ComAp
The heart of smart control

InteliLite AMF25

Controller for single gen-set applications

SW version 1.9.0

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Global Guide

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1.1 Clarification of notation

Note: *This type of paragraph calls readers attention to a notice or related theme.*

IMPORTANT: This type of paragraph highlights a procedure, adjustment etc., which can cause a damage or unproper function of the equipment if not performed correctly and may not be clear at first sight.

Example: This type of paragraph contains information that is used to illustrate how a specific function works.

1.2 About this Global Guide

This manual contains important instructions for InteliLite controllers family that shall be followed during installation and maintenance of the controllers.

This manual provides general information how to install and operate InteliLite controllers.

This manual is dedicated for:

- Operators of gen-sets
- Gen-set control panel builders
- For everybody who is concerned with installation, operation and maintenance of the gen-set

1.3 Legal notice

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Security Risk Disclaimer

Pay attention to the following recommendations and measures to increase the level of security of ComAp products and services.

Please note that possible cyber-attacks cannot be fully avoided by the below mentioned recommendations and set of measures already performed by ComAp, but by following them the cyber-attacks can be considerably reduced and thereby to reduce the risk of damage. ComAp does not take any responsibility for the actions of persons responsible for cyber-attacks, nor for any damage caused by the cyber-attack. However, ComAp is prepared to provide technical support to resolve problems arising from such actions, including but not limited to restoring settings prior to the cyber-attacks, backing up data, recommending other preventive measures against any further attacks.

Warning: Some forms of technical support may be provided against payment. There is no legal or factual entitlement for technical services provided in connection to resolving problems arising from cyber-attack or other unauthorized accesses to ComAp's Products or Services.

General security recommendations and set of measures

1. AccessCode

• Change the AccessCode BEFORE the device is connected to a network.

• Use a secure AccessCode – ideally a random string of 8 characters containing lowercase, uppercase letters and digits.

• For each device use a different AccessCode.

2. Password

• Change the password BEFORE the device enters a regular operation.

• Do not leave displays or PC tools unattended if an user, especially administrator, is logged in.

3. Controller Web interface

• The controller web interface at port TCP/80 is based on http, not https, and thus it is intended to be used only in closed private network infrastructures.

• Avoid exposing the port TCP/80 to the public Internet.

4. MODBUS/TCP

• The MODBUS/TCP protocol (port TCP/502) is an instrumentation protocol designed to exchange data between locally connected devices like sensors, I/O modules, controllers etc. From it's nature it does not contain any kind of security – neither encryption nor authentication. Thus it is intended to be used only in closed private network infrastructures.

• Avoid exposing the port TCP/502 to the public Internet.

5. SNMP

• The SNMP protocol (port UDP/161) version 1,2 is not encrypted. Thus it is intended to be used only in closed private network infrastructures.

• Avoid exposing the port UDP/161 to the public Internet.

Used Open Source Software: mBed-TLS

https://www.mbed.com/en/development/software/mbed-tls/

http://www.apache.org/licenses/LICENSE-2.0

Used Font: zpix-pixel-font

WEBLINK to the license conditions: https://github.com/SolidZORO/zpix-pixel-font

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1.4 General warnings

1.4.1 Remote control and programing

Controller can be remotely controlled. In the event that maintenance of gen-set has to be done, or controller has to be programmed, check the following points to ensure that the engine cannot be started or any other parts of the system cannot be effected.

To be sure:

- Disconnect remote control
- Disconnect binary outputs

1.4.2 SW and HW versions compatibility

Be aware to use proper combination of SW and HW versions.

1.4.3 Dangerous voltage

In no case touch the terminals for voltage and current measurement!

Always connect grounding terminals!

In any case do not disconnect controller CT terminals!



1.4.4 Adjust the setpoints

All parameters are adjusted to their typical values. However the setpoints has to be checked and adjusted to their real values before the first starting of the gen-set.

> **IMPORTANT: Wrong adjustment of setpoints can destroy the gen-set.**

Note: *The controller contains a large number of configurable setpoints, because of this it is impossible to describe all of its functions. Some functions can be changed or have different behavior in different SW versions. Always check the Global guide and New feature list for SW version which is used in controller. This manual only describes the product and is not guaranteed to be set for your application.*

IMPORTANT: Be aware that the binary outputs can change state during and after software reprogramming (before the controller is used again ensure that the proper configuration and setpoint settings are set in the controller).

The following instructions are for qualified personnel only. To avoid personal injury do not perform any action not specified in related guides for product.

1.5 Certifications and standards

- EN 61000-6-2
- EN 61000-6-4
- EN 61010-1
- EN 60068-2-1 (-20 °C/16 h for std, -40 °C/16 h for LT version)
- EN 60068-2-2 (70 °C/16 h)
- EN 60068-2-6 (2÷25 Hz / ±1,6 mm; 25÷100 Hz / 4,0 g)
- EN 60068-2-27 (a=500 m/s^2; T=6 ms)
- EN 60068-2-30:2005 25/55°C, RH 95%, 48hours
- EN 60529 (front panel IP65, back side IP20)

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1.6 Document history

Revision number	Related sw. version	Date	Author
11	1.9.0	23.9.2019	Michal Slavata
10	1.8.0	21.5.2019	Michal Slavata
9	1.7.0	22.8.2018	Michal Slavata
8	1.7.0	4.7.2018	Michal Slavata
7	1.6.0	28.2.2018	Michal Slavata
6	1.5.0	9.10.2017	Michal Slavata
5	1.3.2	24.5.2017	Michal Slavata
4	1.2.1	5.12.2016	Michal Slavata
3	1.1.0	23.5.2016	Michal Slavata
2	1.1.0	6.3.2016	Michal Slavata
1	1.0.0	15.7.2016	Michal Slavata

1.7 Symbols in this manual

- 3 x Phases
- Active current sensor
- AirGate
- Alternating current
- Analog modem
- Battery
- Binary output
- Breaker contact
- Breaker contact
- Breaker
- Breaker
- Breaker
- Capacitor
- Coil
- Connector - female
- Connector - male
- Contact
- Contactor
- Controller simplified
- Module simplified
- Current measuring
- Current measuring
- Diode
- Ethernet male
- Ethernet female
- Fuel solenoid
- Fuse
- Fuse switch
- Generator
- Generator schematic
- Grounding
- GSM
- GSM modem
- IG-AVRi
- IG-AVRi TRANS
- Jumper
- Load
- Mains
- Mains
- Mobile provider
- Passive current sensor
- Pick - up
- Relay coil
- Relay coil of slow-operating
- Resistor
- Resistor adjustable
- Resistive sensor RPTC
- RS 232 male
- RS 232 female
- Starter
- Switch - manually operated
- Transformer
- USB type B male
- USB type B female
- Voltage measuring
- Wifi / WAN / LAN

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2.1 General description

InteliLite Family controllers are comprehensive gen-set controllers for single gen-sets operating in stand-by (MRS) or back-up (AMF) applications. A modular construction allows upgrades to different levels of complexity in order to provide the best solution for various customer applications. The controllers are equipped with a powerful graphic display showing icons, symbols and bar graphs for intuitive operation, which, together with its high level of functionality, sets new standards in Gen-set controls.

2.1.1 The key features of InteliLite

- Easy-to-use operation and installation. The factory default configuration covers most applications
- Various customizations are possible thanks to its configurability
- Excellent remote communication capabilities
- High level of support for EFI engines (most world producers)
- High reliability

2.2 True RMS measurement

This controller measures AC values based on True RMS principle. This principle corresponds exactly to the physical definition of alternating voltage effective values. Under normal circumstances the mains voltage should have a pure sinusoidal waveform. However some nonlinear elements connected to the mains produce harmonic waveforms with frequencies of multiplies of the basic mains frequency and this may result in deformation of the voltage waveforms. The True RMS measurement gives accurate readings of effective values not only for pure sinusoidal waveforms, but also for deformed waveforms.

2.3 Configurability and monitoring

One of the key features of the controller is the system's high level of adaptability to the needs of each individual application and wide possibilities for monitoring. This can be achieved by configuring and using the powerful PC/mobile tools.

2.3.1 Supported configuration and monitoring tools

- InteliConfig - complete configuration and single gen-set monitoring
- WebSupervisor - web-based system for monitoring and controlling
  - WebSupervisor mobile - supporting application for smart-phones
- WinScope - special graphical monitoring software

Note: *Use the InteliConfig PC software to read, view and modify configuration from the controller or disk and write the new configuration to the controller or disk.*

The firmware of controller contains a large number of binary inputs and outputs needed for all necessary functions available. However, not all functions are required at the same time on the same gen-set and also the controller hardware does not have so many input and output terminals. One of the main tasks of the configuration is mapping of “logical” firmware inputs and outputs to the “physical” hardware inputs and outputs.

2.3.2 Configuration parts

- Mapping of logical binary inputs (functions) or assigning alarms to physical binary input terminals
- Mapping of logical binary outputs (functions) to physical binary output terminals
- Assigning sensor characteristics (curves) and alarms to analog inputs
- Selection of peripheral modules, which are connected to the controller, and doing the same (as mentioned above) for them
- Selection of ECU type, if an ECU is connected
- Changing the language of the controller interface

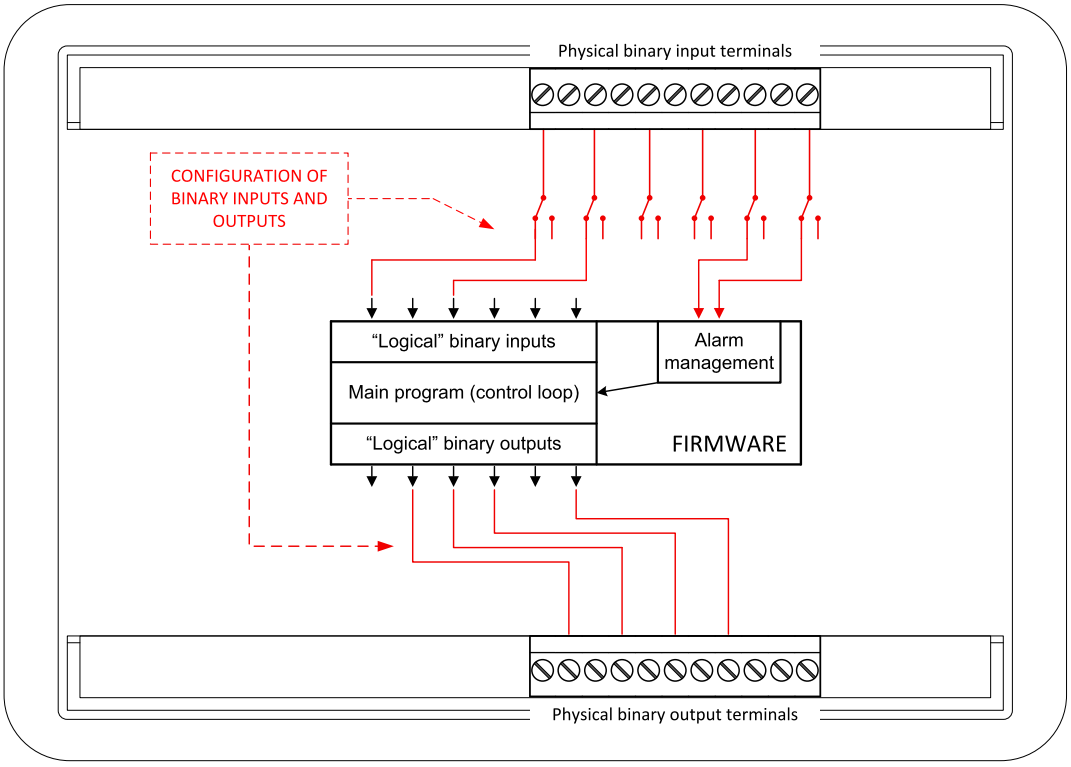


Image 2.1 Principle of binary inputs and outputs configuration

The controller is shipped with a default configuration, which should be suitable for most standard applications. This default configuration can be changed only by using a PC with the InteliConfig software. See InteliConfig documentation for details.

Once the configuration is modified, it can be saved to a file for later usage with another controller or for backup purposes. The file is called archive and has the file extension .ail3. An archive contains a full image of the controller at the time of saving (if the controller is online for the PC) except the firmware. Besides configuration it also contains current adjustment of all setpoints, all measured values, a copy of the history log and a copy of the alarm list.

The archive can be simply used for cloning controllers, i.e. preparing controllers with identical configuration and settings.

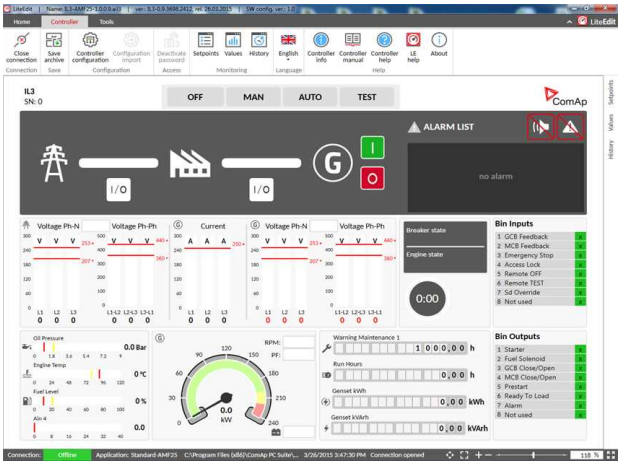
2.4 PC Tools

2.4.1 InteliConfig

Configuration and monitoring tool for InteliLite controllers. See more in InteliConfig Reference Guide.

This tool provides the following functions:

- Direct or internet communication with the controller
- Offline or online controller configuration
- Controller firmware upgrade
- Reading/writing/adjustment of setpoints
- Reading of measured values
- Browsing of controller history records
- Exporting data into a XLS file
- Controller language translation

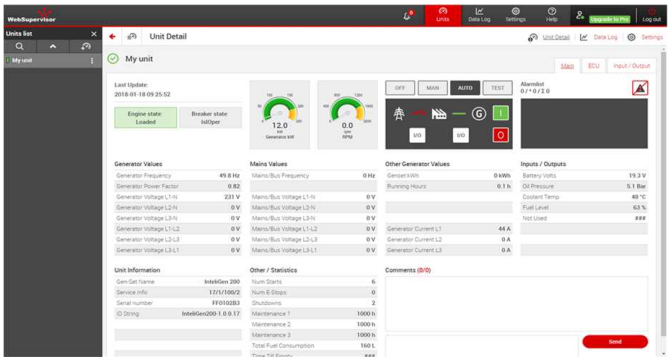


2.4.2 WebSupervisor

Web-based system for monitoring and controlling of controllers. See more at the WebSupervisor webpage.

This tool provides the following functions:

- Site and fleet monitoring
- Reading of measured values
- Browsing of controller history records
- On-line notification of alarms
- Email notification
- Also available as a smart-phone application



WebSupervisor available at: www.websupervisor.net

Demo account:

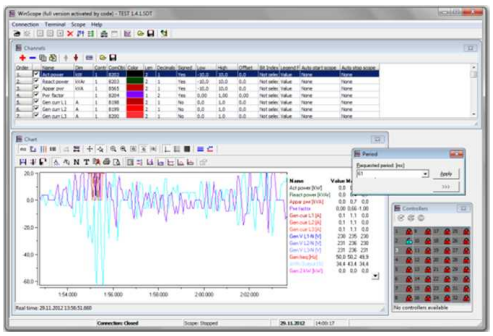
- Login: comaptest
- Password: ComAp123

2.4.3 WinScope

Special graphical controller monitoring software used mainly for commissioning and gen-set troubleshooting. See more in the WinScope Reference guide.

This tool provides the following functions:

- Monitoring and archiving of ComAp controller's parameters and values
- View of actual / historical trends in controller
- On-line change of controllers' parameters for easy regulator setup

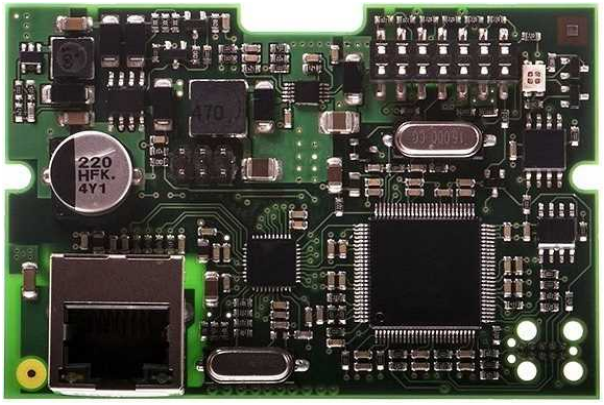


2.5 Plug-in Modules

2.5.1 CM-Ethernet

Internet/Ethernet module including web server.

- 10/100 Mbit ethernet interface in RJ45 socket
- Web interface for monitoring and adjustment of the controller
- Direct IP and/or AirGate connection for remote access from InteliConfig
- MODBUS/TCP and SNMP protocols for integration of the controller into building management systems or other remote monitoring purposes
- Sending of active emails
- Simply connection via AirGate



2.5.2 CM-4G-GPS

GSM/4G Internet module and GPS locator

- Wireless integrated solution
- Quick and easy installation
- Support of WebSupervisor
- Instant alarm SMS notification
- System control over SMS
- Quad Band GPRS/EDGE modem, 850/900/1800/1900 MHz, FDD LTE: Band 1, Band 2, Band 3, Band 4, Band 5, Band 7, Band 8, Band 20, all bands with diversity, WCDMA/HSDPA/HSUPA/HSPA+: Band 1, Band 2, Band 5, Band 8, all bands with diversity
- GPRS multi-slot class 10
- TCP/IP communication over GPRS



2.5.3 CM-GPRS

GSM/GPRS Internet module

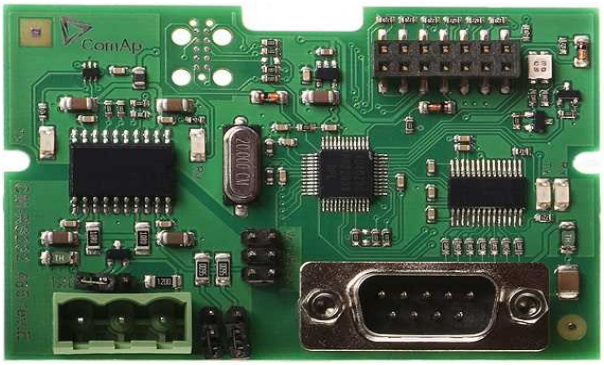
- Wireless integrated solution
- Quick and easy installation
- Support of WebSupervisor
- Instant alarm SMS notification
- System control over SMS
- Quad Band GPRS/EDGE modem, 850/900/1800/1900 MHz
- GPRS multi-slot class 10
- TCP/IP communication over GPRS



2.5.4 CM-RS232-485

Communication module with two communication ports.

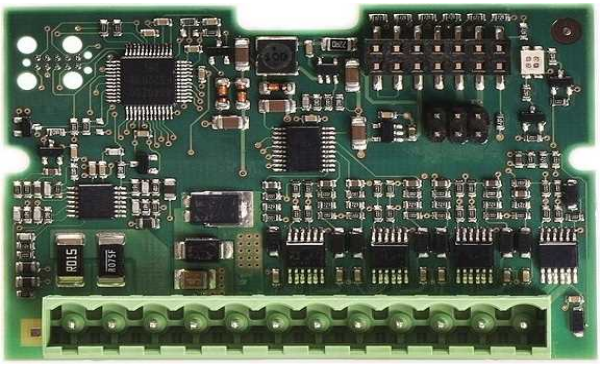
- RS232 and RS485 interface
- MODBUS
- Serial connection to InteliConfig



2.5.5 EM-BIO8-EFCP

Hybrid current input and binary input/output extension module.

- One additional AC current (CT) measuring for Earth Fault Current protection (EFCP)
- Wide range of measured current - one input for 1A and 1 input for 5A
- Up to 8 additional configurable binary inputs or outputs



2.6 CAN modules

2.6.1 Inteli IO8/8

The unit offers the user the flexibility to configure the unit to have 8 binary inputs, 8 binary outputs, and 2 analog outputs, or 16 binary inputs, 0 binary outputs and 2 analog outputs via switches inside the controller.

Configuration 8/8

- 8 Binary inputs (options: pull up or pull down logic)
- 8 Binary outputs (options: Low side switch (LSS) or High side switch (HSS))
- 2 Analog outputs (options: voltage (0-10V), current (0-20mA) and PWM (5V, adjustable frequency 200Hz-2,4kHz))

Configuration 16/0

- 16 Binary inputs (options: pull up or pull down logic)
- 0 Binary outputs
- 2 Analog outputs (options: voltage (0-10V), current (0-20mA) and PWM (5V, adjustable frequency 200Hz-2,4kHz))



2.6.2 Inteli AIN8

The unit offers the user the flexibility to configure the unit to have 8 analog inputs.

Supported sensors:

- Resistor 3-wire input
  - Common resistor: 0-250Ω, 0-2400Ω, 0-10kΩ
  - Temperature sensor: Pt100, Pt1000, Ni100, Ni1000
- Current (active or passive sensors)
  - ±20mA , 0-20mA, 4-20mA
- Voltage
  - ±1V, 0-2,4V, 0-5V, 0-10V
  - Lambda probes
  - Thermocouples are not supported (the measuring loop was designed for lambda probes, what caused non-support of thermocouples)



2.6.3 Inteli AIN8TC

8 Analog Channels Module

- 8 analog input channels for measuring temperature by thermocouples



2.6.4 Inteli AIO9/1

9 Analog Inputs and 1 Analog Output Module

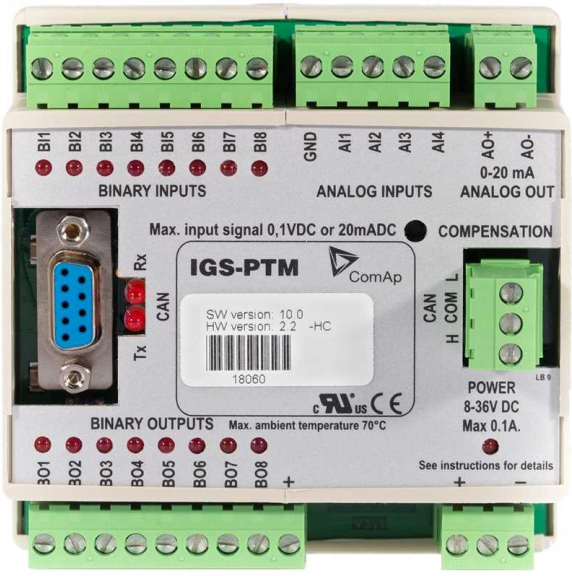
- 4× differential voltage inputs for measurement in range of 0 - 65 V or -65 V – 0 V
- 4× shielded, galvanically separated ±75 mV inputs
- Resistance analog input 0 – 2500 ohm
- One analog output



2.6.5 IGS-PTM

The unit offers the user the flexibility to configure the unit to have 8 binary inputs, 8 binary outputs, 4 analog inputs and 1 analog outputs.

- Configurable 8 binary and 4 analog inputs
- Configurable 8 binary and 1 analog output
- LEDs indicate the state of binary inputs/outputs
- Measures values from Pt100 and Ni100 sensors
- Analog inputs (resistance range 0-250 Ohms, voltage range 0-100mV, current range 0-20mA - selectable via jumper)
- UL certified



2.6.6 IGL-RA15

Remote annunciator.

- 15 programmable LEDs with configurable colors red-green-yellow
- Lamp test function with status LED
- Customizable labels
- Local horn output
- Maximal distance 200 m from the controller
- Up to 4 units can be connected to the controller
- UL certified



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3 Applications overview

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3.1 AMF - Automatic Mains Failure Start

The typical scheme of Automatic Mains Failure Start application is shown below. The controller controls two breakers – a mains breaker and a generator breaker. Feedback from both breakers isn't necessary. InteliLite controllers can also work without breaker feedbacks.

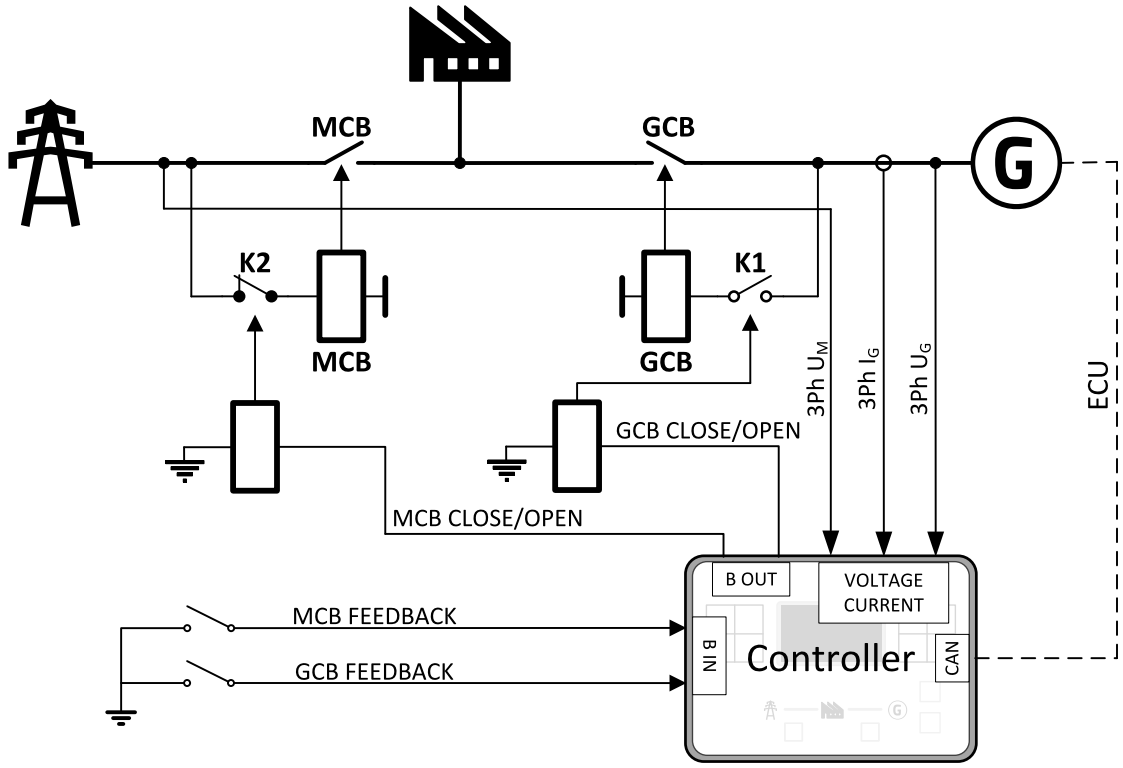


Image 3.1 AMF application overview

3.2 MRS - Manual Remote Start

The typical scheme of Manual Remote Start application is shown below. The controller controls one breaker – a generator breaker. Feedback from breaker isn't necessary. InteliLite controllers can also work without breaker feedback.

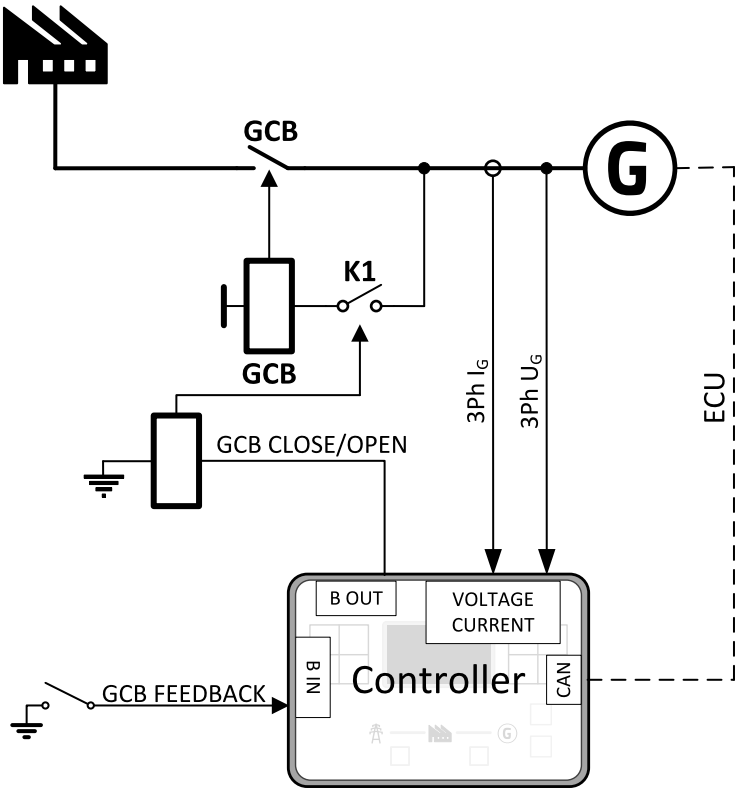


Image 3.2 MRS application overview

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4 Installation and wiring

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4.2 Controller installation 23
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4.5 Plug-in module installation 58
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4.1 Package content

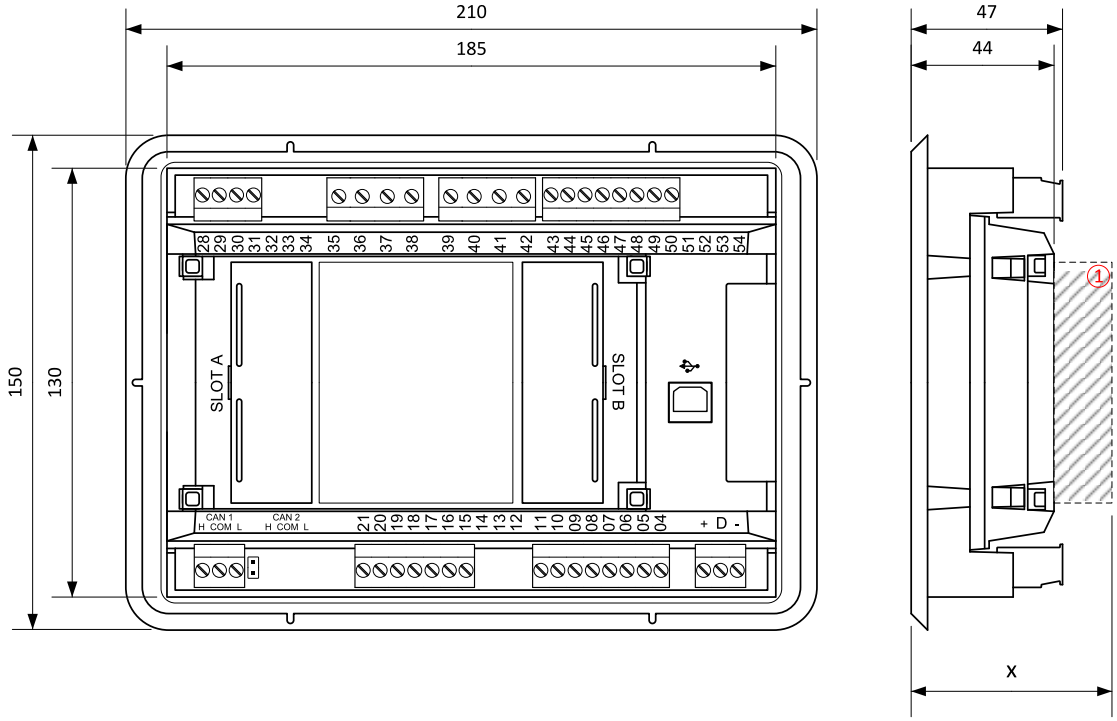
The package contains:

- Controller
- Mounting holders
- Terminal blocks

Note: *The package does not contain a communication or extension modules. The required modules should be ordered separately.*

4.2 Controller installation

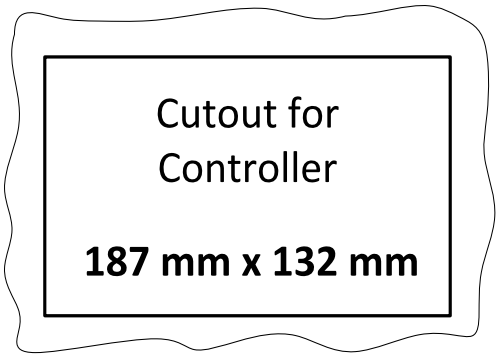
4.2.1 Dimensions



① Plug-in module

Note: *Dimension x depends on plug-in module*

Note: *Dimensions are in millimeters.*

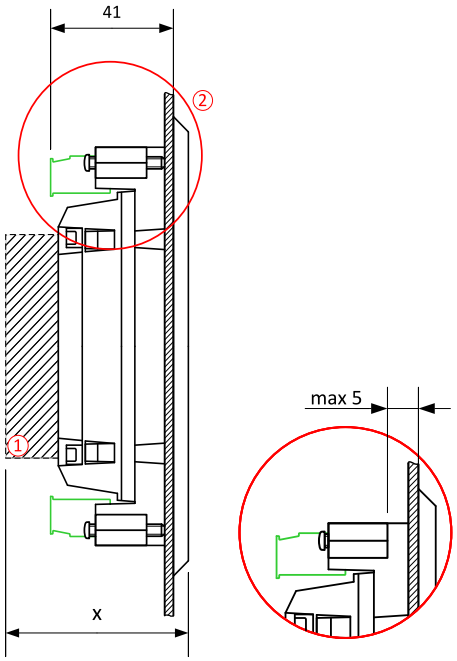


Note: *Cutout is in millimeters.*

4.2.2 Mounting

The controller is to be mounted onto the switchboard door. Requested cutout size is 187 x 132 mm. Use the screw holders delivered with the controller to fix the controller into the door as described on pictures below.Recommended torque for holders is 0.15 N·m.

Panel door mounting



Note: *Enclosure Type rating with mounting instruction - For use on a Flat surface of a type 1 enclosure.*

4.3 Terminal Diagram

① GENERATOR CURRENT MEASUREMENT		② GENERATOR VOLTAGE MEASUREMENT		③ MAINS VOLTAGE MEASUREMENT		④ BINARY INPUTS	
T28	COM	T35	N	T39	N	T43	BIN1
T29	L1	T36	L1	T40	L1	T44	BIN2
T30	L2	T37	L2	T41	L2	T45	BIN3
T31	L3	T38	L3	T42	L3	T46	BIN4
						T47	BIN5
						T48	BIN6
						T49	BIN7
						T50	BIN8

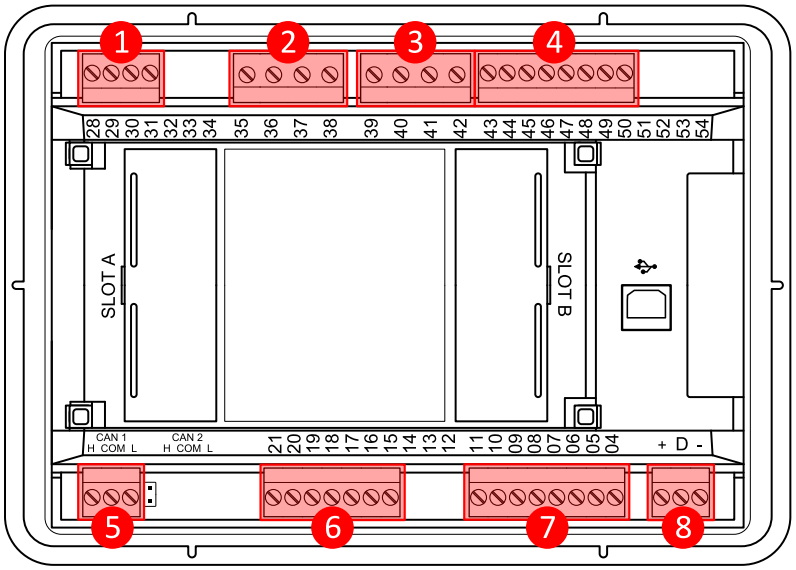
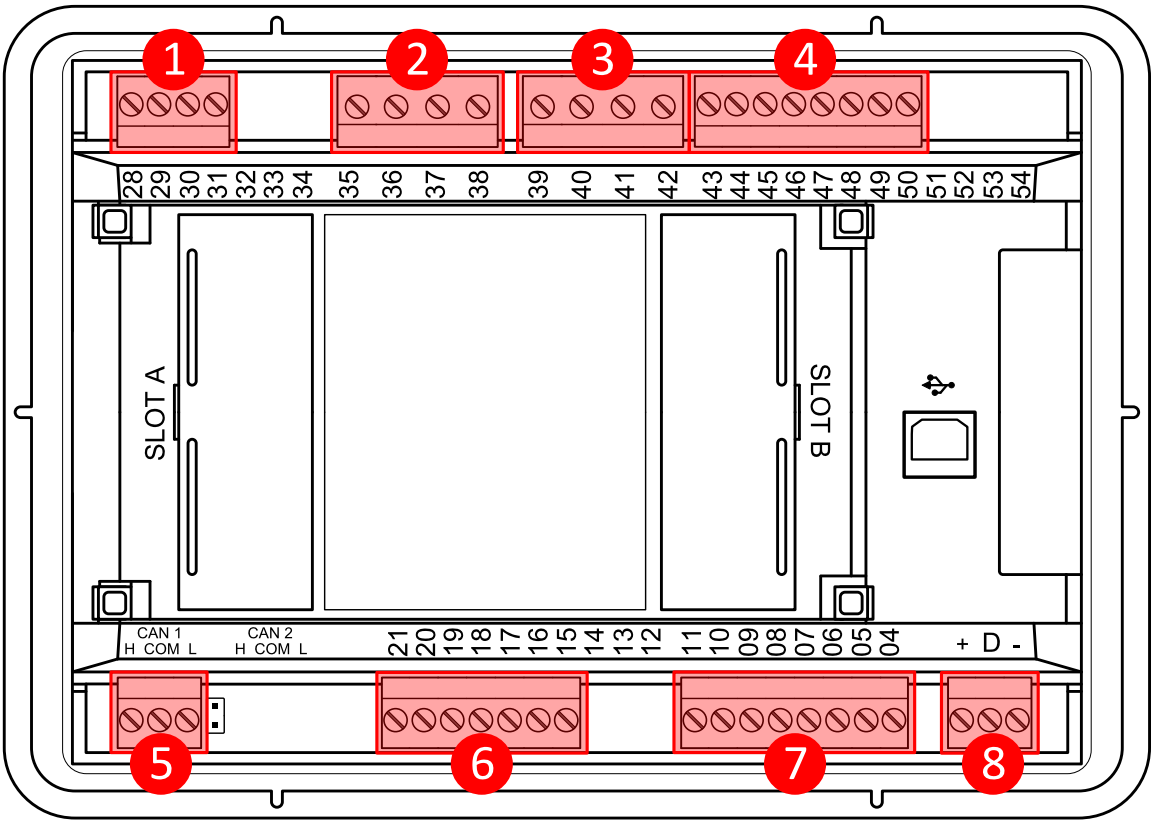


Image 4.1 Terminal diagram for InteliLite AMF25

⑤ CAN1		⑥ ANALOG INPUTS		⑦ BINARY OUTPUTS		⑧ POWER SUPPLY, D+	
T25	L	T15	RPM GND	T04	BOUT1	T01	BATT -
T26	COM	T16	RPM IN	T05	BOUT2	T02	D+
T27	H	T17	A COM	T06	BOUT3	T03	BATT +
		T18	A01	T07	BOUT4		
		T19	A02	T08	BOUT5		
		T20	A03	T09	BOUT6		
		T21	A04	T10	BOUT7		
				T11	BOUT8		

4.4 Recommended wiring



1	Current inputs	28 - 31	**Current measurement wiring (page 30)**
2	Generator voltage inputs	35 - 38	**Voltage measurement AMF wiring (page 32)** **Voltage measurement MRS wiring (page 39)**
3	Mains voltage inputs	39 - 42	**Voltage measurement AMF wiring (page 32)**
4	Binary inputs	43 - 50	**Binary inputs (page 47)**
5	CAN bus and RS485	H, COM, L	**CAN bus and RS485 wiring (page 54)**
6	Analog inputs	15 - 21	**Analog inputs (page 49)**
7	Binary outputs	04 - 11	**Binary Outputs (page 48)**
8	Power supply	"+", D, "-"	**Power supply (page 27)**
9	USB		**USB (page 57)**

Note: *Wiring terminal markings to included tightening torque: 0,5 N-m (4,5 lb-in)., and wire size: 2 mm^2 (12-26AWG).*

4.4.1 General

To ensure proper function:

- Use grounding terminals.
- Wiring for binary inputs and analog inputs must not be run with power cables.
- Analog and binary inputs should use shielded cables, especially when the length is more than 3 m.

Tightening torque, allowable wire size and type, for the Field-Wiring Terminals:	
For Mains(Bus) Voltage, Generator Voltage and Current terminals	
	Specified tightening torque is 0,56 Nm (5,0 In-lbs)
	use only diameter 2,0 - 0,5 mm (12 - 26 AWG) conductor, rated for 90°C minimum.
For other controller field wiring terminals	
 	Specified tightening torque 0,79 nm (7,0 In-lb)
	Use only diameter 2,0 - 0,5 mm (12 - 26 AWG) conductor, rated for 75°C minimum.
	use copper conductors only

4.4.2 Grounding

The shortest possible length of wire should be used for controller grounding. Use cable min 2.5 mm^2.

The negative " - " battery terminal must be properly grounded.

Switchboard and engine must be grounded at common point. Use as short cable as possible to the grounding point.

4.4.3 Power supply

To ensure proper function:

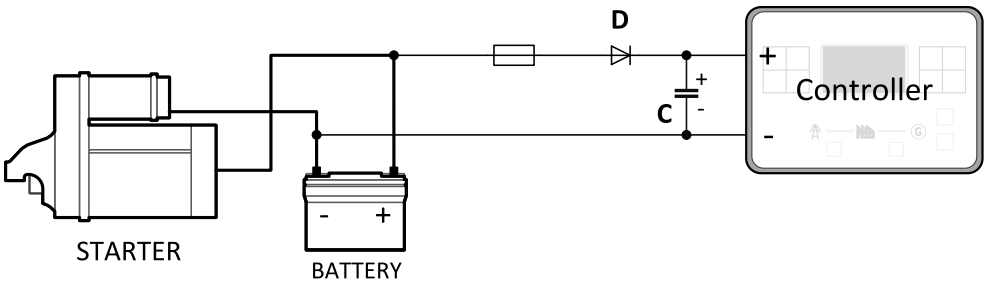
- Use power supply cable min. 1.5 mm^2

Maximum continuous DC power supply voltage is 36 V DC. The controller's power supply terminals are protected against large pulse power disturbances. When there is a potential risk of the controller being subjected to conditions outside its capabilities, an outside protection device should be used.

It is necessary to ensure that potential difference between generator current COM terminal and battery " - " terminal is maximally ± 2 V. Therefore is strongly recommended to interconnect these two terminals together.

Note: *The controller should be grounded properly in order to protect against lighting strikes. The maximum allowable current through the controller's negative terminal is 4 A (this is dependent on binary output load).*

For the connections with 12 V DC power supply, the controller includes internal capacitors that allow the controller to continue in operation during cranking if the batter voltage dip occurs. If the voltage dip goes during cranking to 0 V and after 50 ms it recovers to 4 V, the controller continues operating. This cycle can repeat several times. During this voltage dip the controller screen backlight can turn off.



Note: *Recommended fusing is 3 A fuse.*

Note: *In case of the dip to 0 V the high-side binary outputs will be temporarily switched off and after recovering to 4 V back on.*

IMPORTANT: When the controller is power up only by USB and the USB is disconnected then the actual statistics can be lost.

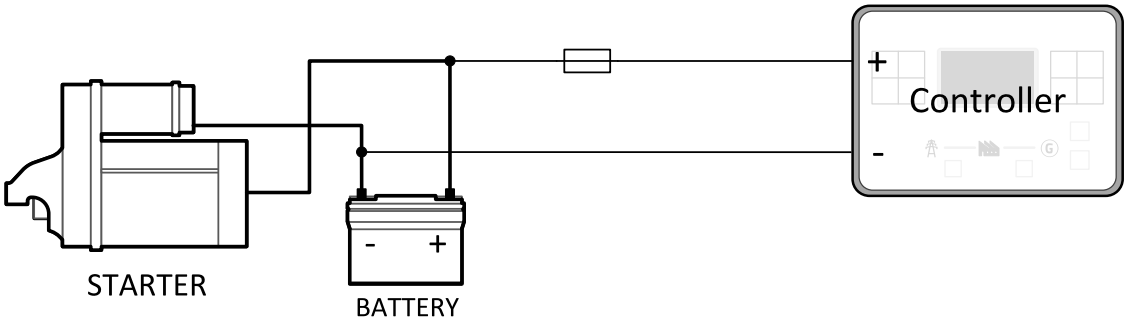
Note: *Suitable conductor protection shall be provided in accordance with NFPA 70, Article 240.*

Note: *Low voltage circuits (35 volts or less) shall be supplied from the engine starting battery or an isolated secondary circuit.*

Note: *It is also possible to further support the controller by connecting the external capacitor and separating diode. The capacitor size depends on required time. It shall be approximately thousands of µF. The capacitor size should be 5 000 µF to withstand 150 ms voltage dip under following conditions: Voltage before dip is 12 V, after 150 ms the voltage recovers to min. allowed voltage, i.e. 8 V.*

Power supply fusing

A 3 A fuse should be connected in-line with the battery positive terminal to the controller and modules. These items should never be connected directly to the starting battery. Fuse value and type depends on number of connected devices and wire length. Recommended fuse (not fast) type - T3 A. Not fast due to internal capacitors charging during power up.



Note: *Recommended fusing is 3 A fuse.*

IMPORTANT: 3 A fuse is calculated without BOUT consumption nor extension modules. Real value of fuse depends on consumption of binary outputs and modules.

Example: Maximal consumption of binary outputs can be 22 A

- 2 x 10 A on high current outputs (for 10 seconds)
- 2 A on all others binary outputs

4.4.4 Measurement wiring

Use 1.5 mm^2 cables for voltage connection and 2.5 mm^2 for current transformers connection. Adjust **Connection type (page 193)**, **Nominal Voltage Ph-N (page 195)**, **Nominal Voltage Ph-Ph (page 195)**, **Nominal Current (page 191)**, **PT Ratio (page 195)**, **Vm PT Ratio (page 196)** and **CT Ratio (page 192)** by appropriate setpoints in the Basic Settings group.

IMPORTANT: Risk of personal injury due to electric shock when manipulating voltage terminals under voltage. Be sure the terminals are not under voltage before touching them.
Do not open the secondary circuit of current transformers when the primary circuit is closed. Open the primary circuit first.

CT Location

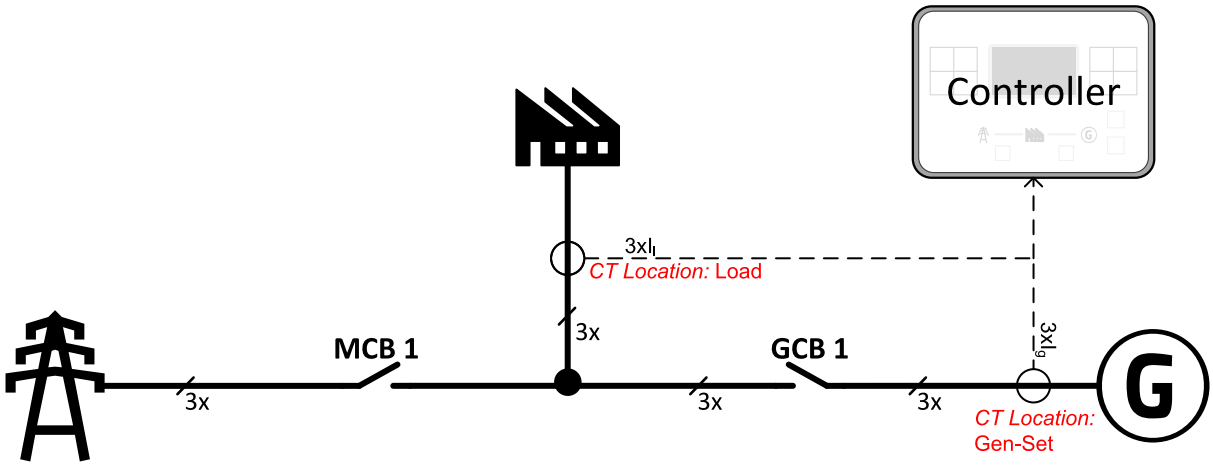


Image 4.2 CT Location

There are two options of CT location.

a) Load

b) Gen-Set

Note: *The current measurement protections are active only when the Gen-set is running.*
If the CT Location is set to Load the ***Short Circuit BOC (page 243)*** *protection is enabled only when GCB is closed.*

Current measurement wiring

The number of CT's is automatically selected based on selected value of setpoint **Connection type (page 193)** [3Ph4Wire / High Leg D / 3Ph3Wire / Split Ph / Mono Ph].

Generator currents and power measurement is suppressed if current level is bellow <1 % of CT range.

To ensure proper function:

- Use cables of 2.5 mm^2
- Use transformers to 5 A
- Connect CT according to following drawings:

3 phase application:

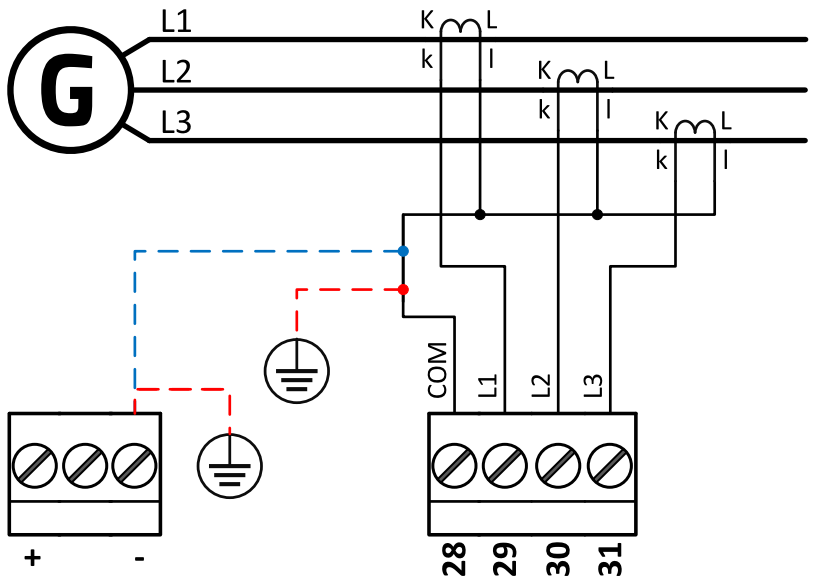


Image 4.3 3 phase application

IMPORTANT: It is necessary to ensure that potential difference between current COM terminal and power supply "-" terminal is maximally ± 2 V. There are 2 options how to ensure this:

- **"Red" option - properly ground both terminals**
- **"Blue" option - interconnect these two terminals**

Always apply only one option. Never realize both options on one installation.

Split phase application:

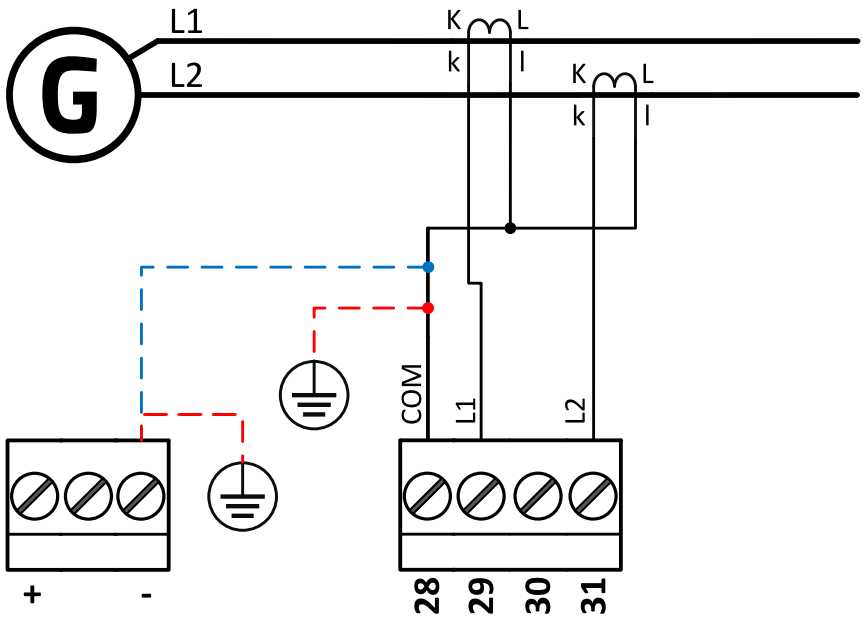


Image 4.4 Split phase application

IMPORTANT: The second phase of split phase connection is connected to the terminal, where is normally connected the third phase.

IMPORTANT: It is necessary to ensure that potential difference between current COM terminal and power supply "-" terminal is maximally ± 2 V. There are 2 options how to ensure this:

- **"Red" option - properly ground both terminals**
- **"Blue" option - interconnect these two terminals**

Always apply only one option. Never realize both options on one installation.

Mono phase application:

Connect CT according to following drawings. Terminals phase 2 and phase 3 are opened.

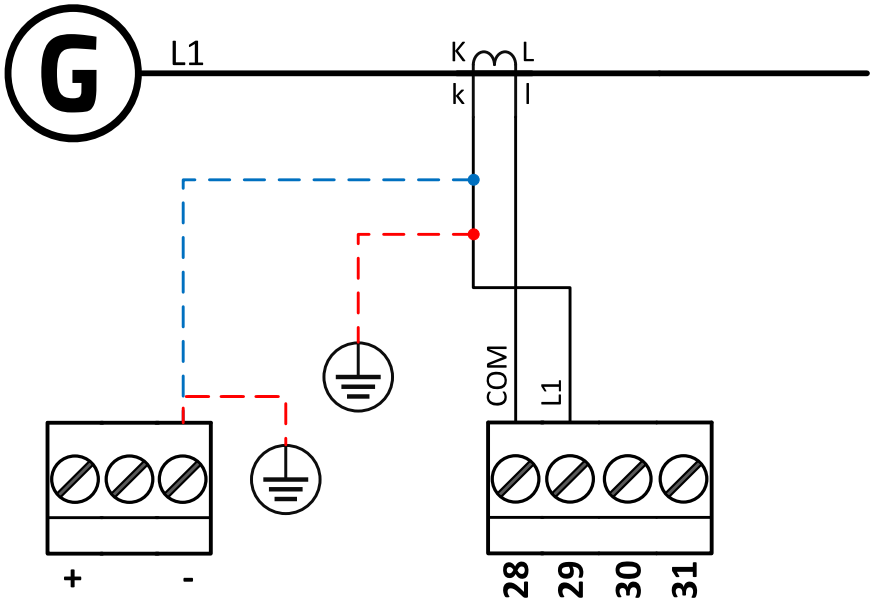


Image 4.5 Mono phase application

IMPORTANT: It is necessary to ensure that potential difference between current COM terminal and power supply "-" terminal is maximally ± 2 V. There are 2 options how to ensure this:

- **"Red" option - properly ground both terminals**
- **"Blue" option - interconnect these two terminals**

Always apply only one option. Never realize both options on one installation.

Voltage measurement AMF wiring

There are 4 voltage measurement Connection Type (setpoint **Connection type (page 193)** [3Ph4Wire /3Ph3Wire / Split Ph / Mono Ph]) options, every type matches to corresponding generator connection type.

Note: *For fusing of voltage measurement input use T1A or T2A fuse.*

The generator protections are evaluated from different voltages based on **Connection type (page 193)** setting:

- 3Ph 4W – Ph-Ph voltage, Ph-N voltage
- 3Ph 3W – Ph-Ph voltage
- SplPhL1L2 – Ph-N voltage
- SplPhL1L3 – Ph-N voltage
- Mono Ph – Ph-N voltage

ConnectionType: 3 Phase 4 Wires

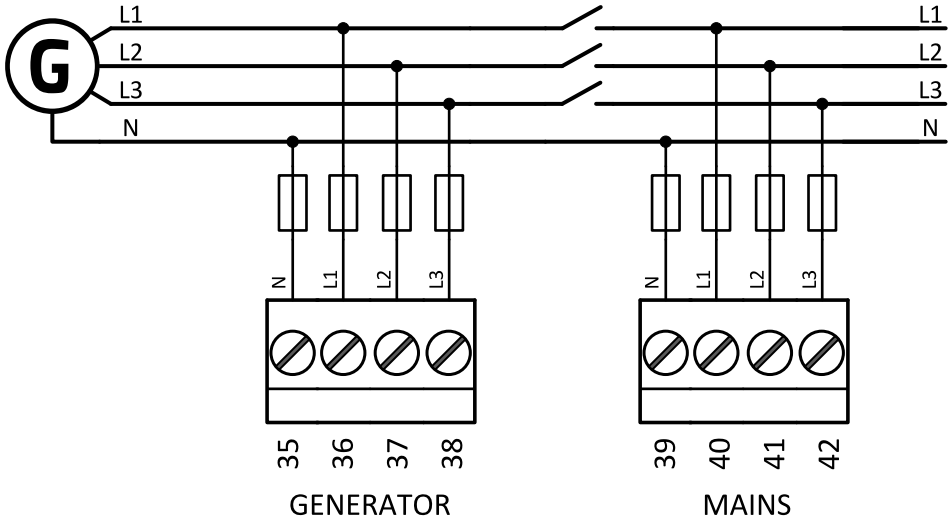


Image 4.6 3 phase application with neutral

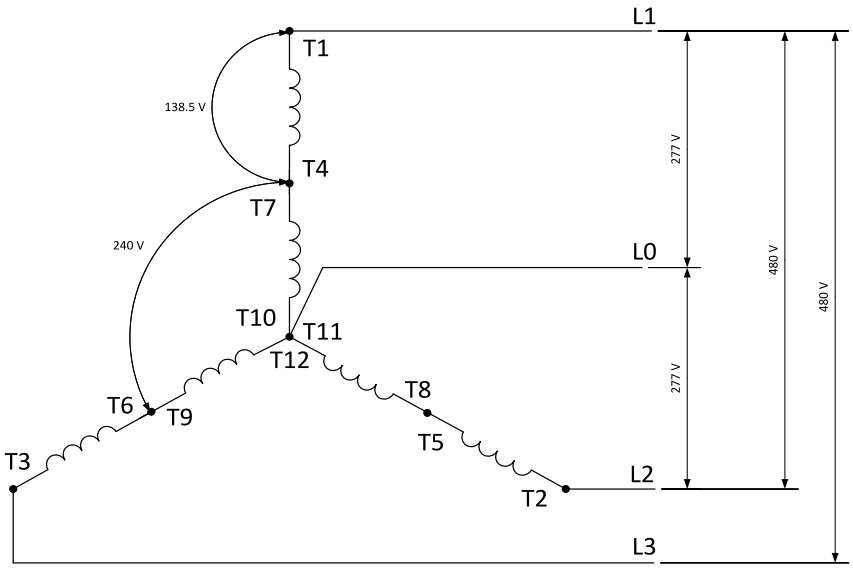


Image 4.7 Typical 3 Phase 4 Wires generator wiring

ConnectionType: High Leg D

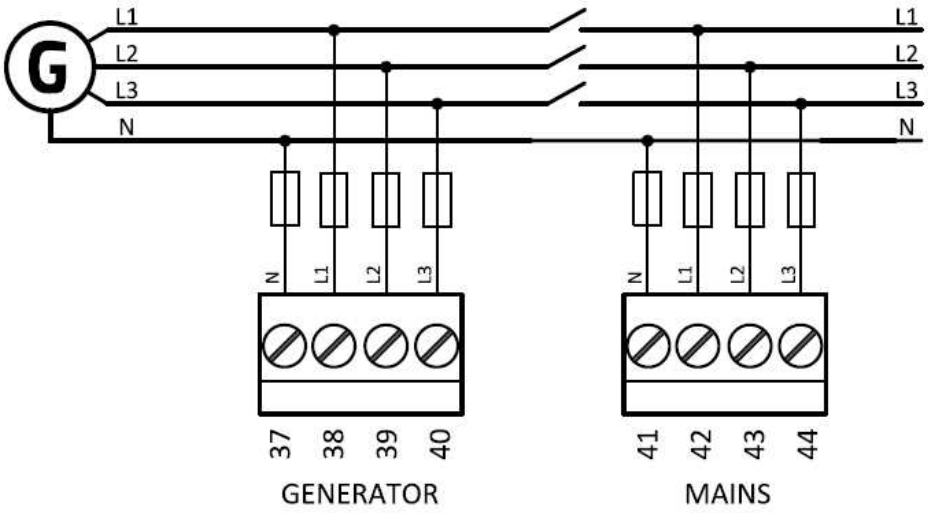


Image 4.8 High Leg Delta application

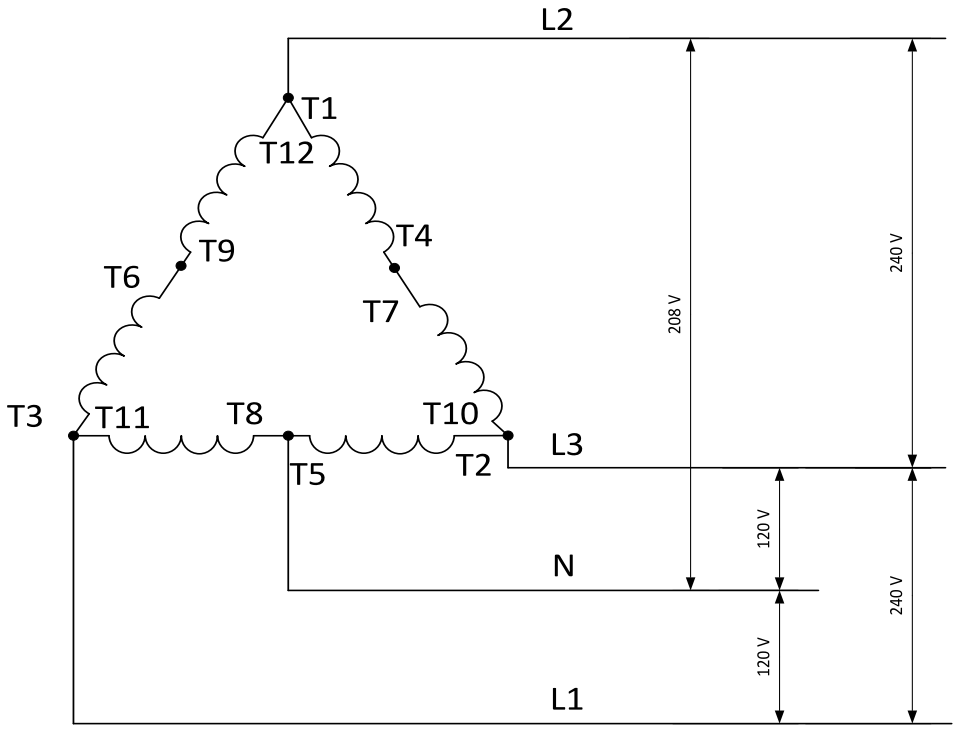


Table 4.1 Typical High Leg D generator wiring

ConnectionType: 3 Phase 3 Wires

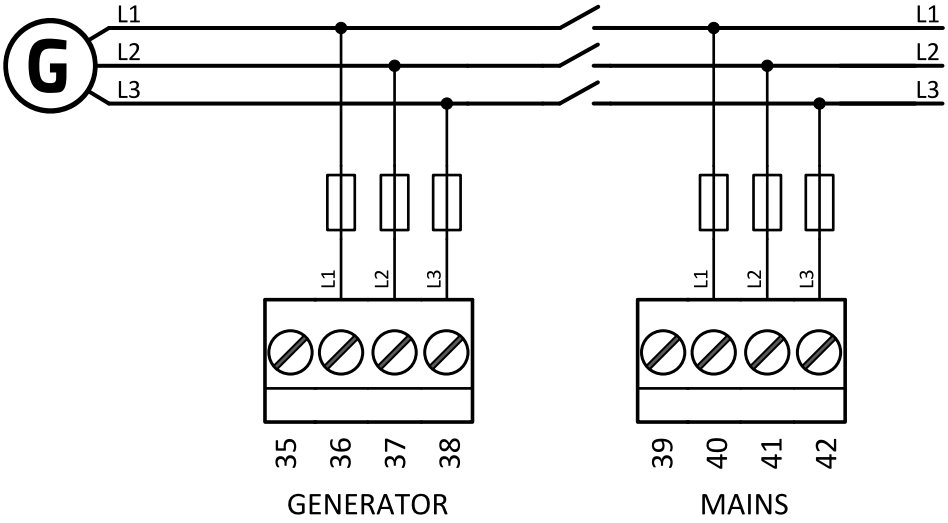


Image 4.9 3 phase application without neutral

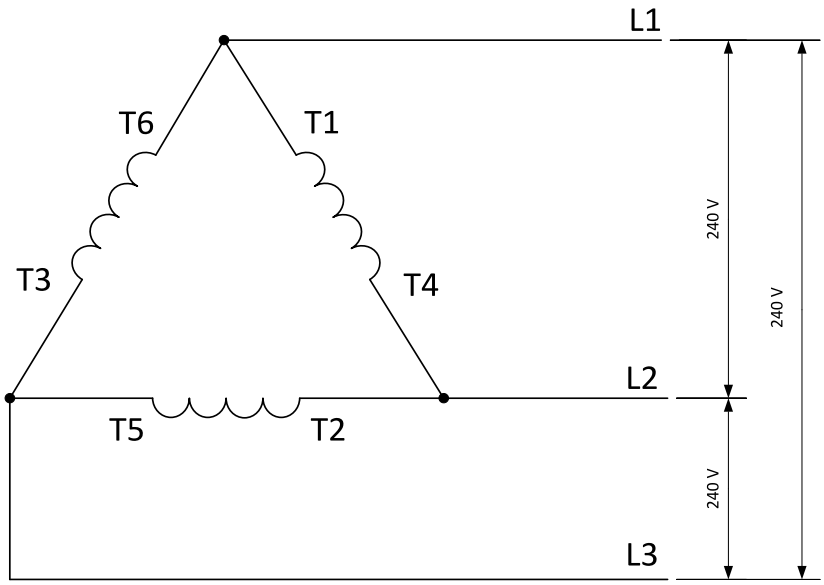


Image 4.10 Typical 3 Phase 3 Wires generator wiring

ConnectionType: SplPhL1L2

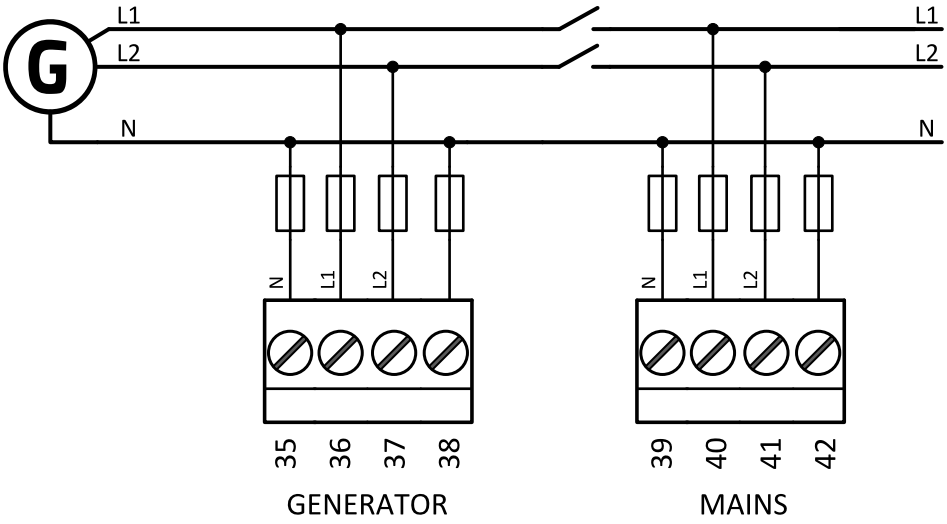
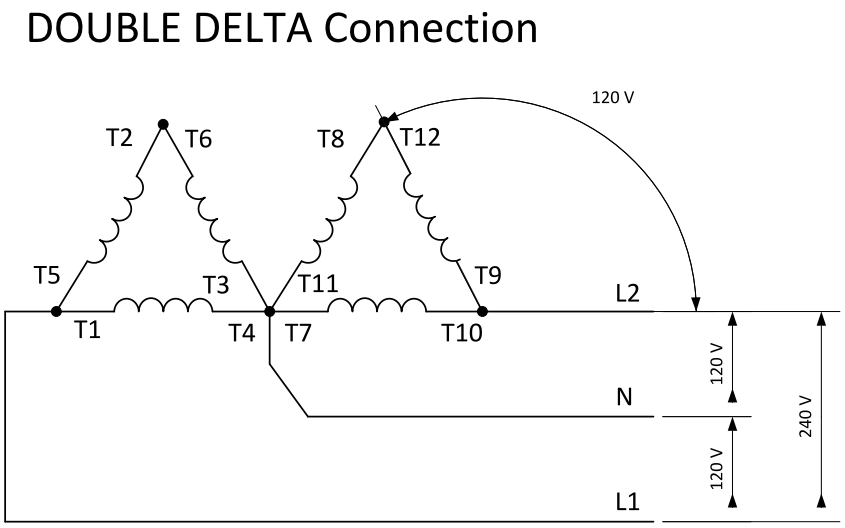


Image 4.11 Split phase L1L2 application



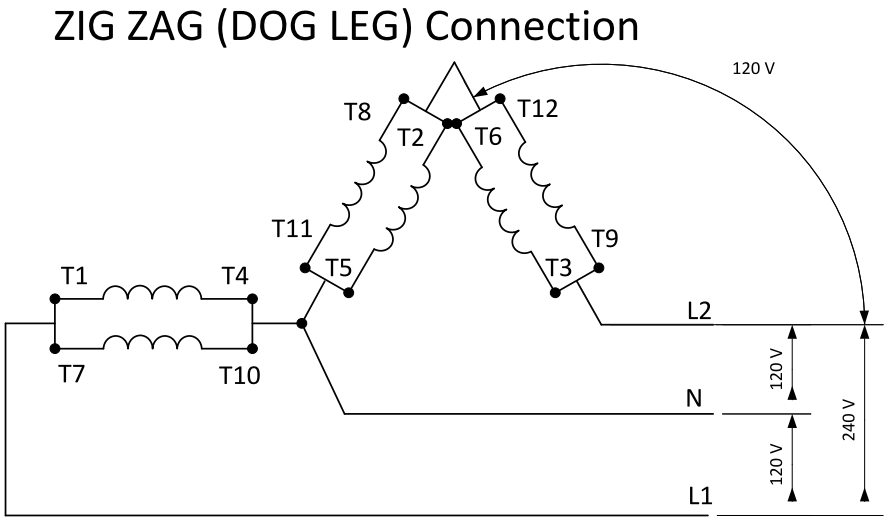


Image 4.12 Typical Split Phase generator wiring

ConnectionType: SplPhL1L3

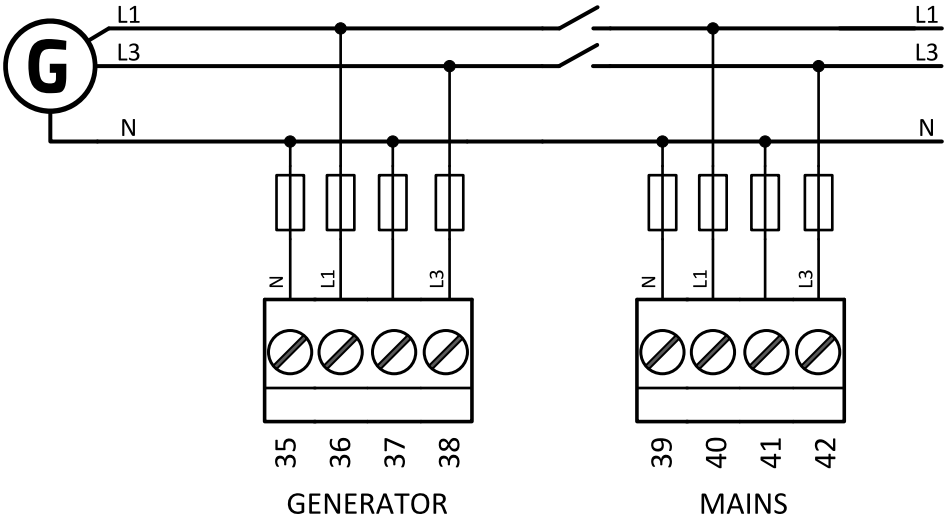
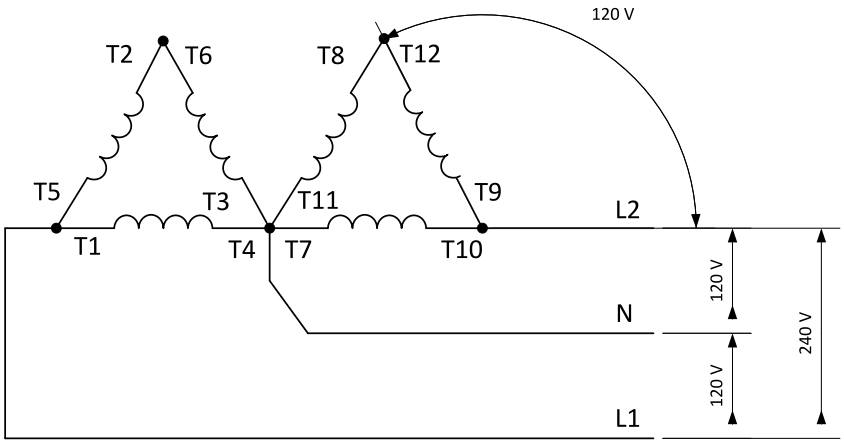


Image 4.13 Split phase L1L3 application

IMPORTANT: The second phase of split phase connection is connected to the terminal, where is usually connected the third phase.

DOUBLE DELTA Connection



ZIG ZAG (DOG LEG) Connection

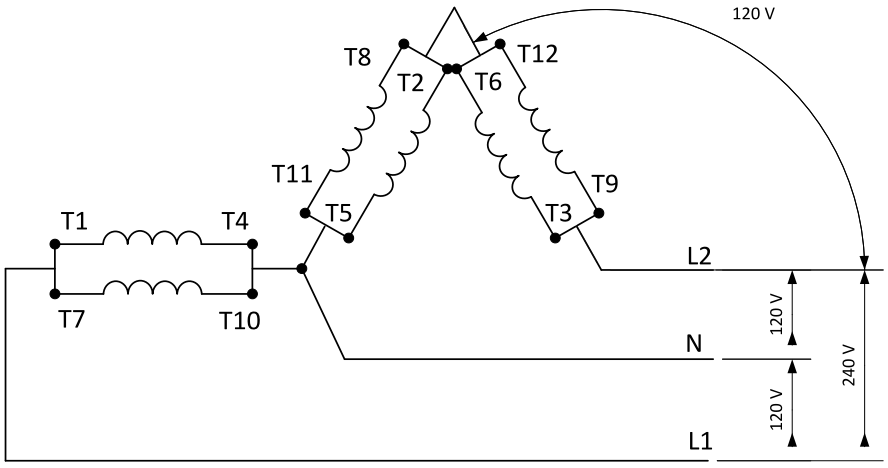


Image 4.14 Typical Split Phase generator wiring

ConnectionType: Mono Phase

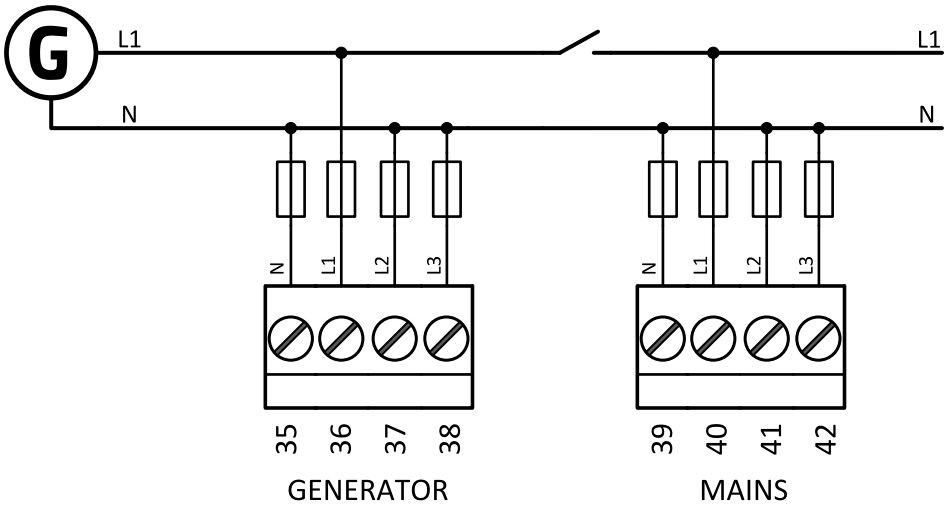


Image 4.15 Mono phase application

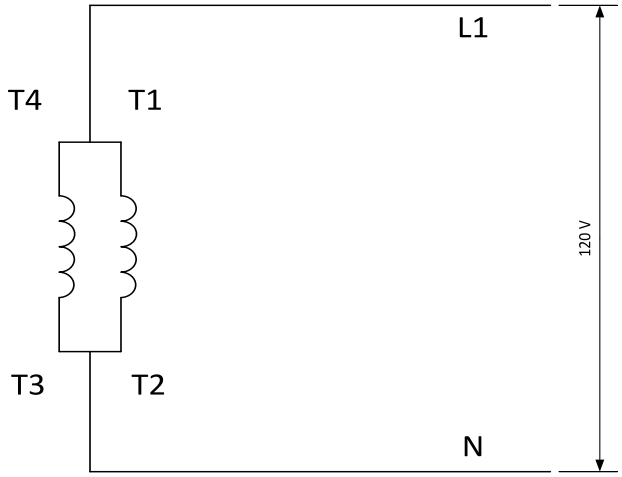


Image 4.16 Typical Mono Phase generator wiring

Voltage measurement MRS wiring

There are 4 voltage measurement Connection Type (setpoint **Connection type (page 193)** [3Ph4Wire /3Ph3Wire / Split Ph / Mono Ph]) options, every type matches to corresponding generator connection type.

Note: *For fusing of voltage measurement input use T1A or T2A fuse.*

The generator protections are evaluated from different voltages based on **Connection type (page 193)** setting:

- 3Ph 4W – Ph-Ph voltage, Ph-N voltage
- 3Ph 3W – Ph-Ph voltage
- SplPhL1L2 – Ph-N voltage
- SplPhL1L3 – Ph-N voltage
- Mono Ph – Ph-N voltage

ConnectionType: 3 Phase 4 Wires

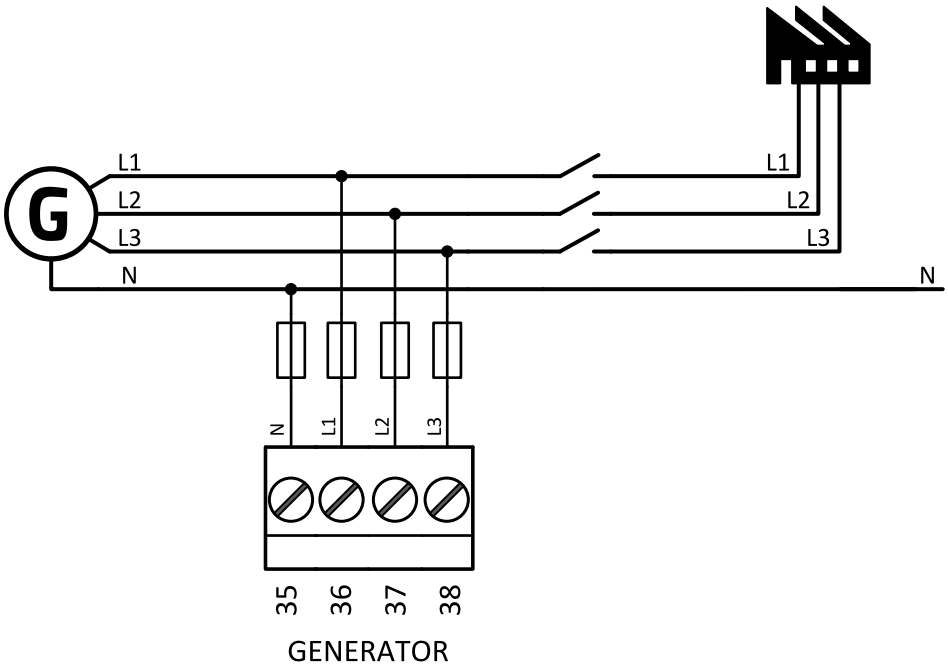


Image 4.17 3 phase application with neutral

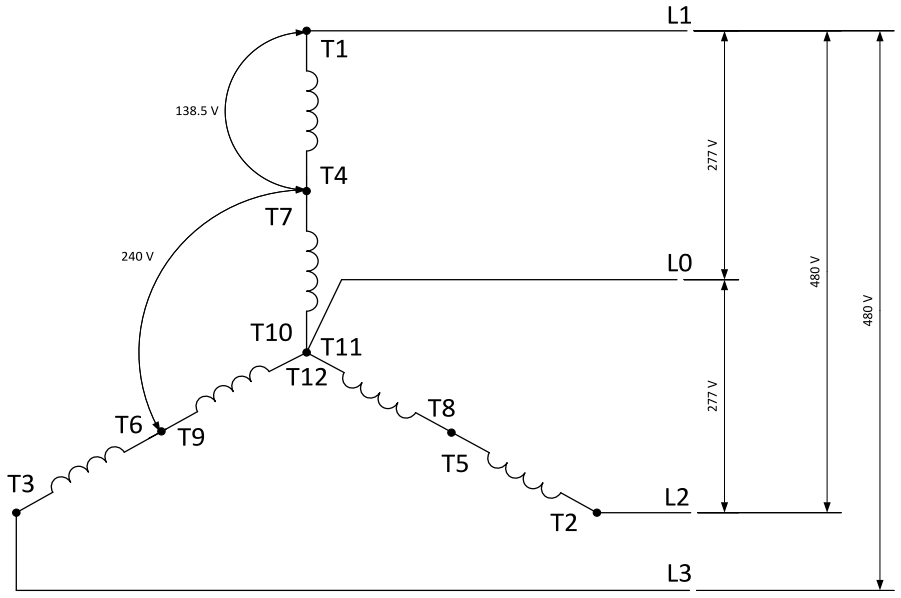


Image 4.18 Typical 3 Phase 4 Wires generator wiring

ConnectionType: High Leg D

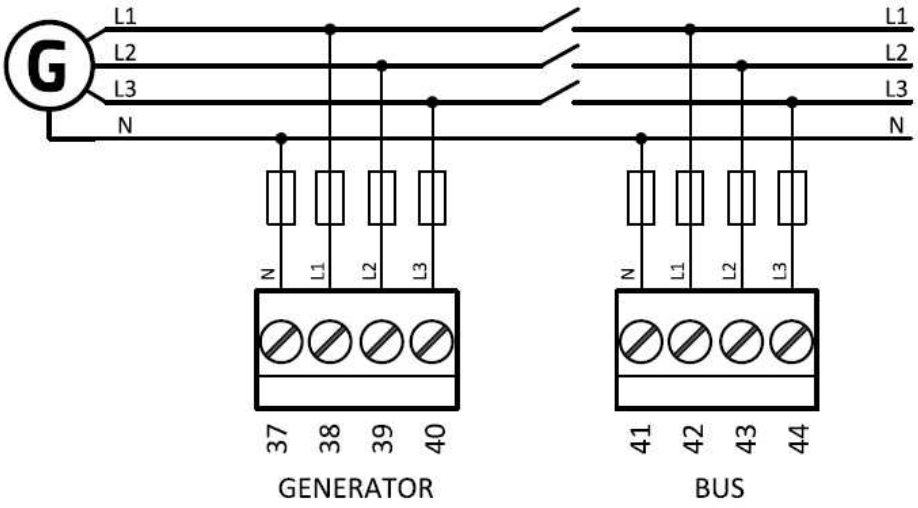


Image 4.19 High Leg Delta application

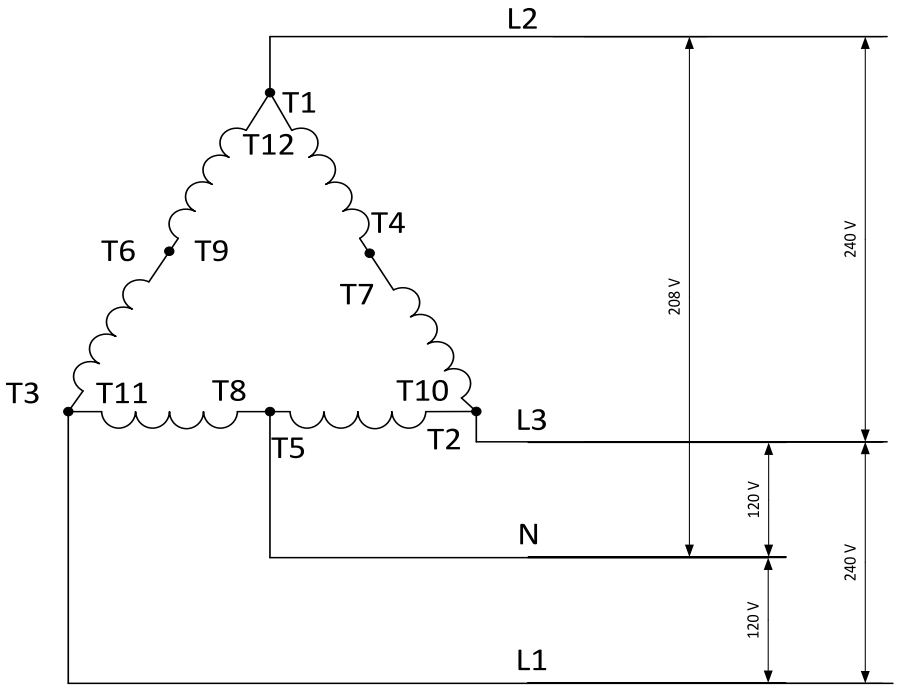


Image 4.20 Typical High Leg D generator wiring

ConnectionType: 3 Phase 3 Wires

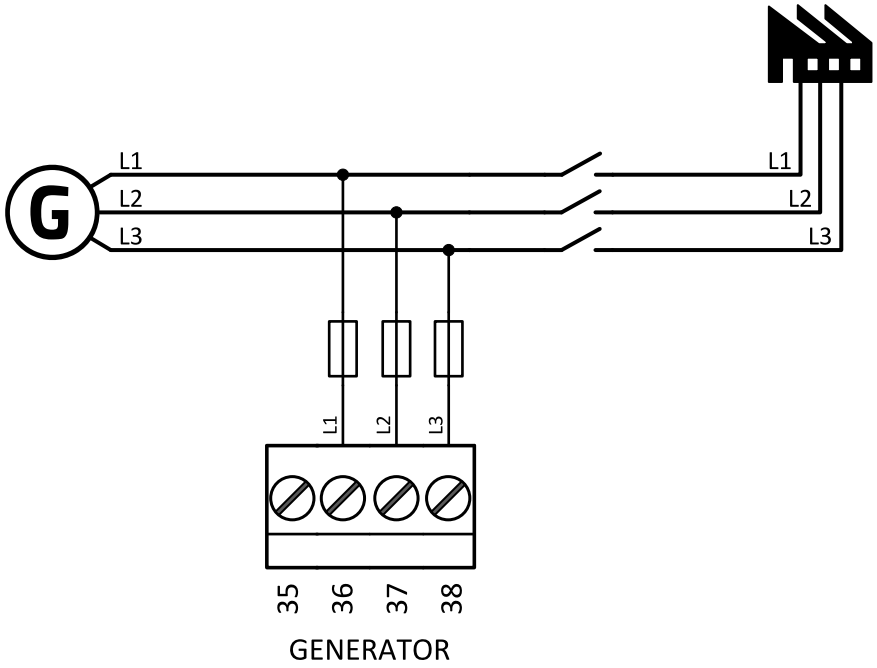


Image 4.21 3 phase application without neutral

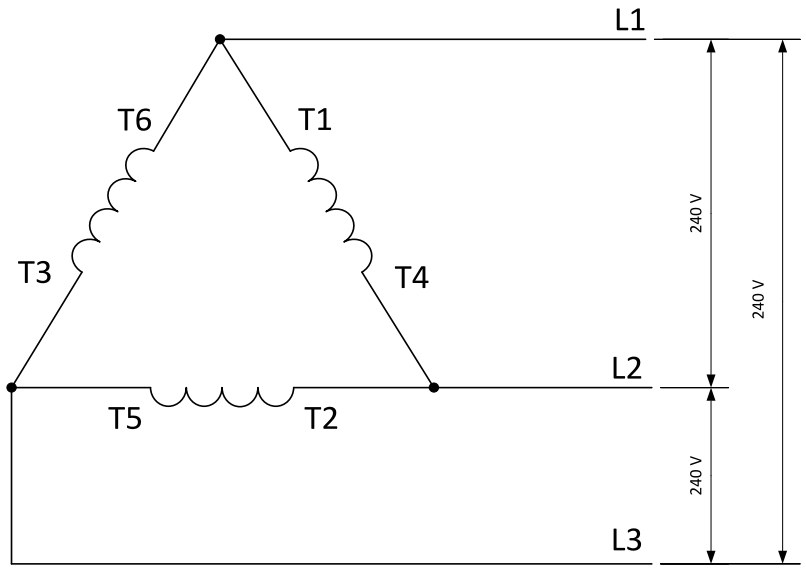


Image 4.22 Typical 3 Phase 3 Wires generator wiring

ConnectionType: SplPhL1L2

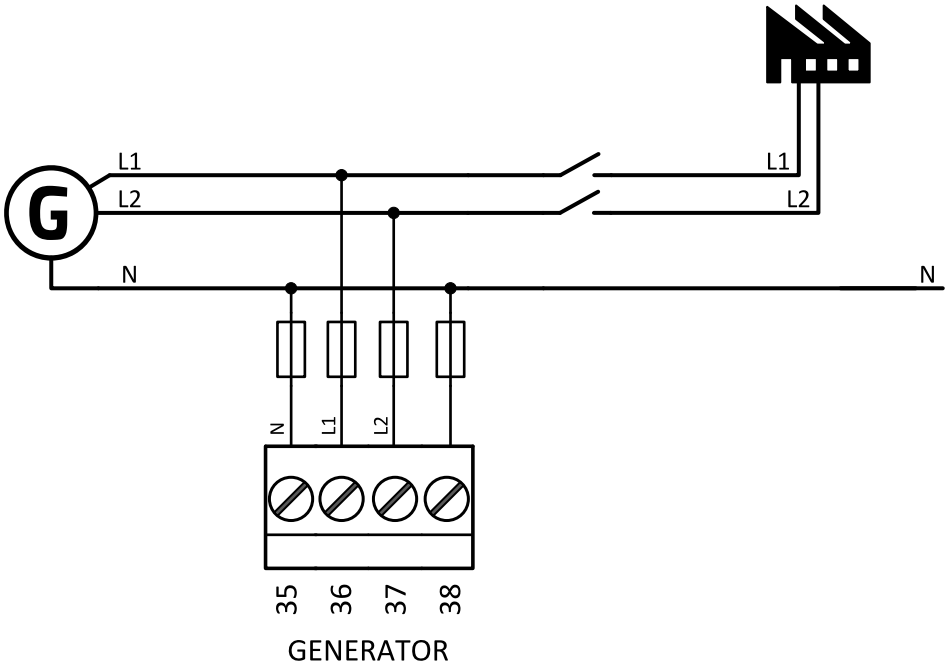
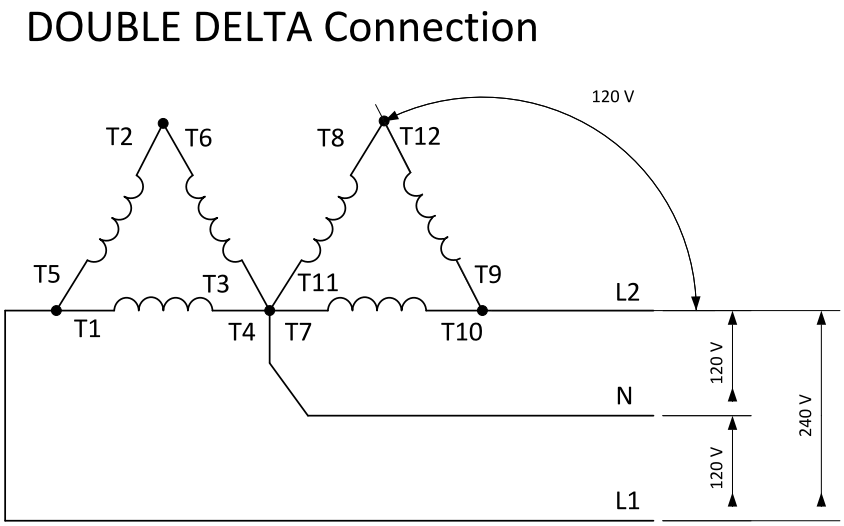


Image 4.23 Split phase L1L2 application



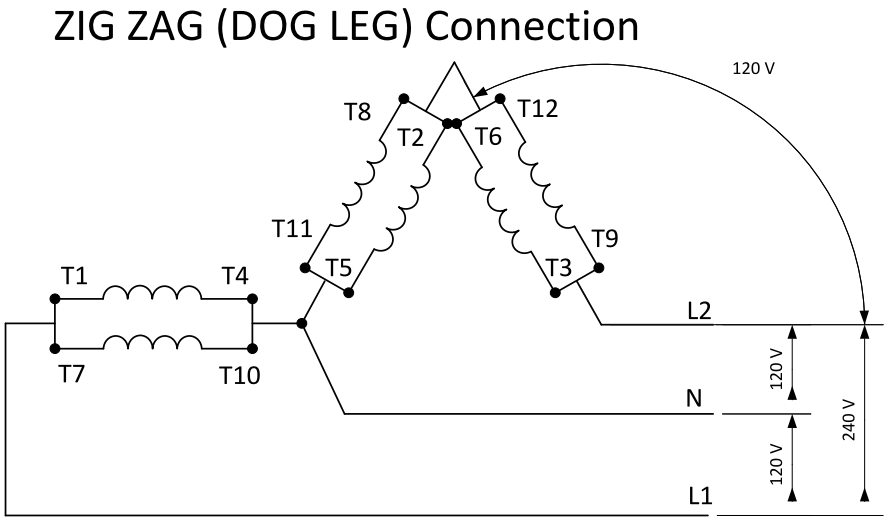


Image 4.24 Typical Split Phase generator wiring

ConnectionType: SplPhL1L3

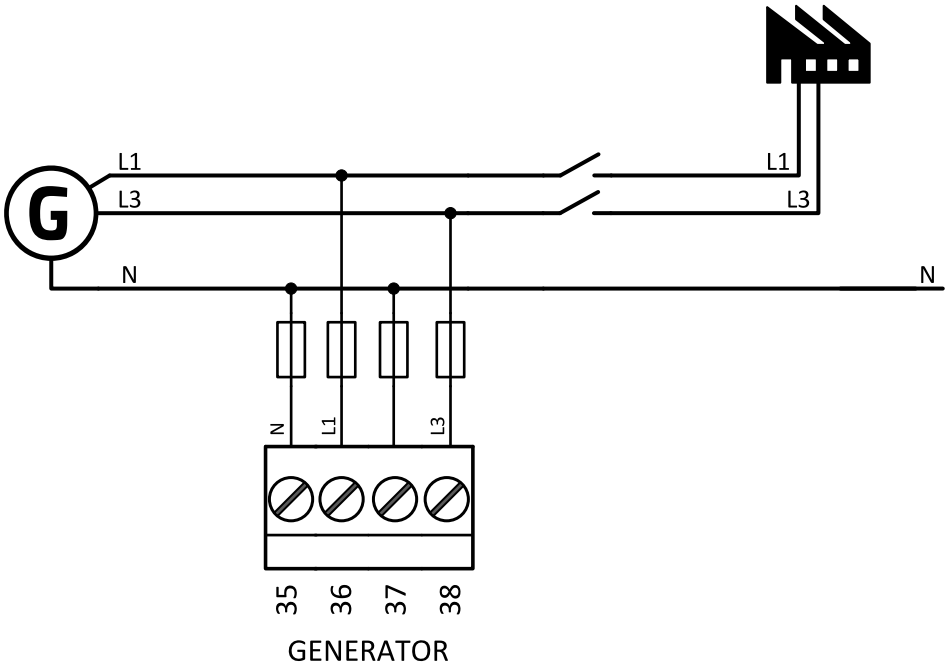
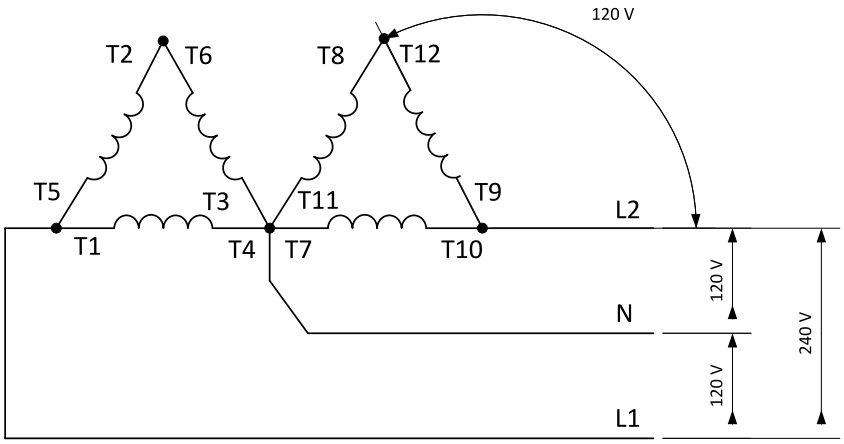


Image 4.25 Split phase L1L3 application

IMPORTANT: The second phase of split phase connection is connected to the terminal, where is usually connected the third phase.

DOUBLE DELTA Connection



ZIG ZAG (DOG LEG) Connection

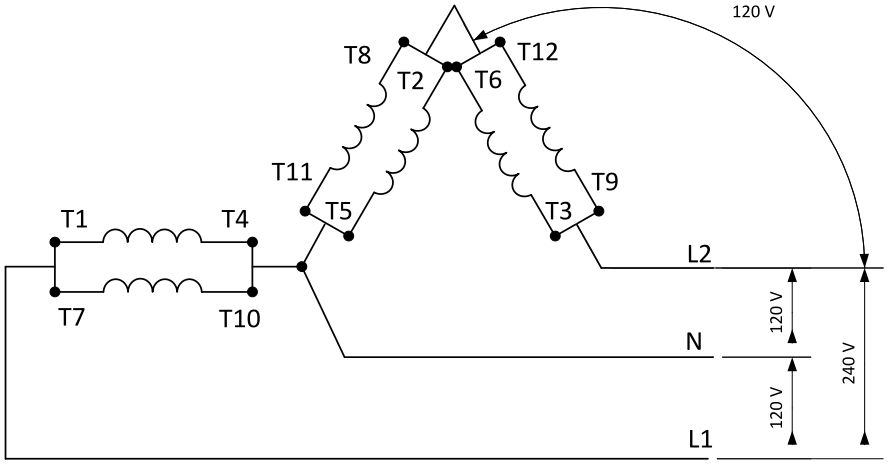


Image 4.26 Typical Split Phase generator wiring

ConnectionType: Mono Phase

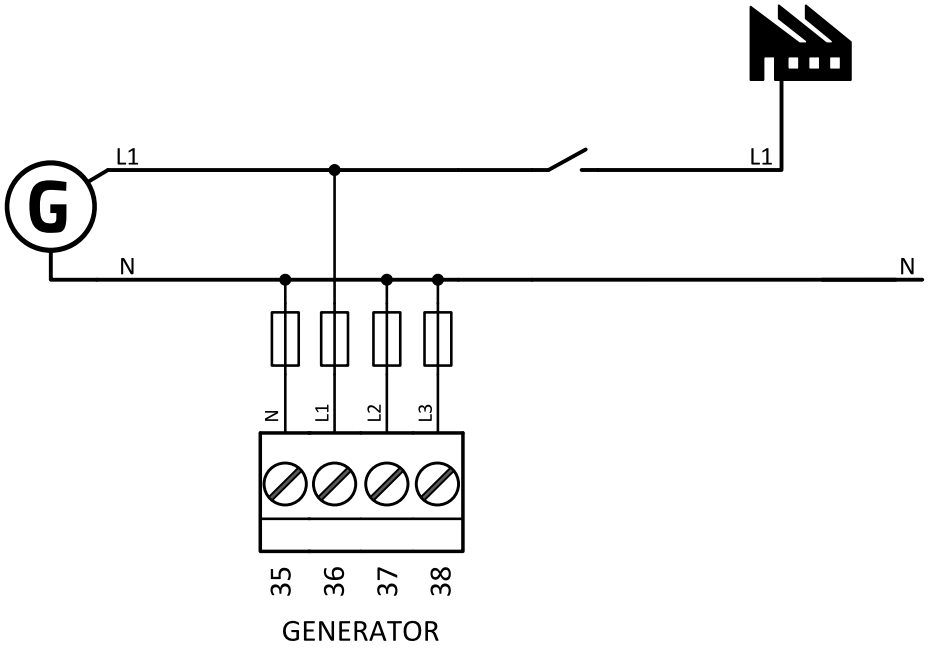


Image 4.27 Mono phase application

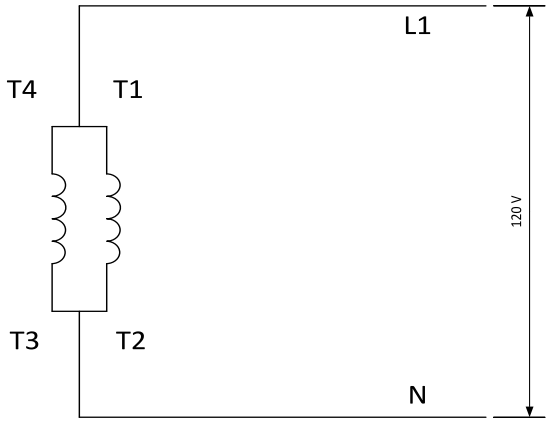


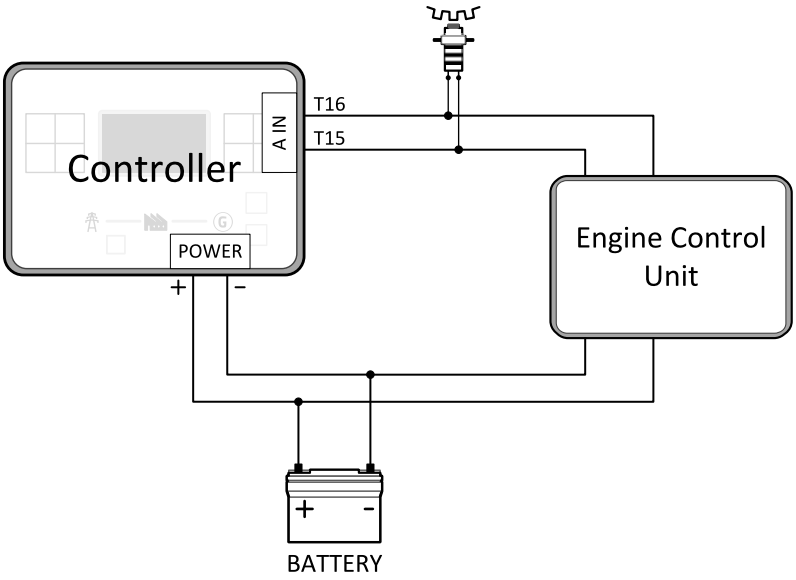
Image 4.28 Typical Mono Phase generator wiring

4.4.5 Magnetic pick-up

A magnetic speed sensor (pickup) is the most common method of engine speed measurement. To use this method, mount the pickup opposite to the engine flywheel, connect the cable to the controller as shown on the picture below and adjust the setpoint **Gear Teeth (page 197)** according to the number of teeth on the flywheel.

For the details about the pick-up input parameters **see Technical data on page 180**

IMPORTANT: To ensure proper function use a shielded cable.



If engine will not start:

- Check ground connection from pick-up to controllers, eventually disconnect ground connection to one of them.

Note: *In some cases the controller will measure a RPM value even though the gen-set is not running: RPM is measured from the generator voltage (Gear Teeth = 0). Controller is measuring some voltage value on input terminals due to open fusing. If RPM > 0 the controller will be put into a Not ready state and the engine will not be allowed to start.*

4.4.6 Binary inputs

Use minimally 1 mm^2 cables for wiring of Binary inputs.

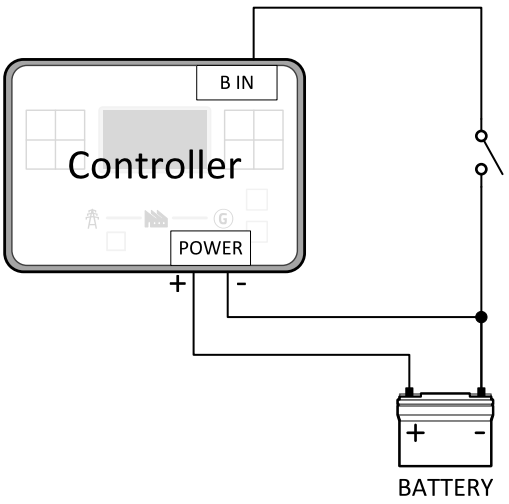


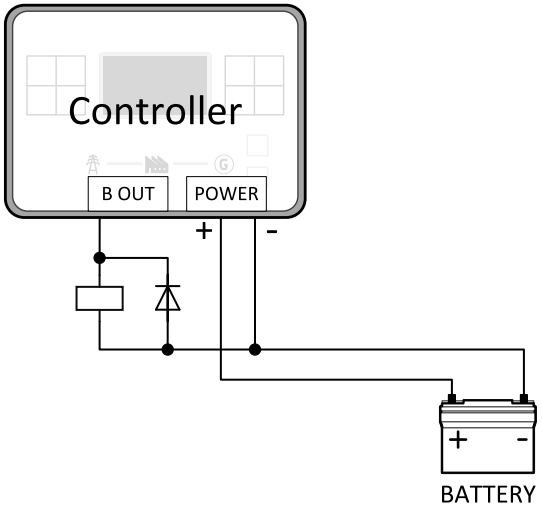
Image 4.29 Wiring binary inputs

Note: *The name and function or alarm type for each binary input have to be assigned during the configuration.*

4.4.7 Binary Outputs

Use min. 1 mm^2 cables for wiring of binary outputs. Use external relays as indicated on the schematic below for all outputs except those where low-current loads are connected (signalization etc...).

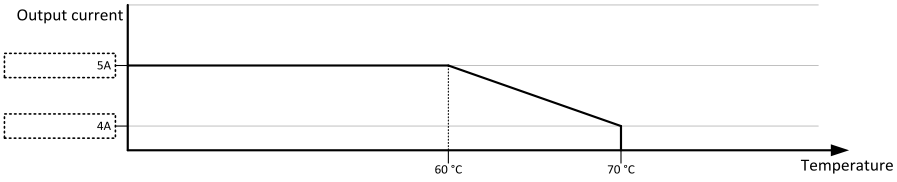
IMPORTANT: Use suppression diodes on all relays and other inductive loads!



Note: *Every single low current binary output can provide up to 0,5 A of steady current.*

Note: *Binary output 1 (terminal 4) and binary output 2 (terminal 5) are high current outputs (5 A for long term).*

IMPORTANT: When operating temperature is higher than 60 °C it is strongly recommended to limit output current of high current binary outputs (terminal 4 and terminal 5) to 4 A (each).



4.4.8 Emergency stop

The Emergency Stop function can be made in two ways:

- Connecting a normally closed “mushroom-type” button to the binary input . This is a purely software solution.
- A hard-wired solution, where the button also disconnects the power supply from the controller outputs.

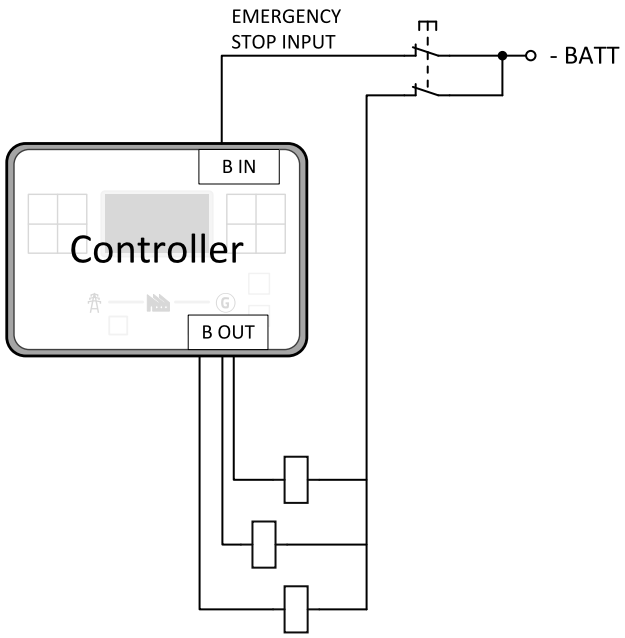


Image 4.30 Hard-wired emergency stop

IMPORTANT: Suppression diodes are not indicated, but required.

4.4.9 Analog inputs

The analog inputs are designed for resistive automotive type sensors like VDO or DATCON. The sensors are connected either by one wire (the second pole is the sensor body) or by two wires.

- In the case of grounded sensors, connect the AI COM terminal to the engine body as near to the sensors as possible.
- In the case of isolated sensors, connect the AI COM terminal to the negative power supply terminal of the controller as well as one pole of each sensor.

Analog inputs are typically used for: Oil Pressure, Coolant Temperature and Fuel Level. All of these parameters are connected with relevant protections.

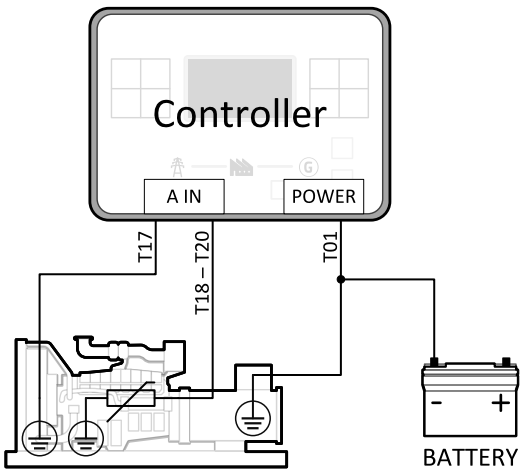


Image 4.31 Grounded sensors

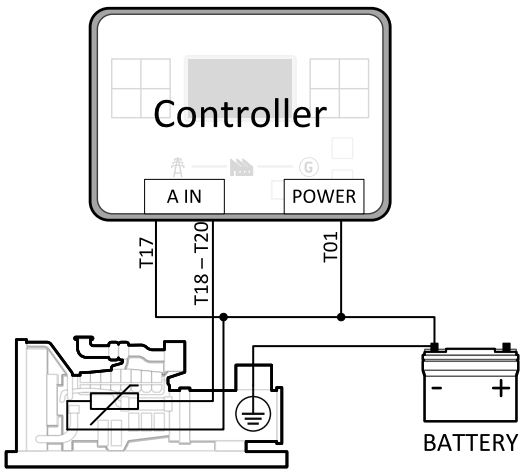


Image 4.32 Isolated sensors

Note: *Schemes show only analog input connection overview, not actual wiring.*

Note: *The name, sensor characteristic and alarm types for each analog input have to be assigned during configuration.*

Analog inputs with voltage & current sensors

On each analog input, there is a possibility to connect voltage or current output sensor instead of resistive one. Recommended wiring connection for these measurements and recommended curves are bellow.

Voltage sensors

Sensor's output range (V)	R1 (Ω)	R2 (Ω)
0 - 10	390	100
0 - 30	1500	100
0 - 70	3300	100

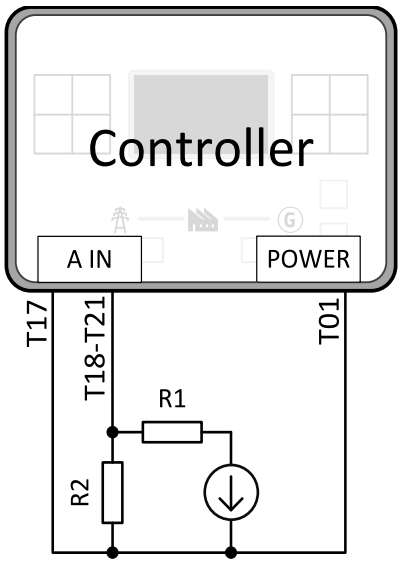


Image 4.33 Wiring of analog input with voltage sensor

Tables for HW versions 1.1 and lower.

0 - 10 V											
V	0	1	2	3	4	5	6	7	8	9	10
Ω	81	145	219	306	409	539	685	887	1125	1458	1933

0 - 30 V								
V	0	2	4	6	8	10	12	14
Ω	95	134	177	223	274	330	395	465
V	16	18	20	22	24	26	28	30
Ω	543	633	735	853	993	1154	1350	1589

0 - 70 V												
V	0	2	4	6	8	10	12	14	16	18	20	22
Ω	99	117	137	155	175	196	219	242	266	291	318	346
V	24	26	28	30	32	34	36	38	40	42	44	46
Ω	375	406	439	473	510	549	589	633	679	729	781	838
V	48	50	52	54	56	58	60	62	64	66	68	70
Ω	873	963	1033	1110	1193	1283	1383	1492	1612	1748	1896	2065

Tables for HW versions 1.2 and higher.

0 - 10 V											
V	0	1	2	3	4	5	6	7	8	9	10
Ω	80	98	119	143	172	208	251	306	378	474	611

0 - 30 V								
V	0	2	4	6	8	10	12	14
Ω	94	105	118	131	147	163	182	202
V	16	18	20	22	24	26	28	30
Ω	226	252	282	317	358	405	463	533

0 - 70 V												
V	0	2	4	6	8	10	12	14	16	18	20	22
Ω	97	102	108	114	120	126	133	140	147	154	162	170
V	24	26	28	30	32	34	36	38	40	42	44	46
Ω	179	188	198	208	219	231	243	256	269	284	300	316
V	48	50	52	54	56	58	60	62	64	66	68	70
Ω	334	354	375	398	422	449	479	511	547	587	631	681

Note: *This is a conversion of voltage from voltage sensor to appropriate resistance value. Use resistance values in InteliConfig to create your specific curve. These values should be used in "Ohm" column.*

Current sensors

Sensor's output range (mA)	R (Ω)
0-20	100

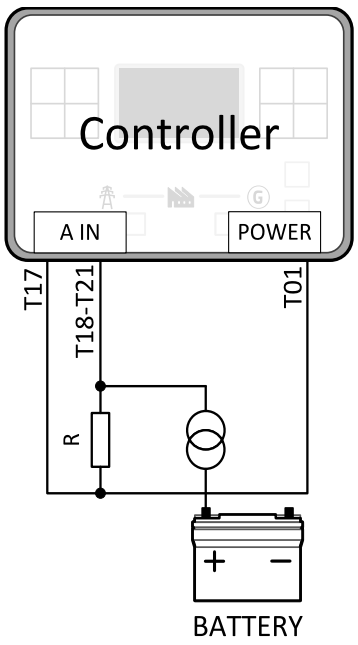


Image 4.34 Wiring of analog input with current sensor

Table for HW versions 1.1 and lower.

0 - 22 mA												
mA	0	1	2	3	4	5	6	7	8	9	10	11
Ω	100	131	164	200	238	280	325	374	427	485	550	621
mA	12	13	14	15	16	17	18	19	20	21	22	
Ω	700	788	887	1000	1128	1276	1450	1654	1900	2200	2575	

Table for HW versions 1.2 and higher.

0 - 22 mA												
mA	0	1	2	3	4	5	6	7	8	9	10	11
Ω	100	110	120	130	141	154	168	182	198	216	235	256
mA	12	13	14	15	16	17	18	19	20	21	22	
Ω	280	306	336	370	409	453	505	566	640	730	842	

Note: *This is a conversion of current from current sensor to appropriate resistance value. Use resistance values in InteliConfig to create your specific curve. These values should be used in "Ohm" column.*

Analog as binary or tristate inputs

Analog inputs can be used also as binary or tri-state, i.e. for contact sensors without or with circuit check. The threshold level is 750 Ω. In the case of tri-state, values lower than 10 Ω and values over 2400 Ω are evaluated as sensor failure (short or open circuit).

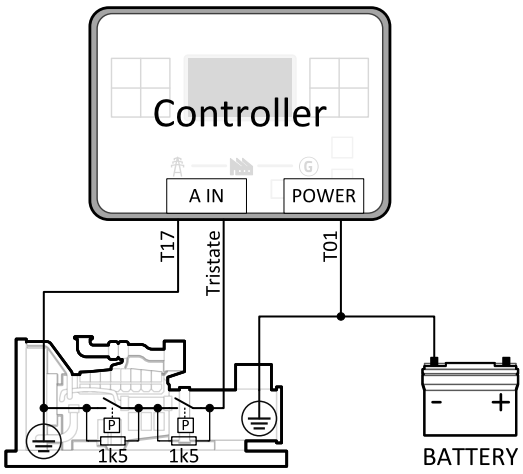


Image 4.35 Analog inputs as tristate

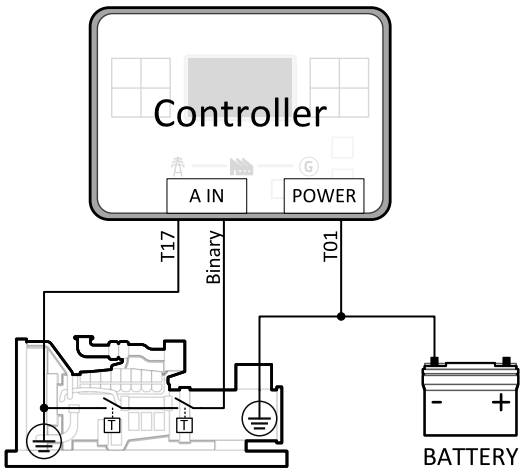


Image 4.36 Analog inputs as binary

Note: *The name, sensor characteristic and alarm types for each analog input have to be assigned during configuration.*

Note: *Tristate and binary sensors are not suitable for Analog Switch functions.*

4.4.10 CAN bus and RS485 wiring

CAN bus wiring

The wiring of the CAN bus should be provided in such a way that the following rules are observed:

- The maximum length of the CAN bus depends on the communication speed. For a speed of 250 kbps, which is used on the CAN1 bus (extension modules, ECU), the maximum length is 200 m.
- The bus must be wired in linear form with termination resistors at both ends. No nodes are allowed except on the controller terminals.
- Shielded cable[1] has to be used, shielding has to be connected to the terminal T01 (Grounding).
- External units can be connected on the CAN bus line in any order, but keeping line arrangement (no tails, no star) is necessary.
- The CAN bus has to be terminated by 120 Ohm resistors at both ends use a cable with following parameters:

Cable type	Shielded twisted pair
Impedance	120 Ω
Propagation velocity	≥ 75% (delay ≤ 4,4 ns/m)
Wire crosscut	≥ 0,25 mm^2
Attenuation (@1MHz)	≤ 2 dB/100 m

Note: *Communication circuits shall be connected to communication circuits of Listed equipment.*

Note: *A termination resistor at the CAN (120 Ω) is already implemented on the PCB. For connecting, close the jumper near the appropriate CAN terminal.*

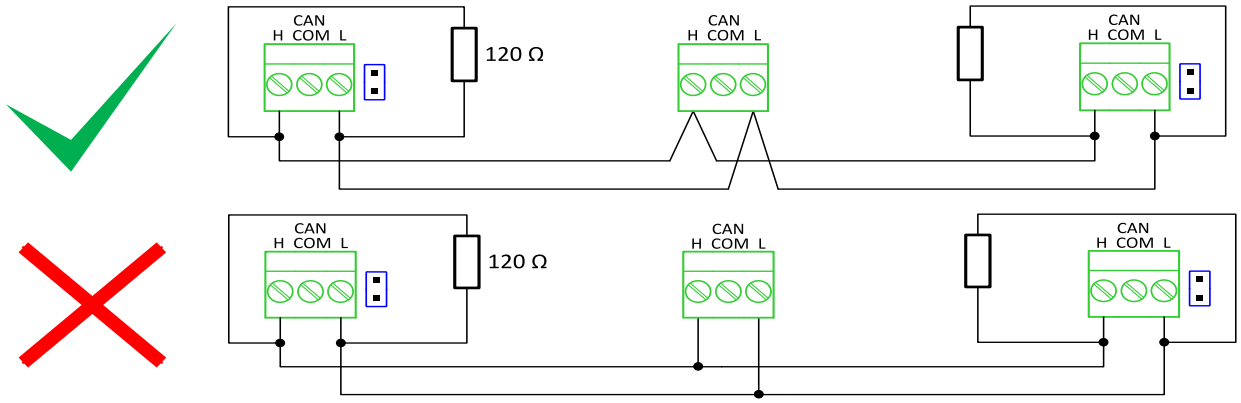


Image 4.37 CAN bus topology

[1] Recommended data cables: BELDEN (http://www.belden.com) - for shorter distances: 3105A Paired - EIA Industrial RS-485 PLTC/CM (1x2 conductors); for longer distances: 3106A Paired - EIA Industrial RS-485 PLTC/CM (1x2+1 conductors)

- For shorter distances (connection within one building)

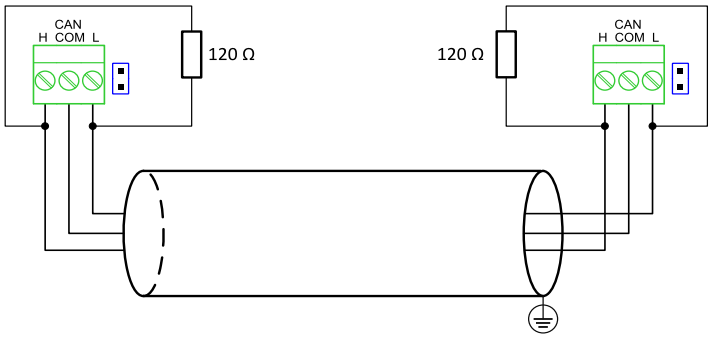


Image 4.38 CAN bus wiring for shorter distances

Note: *Shielding shall be grounded at one end only. Shielding shall not be connected to CAN COM terminal*

- For longer distances or in case of surge hazard (connection out of building, in case of storm etc.)

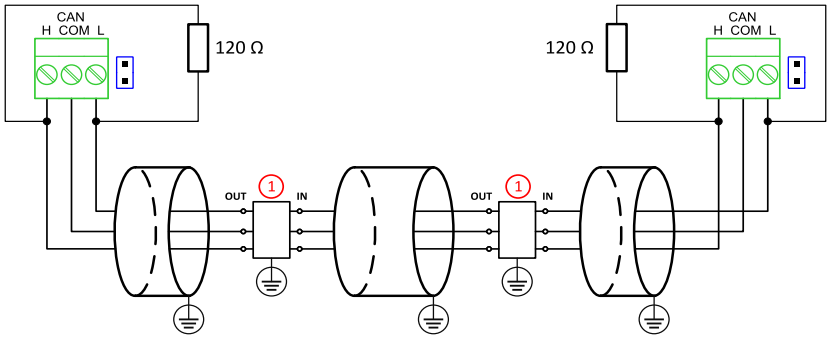


Image 4.39 CAN bus wiring for longer distances

① Recommended PT5-HF-12DC-ST[1]

RS485 wiring

The wiring of the RS485 communication should be provided in such a way that the following rules are observed:

Note: *A termination resistor at the RS485 (120Ω) is already implemented on the PCB. For connecting, close the jumper near the appropriate RS485 terminal.*

- Standard maximum bus length is 1000 m.
- Shielded cable[2] has to be used, shielding has to be connected to the terminal T01 (Grounding).
- External units can be connected on the RS485 line in any order, but keeping line arrangement (no tails, no star) is necessary.
- The line has to be terminated by 120 Ohm resistors at both ends.

---

[1]Protections recommended: Phoenix Contact (http://www.phoenixcontact.com): PT 5-HF-12DC-ST with PT2x2-BE (base element) or Saltek (http://www.saltek.cz): DM-012/2 R DJ

[2]Recommended data cables: BELDEN (http://www.belden.com) - for shorter distances: 3105A Paired - EIA Industrial RS-485 PLTC/CM (1x2 conductors); for longer distances: 3106A Paired - EIA Industrial RS-485 PLTC/CM (1x2+1 conductors)

- For shorter distances (connection within one building)

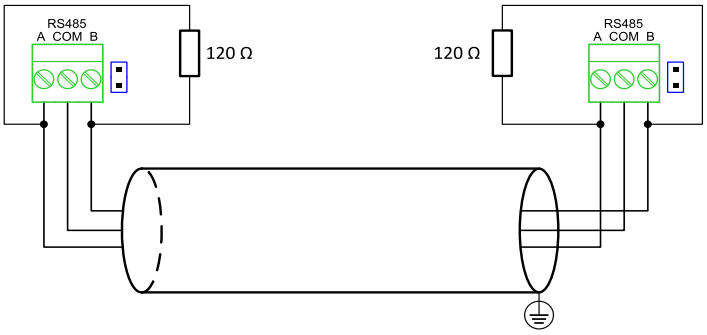


Image 4.40 RS485 wiring for shorter distances

- For longer distances or in case of surge hazard (connection out of building, in case of storm etc.)

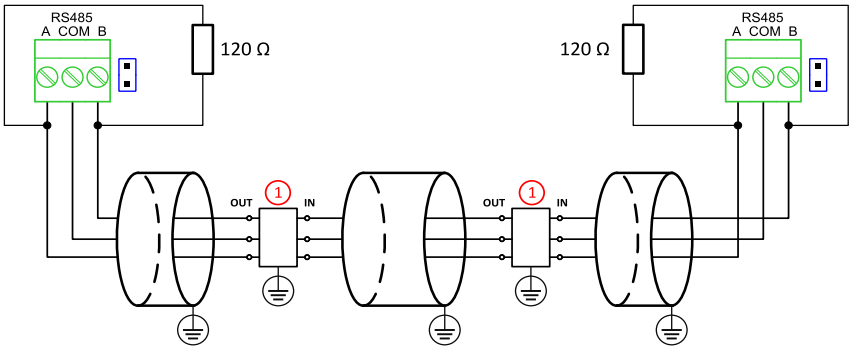


Image 4.41 RS485 wiring for longer distances

① Recommended PT5HF-5DC-ST[1]

Note: *Communication circuits shall be connected to communication circuits of Listed equipment.*

[1]Recommended protections: Phoenix Contact (http://www.phoenixcontact.com): PT 5-HF-5DC-ST with PT2x2-BE (base element)(or MT-RS485-TTL) or Saltek (http://www.saltek.cz): DM-006/2 R DJ

4.4.11 USB

This is required for computer connection. Use the shielded USB A-B cable.

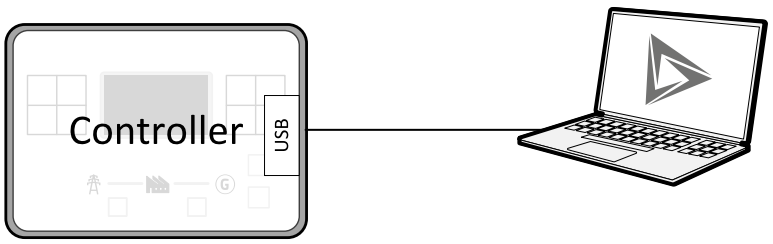
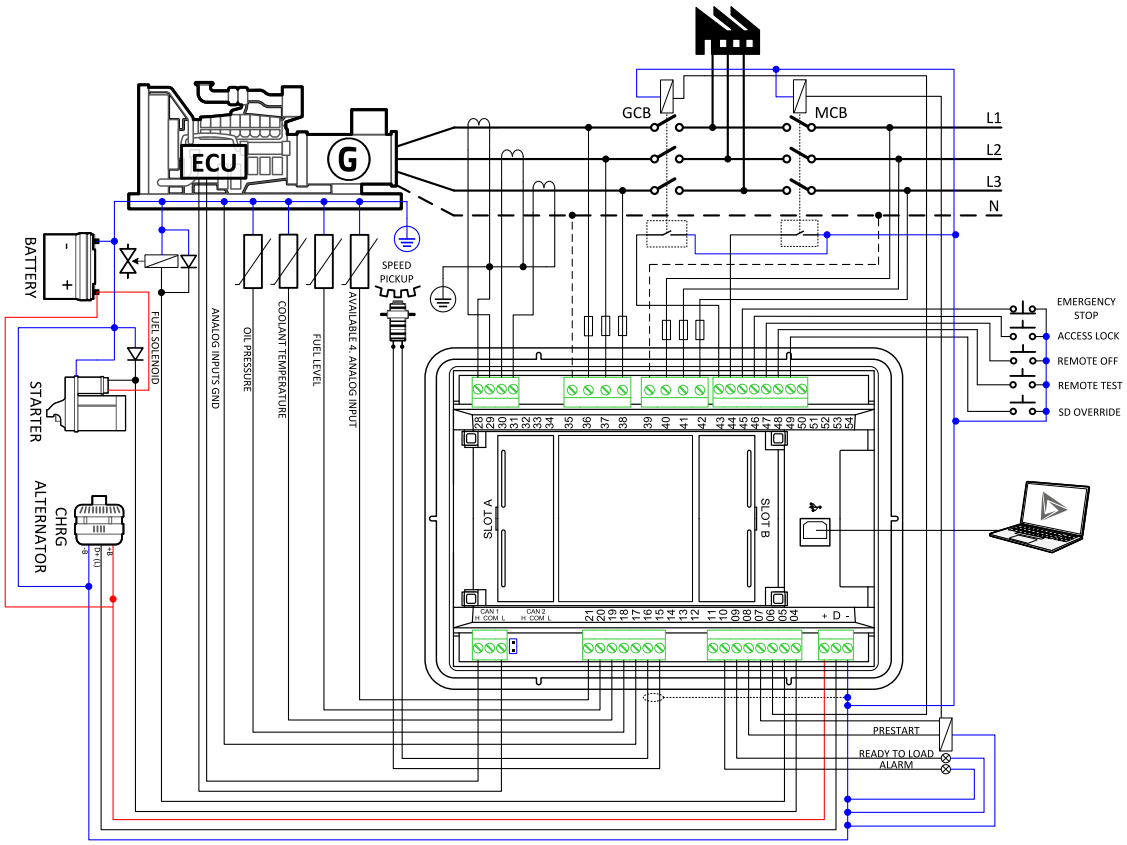


Image 4.42 USB connection

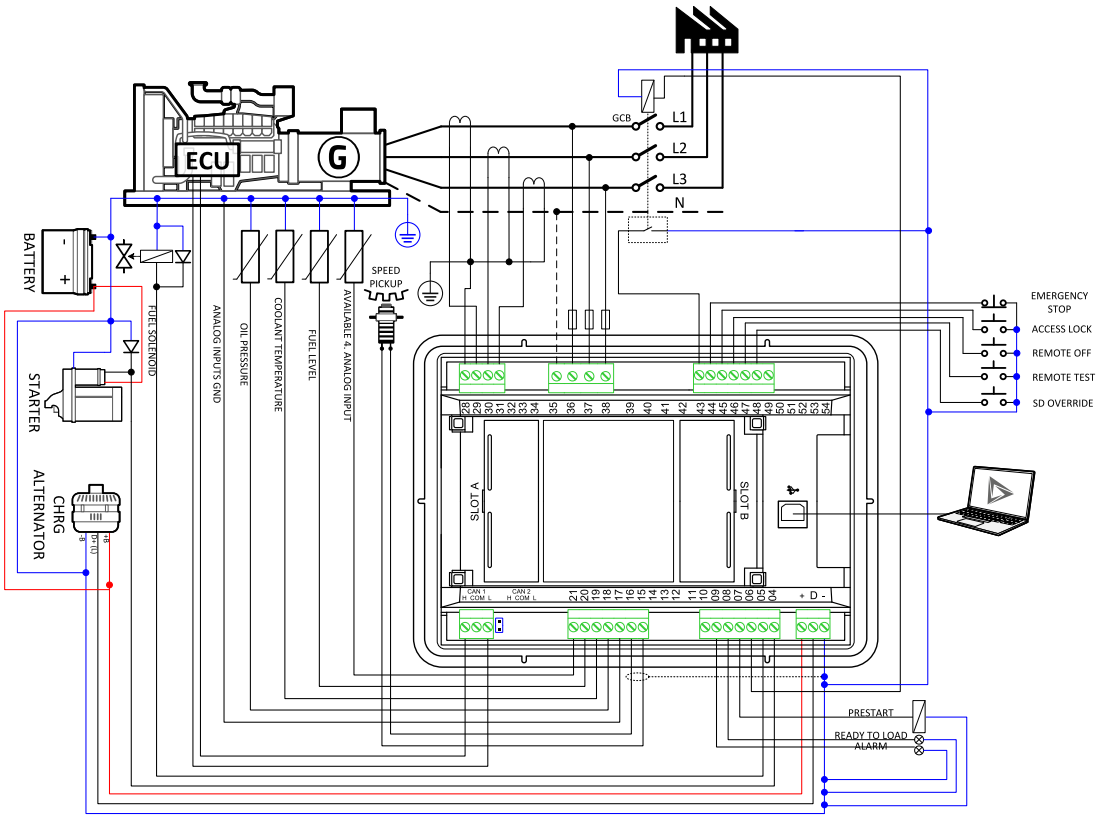
Controller can by also power by USB (only for service purpose like a uploading firmware, change of configuration etc.).

> **IMPORTANT: Power supply by USB is only for service purpose. Binary inputs and outputs are in logical 0. Also plug-in modules are not working.**

4.4.12 Example of AMF Wiring



4.4.13 Example of MRS Wiring

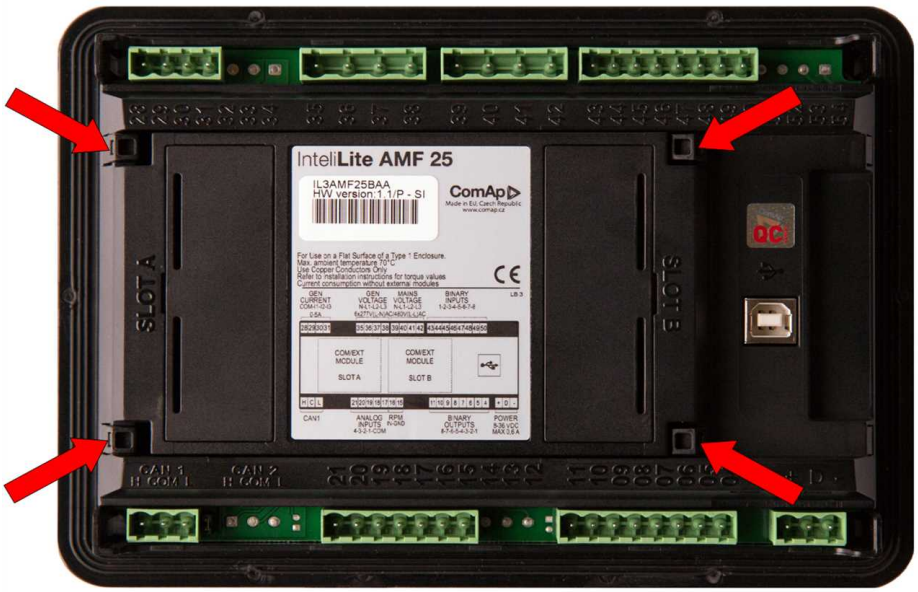


back to Recommended wiring

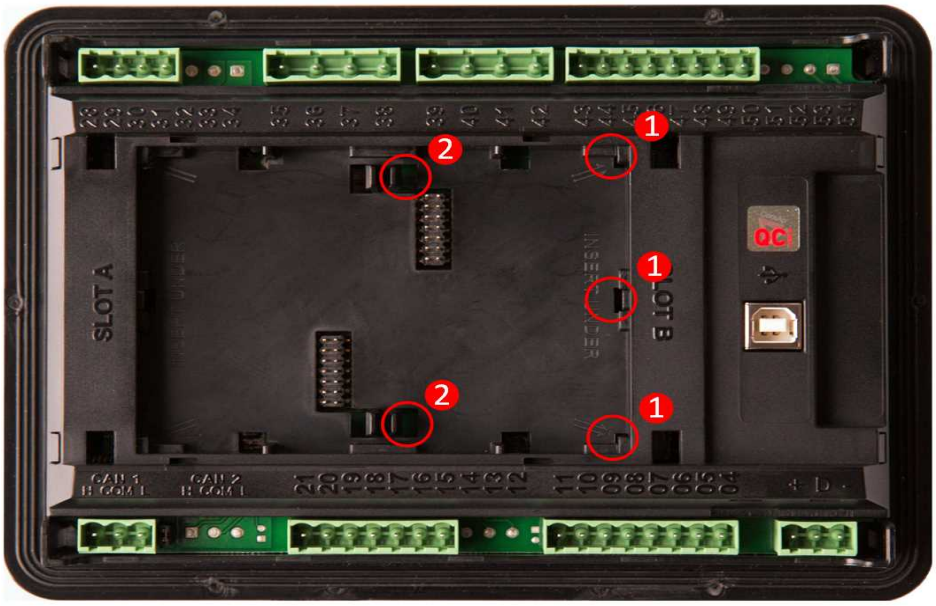
4.5 Plug-in module installation

4.5.1 Installation

Remove the back cover. To do this, press four holders which are located in corners.



After removing back cover insert the plug-in module. Plug-in module has to be inserted under holders. Start with holders marked by symbol 1. On the controller are also arrows for better navigation. After inserting plug-in module under holders 1 press it down to holders marked by symbol 2 which locks the module.



Insert the plug-in module under holders marked by symbol 1.



After locking the plug-in module into holders, place back the back cover (small cover for connectors has to be removed from back cover). Finally insert the small cover for connectors. Small covers are unique for each plug-in module.

4.6 Maintenance

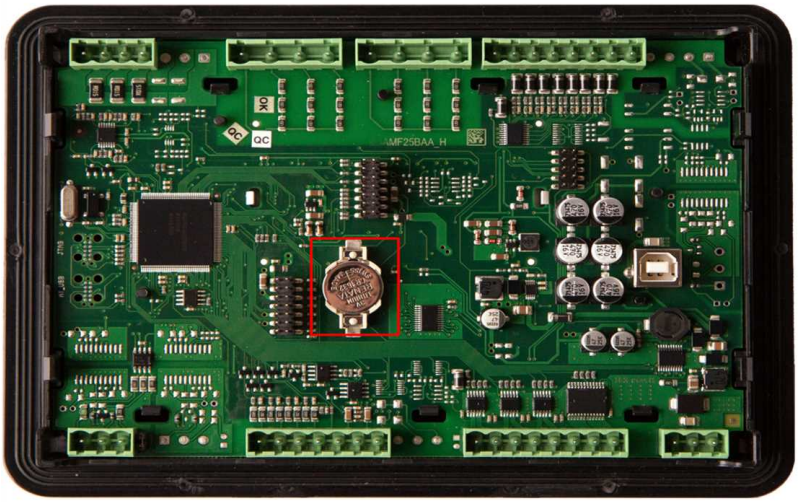
4.6.1 Backup battery replacement

The internal backup battery lifetime is approx. 6 years. If replacement of backup batter is needed, follow these instructions:

- Connect the controller to a PC and save an archive for backup purposes (not necessary but recommended).
- Disconnect all terminals from the controller and remove the controller from the switchboard.
- Remove the back cover and all plug-in modules.
- Release the rear cover using a flat screwdriver or another suitable tool.



- The battery is located in a holder on the circuit board. Remove the old battery with a small sharp screwdriver and push with a finger the new battery into the holder.



- Put the rear cover back. Use slight pressure to lock the snaps into the housing. Pay attention that the cover is in correct position and not upside down!
- Put back the plugin modules and back cover.
- Power the controller on, adjust date and time and check all setpoints.

back to Installation and wiring

5 Controller setup

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5.2 Controller configuration and PC tools connection 62
5.3 Operator Guide 69
5.4 Remote Display 93
5.5 Functions 98

back to Table of contents

5.1 Default configuration

5.1.1 Binary inputs

Number	Description	Configured function
BIN1	Generator circuit breaker feedback	**GCB FEEDBACK (PAGE 556)**
BIN2	Mains circuit breaker feedback	**MCB FEEDBACK (PAGE 560)**
BIN3	Emergency stop button	**EMERGENCY STOP (PAGE 554)**
BIN4	Access lock keyswitch	**ACCESS LOCK (PAGE 525)**
BIN5	Switch controller to OFF mode	**REMOTE OFF (PAGE 564)**
BIN6	Switch controller to TEST mode	**REMOTE TEST (PAGE 565)**
BIN7	Suppression of alarms	**SD OVERRIDE (PAGE 565)**
BIN8	Free slot	**NOT USED (PAGE 561)**

5.1.2 Binary outputs

Number	Description	Function
BOUT1	Starter motor control	**STARTER (PAGE 633)**
BOUT2	Fuel solenoid valve	**FUEL SOLENOID (PAGE 602)**
BOUT3	Indication of breaker state	**GCB CLOSE/OPEN (PAGE 604)**
BOUT4	Indication of breaker state	**MCB CLOSE/OPEN (PAGE 614)**
BOUT5	Activation of any devices before start	**PRESTART (PAGE 621)**
BOUT6	Gen-set can be connected to load	**READY TO LOAD (PAGE 623)**
BOUT7	Indication of unconfirmed alarm	**ALARM (PAGE 582)**
BOUT8	Free slot	**NOT USED (PAGE 620)**

5.1.3 Analog inputs

Number	Configured sensor	Function
AIN1	VDO 10 Bar	**OIL PRESSURE (PAGE 670)**
AIN2	VDO40-120°C	**COOLANT TEMP (PAGE 667)**
AIN3	VDOLevel %	**FUEL LEVEL (PAGE 668)**
AIN4	None	**NOT USED (PAGE 669)**

5.2 Controller configuration and PC tools connection

5.2.1 USB 62
5.2.2 RS232/RS485 63
5.2.3 Ethernet 64

back to Controller setup

This chapter contains brief introduction into the specifics of firmware and archive upload and connection of various PC tools to the controller. If you require detailed information on each PC tool please use the included Help in those PC tools or download their Reference Guides.

5.2.1 USB

You may connect to the controller using the USB port. In this case standard USB A to B cable should be used.

Connection using InteliConfig

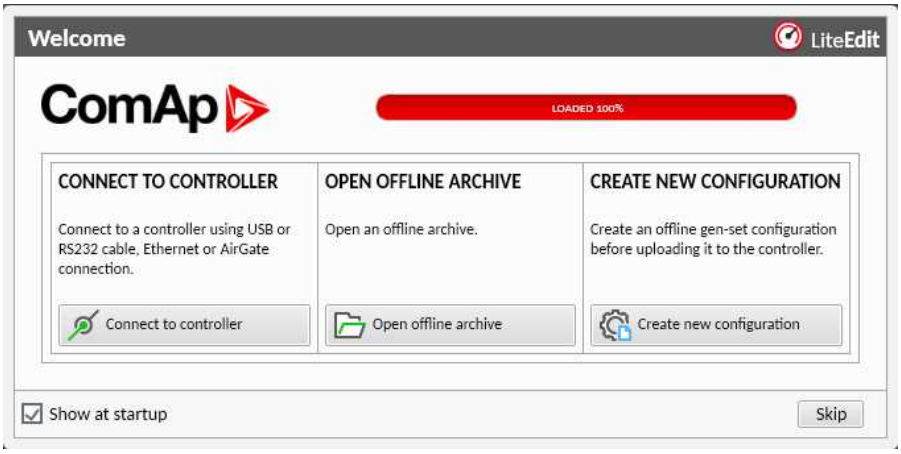


Image 5.1 First screen of InteliConfig - select connect to controller



Image 5.2 Second screen of InteliConfig - select detected controllers

Connection using WinScope

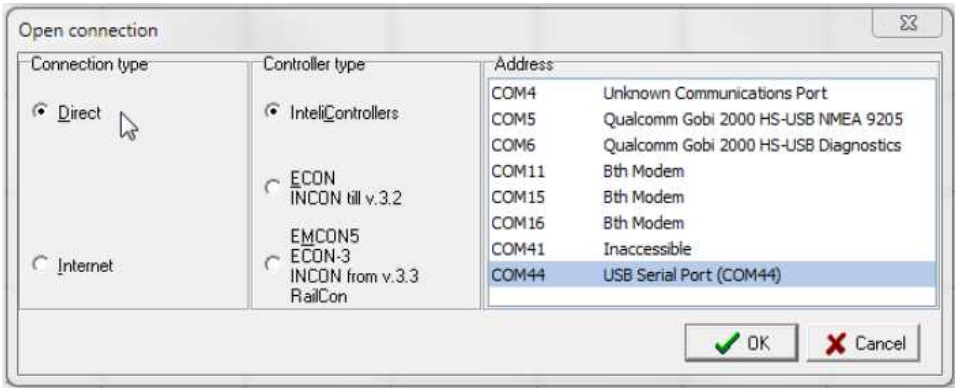


Image 5.3 WinScope screen - select direct connection

5.2.2 RS232/RS485

It is possible to connect to the controller using RS232 or RS485 direct connection (serial port or USB to RS232/RS485 converter may be used). The following settings need to be checked in the controller:

- **COM1 Mode (page 367)** = Direct
- has to be set to the same value as in the PC tool

Connection using InteliConfig

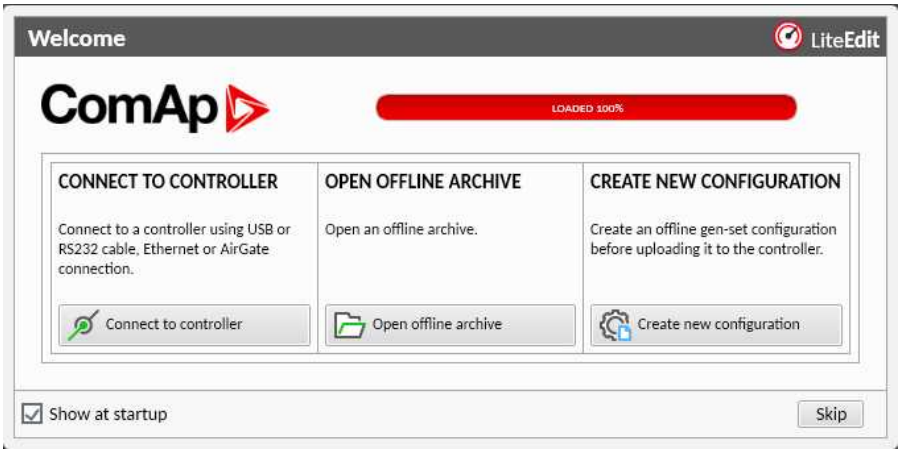


Image 5.4 First screen of InteliConfig - select connect to controller

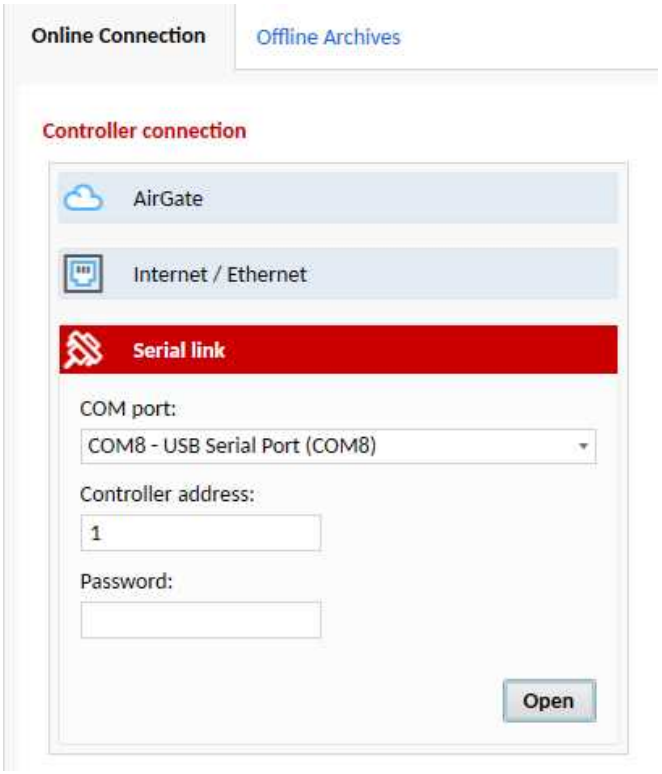


Image 5.5 Second screen of InteliConfig - select Serial link

Connection using WinScope

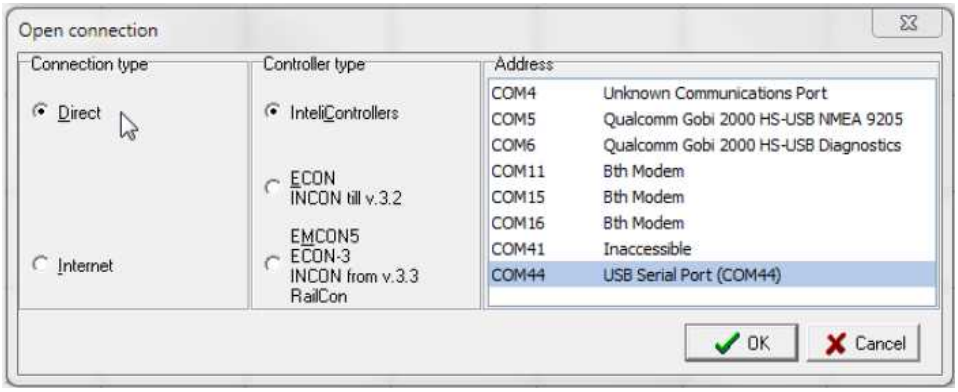


Image 5.6 WinScope screen - select direct connection

Note: *Winscope supports only 19200, 38400, 57600 speeds.*

5.2.3 Ethernet

It is possible to connect to the controller using ethernet port either directly or using ComAp's AirGate service.

Direct connection

When you use direct connection the controller needs to be reachable directly from the PC you use (i.e. one LAN or WAN without any firewalls and other points that may not allow the connection). The following settings need to be checked in the controller:

- **Controller Address (page 199)** has to be set to the same value as in the PC tool
- **IP Address Mode (page 402)** can be set to AUTOMATIC when there is DHCP service is available. Otherwise it needs to be set to FIXED
- **IP Address (page 402)** is either set automatically or it can be adjusted to a specific requested value
- **Subnet Mask (page 403)** is either set automatically or it can be adjusted to a specific requested
- **Gateway IP (page 403)** can be set here when it is used
- **ComAp TCP Port (page 408)** number is 23. Make sure that this port is open for communication in your network

Connection using InteliConfig

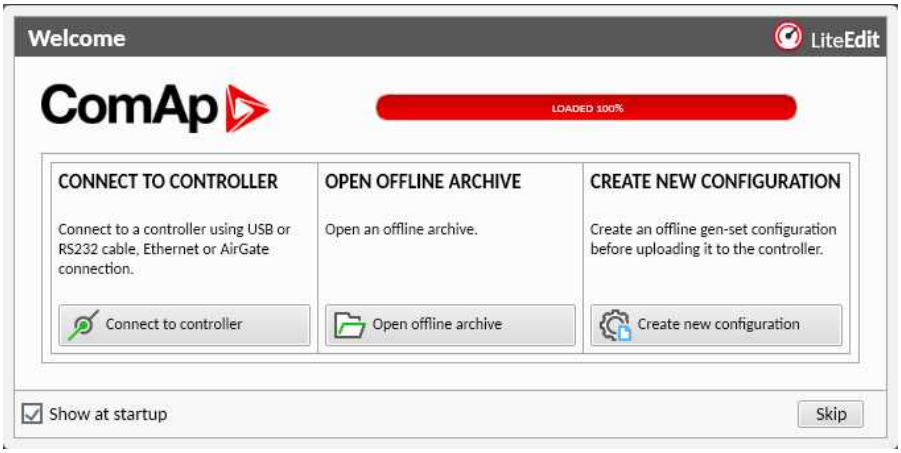


Image 5.7 First screen of InteliConfig - select connect to controller

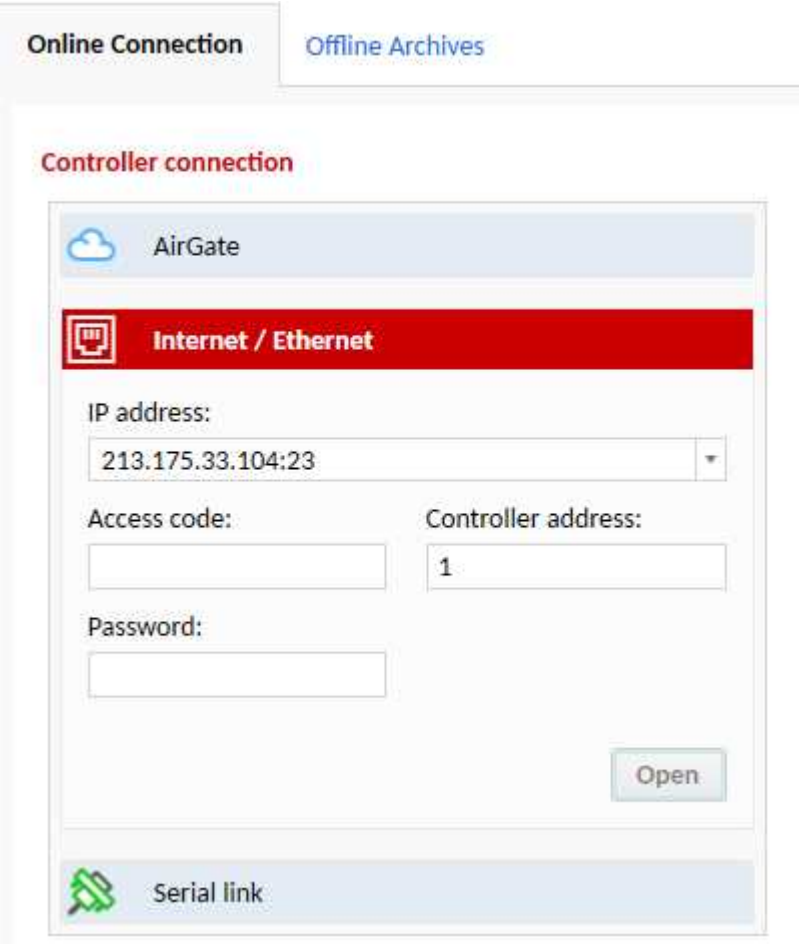


Image 5.8 Second screen of InteliConfig - select Internet/Ethernet

Connection using WinScope

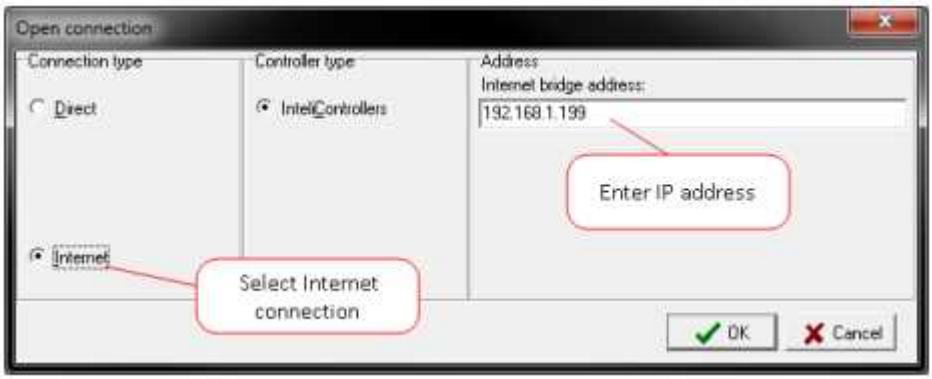


Image 5.9 WinScope screen

AirGate connection

You can use ComAp's AirGate service that allows you to connect to any controller via internet no matter what are the restrictions of the local network (if the controller can connect to the internet AirGate service will work). The following setpoints have to be adjusted:

- **Controller Address (page 199)** has to be set to the same value as in the PC tool
- **IP Address Mode (page 402)** can be set to AUTOMATIC when there is DHCP service is available. Otherwise it needs to be set to FIXED
- **IP Address (page 402)** is either set automatically or it can be adjusted to a specific requested value
- **Subnet Mask (page 403)** is either set automatically or it can be adjusted to a specific requested
- **Gateway IP (page 403)** can be set here when it is used
- **AirGate Connection (page 407)** has to be set to Enabled
- **AirGate Address (page 408)** currently there is one AirGate server running at URL airgate.comap.cz (enter this URL into the setpoint)

Connection using InteliConfig

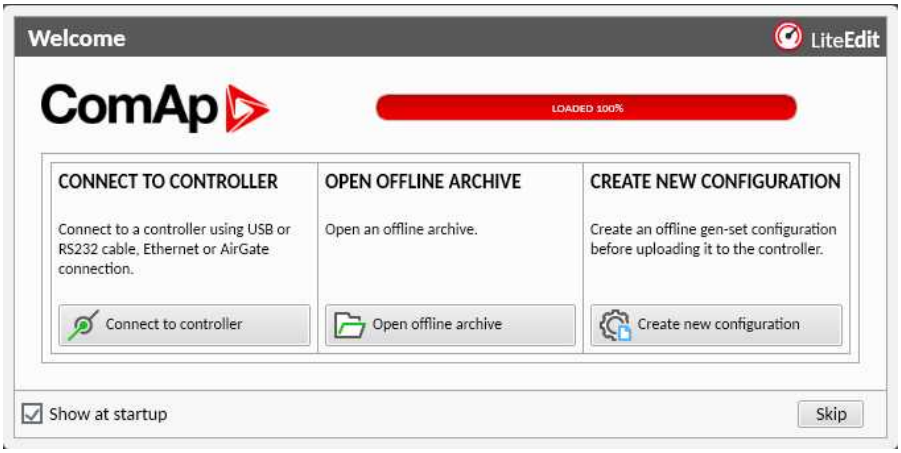


Image 5.10 First screen of InteliConfig - select connect to controller

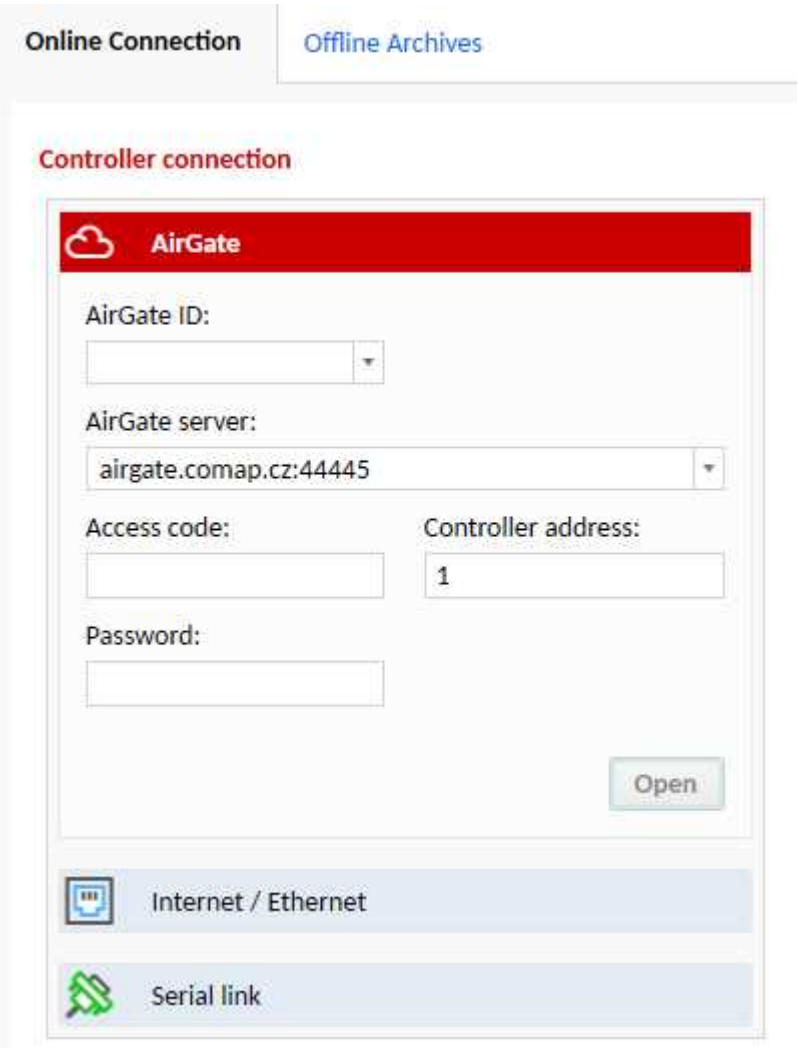


Image 5.11 Second screen of InteliConfig - select AirGate

Connection using WinScope

WinScope doesn't support connection via AirGate.

5.3 Operator Guide

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5.3.1 Front panel elements

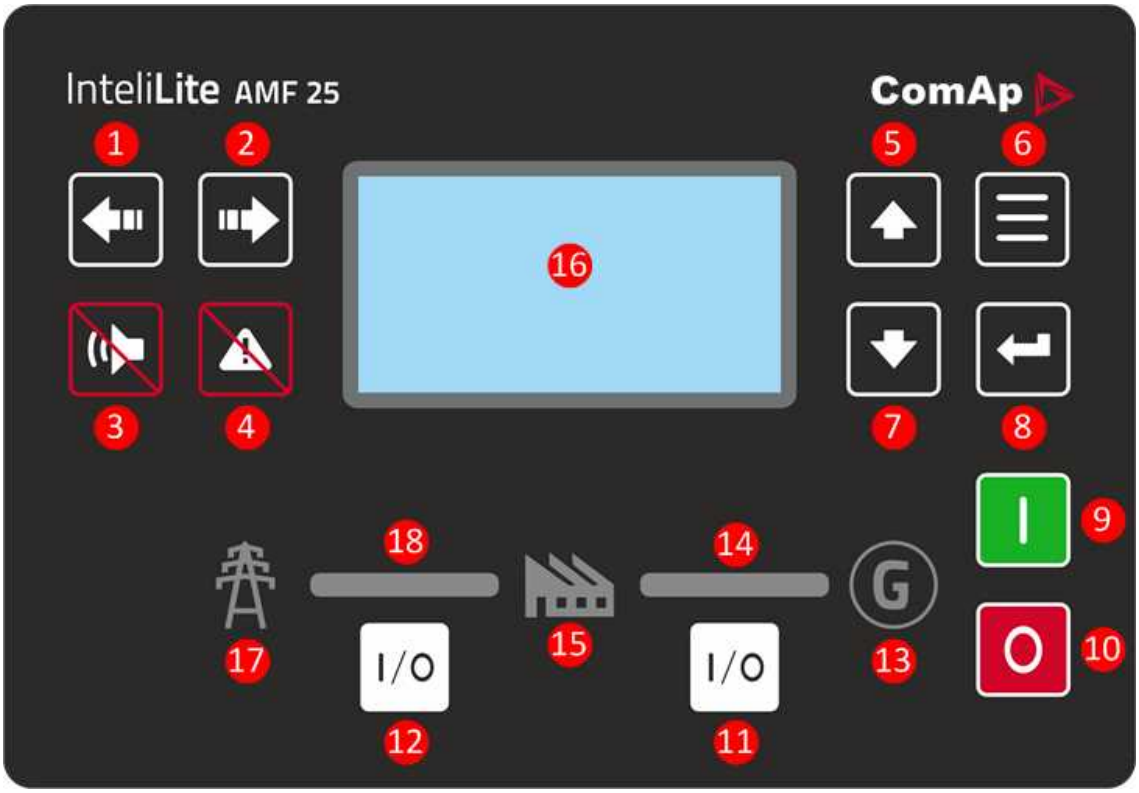


Image 5.12 Operator interface of AMF25

Control buttons		
Position	**Picture**	**Description**
1		**LEFT** button. Use this button to move left or to change the mode. The button can change the mode only if the main screen with the indicator of currently selected mode is displayed. ***Note:*** *This button will not change the mode if the controller mode is forced by one of binary inputs listed in the Reference Guide – "Operating modes" chapter.*
2		**RIGHT** button. Use this button to move right or to change the mode. The button can change the mode only if the main screen with the indicator of currently selected mode is displayed.

		Note: *This button will not change the mode if the controller mode is forced by one of binary inputs listed in the Reference Guide – "Operating modes" chapter.*
3		**HORN RESET** button. Use this button to deactivate the horn output without acknowledging the alarms.
4		**FAULT RESET** button. Use this button to acknowledge alarms and deactivate the horn output. Inactive alarms will disappear immediately and status of active alarms will be changed to "confirmed" so they will disappear as soon as their reasons dismiss.
5		**UP** button. Use this button to move up or increase value.
6		**PAGE** button. Use this button to switch over display pages.
7		**DOWN** button. Use this button to move down or decrease value.
8		**ENTER** button. Use this button to finish editing a setpoint or moving right in the history page.
9		**START** button. Works in MAN mode only. Press this button to initiate the start sequence of the engine.
10		**STOP** button. Works in MAN mode only. Press this button to initiate the stop sequence of the gen-set. Repeated pressing of button will cancel current phase of stop sequence (like cooling) and next phase will continue.
11		**GCB** button. Works in MAN and TEST modes only. Press this button to open or close the GCB.
12		**MCB** button. Works in MAN and TEST modes only. Press this button to open or close the MCB.

Indicators and others

Position	Description
13	**GENERATOR** status indicator. There are two states - Gen-set OK (indicator is green) and Gen-set failure (indicator is red). Green LED is on if the generator voltage is present and within limits. Red LED starts flashing when gen-set failure occurs. After FAULT RESET button is pressed, goes to steady light (if an alarm is still active) or is off (if no alarm is active).
14	**GCB ON**. Green LEDs are on if GCB is closed and Gen-set is healthy. If Gen-set is not healthy and GCB is closed than middle LED is on. It is driven by GCB CLOSE/OPEN output or by GCB feedback signal.
15	**LOAD**. Green LED is ON if load is supplied by mains or by generator. It means, that Gen-set or mains is OK and proper circuit breaker is closed.

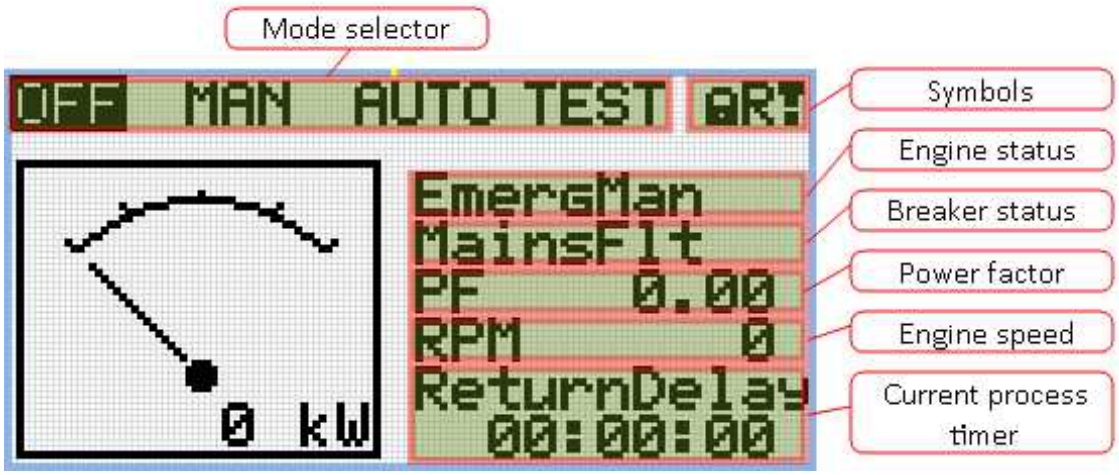
16	Graphic B/W display, 132x64 pixels.
17	**MAINS** status indicator. There are two states - Mains OK (indicator is green) and Mains failure (indicator is red). Green LED is on, if mains is present and within limits. Red LED starts blinking when the mains failure is detected and after the gen-set has started and connected to the load it lights permanently until the mains failure disappears.
18	**MCB ON**. Green LEDs are on if MCB is closed and Mains is healthy. If Mains is not healthy and MCB is closed than middle LED is on. It is driven by MCB CLOSE/OPEN output or by MCB feedback signal.

5.3.2 Display screens and pages structure

The displayed information is structured into "pages" and "screens". Use PAGE button to switch over the pages.

- The page Measurement consists of screens which display measured values like voltages, current, oil pressure etc., computed values like i.e. gen-set power, statistic data and the alarm list on the last screen.
- The page Setpoints contains all setpoints organized to groups and also a special group for entering password.
- The page History log shows the history log in the order that the last record is displayed first.

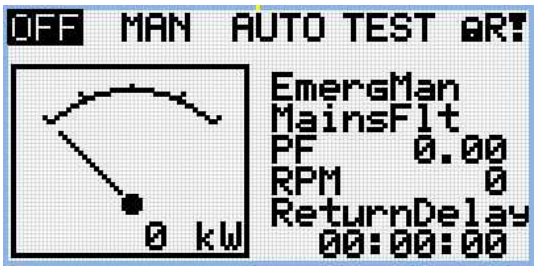
Main Screen

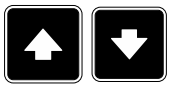


Symbols

- Padlock - active when LBI ACCESS LOCK is active
- R - active when there is active remote connection to controller
- Exclamation mark - active when there is any alarm in alarmlist

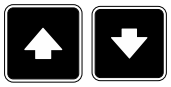
Measurement Screens



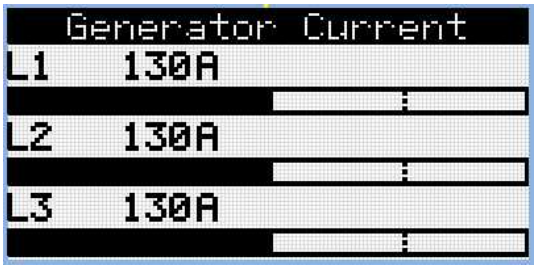


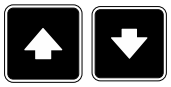
Note: *Use Up and Down button to move between measurement pages.*



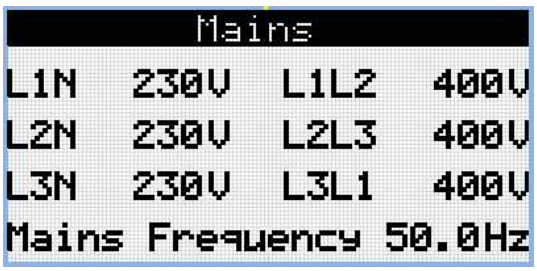


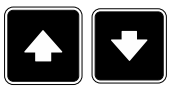
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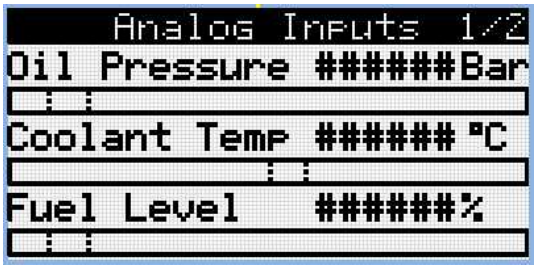


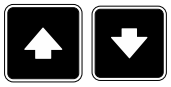
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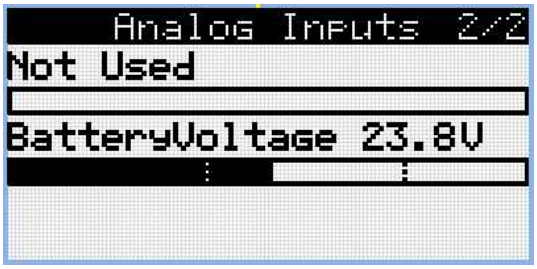


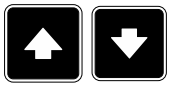
Note: *Use Up and Down button to move between measurement pages.*





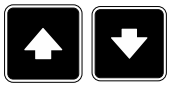
Note: *Use Up and Down button to move between measurement pages.*





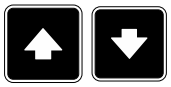
Note: *Use Up and Down button to move between measurement pages.*



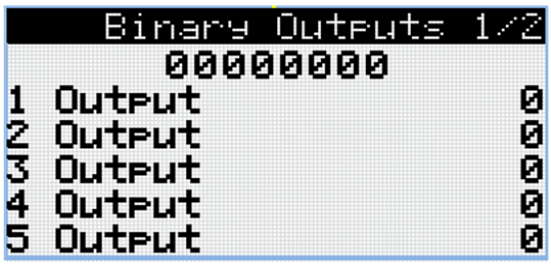


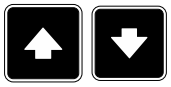
Note: *Use Up and Down button to move between measurement pages.*



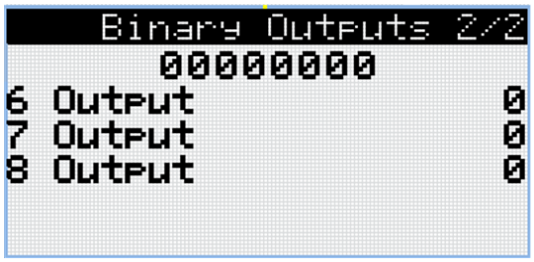


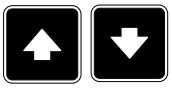
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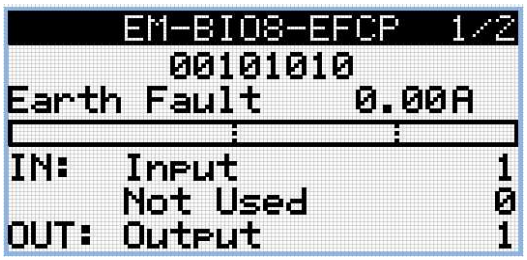


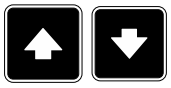
Note: *Use Up and Down button to move between measurement pages.*



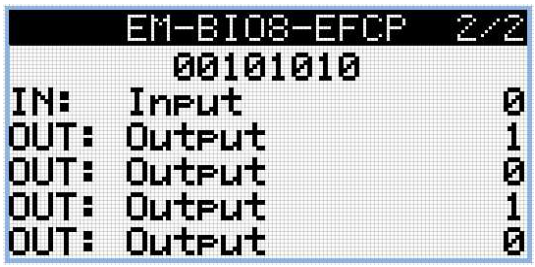


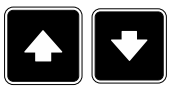
Note: *Use Up and Down button to move between measurement pages.*



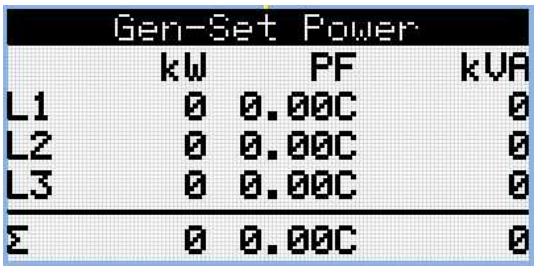


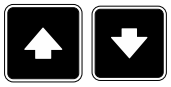
Note: *Use Up and Down button to move between measurement pages.*



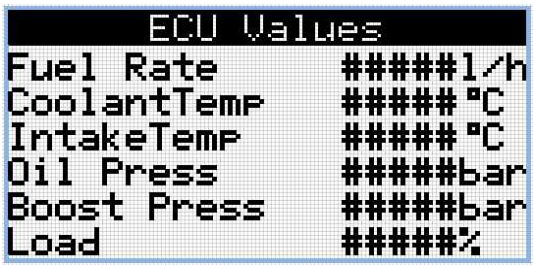


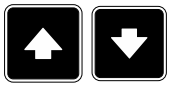
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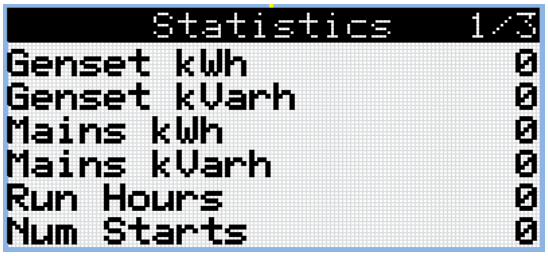


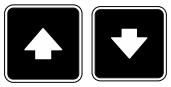
Note: *Use Up and Down button to move between measurement pages.*



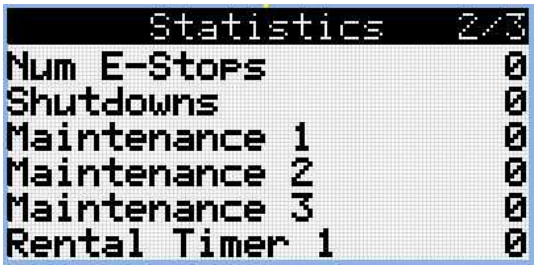


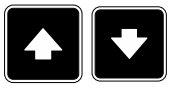
Note: *Use Up and Down button to move between measurement pages.*



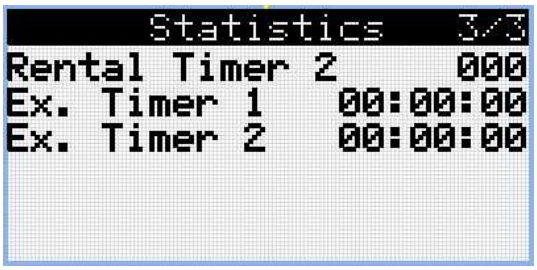


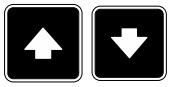
Note: *Use Up and Down button to move between measurement pages.*



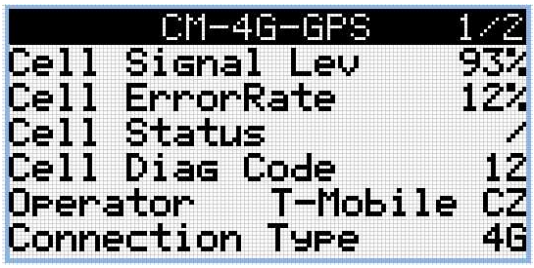


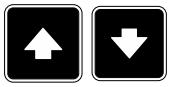
Note: *Use Up and Down button to move between measurement pages.*



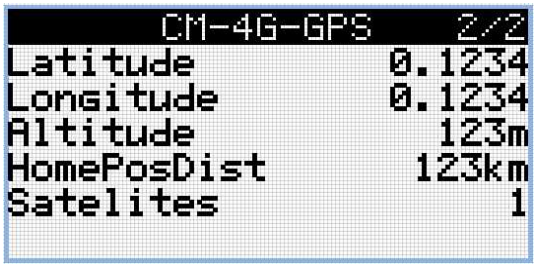


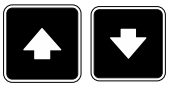
Note: *Use Up and Down button to move between measurement pages.*



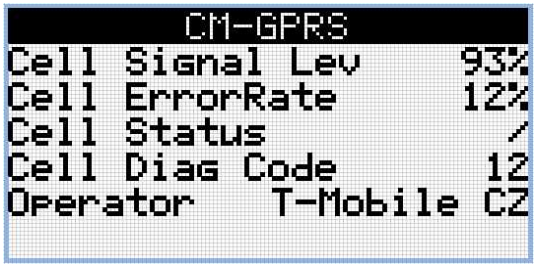


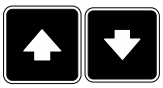
Note: *Use Up and Down button to move between measurement pages.*



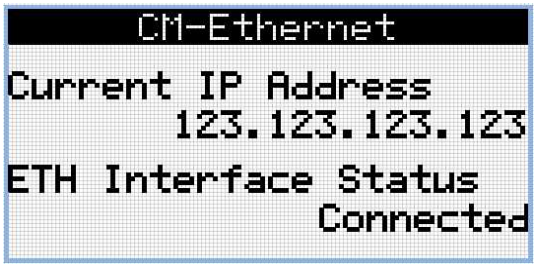


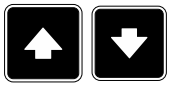
Note: *Use Up and Down button to move between measurement pages.*





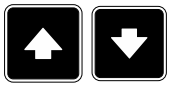
Note: *Use Up and Down button to move between measurement pages.*



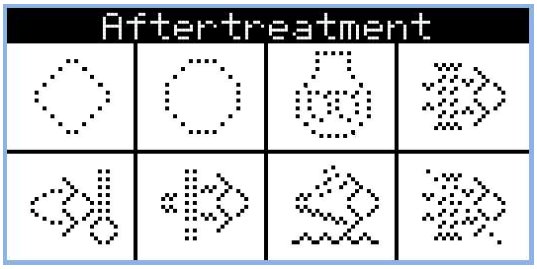


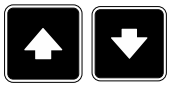
Note: *Use Up and Down button to move between measurement pages.*



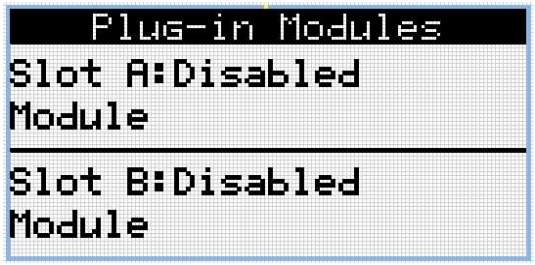


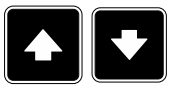
Note: *Use Up and Down button to move between measurement pages.*





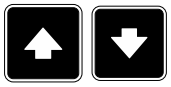
Note: *Use Up and Down button to move between measurement pages.*





Note: *Use Up and Down button to move between measurement pages.*



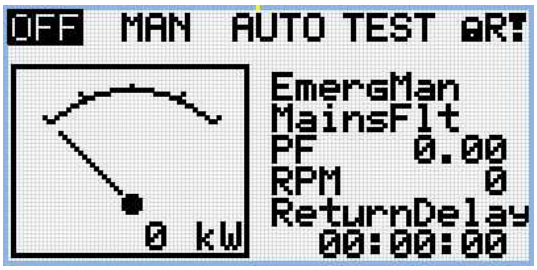


Note: *Use Up and Down button to move between measurement pages.*

Note: *From all of these pages it is possible to switch seamlessly to the setpoint group page by pressing Page button.*

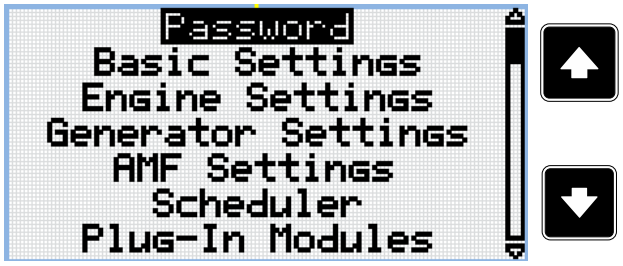
Note: *There can be some additional screens and also some screens can be hidden. Screen's visibility depends on actual configuration (usage of extension or communication modules, ECU, etc.).*

Setpoint Screens





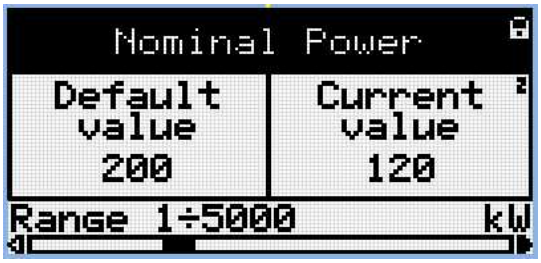
Note: *From all measurement pages we can fluently go to the setpoint group page by pressing Page button.*



Note: *Use Up and Down button to select required setpoint group.*



Note: *Use Enter button to enter selected setpoint group.*

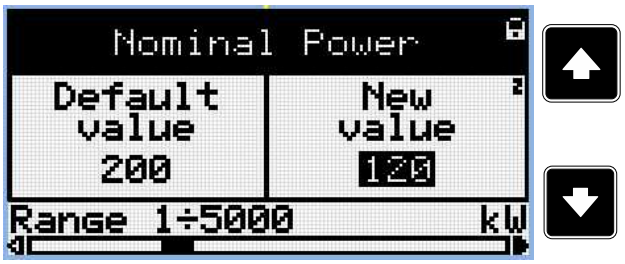




Note: *Use Left and Right button to select required setpoint.*



Note: *Use Enter button to enter selected setpoint.*



Note: *Use Up and Down button to set required value of selected setpoint.*



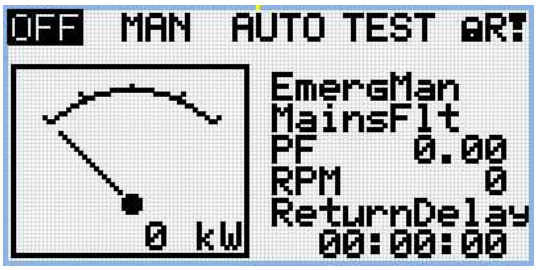
Note: *Use Enter button to confirm adjusted value of setpoint.*



Note: *Use Page button to discard changes, to set setpoint to previous value and to return to the list of setpoints of selected group.*

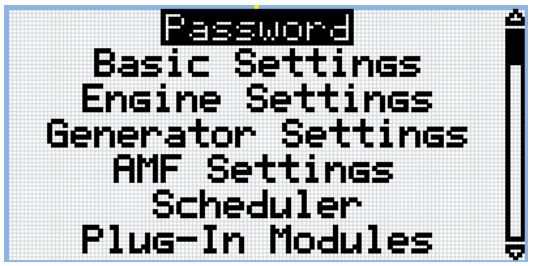
IMPORTANT: Cannot change setpoint? Setpoints marked with an padlock are password protected. Enter password as described in the chapter **Password (page 85).**

History Log



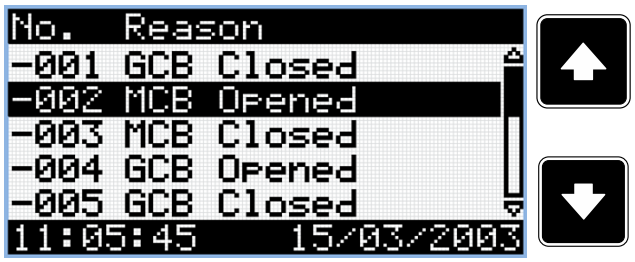


Note: *From all measurement pages we can fluently go to the setpoint group page by pressing Page button.*





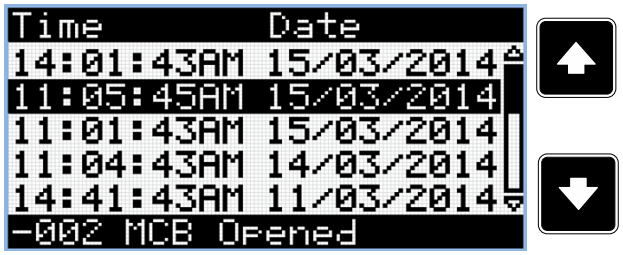
Note: *From setpoint group page we can fluently go to the history log pages by pressing Page button.*



Note: *Use Up and Down button to select required alarm reason.*



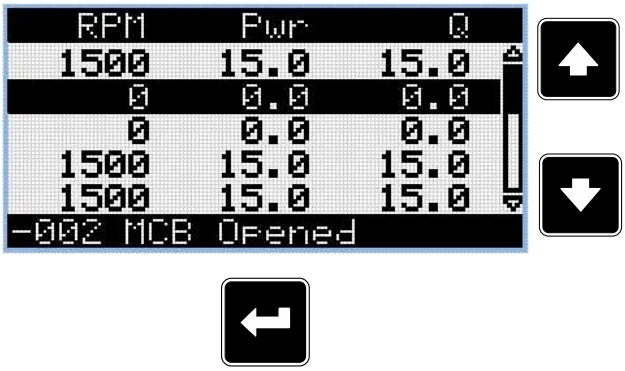
Note: *Use Enter button to move to the next page of history log.*



Note: *Use Up and Down button to select required alarm reason.*



Note: *Use Enter button to move to the next page of history log.*



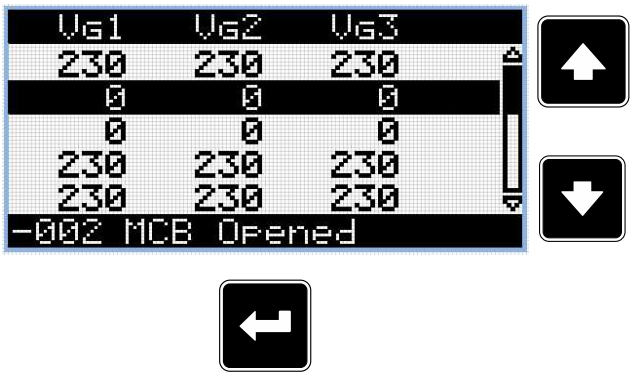
Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



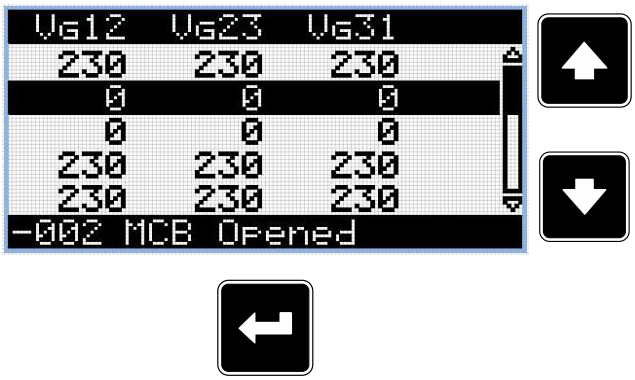
Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



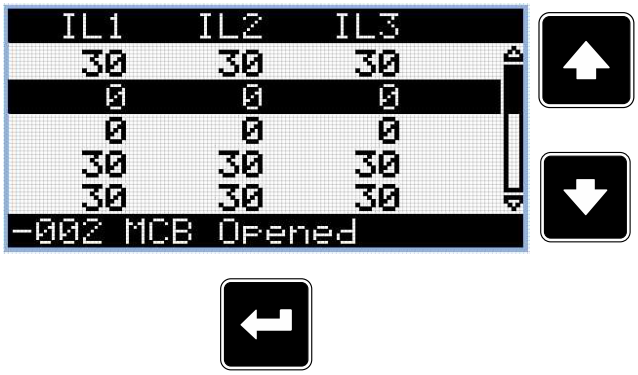
Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



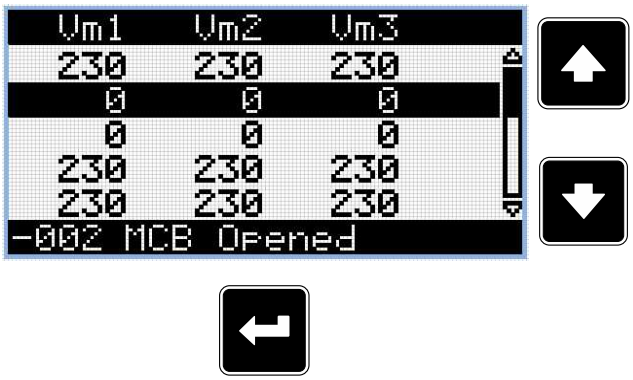
Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



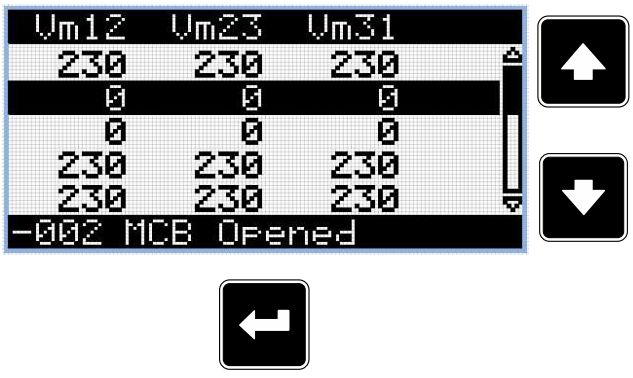
Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



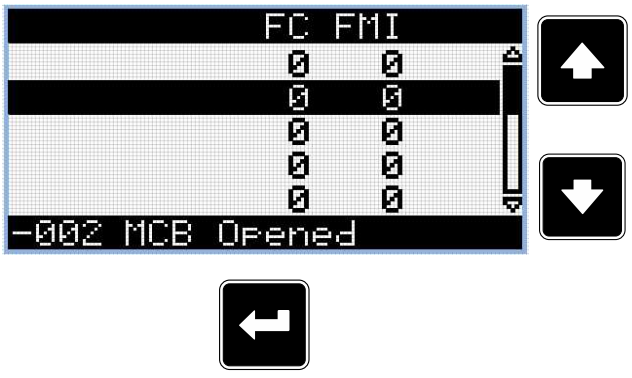
Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



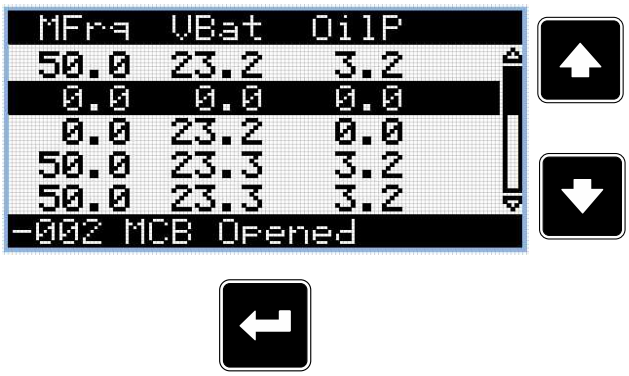
Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



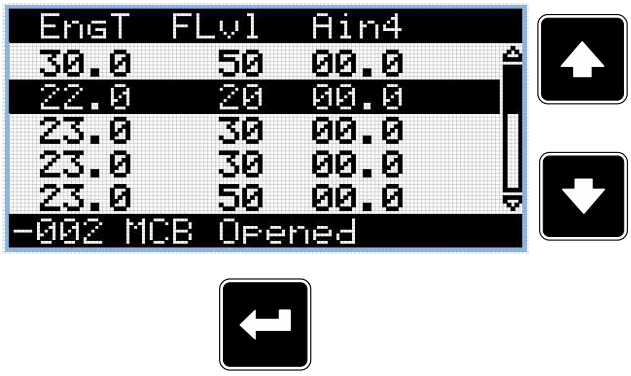
Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



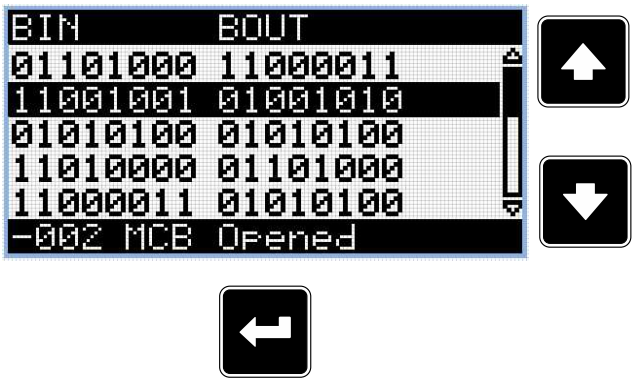
Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the next page of history log.*



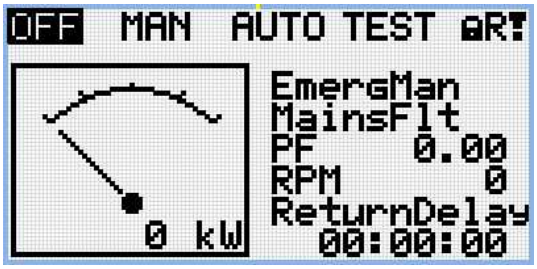
Note: *Use Up and Down button to select required alarm reason.*

Note: *Use Enter button to move to the first page of history log.*

IMPORTANT: The records are numbered in reverse order, i.e. the latest (newest) record is "0" and older records have "-1", "-2" etc.

Note: *This is only basic history record. There can be some additional screens in case that in controller is extension module or ECU is configured. Also it depends on connection type.*

5.3.3 Browsing alarms





Note: *Use Up button to move to alarmlist from main measurement screen.*

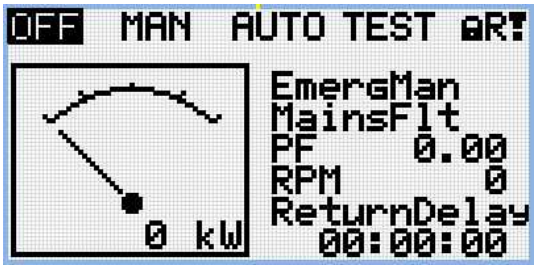


- Active alarms are displayed as white text on black background. It means the alarm is still active, i.e. the appropriate alarm conditions are still present.
- Inactive alarms are displayed as black text on white background. It means the alarm is no more active, i.e. the appropriate alarm conditions are gone.
- Not confirmed alarms are displayed with an asterisk. It means the alarm is still not acknowledged (confirmed).
- ECU alarms: SPN/FMI/OC/SC
  - SPN - Suspect parameter number
  - FMI - type of protection
  - OC - number of errors
  - SC - source of error



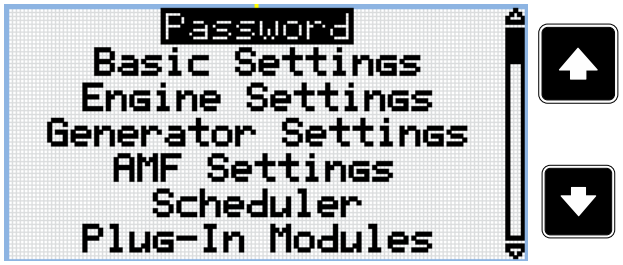
5.3.4 Password

Enter password





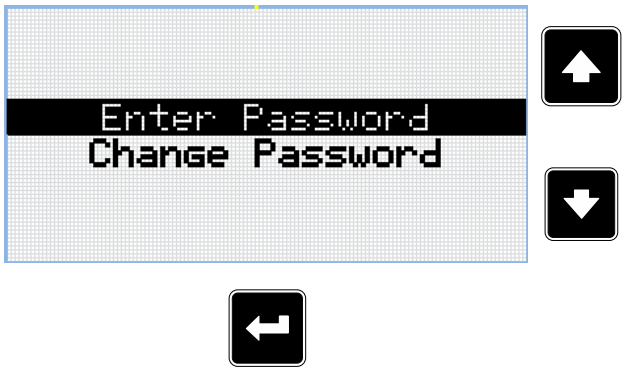
Note: *From all measurement pages we can fluently go to the setpoint group page by pressing Page button.*



Note: *Use Up and Down button to select setpoint group Password.*

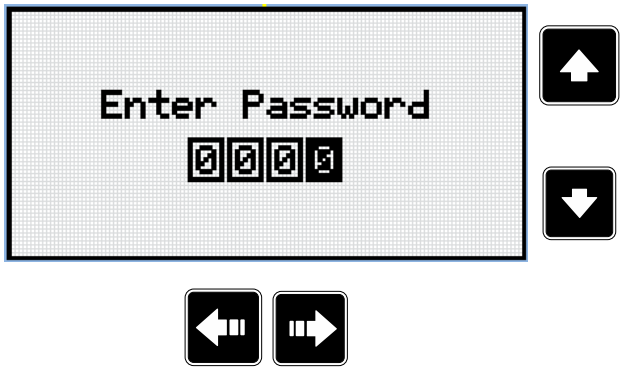


Note: *Use Enter button to enter setpoint group Password.*



Note: *Use Up and Down button to select Enter Password.*

Note: *Use Enter button to enter selected setpoint.*



Note: *Use Up and Down button to set required value of selected setpoint.*

Note: *Use Left and Right button to move between digits.*

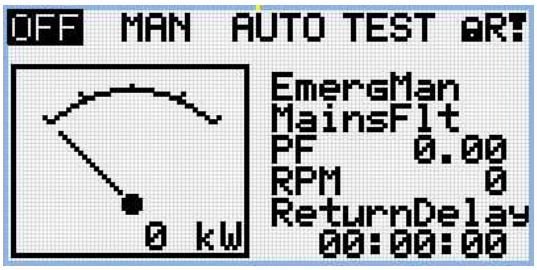


Note: *Use Enter button to confirm the password or Page button to cancel entering the password.*



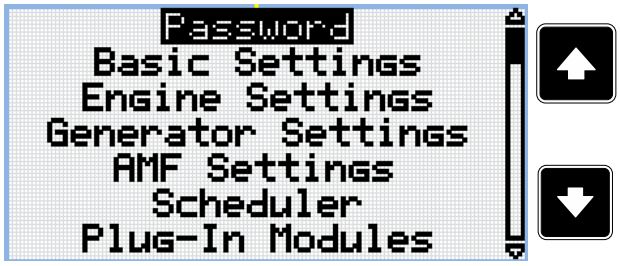
Note: *In case that invalid password is entered, the controller shows Invalid password screen. Use Page button to go back to menu.*

Change password





Note: *From all measurement pages we can fluently go to the setpoint group page by pressing Page button.*



Note: *Use Up and Down button to select setpoint group Password.*



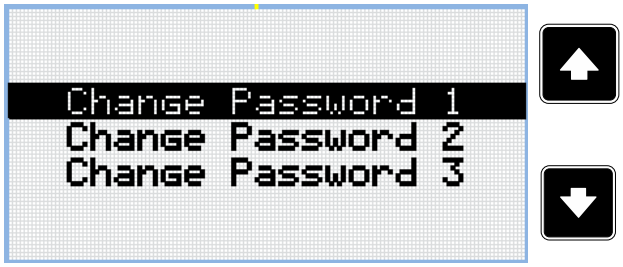
Note: *Use Enter button to enter setpoint group Password.*



Note: *Use Up and Down button to select Change Password.*



Note: *Use Enter button to enter selected setpoint.*



Note: *Use Up and Down button to select required level of password.*



Note: *Use Enter button to enter selected setpoint.*



Note: *Use Up and Down button to set required value of password.*

Note: *Use Left and Right button to move between digits.*

Note: *After setting new password use Enter button to confirm adjusted password.*



Note: *Use Up and Down button to set required value of password again.*

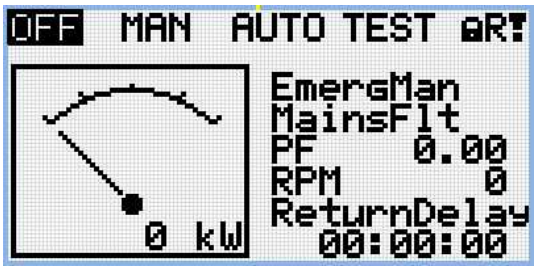
Note: *Use Left and Right button to move between digits.*

Note: *After setting new password again use Enter button to confirm adjusted password or Page button to discard changes and to cancel changing password.*



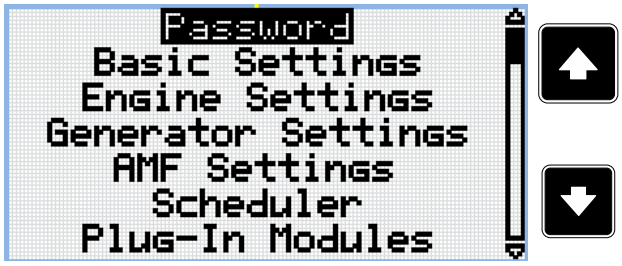
Note: *Before changing the password controller has to be unlocked. In case that controller is locked, the controller shows Password required screen. In that case the password has to be entered before changing the password.*

Log out from controller





Note: *From all measurement pages we can fluently go to the setpoint group page by pressing Page button.*



Note: *Use Up and Down button to select setpoint group Password.*



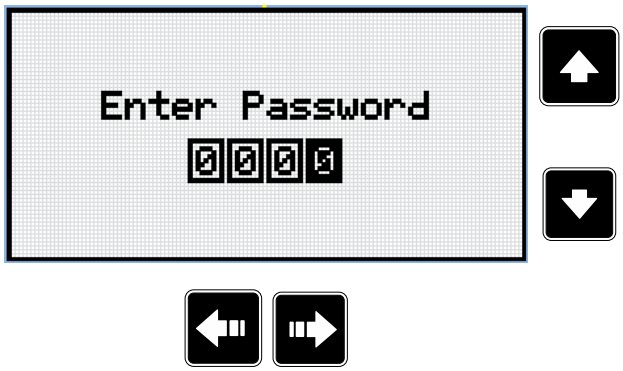
Note: *Use Enter button to enter setpoint group Password.*



Note: *Use Up and Down button to select Enter Password.*



Note: *Use Enter button to enter selected setpoint.*



Note: *Use Up and Down button to set required value of selected setpoint.*

Note: *Use Left and Right button to move between digits.*

Note: *Enter invalid password to log out from controller.*



Note: *In case that invalid password is entered, the controller shows Invalid password screen. Use Page button to go back to menu.*

Lost Password

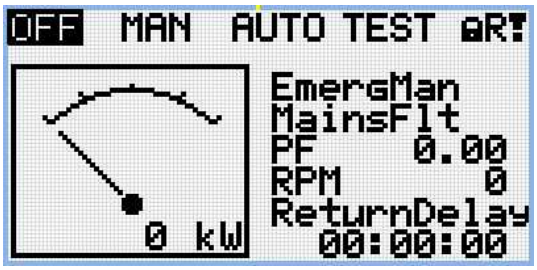
> **IMPORTANT: Display the information screen containing the serial number and password decode number as described in the chapter Information screen (page 91) and send them to your local distributor.**

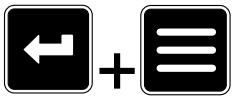
Password break protection

The controller password is protected against breaking by brute force. The protection works at every controller interface separately.

1. When an invalid password is entered 5 times after each other, independently on the time period elapsed between the attempts, the controller will be blocked after the 5th unsuccessful attempt for 1 minute at the particular interface.
2. While the controller is blocked it refuses any further attempts to enter password.
3. When unblocked again the controller accepts one attempt to enter password. If the password is incorrect again the controller will be blocked for 2 minutes.
4. Each further attempt to enter invalid password will double the blocking time, but maximum blocking time is 20 minutes.
5. When incorrect password is entered 100-times after each other the controller is blocked forever and the password reset procedure is required to unblock it.

5.3.5 Information screen





Note: *On Main measurement screen press Enter and Page button together. Enter button has to be pressed first.*



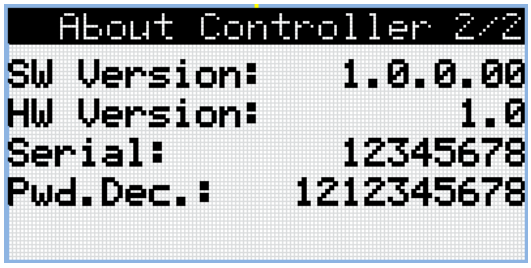


Note: *Use Page button to move to the next page.*





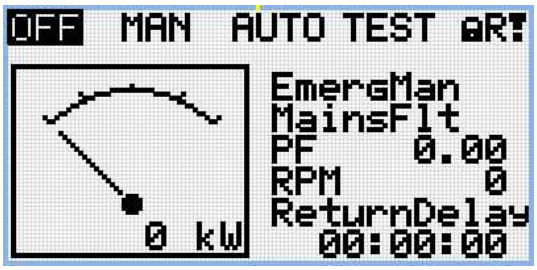
Note: *Use Page button to move to the next page.*

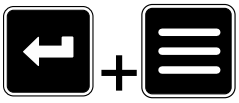




Note: *Use Up button to move back to main measurement screen.*

5.3.6 Language selection





Note: *On Main measurement screen press Enter and Page button together. Enter button has to be pressed first.*



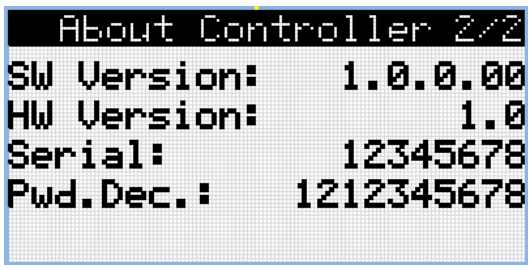


Note: *Use Page button to move to the next page.*





Note: *Use Page button to move to the next page.*





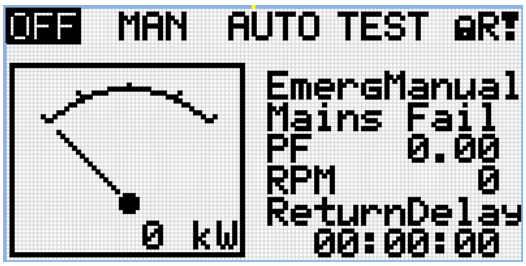
Note: *Use Page button to move to the next page.*



Note: *Use Up and down button to select required language.*

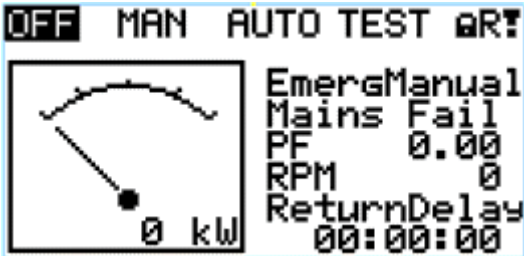
Note: *Use Enter button to confirm selected language.*

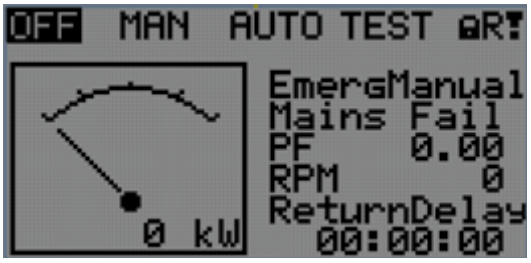
5.3.7 Display contrast adjustment



Note: *On any measurement screen press Enter and Down button together for lower contrast.*

Note: *On any measurement screen press Enter and Up button together for higher contrast.*





Note: *After setting a contrast, no another action is needed.*

back to Controller setup

5.4 Remote Display

This chapter describes Remote display firmware IL3-RD, which is designed as a remote signaling and control software for InteliLite family controllers. It is the optional software which is possible to upload into controller instead of standard controller's firmware.

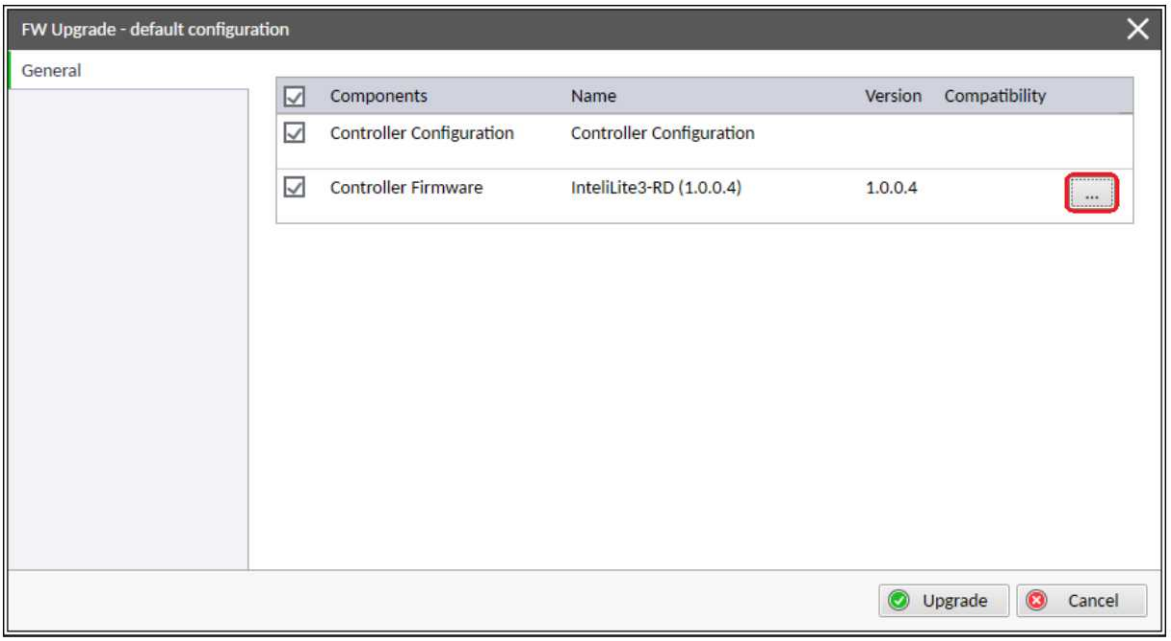
5.4.1 General description

Remote display software works as “remote display and control” for the Master InteliLite family controller. Gen-set can be controlled using Remote display and Master controller simultaneously and independently. All Remote display screens (Measurement screens, Setpoint screens and History Log) displays the same data as Master controller. Front panel buttons on both controllers work the same way. All remote display LEDs shows the same state as corresponding LEDs on Master controller.

5.4.2 IL3-RD Firmware installation

The IL3-RD Remote display firmware is installed in the same way as any other InteliLite firmware using InteliConfig PC tool. Reverting Remote display controller back to regular gen-set controller is carried out the same way.

Note: *InteliConfig shows the most compatible and the most recent firmware as default option. Thus, it is necessary use “More options” (…) button to pick IL3-RD firmware for uploading to controller. (See details on picture below.)*



Note: *IL3-RD consists firmware only, there is no archive included.*

Note: *When IL3-RD firmware is uploaded to controller there is only possible connect InteliConfig using USB connection. InteliConfig serves only for firmware update when connected to Remote display. There is no Master controller SCADA displayed, no possibility to adjust Setpoints, display Values etc.*

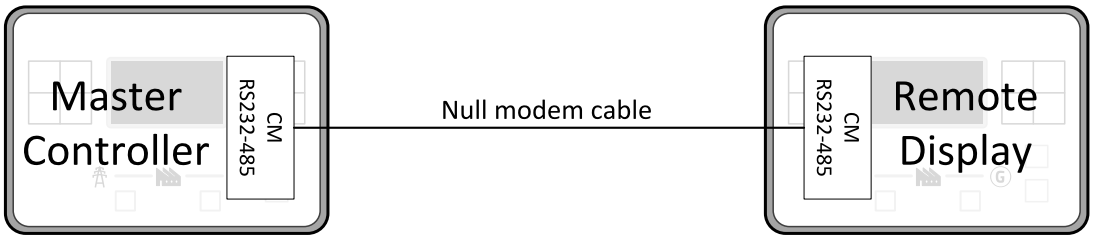
Note: *Please refer to InteliConfig Global Guide for details about firmware uploading to controller.*

5.4.3 Wiring

IL3-RD can be connected to InteliLite family controller via external RS232 or RS485 communication line on CM-232-485 communication module. It is possible to connect only up to two Remote displays to one Master controller, if they are using different communication COMs. To connect two or more remote displays to one communication line (e.g. RS485) is not possible. Using one Remote display it is possible to monitor only one Master controller at the time.

5.4.4 Interconnection variants

RS232

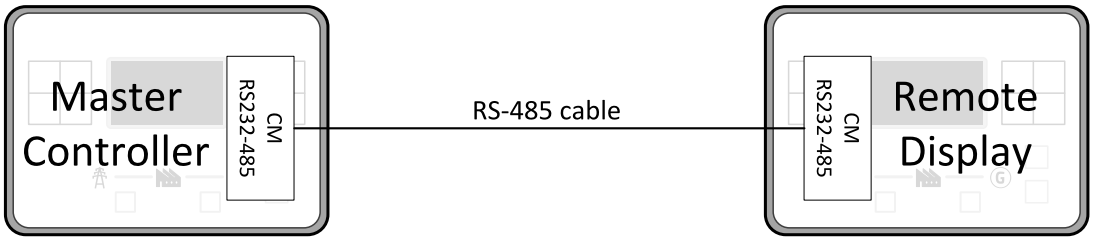


It is necessary to use CM-RS232-485 communication module on both Master controller and Remote display. COM 1 communication channel is used with these settings:

- COM 1 Mode: Direct
- COM 1 Communication Speed: 57600 or 115200 bps
- Controller Address: 1 – 32

The maximal distance between Master controller and Remote display is 10 m for RS-232 connection. It is recommended to use standard Null modem cable (crossover cable), although three wires (TxD, RxD, GND) RS-232 connection is enough for communication.

RS485



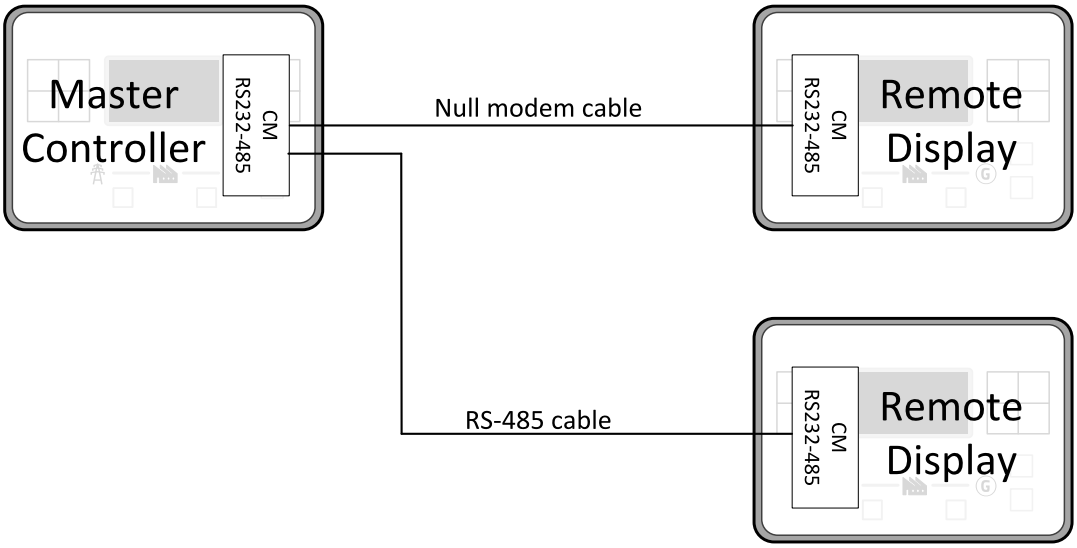
It is necessary to use CM-RS232-485 communication module on both Master controller and Remote display. COM 2 communication channel is used with these settings:

- COM 2 Mode: Direct
- COM 2 Communication Speed: 57600 or 115200 bps
- Controller Address: 1 – 32

The maximal distance between Master controller and Remote display is 1200 m for RS-485 connection. It is recommended to use shielded twisted-pair cables that comply with the EIA RS-485 standard to reduce interference and to achieve maximal distance.

RS232 + RS485

It is possible to combine two previous ways of interconnection and connect two Remote display to one Master controller concurrently. All the parameters and settings are the same as mentioned above.



5.4.5 Connection process

Remote display after power on automatically tries connect to last known Master (if such configuration exist in Remote display). Otherwise Remote display starts to search for any Master controller connected. It starts to search on COM 2 (RS-485) using Master controller address 1 – 32 and continues with COM 1 (RS-232). Remote display tries two communication speeds 57600 bps and 115200 bps.

During this autodetection process the message “Trying to connect” is displayed on screen. This process takes approx. one minute.

When incompatible configuration type is found in detected controller, the message “Unknown cfg format COM x Addr yy” is displayed on screen for 5 seconds and detecting continues with next address in the range.

When detecting finishes with no compatible Master controller found, the message “No connection” is displayed on screen for 5 seconds and detecting process starts from the beginning and continues until compatible master controller is found.

Not supported types of controllers or controllers that are not properly communicating are skipped during the search.

5.4.6 Connection troubleshooting

There are few reasons why Remote display cannot connect to Master controller:

- Not supported type of Master controller is connected.
- Not supported firmware in Master controller.
- Configuration table error in Master controller.
- Wrong settings of setpoint COM x Mode in master controller.
- Wrong settings of setpoint COM x Communication Speed in master controller.
- Wrong connection, wiring, communication fail.

5.4.7 Function description

Remote display software works as “remote display and control” for the Master InteliLite family controller. Gen-set can be controlled using Remote display and Master controller simultaneously and independently. All Remote display screens (Information screens, Measurement screens, Setpoint screens and History Log) displays the same data as Master controller. Front panel buttons on both controllers work the same way. All remote display LEDs shows the same state as corresponding LEDs on Master controller. User can switch screens, enter or set password, adjust setpoints, change language, change Configuration Level, change display contrast and view history records.

Note: *It is recommended to use the same type and model of controller for Master and for Remote display. Only in such case is assured the proper function of all buttons, LED diodes and display.*

> **Example:** When AMF controller HW type is used as a Master controller and MRS controller HW type is used for Remote display there is no possibility to control MCB in MAN mode as there is no MCB button on MRS controller. However, in general all this not recommended combinations works with similar to above mentioned limitation considered.

Master device is always able to work without connected Remote display. Disconnecting of the serial line between Master controller and Remote display has no effect to the Master controller.

When the serial line between Master controller and Remote display is disconnected, or communication cannot be established, Remote display shows it’s own Init screen and message “Trying to connect” and all LEDs are off.

Once remote display finds compatible master it shows message “Cfg processing” and downloads configuration table from master controller. After the configuration from Master controller is downloaded Remote display is reinitiated, jump to master controllers Main measurement screen and regular operation is started.

It is possible to switch to Remote display’s own Init screen to check IL3-RD FW version and serial number of used controller and communication status by press and hold Page button for more than 3 seconds.

5.4.8 Firmware compatibility

Remote Display

Remote Display FW is possible to upload into following controllers:

- InteliLite AMF25
- InteliLite AMF20
- InteliLite MRS16
- InteliLite MRS11
- InteliLite 9

Remote Display vs. Master controller

Remote Display	Master controller		
RD FW ver.	**InteliLite (all versions)**	**InteliLite 9**	**InteliGen 200**
1.0.0	FW ver. 1.5.x	FW ver. 1.1.x	FW ver. 1.1.x
	FW ver. 1.6.x		FW ver. 1.2.x
	FW ver. 1.7.x		FW ver. 1.3.x
	FW ver. 1.8.x		

5.5 Functions

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5.5.1 Start-stop sequence

State	Condition of the transition	Action	Next state
Ready	Start request	**PRESTART (PAGE 621)** on **Prestart Time (page 207)** counter started	Prestart
	RPM > 2 or Oil pressure > **Starting Oil Pressure (page 208)** or Generator voltage > 10V or D+ voltage is higher than **D+ Treshold (page 222)**		Stop (Stop fail)
	OFF Mode selected or Shutdown alarm active		Not Ready

Not Ready	RPM < 2, Oil pressure not detected, Generator voltage < 10V, D+ not Active no shutdown alarm active, other than OFF Mode selected		Ready
Prestart	Prestart time elapsed	**Fuel Solenoid (page 602)** on, **Starter (page 633)** on, **Maximum Cranking Time (page 206)** counter started	Cranking
Cranking	RPM > Starting RPM	**Starter (page 633)** off, **Prestart (page 621)** off	Starting
	D+ input activated or oil pressure detected or Generator voltage > 25% Nominal voltage	**Starter (page 633)** off, **Prestart (page 621)** off	Cranking
	Maximum Cranking Time (page 206), 1st attempt	**Starter (page 633)** off, **Fuel Solenoid (page 602)** off, **Stop Solenoid (page 634)** on, **Cranking Fail Pause (page 206)** timer started	Crank pause
	Maximum Cranking Time (page 206) elapsed, last attempt	**Starter (page 633)** off, **Prestart (page 621)** off	Shutdown (Start fail)
Crank pause	**Cranking Fail Pause (page 206)** elapsed	**Starter (page 633)** on, **Fuel Solenoid (page 602)** on, **Stop Solenoid (page 634)** off, **Maximum Cranking Time (page 206)** counter started	Cranking
Starting	**Idle Time (page 214)** elapsed	**Minimal Stabilization Time (page 216)** and **Maximal Stabilization Time (page 217)** counter started	Running
	any shutdown condition	**Fuel Solenoid (page 602)** off, **Stop Solenoid (page 634)** on	Shutdown
	all cranking attempts elapsed	**Fuel Solenoid (page 602)** off, **Stop Solenoid (page 634)** on	Shutdown (Start fail)
Running	Stop request	**Ready To Load (page 623)** off,**Cooling Time (page 219)** counter started	Cooling
	RPM = 0 or any other shutdown condition	**Ready To Load (page 623)** off, **Fuel Solenoid (page 602)** off	Shutdown
	GCB Close/Open (page 604) closed		Loaded
Loaded	**GCB Close/Open (page 604)** opened		Running
	RPM = 0 or any other shutdown condition	**Fuel Solenoid (page 602)** off, **Stop Solenoid (page 634)** on, **Ready To Load (page 623)** off,	Shutdown

Cooling	**Cooling Time (page 219)** elapsed	**FUEL SOLENOID (PAGE 602)** off, **STOP SOLENOID (PAGE 634)** on	Stop
	RPM = 0 or any other shutdown condition	**FUEL SOLENOID (PAGE 602)** off, **STOP SOLENOID (PAGE 634)** on	Shutdown
	Start request	**READY TO LOAD (PAGE 623)** on	Running
Stop	RPM = 0, Oil pressure not detected, Generator voltage < 10V, D+ not active		Ready
	If at least one of engine running indication is detected when **Stop Time (page 219)** elapsed.		Stop (Stop fail)

Note: *If all generator parameters are OK and **Minimal Stabilization Time (page 216)** elapsed, indicates that GCB is possible to close. In AUTO Mode GCB is closed in this moment automatically.*

Note: *The start-up sequence can be interrupted in any time by stop request*

5.5.2 AMF sequence

State	Condition of the transition	Action	Next state
Mains operation	Mains failed or **MCB FEEDBACK (PAGE 560)** dropout, **MCB Opens On (page 263)** = Mains Fail	**MCB CLOSE/OPEN (PAGE 614)**off, **Emergency Start Delay (page 255)** timer started	Mains failure
	Mains failed or **MCB FEEDBACK (PAGE 560)** dropout, **MCB Opens On (page 263)** = Gen Run	**Emergency Start Delay (page 255)** timer started	Mains failure
Mains failure	Mains voltage and frequency OK, **MCB Opens On (page 263)** = Mains Fail	After elapsing **MCB Close Delay (page 257)** **MCB CLOSE/OPEN (PAGE 614)** on	Mains operation
	Mains voltage and frequency OK, **MCB Opens On (page 263)** = Gen Run	None	Mains operation
	Emergency Start Delay (page 255) elapsed, **MCB Opens On (page 263)** = Mains Fail	Engine start sequence performed, then **GCB CLOSE/OPEN (PAGE 604)** on	Island operation
	Emergency Start Delay (page 255) elapsed, **MCB Opens On (page 263)** = Gen Run	Engine start sequence performed, then **MCB CLOSE/OPEN (PAGE 614)** off, time delay **Transfer Delay (page 256)** performed and **GCB CLOSE/OPEN (PAGE 604)** on	Island operation

Island operation	Mains voltage and frequency OK	**Mains Return Delay (page 255)** timer started	Mains return
Mains return	Mains failed		Island operation
	Mains Return Delay (page 255) elapsed	**GCB CLOSE/OPEN (PAGE 604)** off, then after **Transfer Delay (page 256) MCB CLOSE/OPEN (PAGE 614)** on and then engine stop sequence performed	Mains operation

Note: *Mains failed means mains over/under -voltage, over/under -frequency, voltage asymmetry (preset delay must elapse)*

Note: *If during start-up sequence mains returns, then MCB is reclosed with delay **MCB Close Delay (page 257)**(if opened, depending on **MCB Opens On (page 263)** setpoint) and start-up sequence is interrupted.*

Note: *If mains fails during stop procedure (cooling) again, stop sequence is interrupted, MCB opened and GCB re-closed with **Transfer Delay (page 256)**.*

5.5.3 Operating Modes

Selecting the operating mode is done through Left and Right buttons on the front panel or by changing the **Controller mode (page 198)** setpoint (from the front panel or remotely).

Note: *If this setpoint is configured as password-protected, the correct password must be entered prior to attempting to change the mode.*

Note: *The mode cannot be changed if Access Lock input is active.*

The following binary inputs can be used to force one respective operating mode independent of the mode setpoint selection:

- **Remote OFF (page 564)**
- **Remote TEST (page 565)**
- **Remote MAN (page 563)**
- **Remote AUTO (page 563)**

If the respective input is active the controller will change the mode to the respective position according to the active input. If multiple inputs are active, the mode will be changed according to priorities of the inputs. The priorities match the order in the list above. If all inputs are deactivated, the mode will return to the original position given by the setpoint.

OFF

No start of the gen-set is possible .Controller stays in Not ready status and cannot be started any way. The MCB is closed permanently (**MCB Opens On (page 263)** = GENRUN) or is open or closed according to whether the mains is present or not (**MCB Opens On (page 263)** = MAINSFAIL). No AMF function will be performed. The buttons MCB I/O, GCB I/O, Start I and Stop O including the appropriate binary inputs for external buttons are not active.

IMPORTANT: When engine is running, it is not possible to switch gen-set to OFF mode.

MAN

The engine can be started and stopped manually using the Start and Stop buttons (or external buttons wired to the appropriate binary inputs) in MAN mode. When the engine is running, GCB can be closed. Also MCB can be closed and opened manually using the MCB button, regardless of whether the mains are present or not. No auto start is performed.

Note: *The controller provides interlock between GCB and MCB, it means it is never possible to close both CB together.*

AUTO

The controller does not respond to buttons Start , Stop , MCB ON/OFF and GCB ON/OFF . Engine start/stop request is evaluated form Mains failure/return.

Note: *When the AMF function will start the engine than the engine will be running at least for the time which is defined in* ***Mains Return Delay (page 255)*** *setpoint, even if the mains would return in the meantime.*

TEST

The gen-set will be started when the controller is put to TEST mode and will remain running unloaded. If a mains failure occurs, the MCB will be opened and after **Transfer Delay (page 256)** the GCB will be closed and the gen-set will supply the load. After the mains have recovered, the delay **Mains Return Delay (page 255)**l will count down and if it elapses and the mains is still ok, the controller will transfer the load back to the mains after **Transfer Delay (page 256)** and the gen-set will remain running unloaded again until the mode is changed.

Remote test on load

When binary input is closed, the controller automatically transfers load from the mains to the gen-set. See LBI **REM TEST ON LOAD (PAGE 565)**.

5.5.4 Engine start

Diesel engine

The setpoint **Fuel Solenoid (page 205)** has to be switched to the Diesel position.

- After the command for start is issued (pressing Start button in MAN mode, auto start condition is fulfilled in AUTO mode or controller is switched to TEST mode), outputs **PRESTART (PAGE 621)** and **GLOW PLUGS (PAGE 609)** are energized for time period given by the setpoints **Prestart Time (page 207)** and **Glow Plugs Time (page 208)**.
- After **Prestart Time (page 207)** and **Glow Plugs Time (page 208)**, the output **FUEL SOLENOID (PAGE 602)** is energized and after **Fuel Solenoid Lead (page 214)** the starter of motor is activated by energizing the output **STARTER (PAGE 633)**.
- When one or more of following conditions are met, the starter output is de-energized:
  - The engine speed exceeds the value of **Starting RPM (page 207)**, or
  - One of **Additional running engine indications (page 132)** signals becomes active.
- The controller remains in the Starting phase until the engine speed exceeds the value of **Starting RPM (page 207)**, after that it is considered as started and the Idle period will follow.
- The maximum duration that the output **STARTER (PAGE 633)** is energized is determined by the setpoint **Maximum Cranking Time (page 206)**. If the engine does not start within this period, the output **STARTER**

(PAGE 633) is de-energized and a pause with length determined by **Cranking Fail Pause (page 206)** will follow. PRESTART (PAGE 621) and GLOW PLUGS (PAGE 609) outputs are active during the pause. After the pause has elapsed, the next start attempt is executed. The number of start attempts is given by the setpoint **Cranking Attempts (page 205)**.

- Once the engine is started, the Idle period follows. The binary output IDLE/NOMINAL (PAGE 612) remains inactive (as it was during the start). The idle period duration is adjusted by the setpoint **Idle Time (page 214)**. When controller is in the MAN mode, it is possible to finish the **Idle Time (page 214)** count down by pushing the Start button.
- After the idle period has finished, the output IDLE/NOMINAL (PAGE 612) is activated and the start-up sequence is finished. The **Stabilization (page 107)** phase follows.

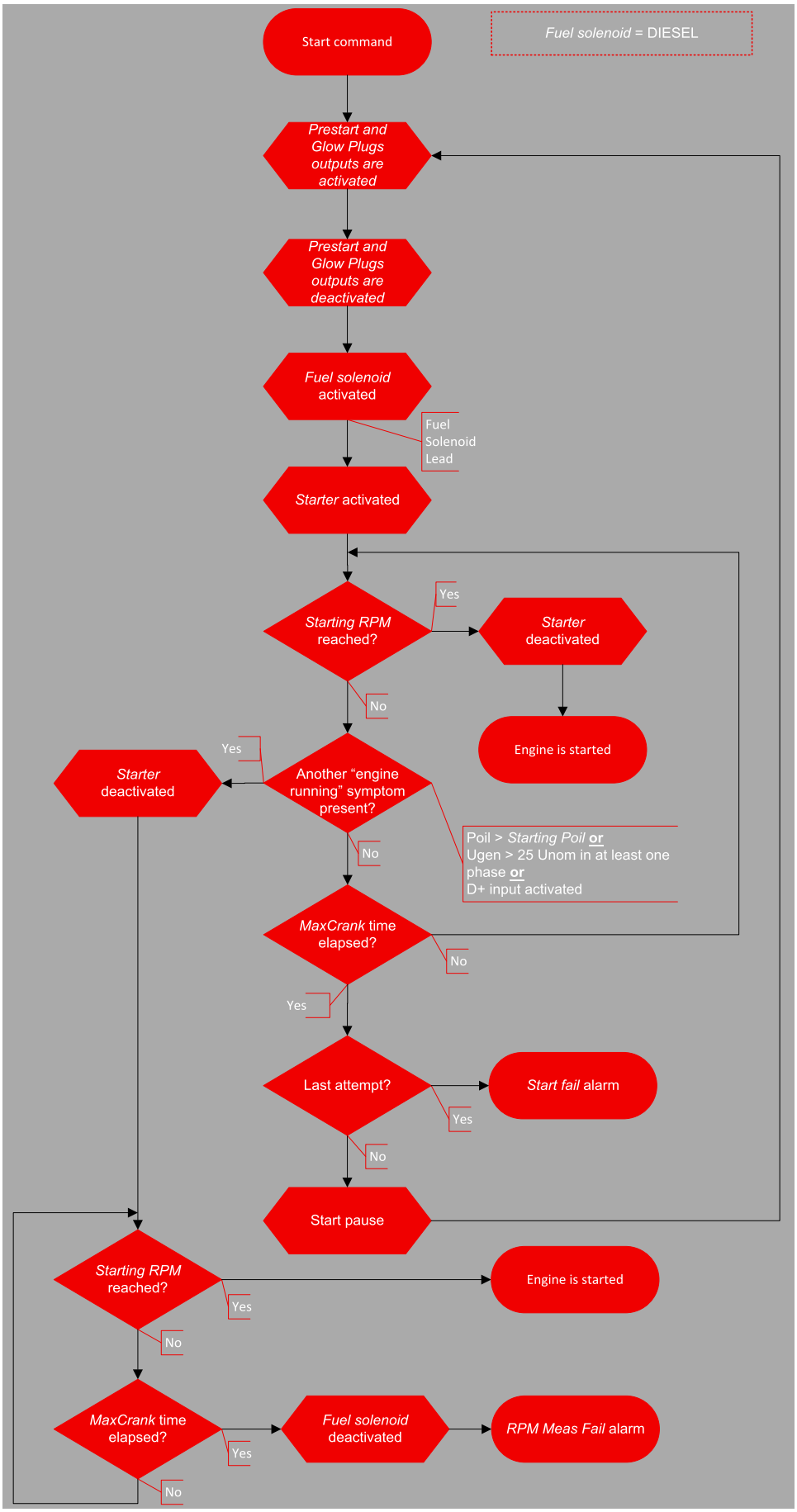


Image 5.13 Flowchart of start of diesel engine

GAS engine

The setpoint **Fuel Solenoid (page 205)** has to be switched to the Gas position.

- After the command for start is issued (pressing Start button in MAN mode, auto start condition is fulfilled in AUTO mode or controller is switched to TEST mode), outputs **PRESTART (PAGE 621)** and **GLOW PLUGS (PAGE 609)** are energized for time period given by the setpoints **Prestart Time (page 207)** and **Glow Plugs Time (page 208)**.
- After **Prestart Time (page 207)** and **Glow Plugs Time (page 208)**, starts countdown of **Sd Ventilation Time (page 218)**
- After **Sd Ventilation Time (page 218)**, the starter of engine is activated by energizing the output **STARTER (PAGE 633)**.
- When the engine speed exceeds 30RPM, the outputs **FUEL SOLENOID (PAGE 602)** and **IGNITION (PAGE 612)** are energized.
- When the engine speed exceeds value of **Starting RPM (page 207)**, the starter of engine is de-energized, the engine is considered as started and the Idle period will follow.

IMPORTANT: Additional running engine indications (page 132) signals are not evaluated during the start of a gas engine. The Pickup must be used in any case!

- The maximum duration that the output **STARTER (PAGE 633)** is energized is determined by the setpoint **Maximum Cranking Time (page 206)**. If the engine does not start within this period, outputs **STARTER (PAGE 633)** and **FUEL SOLENOID (PAGE 602)** are de-energized and a pause with length determined by **Cranking Fail Pause (page 206)** will follow. **PRESTART (PAGE 621)**, **GLOW PLUGS (PAGE 609)** and **IGNITION (PAGE 612)** outputs are active during the pause. After the pause has elapsed, the next start attempt is executed. The number of start attempts is given by the setpoint **Cranking Attempts (page 205)**.
- Once the engine is started, the Idle period follows. The binary output **IDLE/NOMINAL (PAGE 612)** remains inactive (as it was during the start). The idle period duration is adjusted by the setpoint **Idle Time (page 214)**.
- After the idle period has finished, the output **IDLE/NOMINAL (PAGE 612)** is activated and the start-up sequence is finished. The **Stabilization (page 107)** phase follows.

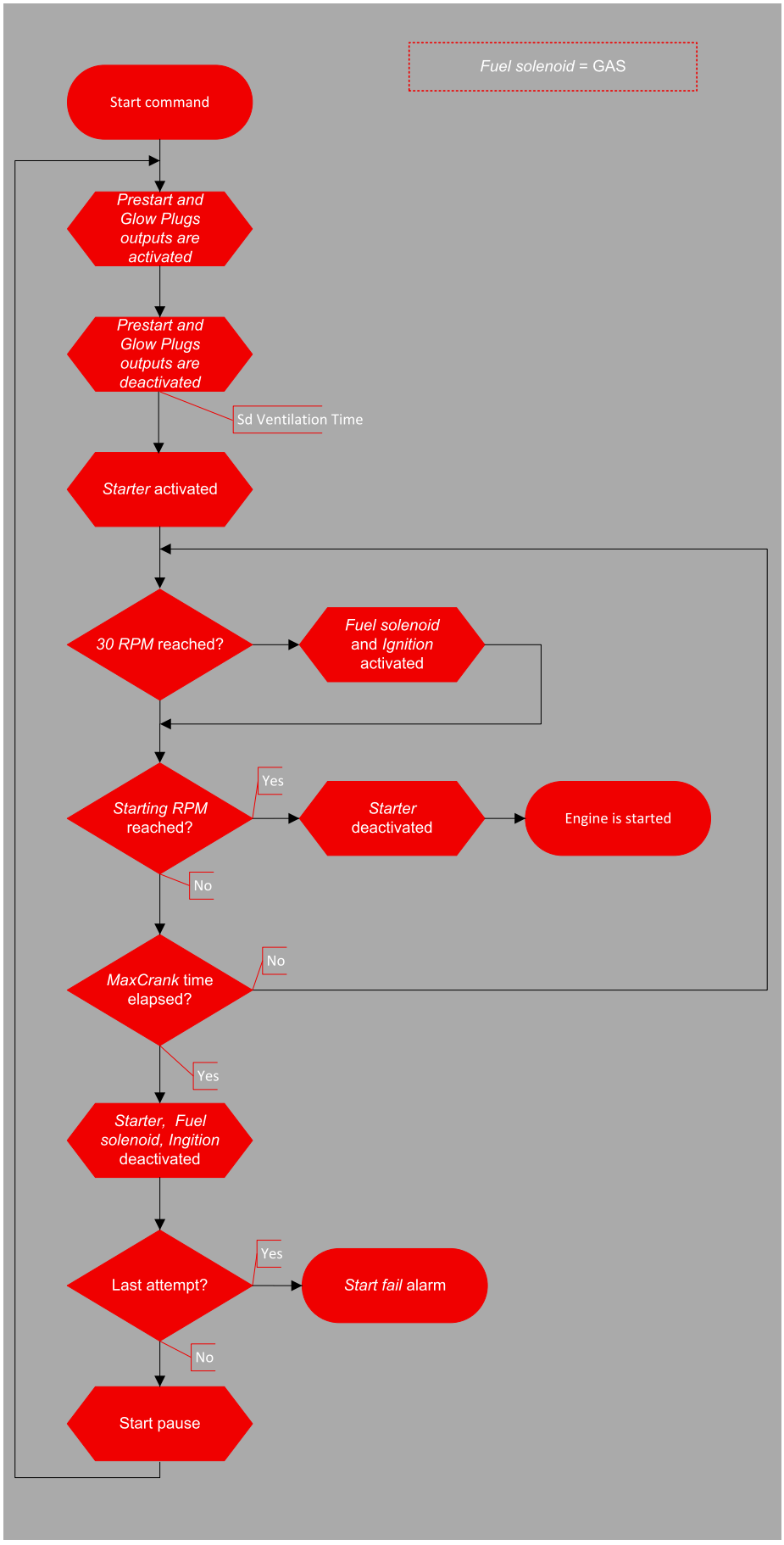


Image 5.14 Flowchart of start of gas engine

5.5.5 Stabilization

When the **Engine start (page 102)** sequence is finished, the gen-set goes into the stabilization phase. There are two timers (setpoints) in this phase:

- **Minimal Stabilization Time (page 216)** starts to count down just after the idle period has finished. Generator voltage and frequency are not checked (respective protections are not evaluated) and the GCB cannot be closed even if the generator voltage and frequency are within limits.
- **Maximal Stabilization Time (page 217)** starts to count down just after the idle period has finished. Generator voltage and frequency are not checked (respective protections are not evaluated) but, opposite to the previous timer, the GCB can be closed if generator voltage and frequency are within limits.

In situations where the GCB is closed automatically (AUTO, TEST modes), the closing of GCB will occur in the first moment when the generator voltage and frequency will get into limits and the **Minimal Stabilization Time (page 216)** has already elapsed.

In the event that the generator voltage or frequency are not within limits within the **Maximal Stabilization Time (page 217)** period, the appropriate protection(s) will be activated and the gen-set will be cooled down and stopped.

Note: *The limits for the generator voltage and frequency are given by setpoints in the **Group: Generator settings (page 242)**.*

Note: *The value of the **Minimal Stabilization Time (page 216)** setpoint has to be lower than the value of **Maximal Stabilization Time (page 217)** setpoint.*

5.5.6 Connecting to load

When the **Stabilization (page 107)** phase is finished, the gen-set can be connected to the load.

The command for connecting the gen-set to the load is issued either automatically (AUTO, TEST modes) or manually by pressing the GCB button. The following conditions must be valid:

- The gen-set is running and the **Minimal Stabilization Time (page 216)** timer has elapsed.
- The gen-set voltage and frequency are within limits.

5.5.7 MRS operation

The "MRS function" represents manual or remote start of gen-set. It is ideal for prime power applications.

The MRS procedure

When the start command is detected, the following steps are performed:

- The gen-set is started.
- GCB is closed and the gen-set begins to supply the load (in AUTO mode, otherwise GCB button has to be pressed)

When the stop command is detected, the following steps are performed:

- GCB is opened and the gen-set stops supply the load.
- After GCB is opened, the gen-set cools down and a stop.

5.5.8 AMF operation

The “AMF function” represents the automatic start in the event that the mains have failed and stop after the mains have been restored. The automatic start can be enabled or disabled by binary inputs **AMF Start Block**

(PAGE 526) or MAINS FAIL BLOCK (PAGE 559).

Note: *The AMF function works only in AUTO mode.*

Mains failure detection

The mains are considered as faulty when one or more of the following conditions are valid:

- The mains voltage is out of the limits given by the setpoints **Mains Undervoltage (page 258)** and **Mains Overvoltage (page 258)** for a time period longer than **Mains < > Voltage Delay (page 258)**.
- The mains voltage unbalance is out of limit given by setpoint **Mains Voltage Unbalance (page 259)** for a time period longer than **Mains Voltage Unbalance Delay (page 259)**.
- The mains frequency is out of the limits given by the setpoints **Mains Underfrequency (page 260)** and **Mains Overfrequency (page 259)** for a time period longer than **Mains < > Frequency Delay (page 260)**.
- The MCB close command was not successful and the alarm **Wrn MCB Fail (page 699)** was not reset.
- Phase rotation is incorrect.

Healthy mains detection

The mains are considered to be healthy when all of following conditions are valid:

- The mains voltage is within the limits given by the setpoints **Mains Undervoltage (page 258)** and **Mains Overvoltage (page 258)**.
- The mains voltage unbalance is within the limits given by the setpoint **Mains Voltage Unbalance (page 259)**.
- The mains frequency is within the limits given by the setpoints **Mains Underfrequency (page 260)** and **Mains Overfrequency (page 259)**.
- The alarm **Wrn MCB Fail (page 699)** is not active (if MCB feedback is active). This condition is not required if MCB is open (MCB feedback is inactive).
- Phase rotation is correct.

The AMF procedure

When the mains failure is detected, the following steps are performed:

- If the setpoint **MCB Opens On (page 263)** is set to Mains Fail, the MCB is opened
- The timer for automatic start of the gen-set **Emergency Start Delay (page 255)** begins to count down.
- After the timer has elapsed, the gen-set is started.

Note: *The automatic start of the gen-set due to AMF function can be disabled by the binary inputs AMF START BLOCK (PAGE 526) or MAINS FAIL BLOCK (PAGE 559).*

- If the setpoint **MCB Opens On (page 263)** is set to Gen Run, the MCB is opened once the generator voltage is within limits (after **Minimal Stabilization Time (page 216)** elapses).

Note: *If the mains are restored to health and the gen-set is still not connected to the load, the controller interrupts the startup process and closes back the MCB.*

- After **Transfer Delay (page 256)** elapses, the GCB is closed and the gen-set begins to supply the load.
- After the mains restored to normal, the timer **Mains Return Delay (page 255)** begins to count down.
- Maximum time between closing of MCB and opening GCB is given by the setpoint **Transfer Delay (page 256)**. After GCB is opened, the gen-set cools down and a stop.

IMPORTANT: Controller has this behavior only in AUTO mode!

5.5.9 Dual Operation

Dual operation - AMF

Dual operation - AMF consists 2 gen-sets and 1 mains. Principle of dual operation is in switching the gen-sets in supplying of load when there is a mains fail or LBI **REMOTE START/STOP (PAGE 564)** is activated on Master controller. Each controller measures mains and its gen-set. Interlock between all breakers (GCB1, GCB2 and MCB) is required. If there is fail of one gen-set, second gen-set will take the load.

MCB control from both controllers is not required. Slave controller in Dual Operation doesn't control MCB (MCB Close/Open is in open position). However it is recommended to be prepare to control MCB also from slave controller - in case of fail of Dual Operation, both controllers are switch to normal AMF operation.

IMPORTANT: Dual operation works only in AUTO mode.

IMPORTANT: Dual operation is in fail also during process of adjustment of setpoints. In this moment slave still tries to control MCB.

IMPORTANT: Setpoint MCB Opens On (page 263) has to be set-up to Mains Fail option.

IMPORTANT: LBI MAINS FAIL BLOCK (PAGE 559) can cause fail of dual operation system. In case of different states of mains on master and slave controllers, alarm Dual Operation Different Mains (page 702) is activated and gen-sets are switched to normal operation.

Note: *LBI **AMF START BLOCK (PAGE 526)** is evaluated on both controllers. When this LBI is activated, gen-set can't start in dual operation. Second gen-set (without active **AMF START BLOCK (PAGE 526)**) will start. Gen-sets are not swapping the load until this LBI is active. Behaviour is the same like with alarm of 2nd level.*

Note: *MCB Fail protection is not used in Slave controller during Dual Operation. MCB is controlled only via Master. Slave controller has MCB Close/Open in open position all the time during Dual Operation.*

Start/stop events

Event	Dual AMF
Mains Fail	Evaluated by Master only
LBI **REMOTE START/STOP (PAGE 564)**	Evaluated by Master only

Dual operation - MRS

Dual operation MRS consists 2 gen-sets. Principle of dual operation is in switching the gen-sets in supplying of load when **REMOTE START/STOP (PAGE 564)** is activated on Master controller (on slave controller this LBI has no function in Dual Operation). Each controller measures its gen-set. Interlock between all breakers (GCB1 and GCB2) is required. If there is fail of one gen-set, second gen-set will take the load.

IMPORTANT: Dual operation works only in AUTO mode.

IMPORTANT: Dual operation is in fail also during process of adjustment of setpoints.

IMPORTANT: It is not possible to use Auto Run option in Exercise timers with dual operation.

Start/stop events

Event	Dual MRS
LBI REMOTE START/STOP (PAGE 564)	Evaluated by Master only

Communication

Communication is establish on RS232 or RS485 communication line. Plug-in module CM-RS232-485 is required. Communication line is selected via setpoints **COM1 Mode (page 367)** or **COM2 Mode (page 369)**. There are options DualMaster and DualSlave. These options adjust, which communication line is selected and which role controller has in Dual Operation.

> **IMPORTANT: For correct communication it is necessary to have one Master and one Slave controller on the same communication line.**

> **IMPORTANT: There are no shared setpoints. It is necessary to have the same settings of AMF setpoints and engine timers in both controllers.**

In case of communication fail between controllers, alarm **Dual Operation Fail (page 703)** is activated. This alarm is activated on both controllers. Both controllers are switched to normal operation.

Adjustment of COM Modes

COM Mode in controller 1	COM Mode in controller 2	Behavior
Master	Slave	OK - normal dual operation function
Slave	Master	OK - normal dual operation function
Master	Master	There will be communication fail (it is necessary to have master and slave to establish communication line) - there will be active alarm **Dual Operation Fail (page 703)**. This alarm will be active on both controllers. Both controllers will be switched to normal operation.
Slave	Slave	There will be communication fail (it is necessary to have master and slave to establish communication line) - there will be active alarm **Dual Operation Fail (page 703)**. This alarm will be active on both controllers. Both controllers will be switched to normal operation.
Disabled	Master/Slave	There will be communication fail (it is necessary to have master and slave to establish communication line) - there will be active alarm **Dual Operation Fail (page 703)**. This alarm will be active on master/slave controller. Both controllers will be switched to normal operation.
Master/Slave	Disabled	There will be communication fail (it is necessary to have master and slave to establish communication line) - there will be active alarm **Dual Operation Fail (page 703)**. This alarm will be active on master/slave controller. Both controllers will be switched to normal operation.
Disabled	Disabled	Both controllers are in normal operation.

Switching of gen-sets

Switching of gen-sets is based on their **Running Hours (page 497)**. The time how long the gen-set is running is adjusted via setpoint **Running Hours Max Difference (page 263)**. When difference of **Running Hours (page 497)** between gen-sets is bigger then value adjusted in this setpoint, load is transferred from first gen-set to second gen-set. First gen-set is supplying the load until second gen-set is in running state. Then the GCB of first gen-set is opened. From this moment timer **Transfer Delay (page 256)** counts down. When it counts down, GCB of second gen-set can be closed.

Note: *Value of **Running Hours (page 497)** can be modified by setpoint **Running Hours Base (page 264)**. This setpoint can add or remove additional running hours to value from statistics. This modified value of running hours is used in dual operation function.*

Note: *In case that both gen-sets have the same running hours, Master controller has higher priority.*

Note: *Switching of gen-sets can be inhibit by setpoint **Swap Gen-sets (page 264)** or by binary input **DUAL SWAP GEN-SETS (PAGE 552)**.*

Note: *Priority of gen-set can be changed by binary input **DUAL TOP PRIORITY (PAGE 552)**. In this case running hours values are not used to decide, which gen-set should start.*

Dual operation adjustment

- Prepare two InteliLite AMF25 or two InteliLite MRS16 controllers with CM-RS232-485 modules
- Copy the identical configurations to both of them
- Use wiring with mechanical/electrical interlock between all breakers (mechanical interlock is preferred)
- Switch both controllers to OFF mode to prevent automatic or remote start
- Adjust setpoints **COM1 Mode (page 367)** or **COM2 Mode (page 369)** (depends on prefered communication line) to DualMaster on first controller and Dual Slave on second controller
- Interconnect communication terminals on CM-RS232-485 modules
- Adjust setpoint **MCB Opens On (page 263)** to Mains Fail option
- Adjust setpoint **Running Hours Max Difference (page 263)** on Master controller
- Adjust setpoints **Running Hours Base (page 264)** on both controllers if running hours change is needed for dual operation
- Adjust additional function of dual operation - **Master Error Protection (page 265)**, **Slave Error Protection (page 265)** and **Swap Gen-sets (page 264)** setpoints
- Change the mode of both controllers to AUTO
- System is now ready for dual operation function

Note: *Breakers feedbacks are recommended, but not required.*

Alarms related to dual operation:

- **Dual Operation Fail (page 703)**
- **Dual Operation Master Fail (page 703)**
- **Dual Operation Slave Fail (page 703)**
- **Dual Operation Different Mains (page 702)**
- **Dual Operation Different FW Version (page 702)**

5.5.10 Engine cool down and stop

The cool down phase follows after the stop command has been issued and the GCB has been opened.

- Duration of the cool down phase is determined by the setpoint **Cooling Time (page 219)**.
- Cooling is performed either at nominal speed (generator voltage and frequency protections are evaluated) or at idle speed (generator voltage and frequency protections are not evaluated). Selection of the speed is done by the setpoint **Cooling Speed (page 218)**.
- The cool down can be finished manually in MAN mode by pressing the STOP button.
- If a new start request comes, the cool down will be interrupted and the gen-set will go back to the stabilization phase. If the cooling was at nominal speed, the stabilization timers will not count down again so the GCB is ready to be closed (after 2 seconds delay).

When the cool down is finished, the output **Fuel Solenoid (page 602)** is de-energized and **Stop Solenoid (page 634)** is energized. The engine will stop within the time period determined by the setpoint **Stop Time (page 219)**. If the engine does not stop within this time, the alarm **Wrn Stop Fail (page 701)** will be issued.

The output **Stop Solenoid (page 634)** is energized until the engine is stopped, but at least for the duration of **Stop Time (page 219)**. If the **Stop Time (page 219)** has elapsed and the engine has still not stopped, the **Stop Solenoid (page 634)** is de-energized for 5 s and then energized again for **Stop Time (page 219)** and this repeats until the engine is stopped.

The output **Ignition (page 612)** is continuously energized until the engine is stopped.

Stopped gen-set evaluation

The gen-set is considered as stopped when all of following conditions are valid:

- The engine speed is lower than 2 RPM.
- The generator voltage in all phases is lower than 10 V.
- None of **Additional running engine indications (page 132)** signals is active.

5.5.11 Alarm management

The controller evaluates two levels of alarms. Level 1 – yellow alarm – is a pre-critical alarm that is only informative and does not take any action regarding gen-set control. Level 2 – red alarm – represents a critical situation, where an action must be taken to prevent damage of the gen-set or technology.

- One alarm of any type can be assigned to each binary input.
- Two alarms (one yellow and one red type) can be assigned to each analog input.
- There are also **Built-in alarms (page 116)** with fixed alarm types.
- Each alarm is written to the **Alarmlist (page 116)**.
- Each alarm causes a record to be written into the history log.
- Each alarm activates the Alarm and Horn output.
- Each alarm can cause sending of a SMS message or an email.

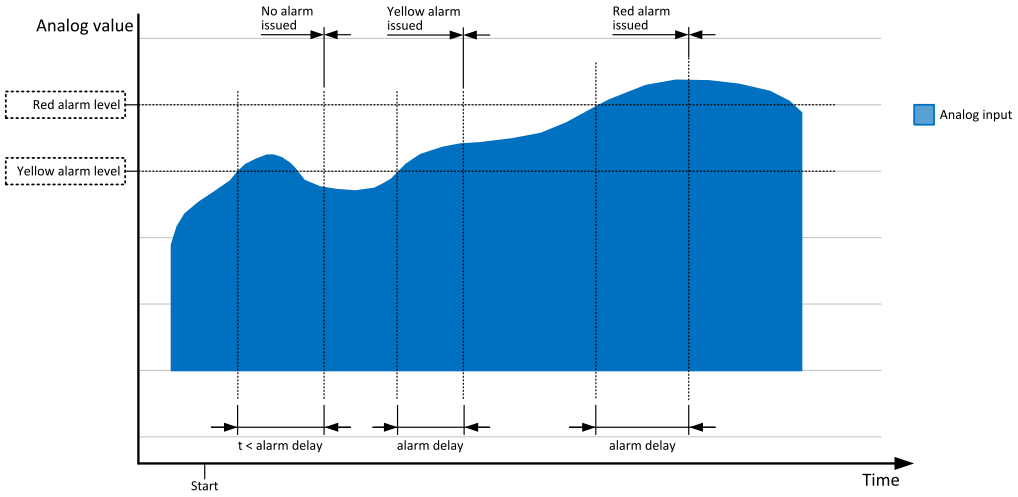


Image 5.15 Analog input alarm evaluation principle

Alarm handling

There are three different alarm categories regarding the period when the alarms are evaluated. The category is selectable for alarms assigned to binary/analog inputs and fixed for built-in alarms. The categories are the following:

- The alarm is evaluated all the time when the controller is switched on.
- The alarm is evaluated only when the engine is running. This type should be used for e.g. oil pressure. These alarms begin to be evaluated after the engine has been started with the delay given by the setpoint **Protection Hold Off (page 217)**.
- The alarm is evaluated only when the generator is excited. These alarms begin to be evaluated after the engine has been started and **Maximal Stabilization Time (page 217)** has elapsed or the GCB has been closed. They remain evaluated until cooling has finished. Only Generator under/overvoltage, Generator voltage unbalance and Generator under/overfrequency belong to this category. This category is not configurable to binary and analog input alarms.

If an alarm is being evaluated and the appropriate alarm condition is fulfilled, the delay of evaluation will start to run. The delay is adjustable by a setpoint (in the case of built-in alarms, analog input alarms) or is adjusted via configuration window in InteliConfig (in the case of binary input alarms). If the conditions persist, the alarm will activate. The alarm will not activate if the condition is dismissed while the delay is still running.

After pressing the Fault reset button or activating the binary input **Fault Reset Button (page 554)**, all active alarms change to confirmed state. Confirmed alarms will disappear from the Alarmlist as soon as the respective condition dismisses. If the condition is dismissed before acknowledging the alarm, the alarm will remain in the Alarmlist as Inactive.

Note: *The input **Sd Override (page 565)** can be used for temporary disabling of red alarms to shutdown the engine. This input may be used in situations where providing the power is extremely important – e.g. if the gen-set drives pumps for fire extinguishers (sprinklers).*

Alarm states

An alarm can have following states:

- Active alarm: the alarm condition persists, alarm delay has elapsed.
- Inactive alarm: the alarm condition has disappeared, but the alarm has not been confirmed.
- Confirmed alarm: the alarm condition persists, but the alarm has already been confirmed.



Image 5.16 Alarm List

Alarm types - Level 1

The level 1 alarm indicates that a value or parameter is out of normal limits, but has still not reached critical level. This alarm does not cause any actions regarding the gen-set control.

Warning (Wrn)

The alarm appears in the Alarmlist and is recorded into the history log. Activates the output **AL COMMON WRN (PAGE 574)** as well as the standard alarm outputs (**HORN (PAGE 611)** and **ALARM (PAGE 582)**).

Alarm indication only

The alarm indication only alarm does not perform any actions regarding gen-set control. Alarm is only displayed in alarmlist.

History record only (HistRecOnl)

The event is recorded into the history. Standard alarm outputs (**HORN (PAGE 611)** and **ALARM (PAGE 582)**) are not activated.

Alarm types - Level 2

The level 2 level alarm indicates that a critical level of the respective value or parameter has been reached.

Note: *It is not possible to start the engine if any red level protection is active or not confirmed.*

> **IMPORTANT: The gen-set can start by itself after acknowledging the alarms if there is no longer an active red alarm and the controller is in AUTO or TEST mode!**

Shutdown (Sd)

The alarm appears in the alarmlist and is recorded into the history log. It causes immediate stop of the Gen-set without cooling phase. Also GCB breaker is open. The gen-set cannot be started again while there is a

shutdown alarm in the alarmlist. Activates the output **AL COMMON SD (PAGE 573)** as well as the standard alarm outputs (**HORN (PAGE 611)** and **ALARM (PAGE 582)**).

Breaker open and cool down (BOC)

The event appears in the alarmlist and is recorded into the history log. It causes immediate opening of the GCB and then the standard stop sequence with cooling follows. The gen-set cannot be started again while there is a BOC alarm in the alarmlist. Activates the output **AL COMMON BOC (PAGE 573)** as well as the standard alarm outputs (**HORN (PAGE 611)** and **ALARM (PAGE 582)**).

Sensor fail detection (FLS)

If the measured resistance on an analog input exceeds the valid range, a sensor fail will be detected and a sensor fail message will appear in the **Alarmlist (page 116)**. The valid range is defined by the most-left (RL) and most-right (RH) points of the sensor characteristic ±12.5% from RH-RL.

Note: *Sometimes there can be problem with lower limit of valid range which can be counted as negative number. In this case the lower limit is set as one half of the RL point of the sensor curve characteristic.*

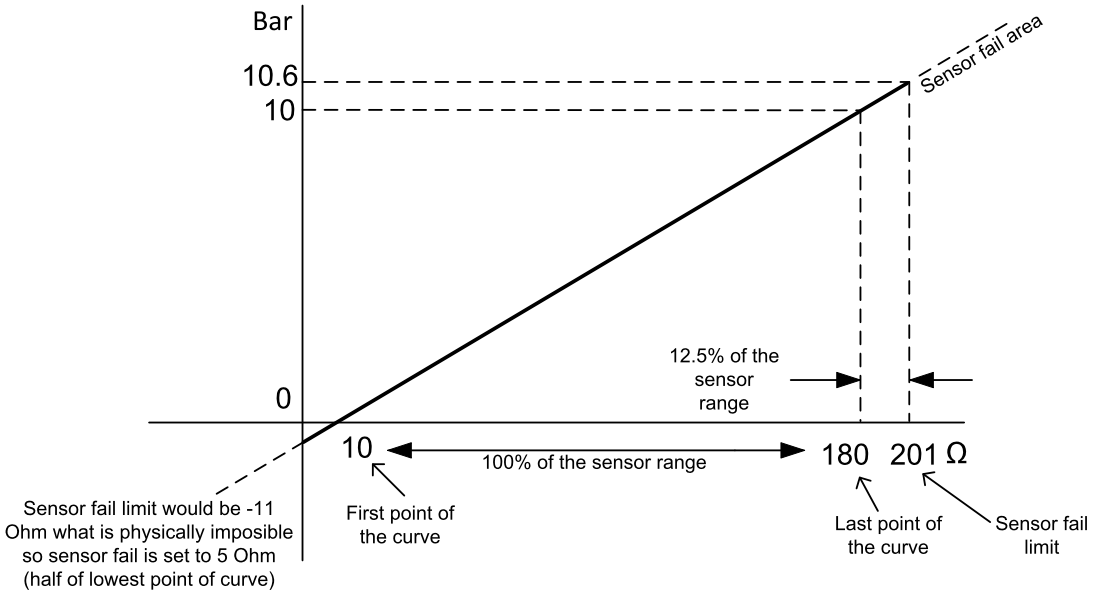


Image 5.17 Sensor fail detection principle

Remote alarm messaging

If communication plug-in module is connected to the controller, the controller can send SMS messages and emails at the moment when a new alarm appears in the **Alarmlist (page 116)** or new event is written in **History log (page 118)**. The message will contain a copy of the **Alarmlist (page 116)** or reasons from **History log (page 118)**. To enable this function, adjust setpoints **Event Message (page 398)**, **Wrn Message (page 399)**, **BOC Message (page 399)** and **Sd Messages (page 399)** to ON. Also enter a valid GSM phone number or email address to the setpoints **Telephone Number 1 (page 392)**, **Telephone Number 2 (page 392)**, **Telephone Number 3 (page 393)**, **Telephone Number 4 (page 393)**, **Email Address 1 (page 395) Email Address 2 (page 396)Email Address 3 (page 396)**, and **Email Address 4 (page 397)**.

The list of all supported terminals shows the table below:

Terminal	Event SMS	Warning SMS	BOC SMS	Shutdown SMS	Event email	Warning email	BOC email	Shutdown email
CM-RS232-485	no	no	no	no	no	no	no	no
CM-Ethernet	no	no	no	no	yes	yes	yes	yes
CM-GPRS	yes	yes	yes	yes	yes*	yes*	yes*	yes*
CM-4G-GPS	yes	yes	yes	yes	yes*	yes*	yes*	yes*

Note: ** Only with enabled **Internet Connection (page 383)**.*

Alarmlist

Alarmlist is a container of active and inactive alarms. It will appear automatically on the controller display, if a new alarm occurs, or can be displayed manually from the display menu.

Active alarms are shown as inverted, not yet confirmed alarms are marked with asterisk before them.

Alarmlist contains three types of alarms:

- Controller built-in alarms
- User configured alarms on binary or analog inputs
- ECU alarms

Controller built-in alarms

An alarm message in the alarmlist begins with a prefix, which represents the alarm type (e.g. Wrn, Sd, BOC, MP, MPR). Then the alarm name follows. In some cases the prefix can be omitted.

User configured alarms

An alarm message in the alarmlist begins with a prefix, which represents the alarm type (e.g. Wrn, Sd, BOC). Alarm type is selected by user during the configuration of binary or analog input as alarm. Then the alarm name follows. Name is adjusted by user during the configuration of binary or analog input as alarm.

ECU alarms

The ECU alarms are received from the ECU. The alarms are represented by the Diagnostic Trouble Code, which contains information about the subsystem where the alarm occurred, the alarm type and the alarm occurrence counter.

The most common fault codes are translated into text form. Other fault codes are displayed as a numeric code and the engine fault codes list must be used to determine the reason.

Built-in alarms

Events specification	Protection type	Description
Analog Input 1 Wrn	WRN	Value measured on analog input 1 is </> than **Analog Protection 1 Wrn (page 266)** setpoint.
Analog Input 1 Sd	SD	Value measured on analog input 1 is </> than **Analog Protection 1 Sd (page 266)** setpoint.
Analog Input 2 Wrn	WRN	Value measured on analog input 2 is </> than **Analog Protection 2 Wrn (page 268)** setpoint.

Events specification	Protection type	Description
Analog Input 2 Sd	SD	Value measured on analog input 2 is </> than **Analog Protection 2 Sd (page 269)** setpoint.
Analog Input 3 Wrn	WRN	Value measured on analog input 3 is </> than **Analog Protection 3 Wrn (page 271)** setpoint.
Analog Input 3 Sd	SD	Value measured on analog input 3 is </> than **Analog Protection 3 Sd (page 272)** setpoint.
Analog Input 4 Wrn	WRN	Value measured on analog input 4 is </> than **Analog Protection 4 Wrn (page 274)** setpoint.
Analog Input 4 Sd	SD	Value measured on analog input 4 is </> than **Analog Protection 4 Sd (page 275)** setpoint.
Wrn Battery Voltage	WRN	Battery voltage is out of limits given by **Battery Undervoltage (page 236)** and **Battery Overvoltage (page 237)** setpoints.
Binary input		Configurable Warning/BOC/Shutdown alarms on the binary inputs.
Sd Battery Flat	SD	If the controller switches off during starting sequence (**STARTER (PAGE 633)** output is active) it doesn't try to start again and activates this protection (controller assumes bad battery condition).
Sd Start Fail	SD	Gen-set start failed. All crank attempts were tried without success.
Parameters Fail	NONE	Wrong check-sum of parameters. Happens typically after downloading new firmware or changing of the parameter. The controller stays in INIT mode. Check all parameters, change value of at least one parameter.
Sd Gen Lx >V BOC Gen Lx <V (where x=1,2,3)	SD BOC	The generator voltage is out of limits given by Gen <V BOC and Gen >V Sd setpoints.
BOC Gen V Unbalance	BOC	The generator voltage is unbalanced more than the value of **Voltage Unbalance BOC (page 247)** setpoint.
BOC Gen >, <Frequency	BOC	The generator frequency is out of limits given by **Generator Overfrequency BOC (page 248)** and **Generator Underfrequency BOC (page 249)** setpoints.
BOC Current Unbalance	BOC	The generator current is unbalanced more than the value of **Current Unbalance BOC (page 245)** setpoint.
BOC Current IDMT	BOC	Generator current exceeds the limit for IDMT protection given by **Nominal Current (page 191)** and **IDMT Overcurrent Delay (page 244)** setpoints.
BOC Overload	BOC	The load is greater than the value given by **Overload BOC (page 242)** setpoint.
Sd Earth Fault	SD	This alarm is activated when Earth Fault value exceeds **Earth Fault Sd (page 411)** limit for at least **Earth Fault Delay (page 410)** period.
Sd Overspeed	SD	The protection comes active if the speed is greater than **Overspeed Sd (page 223)** setpoint.

Events specification	Protection type	Description
Sd Underspeed	SD	During starting of the engine when the RPM reach the value of **Starting RPM (page 207)** setpoint the starter is switched off and the speed of the engine can drop under **Starting RPM (page 207)** again. Then the Underspeed protection becomes active. Protection evaluation starts 5 seconds after reaching **Starting RPM (page 207)**.
Emergency Stop	SD	If the input Emergency Stop is opened shutdown is immediately activated.
GCB Fail	SD	Failure of generator circuit breaker.
MCB Fail	WRN	Failure of mains circuit breaker.
Sd RPM Measurement Fail	SD	Failure of magnetic pick-up sensor for speed measurement. This alarm appears, if starter was disengaged for other reason than overcrossing **Starting RPM (page 207)** (like oil pressure or D+) and at the end of timer **Maximum Cranking Time (page 206)** there are no RPMs > **Starting RPM (page 207)** detected.
Wrn Stop Fail	WRN	Gen-set stop failed. See description at Gen-set Operation States chapter.
Wrn Maintenance 1	WRN	The period for servicing is set by the **Maintenance Timer 1 (page 235)** setpoint. The protection comes if counter reaches zero.
Wrn Maintenance 2	WRN	The period for servicing is set by the **Maintenance Timer 2 (page 236)** setpoint. The protection comes if counter reaches zero.
Wrn Maintenance 3	WRN	The period for servicing is set by the **Maintenance Timer 3 (page 236)** setpoint. The protection comes if counter reaches zero.
Charge Alternator Fail	WRN	Failure of alternator for charging the battery.
Sd Override	WRN	The protection is active if the output Sd Override is closed.
Mains CCW Rot	WRN	Mains voltage phases are not wired correctly. MCB closing is prohibited by chontroller.
Generator CCW Rot	WRN	Genset voltage phases are not wired correctly. GCB closing is prohibited by chontroller.

Note: *This table does not contain all alarms in controller. It is only list of the most common alarms.*

5.5.12 History log

The history log is an area in the controller's non-volatile memory that records "snapshots" of the system at moments when important events occur. The history log is important especially for diagnostics of failures and problems. When the history file is full, the oldest records are removed.

Each record has the same structure and contains:

- The event which caused the record (e.g. "Overspeed alarm" or "GCB closed")
- The date and time when it was recorded
- All important data values like RPM, kW, voltages, etc. from the moment that the event occurred.

Record structure

Name	Abbreviation	Description
Number	No.	Row number (0 corresponds to the last record, -1 to the previous one, etc.)
Reason	Reason	Reason for history record (any event or alarm related to the gen-set
Time	Time	Time
Date	Date	Date
RPM	RPM	Engine rotations per minute
Power	Pwr	Generator active power
Reactive power	Q	Generator reactive power
Power Factor	PF	Generator power factor
Load Character	LChr	Generator load character
Generator Frequency	Gfrq	Generator Frequency
Generator Voltage	Vg1	Generator voltage Ph1
Generator Voltage	Vg2	Generator voltage Ph2
Generator Voltage	Vg3	Generator voltage Ph3
Generator Voltage	Vg12	Generator voltage Ph12
Generator Voltage	Vg23	Generator voltage Ph23
Generator Voltage	Vg31	Generator voltage Ph31
Generator Current	Ig1	Generator current Ph1
Generator Current	Ig2	Generator current Ph2
Generator Current	Ig3	Generator current Ph3
Mains Voltage	Vm1	Mains voltage Ph1
Mains Voltage	Vm2	Mains voltage Ph2
Mains Voltage	Vm3	Mains voltage Ph3
Mains Voltage	Vm12	Mains voltage Ph12
Mains Voltage	Vm23	Mains voltage Ph23
Mains Voltage	Vm31	Mains voltage Ph31
Mains Frequency	Mfrq	Mains Frequency
Voltage Battery	VBat	Voltage of battery
Analog Input 1	Ain1	Analog input 1
Analog Input 2	Ain2	Analog input 2
Analog Input 3	Ain3	Analog input 3
Analog Input 4	Ain4	Analog input 4
Binary Inputs	BIN	Controller binary inputs
Binary Outputs	BOUT	Controller binary outputs
Controller Mode	Mode	Controller mode

Note: *When some setpoint is changed, in history log is written its number of communication object.*

5.5.13 Breaker control

The following power switches are controlled by the controller:

- The generator circuit breaker or contactor – GCB
- The Mains circuit breaker or contactor – MCB

It is possible to use either a motorized circuit breaker or contactor. Below is a list of available control outputs that should fit all types of contactors or breakers. The following rules must be kept to when designing the wiring of power switches:

- The control outputs must be configured and wiring of the power switches must be provided in such a way, that the controller has full control over the breakers – i.e. the controller can open and close the breaker at any time.
- The breaker must respond within max. 5 seconds to a close and open command. Special attention should be paid to opening of motorized circuit breakers, as it could take more than 5 seconds on some types. In such cases it is necessary to use an undervoltage coil for fast opening.
- After opening the breaker, there is internal delay for another closing of breaker. Delay is 6 seconds - 5 seconds for OFF coil and 1 second for UV coil. After these 6 seconds, breaker can be closed again. For opening of breaker there is no delay.

Breaker control outputs

Close/Open	An output for control of a contactor. Its state represents the breaker position requested by the controller. The breaker must react within 2 seconds to a close or open command, otherwise an alarm is issued.
ON coil	An output giving a 2 second pulse in the moment the breaker has to be closed. The output is intended for control of close coils of circuit breakers.
OFF coil	An output giving a pulse in the moment the breaker has to be opened. The pulse lasts until the feedback deactivates, but at least for 2 seconds. The output is intended for control of open coils of circuit breakers.
UV coil	The GCB UV coil output is active the whole time the gen-set is running (not in idle or cooling). The MCB UV coil output is active when the controller is switched on. The output is deactivated for at least 2 seconds in the moment the breaker has to be switched off. The output is intended for control of undervoltage coils of circuit breakers.

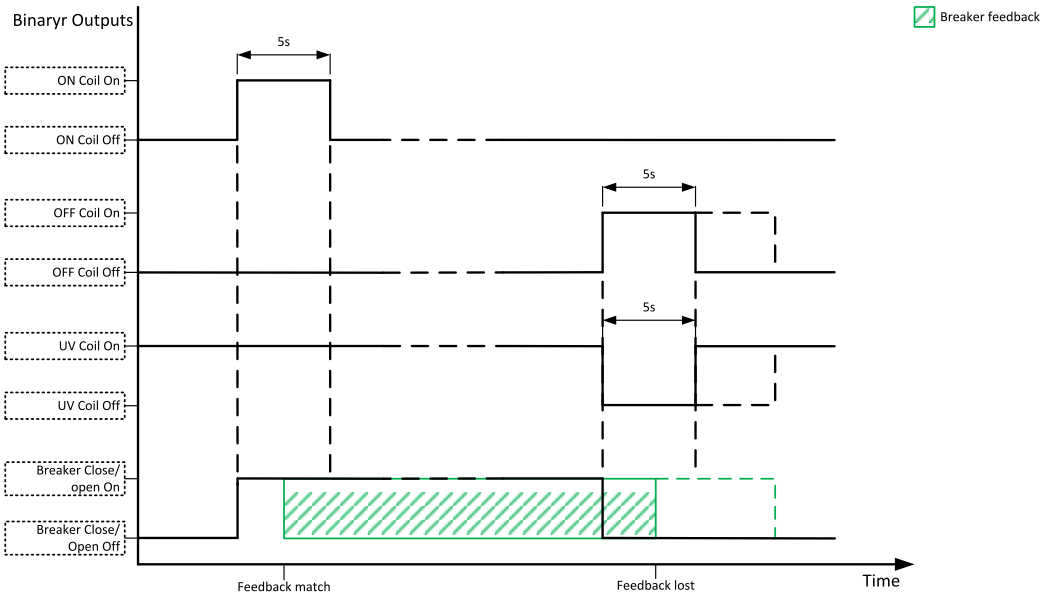


Image 5.18 Breaker control outputs

MCB special requirements

- If a contactor is used on the MCB position, it is recommended that the wiring be provided in such a way that the contactor will be normally closed and will open if the logical binary output **MCB CLOSE/OPEN (PAGE 614)** closes. This behavior is called “negative logic” and can be adjusted by the setpoint **MCB Logic (page 261)**. The negative logic will prevent accidental opening of the MCB when the controller is switched off.
- If a contactor is used on the MCB position, it will open itself immediately after the mains have failed, because it will lose power for the coil. That is why the following adjustment is necessary to prevent triggering the **Wrn MCB Fail (page 699)** alarm: **MCB Opens On (page 263)** = Mains Fail, **Mains < > Voltage Delay (page 258)** ≤ 1.
- If a 230 V motor driven circuit breaker is used on the MCB position and an undervoltage coil is not fitted, it is not possible to open the breaker after the mains have failed, because there is no power for the motor drive until the gen-set is started and providing voltage. Adjusting the setpoint **MCB Opens On (page 263)** = Gen Run will prevent triggering the **Wrn MCB Fail (page 699)** alarm.

Breaker fail detection

Breaker fail detection is based on binary output breaker close/open comparing with binary input breaker feedback.

IMPORTANT: It is necessary to configure breaker feedback to use this function.

IMPORTANT: Also it is possible to use breakers without feedbacks. In this case there is no check of breaker real state.

There are three different time delays for breaker fail detection – see following diagrams.

When binary output breaker close/open is in steady state and breaker feedback is changed the breaker fail is detected immediately (no delay).

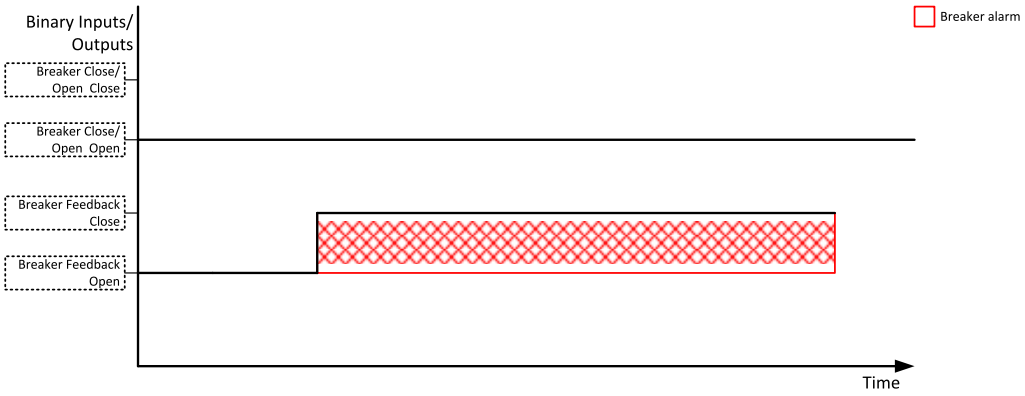


Image 5.19 Breaker fail - breaker close/open in steady position - open

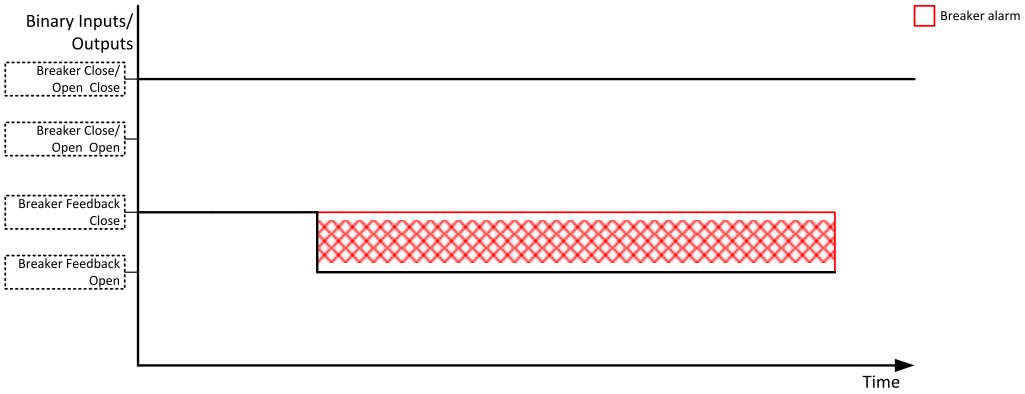


Image 5.20 Breaker fail - breaker close/open in steady position - close

When binary output breaker close/open opens there is 2 sec delay for breaker fail detection.

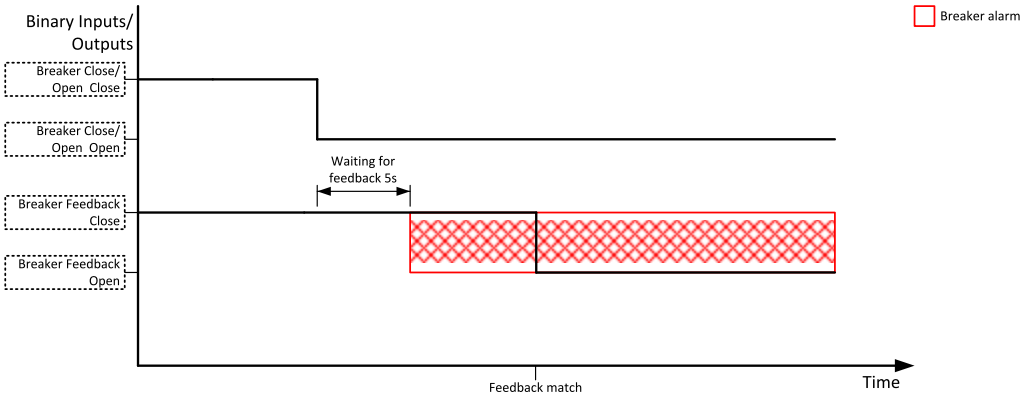


Image 5.21 Breaker fail - breaker close/open opens

When binary output breaker close/open closes there is 2 sec delay for breaker fail detection.

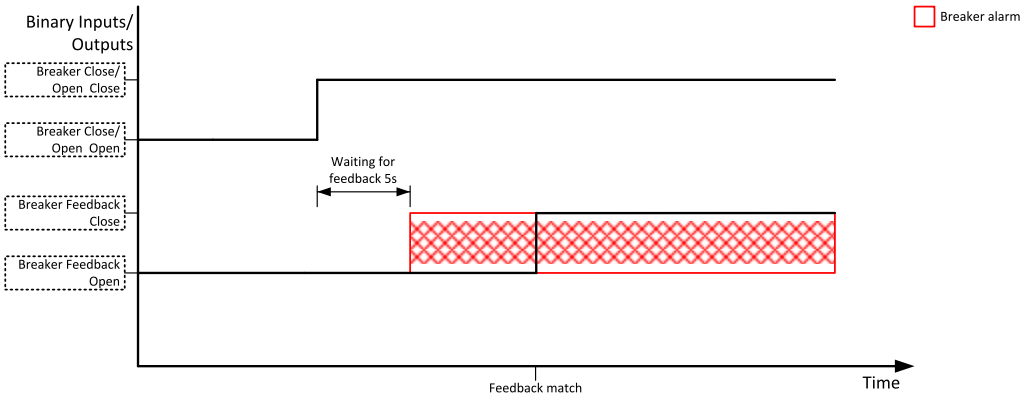


Image 5.22 Breaker fail - breaker close/open closes

5.5.14 Exercise timers

The exercise (general-purpose) timers in controller are intended for scheduling of any operations such as e.g. periodic tests of the gen-set, scheduled transfer of the load to the gen-set prior to an expected disconnection of the mains etc.

Related setpoints for timer 1 are:

- **Timer 1 Function (page 327)**
- **Timer 1 Repetition (page 328)**
- **Timer 1 First Occur. Date (page 329)**
- **Timer 1 First Occur. Time (page 329)**
- **Timer 1 Duration (page 329)**
- **Timer 1 Repeated (page 330)**
- **Timer 1 Repeat Day (page 333)**
- **Timer 1 Day (page 332)**
- **Timer 1 Repeated Day In Week (page 333)**
- **Timer 1 Repeat Day In Month (page 333)**
- **Timer 1 Repeat Week In Month (page 334)**
- **Timer 1 Refresh Period (page 331)**
- **Timer 1 Weekends (page 332)**

Related setpoints for timer 2 are:

- **Timer 2 Function (page 334)**
- **Timer 2 Repetition (page 335)**
- **Timer 2 First Occur. Date (page 336)**
- **Timer 2 First Occur. Time (page 336)**
- **Timer 2 Duration (page 336)**
- **Timer 2 Repeated (page 337)**
- **Timer 2 Repeat Day (page 340)**
- **Timer 2 Day (page 339)**
- **Timer 2 Repeated Day In Week (page 340)**
- **Timer 2 Repeat Day In Month (page 340)**
- **Timer 2 Repeat Week In Month (page 341)**
- **Timer 2 Refresh Period (page 338)**
- **Timer 2 Weekends (page 339)**

Available modes of each timer:

Once	This is a single shot mode. The timer will be activated only once at preset date/time for preset duration.
Daily	The timer is activated every "x-th" day. The day period "x" is adjustable. Weekends can be excluded. E.g. the timer can be adjusted to every 2nd day excluding Saturdays and Sundays.
Weekly	The timer is activated every "x-th" week on selected weekdays. The week period "x" is adjustable. E.g. the timer can be adjusted to every 2nd week on Monday and Friday.
Monthly	The timer is activated every "x-th" month on the selected day. The requested day can be selected either as "y-th" day in the month or as "y-th" weekday in the month. E.g. the timer can be adjusted to every 1st month on 1st Tuesday.
Short period	The timer is repeated with adjusted period (hh:mm). The timer duration is included in the period.

Once mode

Set-up via InteliConfig

To set-up timer via InteliConfig go to the setpoint ribbon, setpoint group scheduler and setpoint *Timer 1 Setup*.

Note: *First of all function of timer has to be adjusted via setpoint* ***Timer 1 Function (page 327)****.*

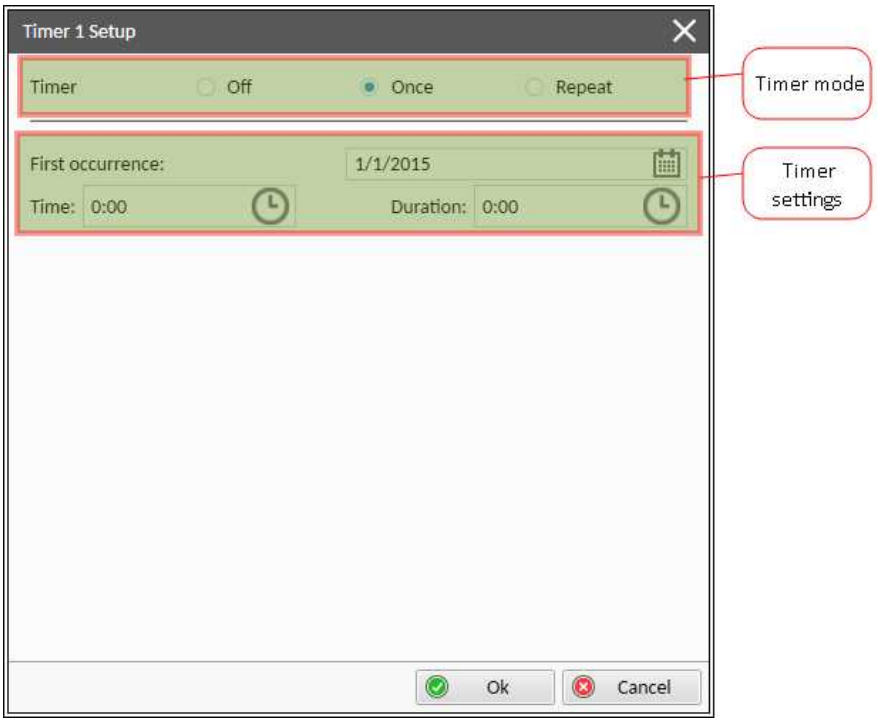


Image 5.23 Once mode - InteliConfig

In timer mode select Once. In timer settings adjust date and time of occurrence of timer. Also adjust the duration of timer.

Set-up via controller interface

In controller go to the Scheduler setpoint group. Select the function of timer via **Timer 1 Function (page 327)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 328)** setpoint select

Once mode. Than adjust **Timer 1 First Occur. Date (page 329)**, **Timer 1 First Occur. Time (page 329)** and **Timer 1 Duration (page 329)**.

Note: *Use left and right buttons to move between timer setpoints.*

Daily mode

Set-up via InteliConfig

To set-up timer via InteliConfig go to the setpoint ribbon, setpoint group scheduler and setpoint *Timer 1 Setup*.

Note: *First of all function of timer has to be adjusted via setpoint* ***Timer 1 Function (page 327)****.*

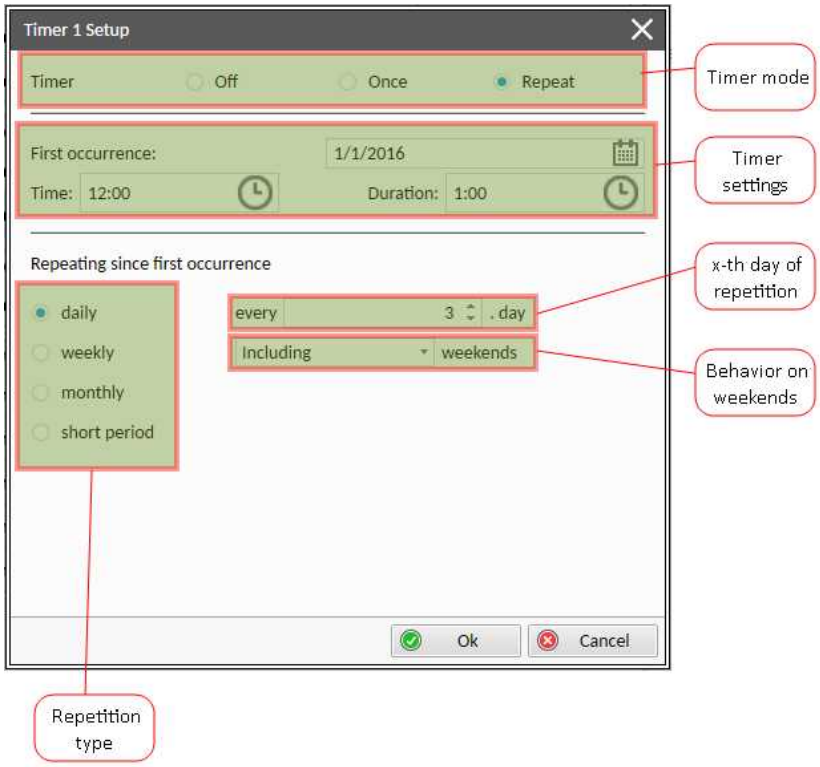


Image 5.24 Daily mode - InteliConfig

In timer mode select Repeat. In repetition type select Daily. In timer settings adjust date and time of first occurrence of timer. Also adjust the duration of each occurrence of timer. Than select the x-th day of repetition (**Timer 1 Refresh Period (page 331)**) and behavior of timer on weekends (**Timer 1 Weekends (page 332)**).

> **Example:** On image example first start of timer will be 1/1/2016 at 12:00. Duration will be 1 hour. Timer will be again activated every 3rd day at 12:00 for 1 hour including weekends.

Set-up via controller interface

In controller go to the Scheduler setpoint group. Select the function of timer via **Timer 1 Function (page 327)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 328)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 329)**, **Timer 1 First Occur. Time (page 329)** and **Timer 1 Duration (page 329)**. In setpoint **Timer 1 Repeated (page 330)** select Daily and adjust **Timer 1 Refresh Period (page 331)** (x-th day of repetition) and **Timer 1 Weekends (page 332)** (behavior of timer on weekends).

Note: *Use left and right buttons to move between timer setpoints.*

Weekly mode

Set-up via InteliConfig

To set-up timer via InteliConfig go to the setpoint ribbon, setpoint group scheduler and setpoint *Timer 1 Setup*.

Note: *First of all function of timer has to be adjusted via setpoint* ***Timer 1 Function (page 327)****.*

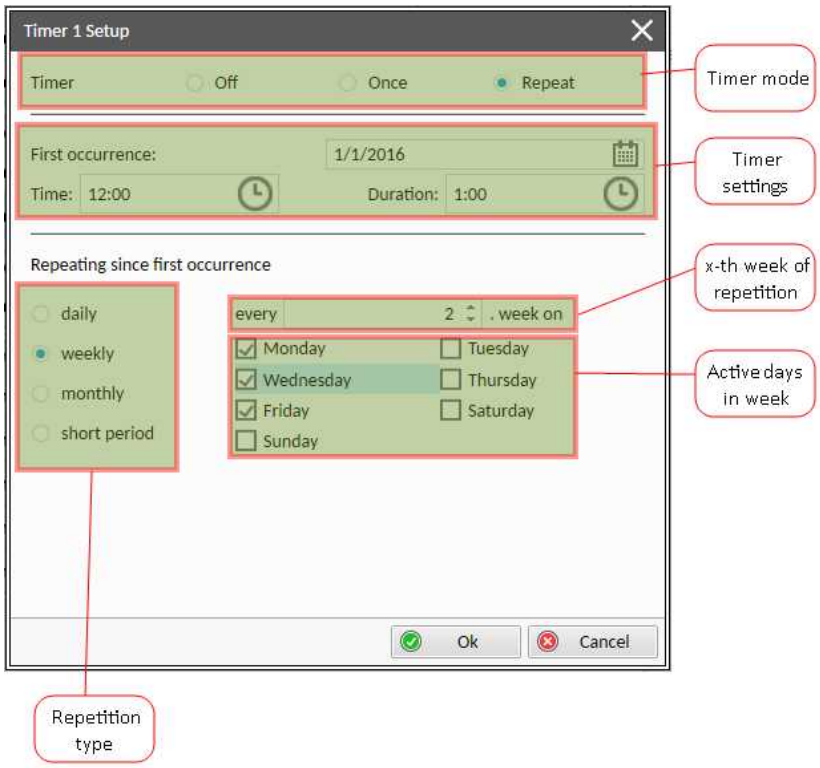


Image 5.25 Weekly mode - InteliConfig

In timer mode select Repeat. In repetition type select Weekly. In timer settings adjust date and time of first occurrence of timer. Also adjust the duration of each occurrence of timer. Than select the x-th week of repetition (**Timer 1 Refresh Period (page 331)**) and days when timer should be active (**Timer 1 Day (page 332)**).

> **Example:** On image example first start of timer will be 1/1/2016 at 12:00. Duration will be 1 hour. Timer will be again activated every 2nd week on Monday, Wednesday and Friday at 12:00 for 1 hour.

Set-up via controller interface

In controller go to the Scheduler setpoint group. Select the function of timer via **Timer 1 Function (page 327)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 328)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 329)**, **Timer 1 First Occur. Time (page 329)** and **Timer 1 Duration (page 329)**. In setpoint **Timer 1 Repeated (page 330)** select Weekly and adjust **Timer 1 Day (page 332)** (days when timer should be active) and **Timer 1 Refresh Period (page 331)** (x-th week of repetition).

Note: *Use left and right buttons to move between timer setpoints.*

Monthly mode

Set-up via InteliConfig

To set-up timer via InteliConfig go to the setpoint ribbon, setpoint group scheduler and setpoint *Timer 1 Setup*.

Note: *First of all function of timer has to be adjusted via setpoint* ***Timer 1 Function (page 327)****.*

There are two types of monthly repetition. First of them is based on repeating one day in month.

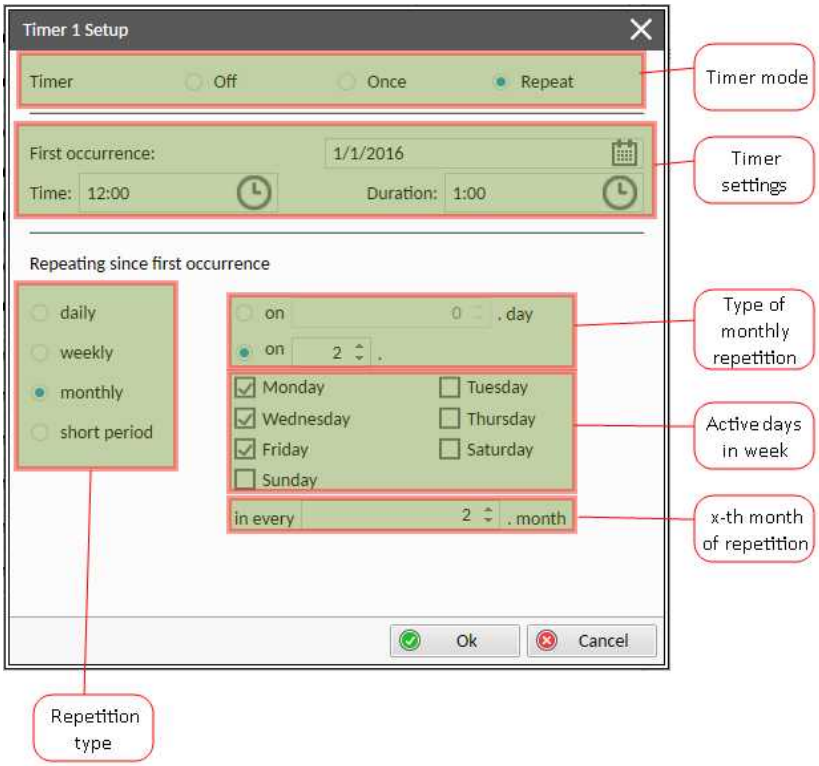


Image 5.26 Monthly mode - InteliConfig

In timer mode select Repeat. In repetition type select Monthly. In timer settings adjust date and time of first occurrence of timer. Also adjust the duration of each occurrence of timer. Than select the type of monthly repetition and the x-th day of repetition (**Timer 1 Repeat Day In Month (page 333)**). Than select the x-th month of repetition.

> **Example:** On image example first start of timer will be 1/1/2016 at 12:00. Duration will be 1 hour. Timer will be again activated every 2nd day in 2nd month at 12:00 for 1 hour.

Second type of monthly repetition is based on repeating days in week in month.

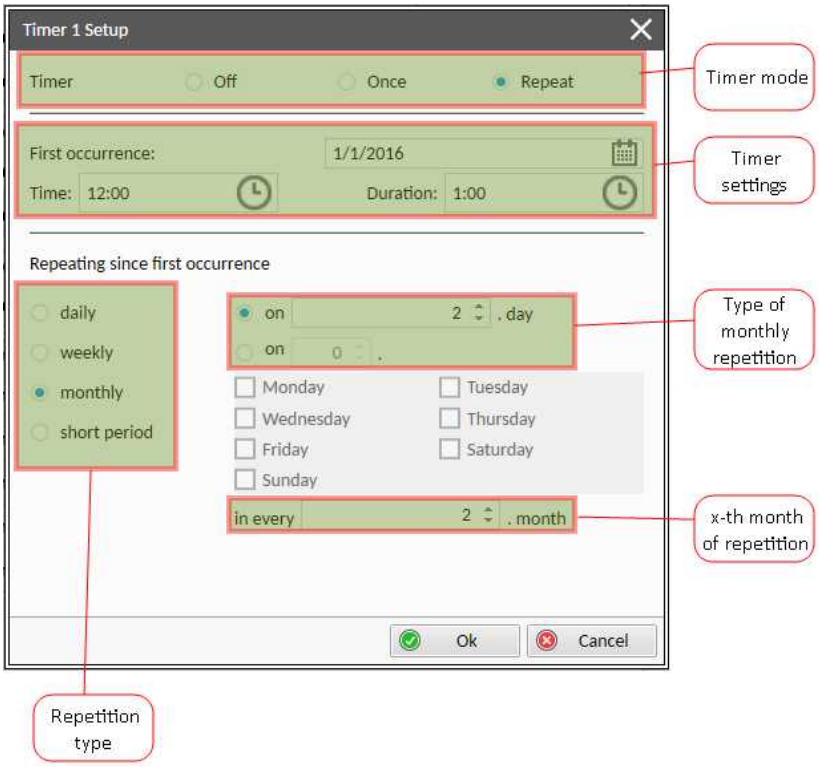


Image 5.27 Monthly mode - InteliConfig

In timer mode select Repeat. In repetition type select Monthly. In timer settings adjust date and time of first occurrence of timer. Also adjust the duration of each occurrence of timer. Than select the type of monthly repetition, the x-th week of repetition and days in week. Than select the x-th month of repetition.

> **Example:** On image example first start of timer will be 1/1/2016 at 12:00. Duration will be 1 hour. Timer will be again activated every 2nd week in 2nd month on Monday, Wednesday and Friday at 12:00 for 1 hour.

Set-up via controller interface

There are two types of monthly repetition. First of them is based on repeating one day in month.

In controller go to the Scheduler setpoint group. Select the function of timer via **Timer 1 Function (page 327)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 328)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 329)**, **Timer 1 First Occur. Time (page 329)** and **Timer 1 Duration (page 329)**. In setpoint **Timer 1 Repeated (page 330)** select Monthly and adjust type of monthly repetition via **Timer 1 Repeat Day (page 333)**, **Timer 1 Refresh Period (page 331)** (x-th month of repetition) and **Timer 1 Repeat Day In Month (page 333)** (concrete day in repeated months).

Second type of monthly repetition is based on repeating days in week in month.

In controller go to the Scheduler setpoint group. Select the function of timer via **Timer 1 Function (page 327)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 328)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 329)**, **Timer 1 First Occur. Time (page 329)** and **Timer 1 Duration (page 329)**. In setpoint **Timer 1 Repeated (page 330)** select Monthly and adjust type of monthly repetition via **Timer 1 Repeat Day (page 333)**, **Timer 1 Refresh Period (page 331)** (x-th month of repetition), **Timer 1 Repeated Day In Week (page 333)** (days in week when timer is active) and **Timer 1 Repeat Week In Month (page 334)** (concrete week in repeated months).

Note: *Use left and right buttons to move between timer setpoints.*

Short period mode

Set-up via InteliConfig

To set-up timer via InteliConfig go to the setpoint ribbon, setpoint group scheduler and setpoint *Timer 1 Setup*.

Note: *First of all function of timer has to be adjusted via setpoint* ***Timer 1 Function (page 327)****.*

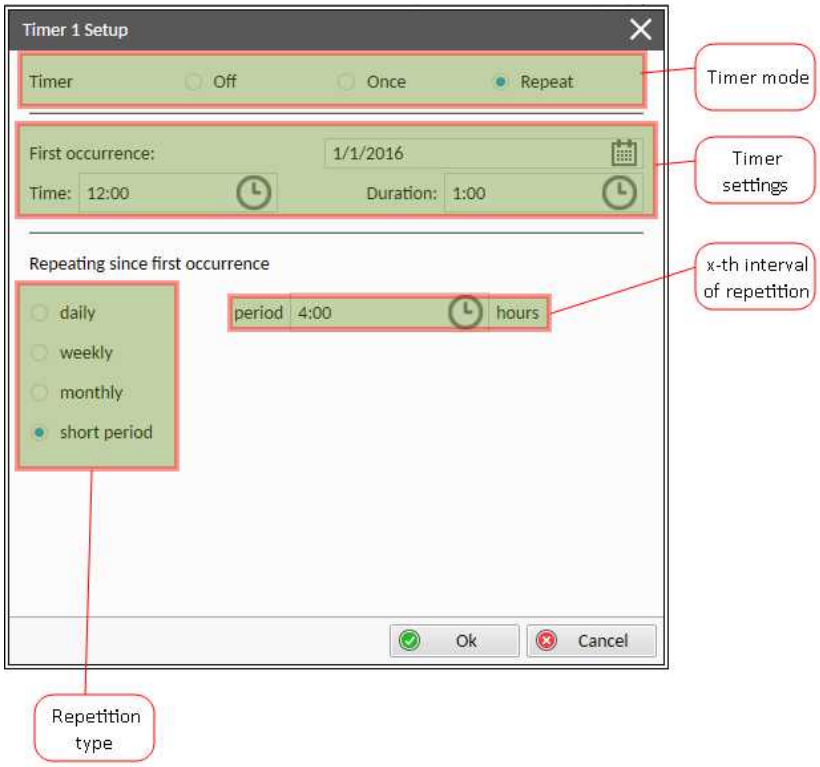


Image 5.28 Short period mode - InteliConfig

In timer mode select Repeat. In repetition type select Short period. In timer settings adjust date and time of first occurrence of timer. Also adjust the duration of each occurrence of timer. Than select the interval of repetition (shorter than 1 day).

> **Example:** On image example first start of timer will be 1/1/2016 at 12:00. Duration will be 1 hour. Timer will be again activated every 4th hour for 1 hour.

Set-up via controller interface

In controller go to the Scheduler setpoint group. Select the function of timer via **Timer 1 Function (page 327)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 328)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 329)**, **Timer 1 First Occur. Time (page 329)** and **Timer 1 Duration (page 329)**. In setpoint **Timer 1 Repeated (page 330)** select Short Period and adjust **Timer 1 Refresh Period (page 331)** (interval of repetition).

Note: *Use left and right buttons to move between timer setpoints.*

5.5.15 Rental Timers

In controller are two timers which are designed like rental timer. Rental timers will stop gen-set after their elapse.

How to set-up rental timer

This is a short guide for settings of rental timers. Please see following few steps how to set up rental timers:

- Choose the type of rental timer
  - **Rental Timer 1 (page 341)** (based on engine running hours)
  - **Rental Timer 2 (page 343)** (based on date)
- Adjust the length of chosen timer
- Adjust the warning for user **Rental Timer 1 Wrn (page 343)** or **Rental Timer 2 Wrn (page 345)**(warning will be displayed in alarmlist before elapsing of rental timer)
- Adjust **Rental Timer BOC (page 345)** - common for both timers (if engine is still running after rental timer counts down, this timer will starts count down and after elapse of timer the gen-set will be cooled down and stop)

5.5.16 Service timers

Running hours counters

Service timers are used as maintenance interval counters. Counters can be set by setpoints - **Maintenance Timer 1 (page 235)**, **Maintenance Timer 2 (page 236)** and **Maintenance Timer 3 (page 236)**. All of them work the same way - their values are decremented every hour when the gen-set is running.

Actual value of counters is located either as the same setpoints **Maintenance Timer 1 (page 235)**, **Maintenance Timer 2 (page 236)** and **Maintenance Timer 3 (page 236)** or as values **Maintenance 1 (page 495)**, **Maintenance 2 (page 495)** and **Maintenance 3 (page 496)**.

When the value of counter reaches 0, the alarm **Wrn Maintenance 1 (page 699)** or **Wrn Maintenance 2 (page 699)** or **Wrn Maintenance 3 (page 699)** is active until the respective counter is readjusted back to nonzero value.

Unused counter has to be adjusted to maximal value 10000 (Disabled).

5.5.17 Analog switches

There are logical analog function dedicated for analog switches. Each analog switch has setpoints for level ON and level OFF and logical binary output.

Analog switch	Setpoints	Binary output
AIN Switch 01 (page 660)	Analog Switch 1 On (page 267) Analog Switch 1 Off (page 268)	AIN Switch01 (page 582)
AIN Switch 02 (page 660)	Analog Switch 2 On (page 270) Analog Switch 2 Off (page 271)	AIN Switch02 (page 583)
AIN Switch 03 (page 660)	Analog Switch 3 On (page 273) Analog Switch 3 Off (page 274)	AIN Switch03 (page 583)
AIN Switch 04 (page 661)	Analog Switch 4 On (page 276) Analog Switch 4 Off (page 277)	AIN Switch04 (page 584)
AIN Switch 05 (page 661)	Analog Switch 5 On (page 279) Analog Switch 5 Off (page 280)	AIN Switch05 (page 584)

Analog switch	Setpoints	Binary output
AIN Switch 06 (page 661)	Analog Switch 6 On (page 282) Analog Switch 6 Off (page 283)	AIN Switch06 (page 585)
AIN Switch 07 (page 662)	Analog Switch 7 On (page 285) Analog Switch 7 Off (page 286)	AIN Switch07 (page 585)
AIN Switch 08 (page 662)	Analog Switch 8 On (page 288) Analog Switch 8 Off (page 289)	AIN Switch08 (page 586)
AIN Switch 09 (page 662)	Analog Switch 9 On (page 291) Analog Switch 9 Off (page 292)	AIN Switch09 (page 586)
AIN Switch 10 (page 663)	Analog Switch 10 On (page 294) Analog Switch 10 Off (page 295)	AIN Switch10 (page 587)
AIN Switch 11 (page 663)	Analog Switch 11 On (page 297) Analog Switch 11 Off (page 298)	AIN Switch11 (page 587)
AIN Switch 12 (page 663)	Analog Switch 12 On (page 300) Analog Switch 12 Off (page 301)	AIN Switch12 (page 588)
AIN Switch 13 (page 664)	Analog Switch 13 On (page 303) Analog Switch 13 Off (page 304)	AIN Switch13 (page 588)
AIN Switch 14 (page 664)	Analog Switch 14 On (page 306) Analog Switch 14 Off (page 307)	AIN Switch14 (page 589)
AIN Switch 15 (page 664)	Analog Switch 15 On (page 309) Analog Switch 15 Off (page 310)	AIN Switch15 (page 589)
AIN Switch 16 (page 665)	Analog Switch 16 On (page 312) Analog Switch 16 Off (page 313)	AIN Switch16 (page 590)
AIN Switch 17 (page 665)	Analog Switch 17 On (page 315) Analog Switch 17 Off (page 316)	AIN Switch17 (page 590)
AIN Switch 18 (page 665)	Analog Switch 18 On (page 318) Analog Switch 18 Off (page 319)	AIN Switch18 (page 591)
AIN Switch 19 (page 666)	Analog Switch 19 On (page 321) Analog Switch 19 Off (page 322)	AIN Switch19 (page 591)
AIN Switch 20 (page 666)	Analog Switch 20 On (page 324) Analog Switch 20 Off (page 325)	AIN Switch20 (page 592)

The behavior of the switch depends on the adjustment of the setpoints.

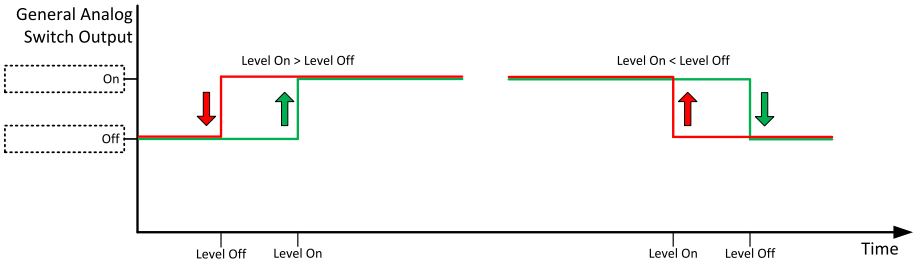


Image 5.29 Principle of analog switch

5.5.18 Additional running engine indications

It is helpful to have information other than speed (RPM), whether the engine is rotating or not, especially if RPM is measured from the generator frequency instead of magnetic pickup. The generator frequency measurement can be unreliable at very low speeds and/or may have a delayed reaction to sudden and big changes (i.e. in the moment that the engine has just started…).

The following conditions are evaluated as additional running engine indication:

- Voltage on the D+ input is higher than the **D+ Treshold (page 222)** of battery voltage. Connect this input to the D+ (L) terminal of the charging alternator and enable the D+ function by the setpoint **D+ Function (page 220)**. If D+ terminal is not available, leave the input unconnected and disable the function.
- The pickup is not used and frequency is not detected on the pickup input. Connect the pickup input to the W terminal of the charging alternator if you do not use pickup and the W terminal is available. If not, leave the input unconnected.
- Oil pressure > **Starting Oil Pressure (page 208)** setpoint. The oil pressure is evaluated from the analog input or from the ECU if an ECU is configured.
- Binary input **OIL PRESSURE (PAGE 561)** is in logical 0.
- At least one phase of generator voltage is >25% of nominal voltage.

These signals are used during start for powering down the starter motor even if still no RPM is measured and also during stop in order to evaluate if the engine is really stopped.

5.5.19 Voltage phase sequence detection

Controller detects phase sequence voltage terminals. This protection is important after controller installation to avoid wrong voltage phase connection. There is fix defined phase sequence in controller L1, L2, L3. When the phases are connected in different order (e.g. L1,L3,L2 or L2,L1,L3) following alarms are detected:

- **Generator CCW Rotation (page 706)**
- **Mains CCW Rotation (page 706)**

5.5.20 Gen-set operation states

Engine state machine

Init	Autotest during controller power on. ***Note:*** *Sometimes controller stays in Init mode after FW upgrade. It means that there are new parameters which should be checked by user. It is possible to disable this control via InteliConfig.*
Not ready	Gen-set is not ready to start. **Example:** When shutdown alarm is active or unit is in OFF mode.
Prestart	Prestart sequence in process, **PRESTART (PAGE 621)** output is closed. **Example:** Usually used for preheating or processes executed prior gen-set start.
Cranking	Engine is cranking, **STARTER (PAGE 633)** output is closed
Pause	Pause between start attempts.
Starting	Starting speed is reached and the Idle timer is running.
Running	Gen-set is running at nominal speed.
Loaded	Gen-set is running at nominal speed and **GCB CLOSE/OPEN (PAGE 604)** is closed.
Stop	Stop. **Example:** Automatic or manual stop command was issued, engine is stopping.
Shutdown	Shut-down alarm activated.
Ready	Gen-set is ready to run.
Cooling	Gen-set is cooling before stop.
EmergMan	**EMERGENCY MAN (PAGE 553)** gen-set operation. **Example:** Used for bypass the controller and engine manual start.

Engine started conditions

- Engine speed (RPM) > **Starting RPM (page 207)** or
- Oil pressure > **Starting Oil Pressure (page 208)** or
- Binary input **OIL PRESSURE (PAGE 561)** is in logical 0 or
- D+ terminal active (reached **D+ Treshold (page 222)** of supply voltage) for minimum 1 s or
- Generator voltage > 25% of **Nominal Voltage Ph-N (page 195)** or **Nominal Voltage Ph-Ph (page 195)** (any phase)

Note: *Any of these condition will disconnect starter of the engine, however for transition to next state RPM needs to be higher than **Starting RPM (page 207)**.*

Engine running conditions

- Engine speed (RPM) > **Starting RPM (page 207)** or
- Oil pressure > **Starting Oil Pressure (page 208)** or
- Binary input **OIL PRESSURE (PAGE 561)** is in logical 0 or
- Generator voltage > 25% of **Nominal Voltage Ph-N (page 195)**

Still engine conditions

- Engine speed (RPM) < **Starting RPM (page 207)** or
- Oil pressure < **Starting Oil Pressure (page 208)** or
- Binary input **OIL PRESSURE (PAGE 561)** is in logical 1 or
- Generator voltage < 50 V (any phase)

Note: *When the engine was running before and all above conditions are fulfilled, additional 2 s delay is necessary to confirm "still engine".*

When any engine running conditions are appeared on still engine than the **Wrn Stop Fail (page 701)** is activated with following delay:

- for generator voltage from 10 V to < 50 % of nominal voltage, Wrn Stop Fail has delay 1 s
- for generator voltage > 50 % of nominal voltage, Wrn Stop Fail has delay 200 ms
- Oil pressure > **Starting Oil Pressure (page 208)**, Wrn Stop Fail has delay 1 s
- Binary input **OIL PRESSURE (PAGE 561)** is in logical 0, Wrn Stop Fail has delay 1 s
- for detected RPM, there is no delay.

Stop engine conditions

If no engine running conditions are validated than the controller will wait extra 12 s before leaving the Machine state Stop and than it will release the **STOP SOLENOID (PAGE 634)** output.

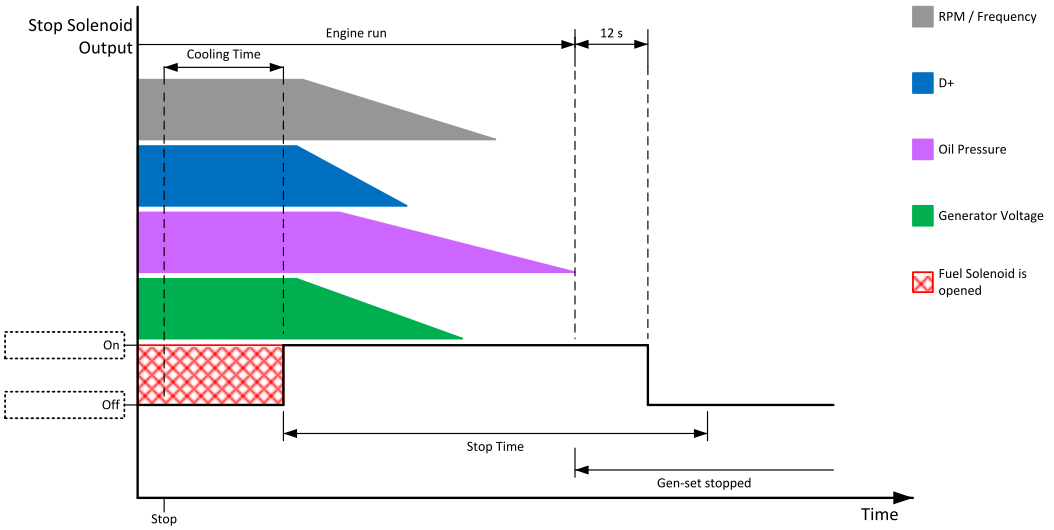


Image 5.30 Engine stops in **Stop Time (page 219)**

When the total time of stopping will exceed setpoint **Stop Time (page 219)** than the **Wrn Stop Fail (page 701)** and binary outputs are activated. The controller will continuously try to stop the engine.

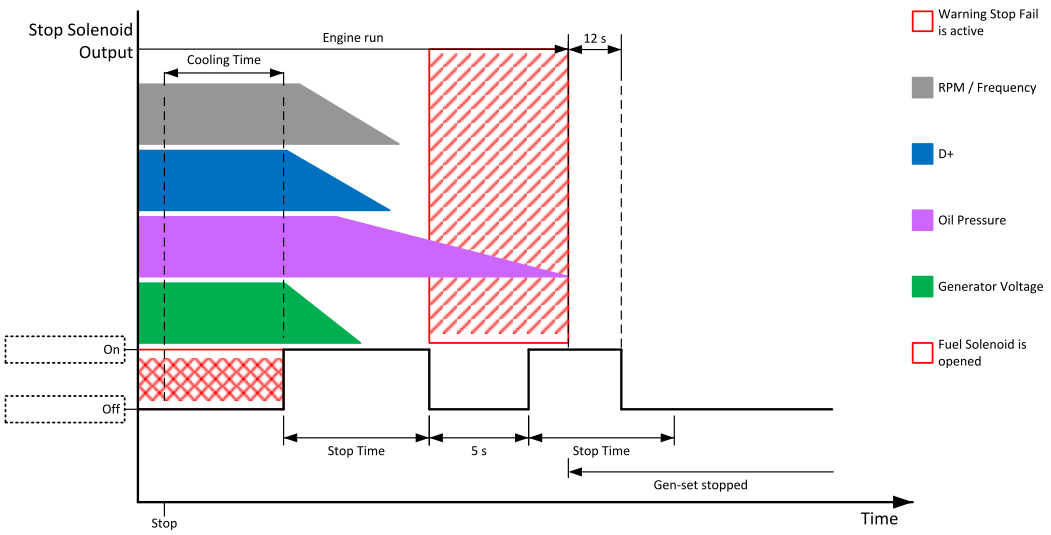


Image 5.31 Engine stops after first **Stop Time (page 219)**

Electric state machine

MainsOper	Mains is present and all its values are within limits. **Example:** MCB is closed, GCB is opened
MainsFlt	Mains fails
IslOper	Island operation **Example:** MCB is opened, GCB is closed
MainsRet	Mains recover
BrksOff	GCB, MCB opened

5.5.21 Sensor curves

Background of the sensor calibration

To correct measuring error of each analog input (pressure, temperature, level, etc.) calibrating constants should be set. Calibration is made by adding the value of setpoint **CU AIN1 Calibration (page 351)**, or **CU AIN2 Calibration (page 352)**, or **CU AIN3 Calibration (page 352)**, or **CU AIN4 Calibration (page 353)** directly to the calculated value at analog input.

Note: *The calibration must be done at the operational point of the analog input (e.g. 80°C, 4.0Bar etc..)*

Default sensor curves

There are 16 default resistive curves available. The following table provides information on minimum/maximum values of respective sensors. Actual values especially of temperature curves may differ. Meaning is to prolong curve to the lower temperature values, so the cold engine will not raise alarm fail sensor.

Curve	Min [Ohm]	Max [Ohm]	Units
VDO 10 Bar 0-2400ohm	0	2400	Bar
VDO40-120°C0-2400ohm	0	2400	°C
VDOLevel%0-2400ohm	0	2400	%
General line 1	0	1000	ohm
General line 2	0	1000	ohm
General line 3	0	1000	ohm
General line 4	0	1000	ohm
General line 5	0	1000	ohm
General line 6	0	1000	ohm
General line 7	0	1000	ohm
General line 8	0	1000	ohm
General line 9	0	1000	ohm
General line 10	0	1000	ohm
General line 11	0	1000	ohm
General line 12	0	1000	ohm
General line 13	0	1000	ohm

Note: *Curves can be modified via InteliConfig. In InteliConfig are also prepared some standard curves.*

IMPORTANT: For right behavior of function, curve for this analog input has to be in percentage and setpoint Fuel Tank Volume (page 232) has to be adjusted correctly.

back to Functions

5.5.22 PLC

PLC Editor is powerful tool which helps you to create your own PLC scheme. It has graphical interface to have user interface easy to use.

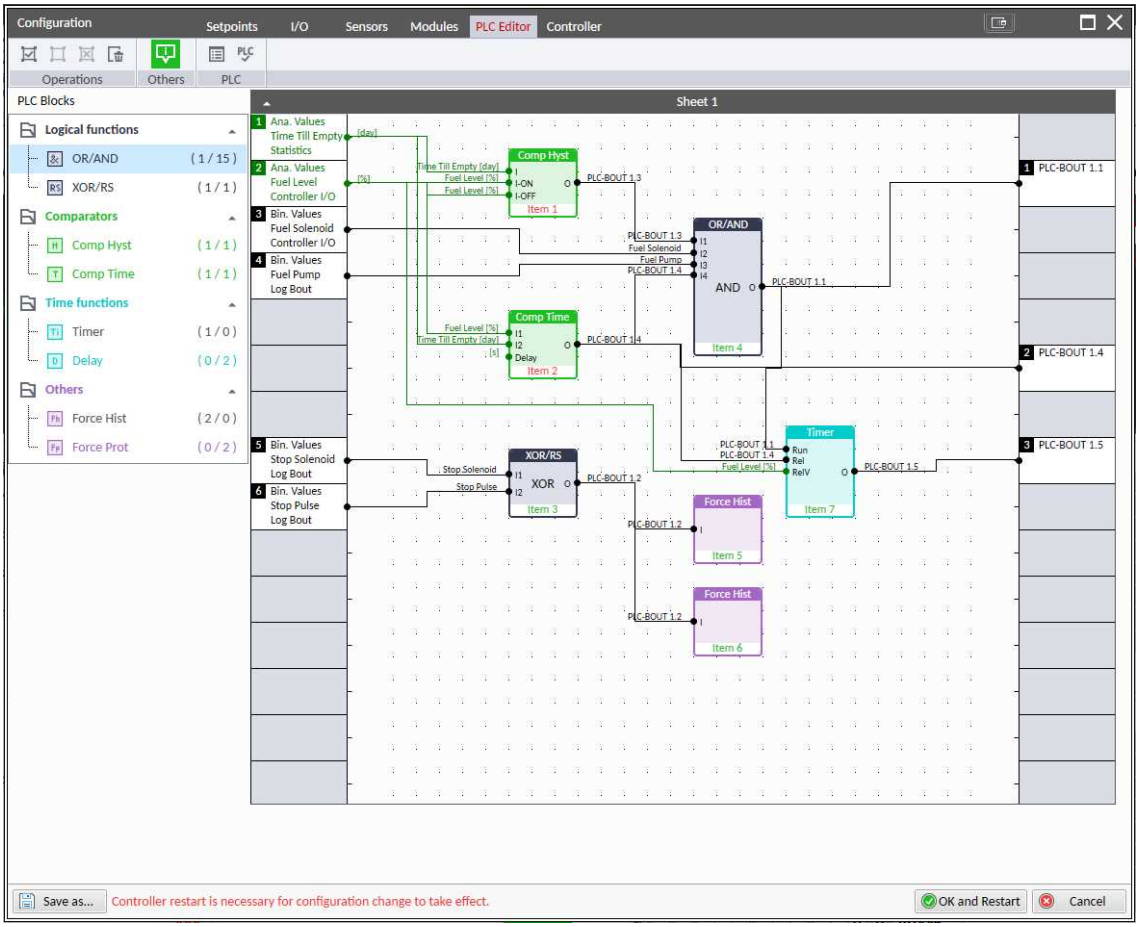


Image 5.32 PLC Editor main page

List of available PLC blocks

PLC block	Number of blocks
OR/AND	16
XOR/RS	2
Comparator with hysteresis (Comp Hyst)	2
Comparator with delay (Comp Time)	2
Timer	1
Delay	4
Force history record (Force Hist)	2
Force protection (Force Prot)	2

Working with the editor

If the currently opened archive does not contain any PLC program, then an empty drawing is created automatically when you select the PLC Editor. The procedure of creation of a PLC drawing (program) contains following essential steps:

- Adjust the sheet to your needs. See **Working with sheets (page 138)** for more information.
- Add PLC blocks into the sheets. See **Adding PLC blocks (page 138)** for more information.
- Define inputs and outputs of the PLC program. See **Define inputs and outputs (page 139)** for more information.
- Create connections between inputs, blocks and outputs. See **Creating wires (page 142)** for more information.
- Adjust properties of the blocks. See **List of PLC blocks (page 672)** for more information about blocks.

Working with sheets

Drag the sheet edges to re-size the sheet according to your needs.

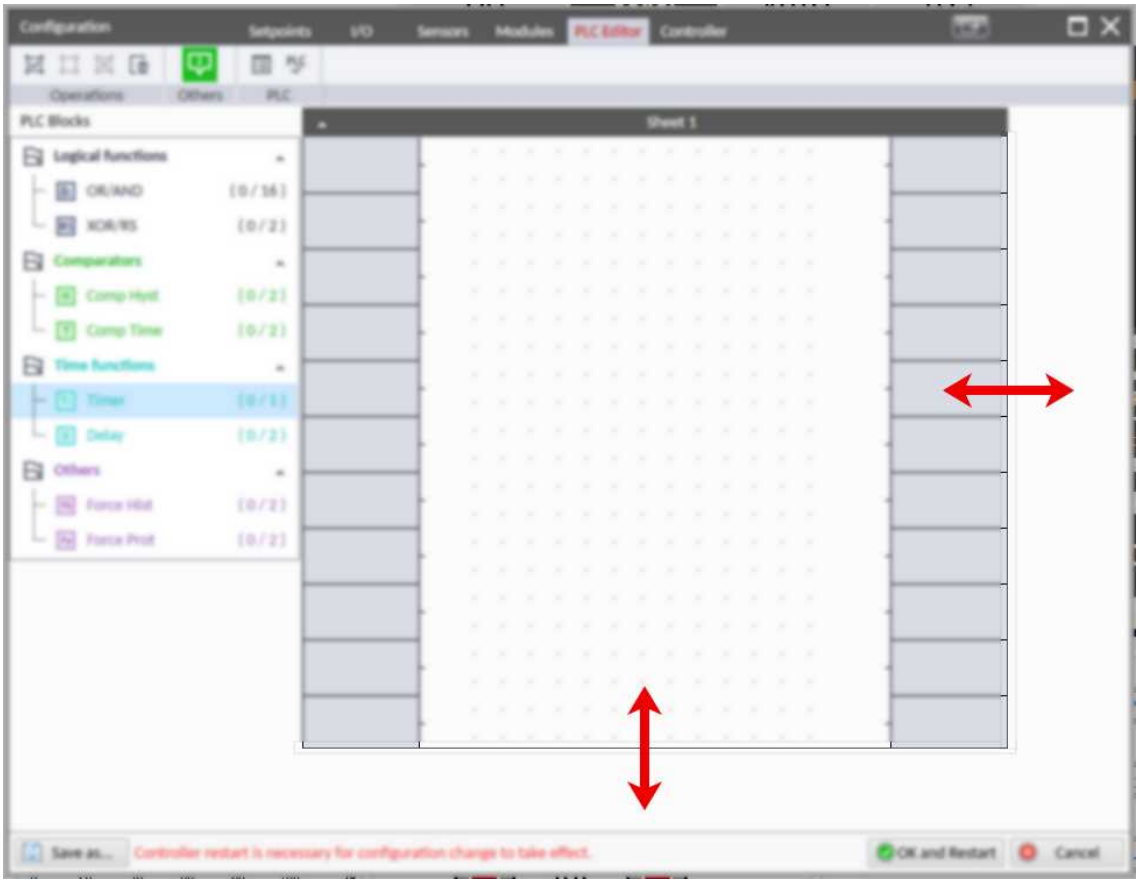


Image 5.33 Adjusting PLC sheet

Adding PLC blocks

Adding PLC block is simple and intuitive. Follow the procedure below to add PLC block.

- Select required block from the list of available PLC blocks at the left and drag it into the sheet.
- Double-click on the block and adjust properties of the block. See **List of PLC blocks (page 672)** for more information about blocks.

- Connect the block inputs and outputs by drawing wires in the sheet. See **Define inputs and outputs (page 139)** for more information. It is also possible to connected inputs and outputs via properties of selected PLC block.

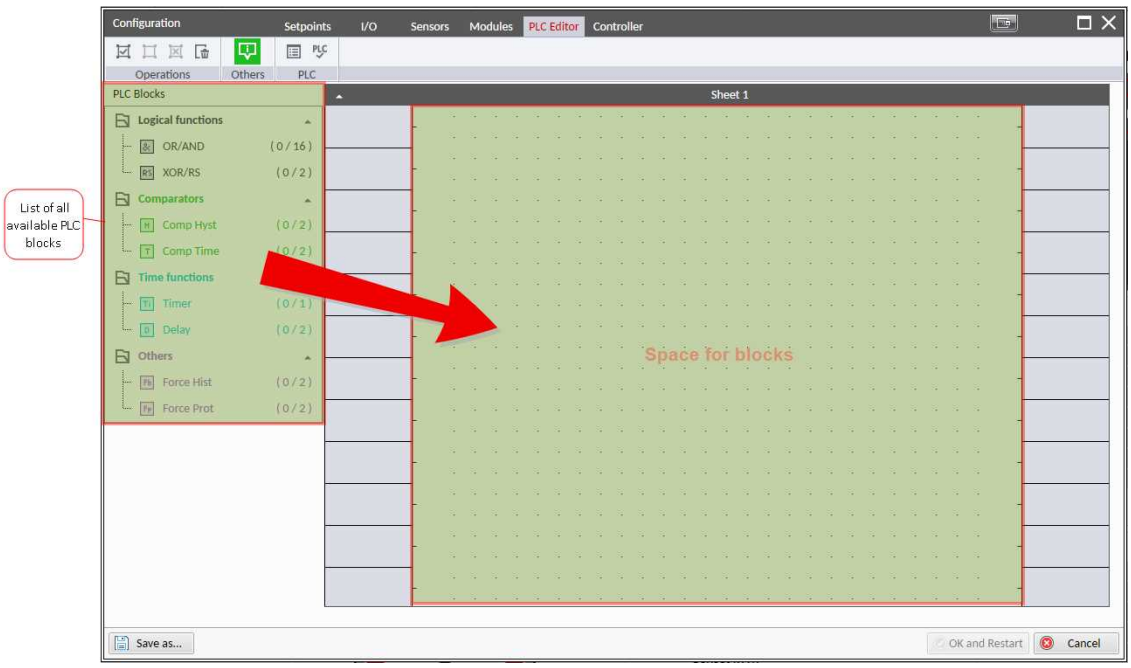


Image 5.34 Adding PLC blocks

Note: *To delete PLC block just click on it and press delete button. Also delete selection function can by used.*

Note: *To see context help for selected PLC block just press F1 button.*

Define inputs and outputs

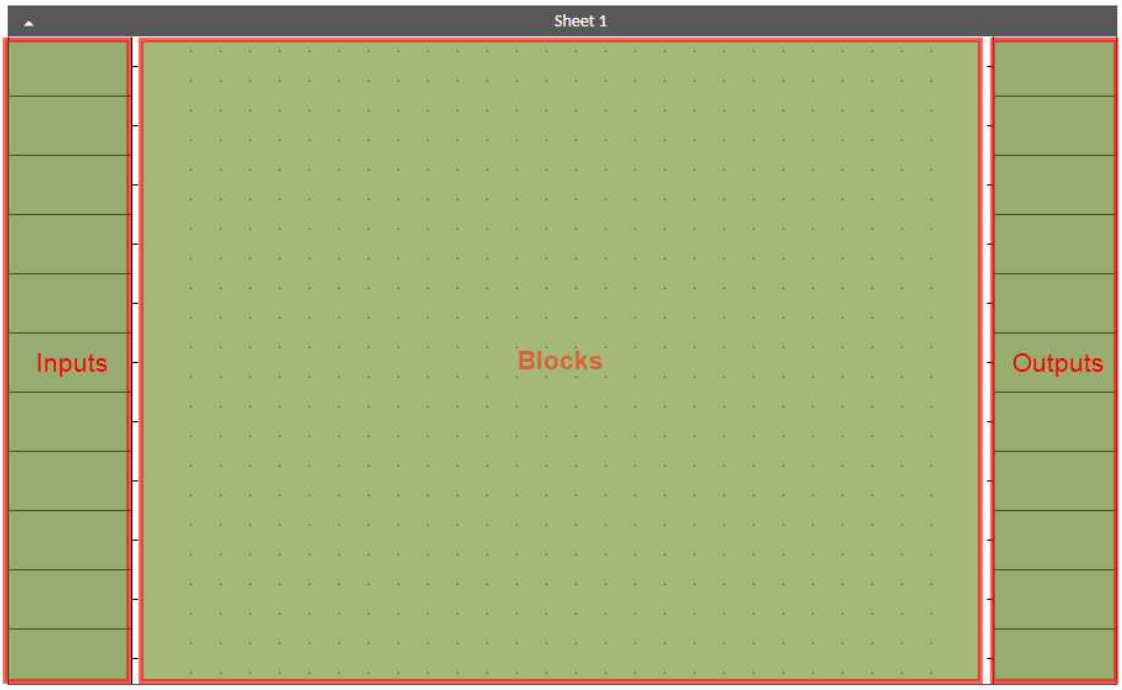
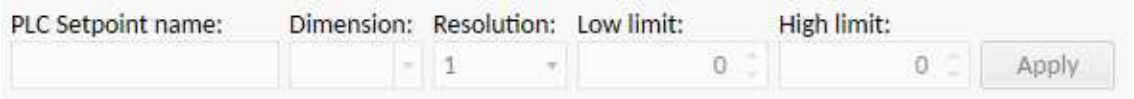


Image 5.35 Blank sheet of PLC editor

Inputs

Sheet inputs are located at the left side of a sheet. Follow the procedure below to add or edit an input.

- Double-click on a free input position or existing input to add new input or edit the existing one.
- Select the source for the input.
  - If you create a binary input, you can select a source from following categories:
    - Bin. Values - this category contains all binary values available in the controller as binary inputs, logical binary outputs etc.
    - PLC Outputs - this category contains all PLC blocks binary outputs available in the controller.
  - If you create an analog input, you can select a source from following categories:
    - Ana. Values - this category contains all analog values available in the controller as analog inputs, electrical values, values from ECU etc.
    - All Setpoints - this category contains all setpoints of the controller except the dedicated PLC setpoints. Names, resolutions and dimensions of these setpoints can not be modified.
    - PLC Setpoints - this category contains a group of setpoints which are dedicated for using in the PLC program. PLC setpoints can be renamed, their dimension, resolution and limits can be modified according to need of PLC blocks where they are used.



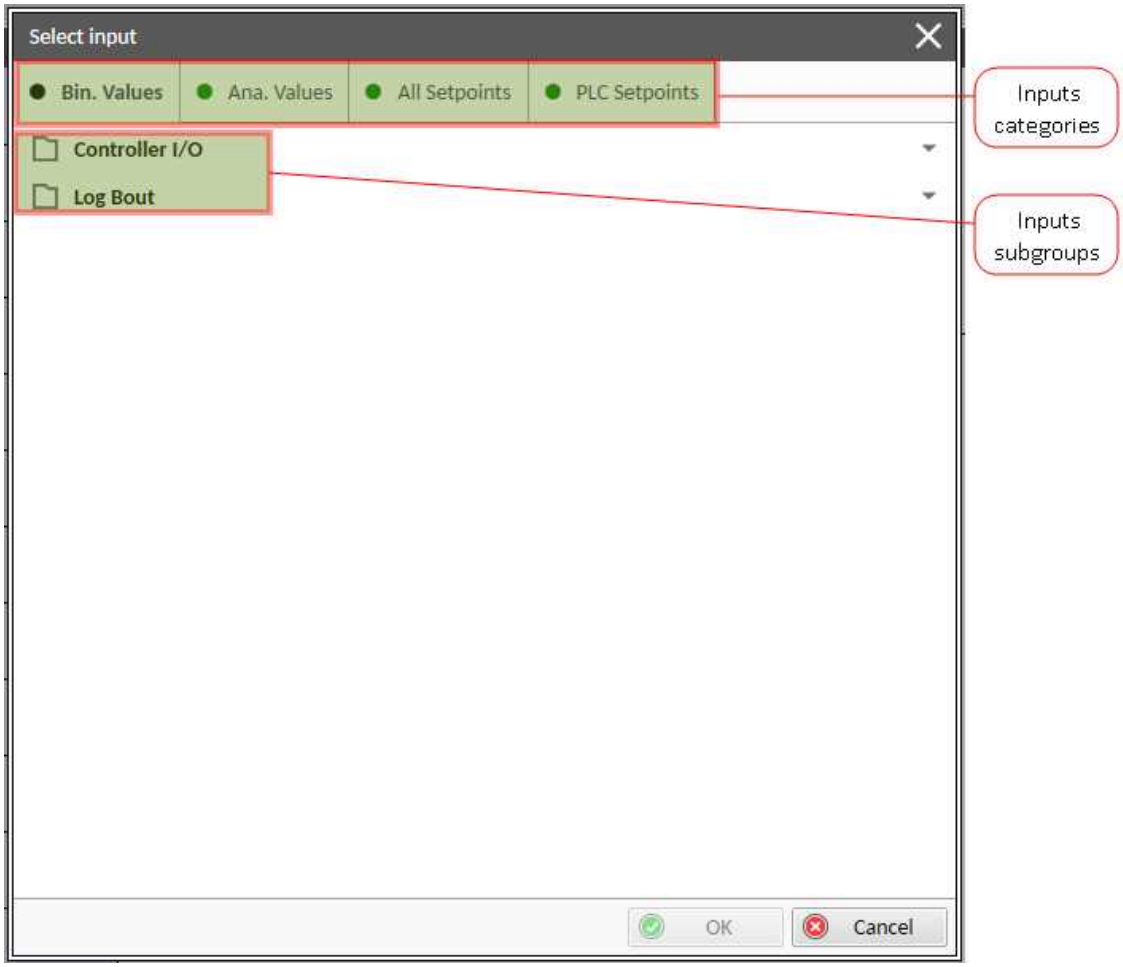


Image 5.36 PLC inputs

Outputs

Sheet outputs are located at the right side of a sheet. Follow the procedure below to add or edit an input.

- Doubleclick on a free output position to add new sheet output.
- Doubleclick on an already created output to configure the output onto a controller output terminal or a logical binary input (first of all some PLC block output has to be connected to this output to enable configuration of output).

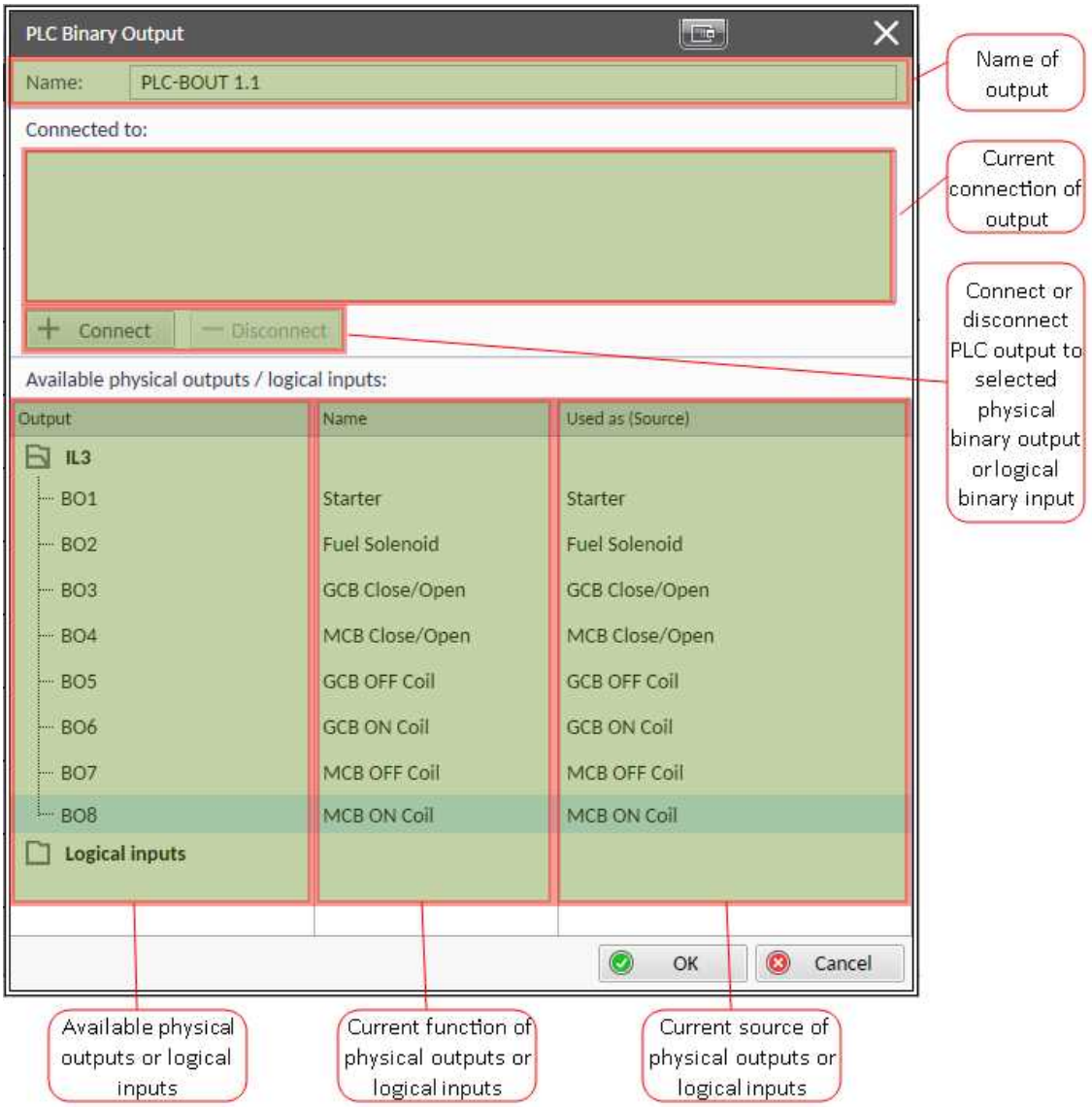


Image 5.37 PLC outputs

IMPORTANT: It is necessary to click on Connect button after selecting the output. Otherwise PLC output is not connected to output.

Creating wires

Wires can be create between PLC inputs and PLC blocks and between PLC blocks and PLC outputs.

IMPORTANT: Keep the order of starting and finishing connection points. Wires between inputs and blocks have to start from inputs. Wires between blocks and outputs have to start from blocks.

Follow the procedure below to create wire.

- Locate the mouse pointer over the starting point of the wire. If the area under the mouse pointer is a connection point, the pointer will change the color (fill of pointer will be white).
- Press and hold the left mouse button and drag the wire to the destination of required connection point. If you point over a valid connection point, the connection point will be marked with a red circle.
- Release the left mouse button to create a wire between the two points. The wire is routed automatically.

Note: *It is possible to make connection only between the outputs and inputs with the same type of value (binary or analog). Binary values are marker by black pointer, analog values are marked with green pointer.*

Note: *To delete wire just click on it and press delete button. Also delete selection function can by used.*

PLC logic execution rules

The PLC program is executed every 100 ms. The blocks are executed in order according to block numbers (item numbers), which are indicated in each block. The block numbers are assigned automatically according to position on sheet.

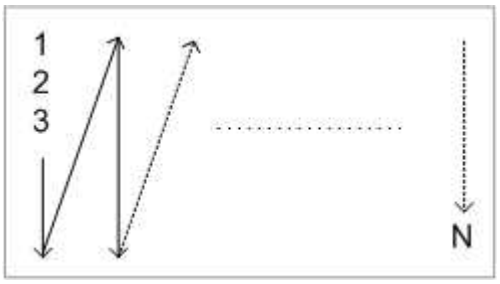
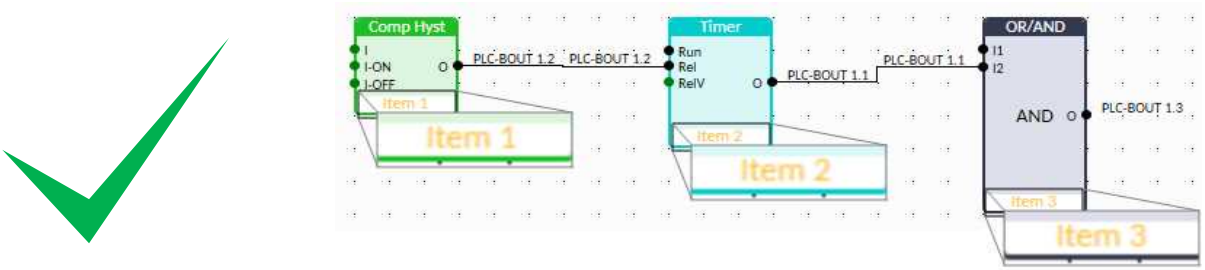
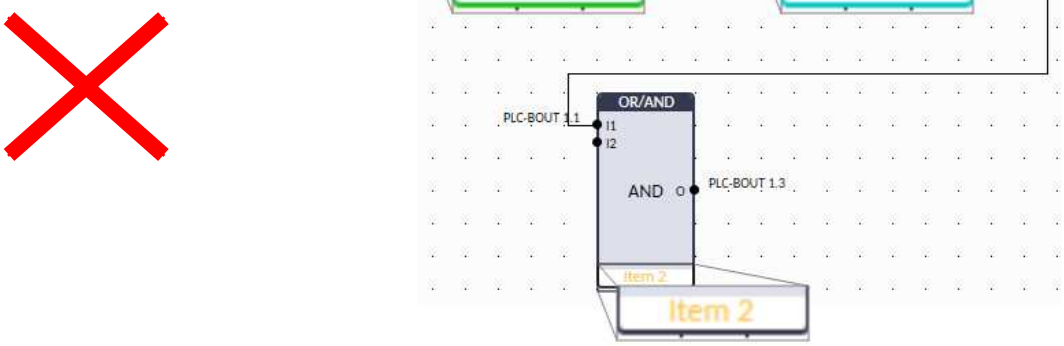


Image 5.38 PLC execution logic

IMPORTANT: Please always check that the blocks are ordered correctly, especially if you use direct feedbacks from outputs to inputs within one sheet. Wrong order may lead to incorrect results!!!





Other functions

Consistency check

Use this function to check if all inputs and outputs of PLC block are connected.

Delete whole content of sheet

Use this function to delete the whole content of sheet (including blocks, wires, inputs, outputs, etc...).

Hints

Use this function to enable or disable quick hints for blocks (controller help is not affected by this function).

PLC monitor

PLC monitor is a powerful tool for monitoring your PLC. Just click on PLC monitor button on main InteliConfig page to see you PLC. Active inputs and outputs have blue color. Also wires with active signals have blue color.

> **IMPORTANT: It is not possible to edit PLC in PLC monitor tool.**

5.5.23 Geo-fencing

Geo-fencing function is kind of protection that evaluates whether the actual GPS location is within predefined area and based on the evaluation takes an action (sends sms, stops engine, make history record etc.). Function is enabled by setpoint **Geo-Fencing (page 348)** or by logical binary input **GEO-FENCING ENABLED (PAGE 557)**.

Using InteliConfig, it is possible to set two concentric geo-circles within which the unit is allowed to be located. Each geo-circle is defined as circular geographic area with centre (common for both geo-circles) named Home Position adjusted via setpoints **Home Latitude (page 346)** and **Home Longitude (page 346)** and radius named Fence Radius adjusted via setpoints .**Fence Radius 1 (page 347)** and **Fence Radius 2 (page 347)**.

Protections can be different for both circles. Protection are adjusted via setpoints **Fence 1 Protection (page 349)** and **Fence 2 Protection (page 350)**.

It is also possible to see the current position of the controller in WebSupervisor map view.

5.5.24 Tier 4 Final

Tier 4 Final support generally provides monitoring and control of after-treatment system installed on generators engine. The requirements are defined as:

- Providing After-Treatment status information by
  - displaying universal lamps (icons)
  - displaying analog and binary values
- Control of After-Treatment regeneration function by
  - transmitting commands to the ECU

Providing Aftertreatment status information

After-Treatment screen

This screen is shown with configured ECU which supports Tier 4 Final. After-Treatment screen is automatically shown, once any of selected lamps gets active or change status. Deactivating of the lamp will not trigger showing the screen. The screen is then shown until operator switch it to another one. Alarmlist screen has lower priority so even new alarm appears, After-treatment screen is still displayed. To avoid displaying blank screen,

inactive lamps are represented by "dotted" icons. For no active lamp the screen shows all dotted icons. Please see examples below:

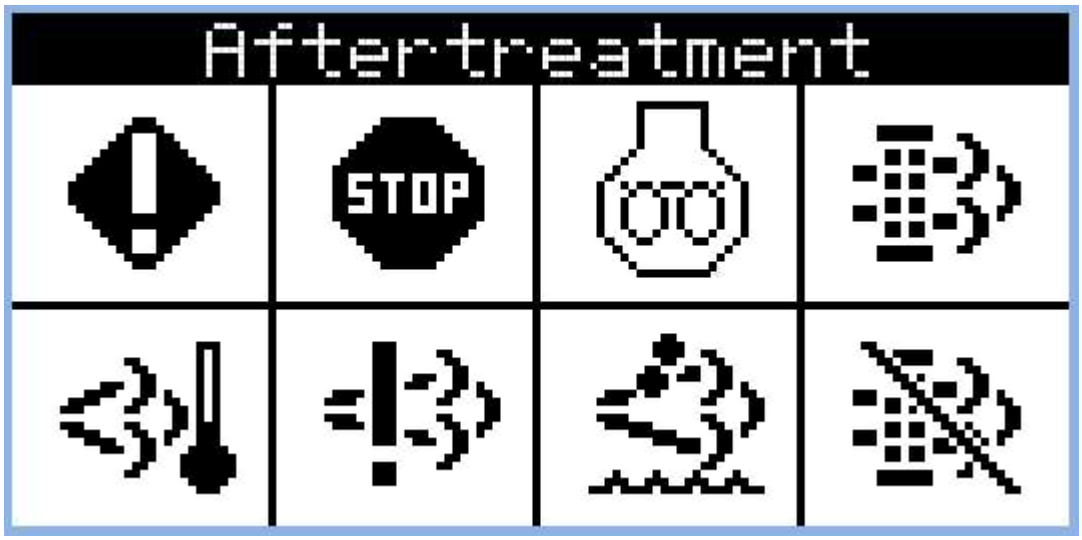


Image 5.39 Example of active Tier 4 Final screen

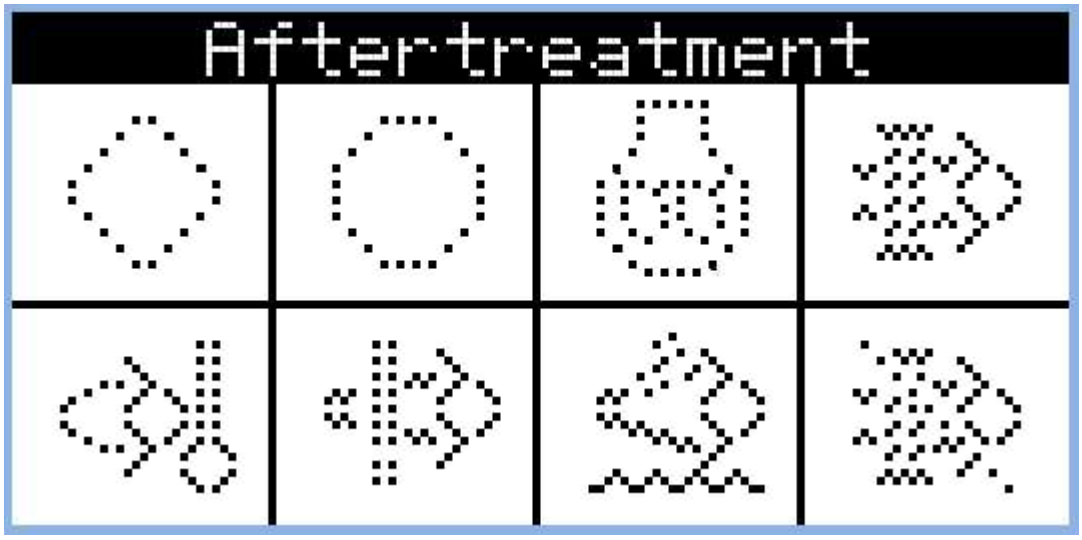


Image 5.40 Example of inactive Tier 4 Final screen

Universal lamps (icons)

Universal lamp icons are shown on the After-Treatment screen. Based on specific value read in specific frame with specific SPN is every lamp icon either:

- shown
- hidden
- blinking slow (1 Hz)
- blinking fast (2 Hz)

Note: *Lamp icon blinking is defined as displaying active lamp icon and inverse colored active lamp icon in required frequency.*

Lamp name	Active icon	Inactive icon	Notes
Amber warning lamp			***Note:*** *This value can light or blink on both frequencies.*
Red stop lamp			***Note:*** *This value can light or blink on both frequencies.*
Engine wait to start lamp			
DPF/SCR lamp command			***Note:*** *DPF = Diesel Particulate Filter; SCR = Selective Catalytic Reduction. This lamp also activates alarm* ***After-Treatment (page 702)****.*
Exhaust system high temperature lamp command			***Note:*** *This lamp also activates alarm* ***After-Treatment (page 702)****.*
Malfunction indicator lamp			***Note:*** *This value can light or blink on both frequencies. This lamp also activates alarm* ***After-Treatment (page 702)****.*
Fluid tank low level indicator			***Note:*** *This lamp also activates alarm* ***After-Treatment (page 702)****.*
DPF regeneration inhibited			***Note:*** *Indicates the state of diesel particulate filter active regeneration inhibition. This lamp also activates alarm* ***After-Treatment (page 702)****.*

Analog values

Supported analog values:

- DPFAshLoad (page 478)
- DPFSootLoad (page 478)
- DEF Level (page 478)

Control of After-Treatment regeneration function

User can force or inhibit regeneration process by activating appropriate binary inputs of the controller. Please see the list of binary inputs below:

- FORCE REGENERATION (PAGE 554)
- REGENERATION INHIB (PAGE 562)

5.5.25 Alternate configuration

In controller are 3 sets of configuration.

Configuration set 1	Configuration set 2	Configuration set 3
Nominal Power Split Phase 1 (page 357)	Nominal Power Split Phase 2 (page 361)	Nominal Power Split Phase 3 (page 365)
Nominal Power 1 (page 357)	Nominal Power 2 (page 361)	Nominal Power 3 (page 365)
Nominal RPM 1 (page 355)	Nominal RPM 2 (page 360)	Nominal RPM 3 (page 364)
Nominal Frequency 1 (page 355)	Nominal Frequency 2 (page 359)	Nominal Frequency 3 (page 363)
Nominal Voltage Ph-N 1 (page 356)	Nominal Voltage Ph-N 2 (page 360)	Nominal Voltage Ph-N 3 (page 364)
Nominal Voltage Ph-Ph 1 (page 356)	Nominal Voltage Ph-Ph 2 (page 360)	Nominal Voltage Ph-Ph 3 (page 364)
Nominal Current 1 (page 355)	Nominal Current 2 (page 359)	Nominal Current 3 (page 363)
Connection Type 1 (page 353)	Connection type 2 (page 357)	Connection type 3 (page 361)
ECU Speed Adjustment 1 (page 366)	ECU Speed Adjustment 2 (page 366)	ECU Speed Adjustment 3 (page 367)

Configuration sets can be changed via logical binary inputs ALTERNATE CONFIG 2 (PAGE 525) and ALTERNATE CONFIG 3 (PAGE 525). Configuration set 1 is active when there is no input activated. In case that inputs ALTERNATE CONFIG 2 (PAGE 525) and ALTERNATE CONFIG 3 (PAGE 525) are active at the same time, the configuration set 3 is took in account.

ALTERNATE CONFIG 2 (PAGE 525)	ALTERNATE CONFIG 3 (PAGE 525)	Active configuration set
0	0	1
1	0	2
0	1	3
1	1	3

IMPORTANT: If LBO ECU POWER RELAY (PAGE 600) is used, change of alternate configuration can be made only in prestart phase. So prestart has to be set up for enough long time.

5.5.26 ECU Frequency selection

Setpoint *ECU Freq Select* is no longer in use. However **ECU Frequency Select (page 481)** value was kept and the value can be calculated from **Nominal Frequency (page 196)** setpoint. Sequence for frequency change is executed automatically (engine must be in still condition and ECU is powered on – ECU Power Relay is not configured) in following steps:

1. Starting of the engine is blocked (state: Not Ready)
2. Wait 100 ms
3. *ECU Stop Pulse* is set for 1000 ms (standard Stop Pulse duration)
4. Wait 3000 ms
5. Frequency selection is changed to a new value
6. Wait 2000 ms
7. *ECU Stop Pulse* is set for 1000 ms (standard Stop Pulse duration)
8. Wait 2000 ms
9. Come back from start blocking state

This sequence does not control LBO **ECU POWER RELAY (PAGE 600)** anyhow.

Note: *If LBO **ECU POWER RELAY (PAGE 600)** is used, this change can be made only in prestart phase. So prestart has to be set up for enough long time.*

5.5.27 Cybernetic security

The cybernetic security is formed by:

- Hardening the storage of a credentials
- Protection against a brute-force attack to the password
- Secure method to reset the password
- A new technology of encryption of the remote communication
- Web interface can be disabled

IMPORTANT: Due to this, we do not recommend performing a rollback from FW 1.8.0 to FW version 1.7.2 or older.

Hardening the storage of a credentials

The user credentials (passwords and access code) have been moved to a hardened storage to prevent the credentials to leak out of the hardware.

IMPORTANT: If a firmware rollback is inevitable, please keep in mind, when the firmware is first time updated to the new firmware (which uses hardened storage) a seamless transfer of the credentials into the hardened storage is performed. However, if the rollback to any previous firmware (which does not use hardened storage) is performed the credentials are NOT transferred back, so the previous firmware will not "see" any change of the credentials made through the new firmware. Moreover, as the transfer of the credentials into the hardened storage is performed only during very first update from an "old" to a "new" firmware, no change of the credentials performed in the "old" firmware after the rollback will be visible in the "new" firmware after a next update to the "new" firmware.

Protection against the brute force attack

Protection against the brute force will take a place when an invalid password is entered repeatedly.

- If the invalid password is entered 5 times, the controller gets blocked for entering password for a while.
- Each further entering of the invalid password cause the consequent blocking time is increased.
- If the invalid password is entered repeatedly the controller gets blocked for entering the password permanently and the password must be reset to a default value as described below.

Note: *Blocking of the controller for entering the password have no influence to controller/genset operation*

Note: *Permanent blocking cannot occur accidentally, just by user mistake. It can be practically triggered only by a focused activity.*

Resetting the administrator password

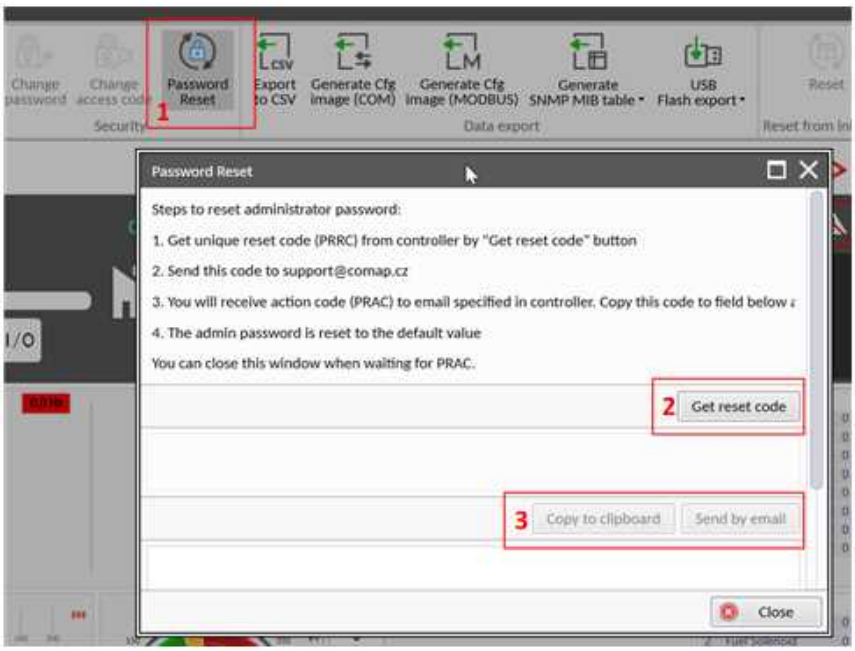
If **the administrator password is lost or controller is permanently locked** due to brute-force attack protection, proceed according to a procedure described below:

> **IMPORTANT: There is a backup e-mail address defined in the controller to which and only which ComAp will send the "password reset action code". Please be sure, that you have adjusted this e-mail address correctly. Use InteliConfig to adjust the backup e-mail address**



Reset password procedure

1. Connect InteliConfig. You may connect remotely if you know Access Code.
2. Get the password reset request code and send it via e-mail to support@comap-control.com



3. Once you receive the reply from ComAp, copy the code from the e-mail (all characters inside the box as indicated below)



Dear customer,
ComAp has received your request for resetting the password in the controller **IG500**, serial number **FF110336**. Please perform following steps to finish the action.

1) Connect your PC application to the controller
2) Copy the action code stated below to the clipboard
3) Paste the clipboard content into the appropriate field in the PC application and press the "Reset" button. Password will be reset to the default value.
4) Adjust and remember new password

Code:

```
ADgjZI2EcREqKq7Dyw/K0eyEURVNy3veXPVcsMuKZpw8hcImRqxyso7/LGec9y
QVthRMC53dZ2SLPHga50qVdpjuNuzLImdK5iDA5J13VIHZ0rW8eInUxj3+qWPa
pADf7nPC9B+t40IXChFPns6Rd4ey1VeAbj+7aca9iyhGUk8cN5V0ePN7+byWND
c7nO+KPop1eoQCgRdMh8AiH60ut7ME2u+qU3FOMG165tmqFGXESCu3cQ+FcsF3
Sxs43QAnYw3sSRPZa57JStdEB3Nk13ooNxH7Bv/gfwsUEjvII3s2WsbjQZ4x/a
XBQF+kp1S9usnz0oXaY+N8RTHd1ynEbyQ=
```

Please note folowing points:
- This code can be used only in the controller from which the corresponding request was generated.
- The code has no time-limited validity
- The code becomes invalid if someone enters valid administrator password into the controller
- The code becomes invalid if someone enters another (invalid) code three-times into the controller

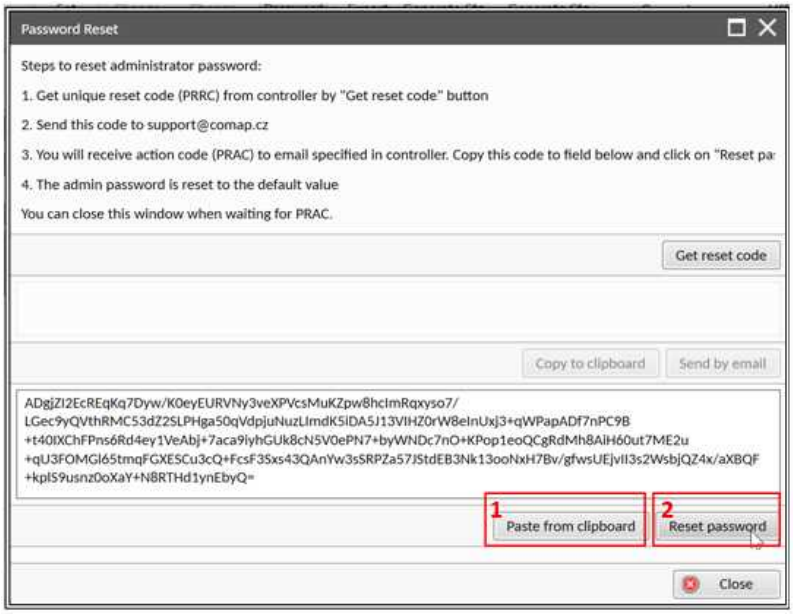
Sincerely
ComAp technical support

If you know the controller mentioned above but have not submitted any request for password reset please contact ComAp technical support support@comap.cz.
If you do not recognize this activity at all you may ignore this e-mail.

This is an automatically generated e-mail. Please do not reply.

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4. Paste the code into the password reset window



Encryption of the communication

New technology “CCS v.1” is used for an authentication and an encryption of the ComAp protocol via Internet/ethernet/AirGate. This technology is based on strong and proven cryptographic algorithms and has passed successfully penetration tests and cybersecurity audit.

Web interface can be disabled

A setpoint has been added to disable the CM-ETHERNET built-in web interface.

> **IMPORTANT: As the web interface is using HTTP protocol it is recommended to disable the web interface unless the controller is connected into a trusted secure network.**

6 Communication

6.1 PC 153
6.2 Connection to 3rd party systems 166

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6.1 PC

6.1.1 Direct communication 153
6.1.2 Remote communication 155

6.1.1 Direct communication

A RS232, USB, RS485 or ethernet interface can be used for direct cable connection to a PC.

Connection via RS232

A plug-in communication module CM-RS232-485 is necessary for communication via RS232 connection.

The module is plugged into the slot located on the rear side of the controller. To find more information about installation of the modules **see Plug-in module installation on page 58**.

RS232 interface uses **COM1 Mode (page 367)** port of the controller. Use a cross-wired serial communication cable with DB9 female connectors and signals Rx, Tx, GND.

Note: *Also USB-RS232 convertor can be used.*

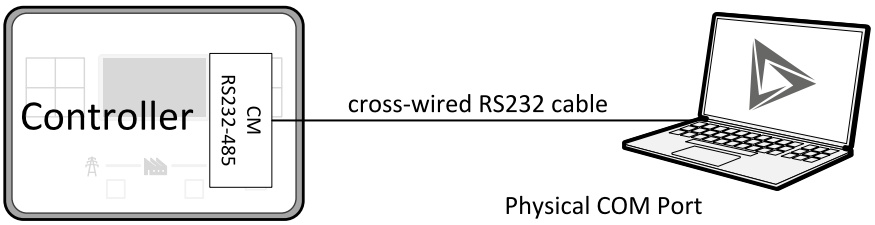


Image 6.1 Cross-wired RS232 cable is used

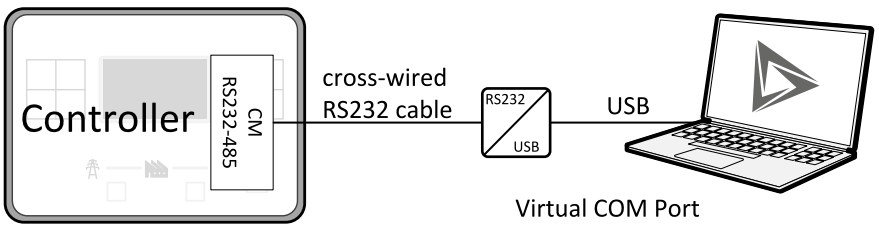


Image 6.2 Cross-wired RS232 cable and USB is used

Connection via RS485

A plug-in communication module CM-RS232-485 is necessary for communication via RS485 connection.

The module is plugged into the slot located on the rear side of the controller. To find more information about installation of the modules **see Plug-in module installation on page 58**.

RS485 interface uses **COM2 Mode (page 369)** port of the controller.

Note: *Also USB-RS485 convertor can be used.*

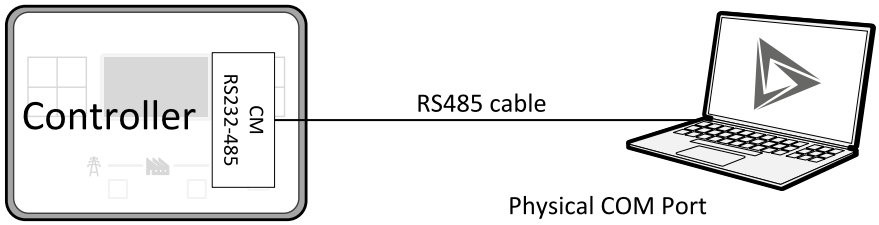


Image 6.3 Plug-in module CM RS232-485 is used

Connection via Ethernet

A plug-in communication module CM-Ethernet is necessary for ethernet connection.

The module is plugged into the slot located on the rear side of the controller. To find more information about installation of the modules **see Plug-in module installation on page 58**.

This connection type is used for communication with the controller from InteliConfig or any other PC tool. This connection can be used regardless of AirGate is switched on or off. Only three remote clients can be connected at the same time (via AirGate only two remote clients at the same time).

To connect your PC tool to the controller use the INTERNET connection type and just put the CM-Ethernet IP address into the gen-set address box in the PC tool. If you do not use the default **ComAp TCP Port (page 408)** 23, then you also have to specify the port number using a colon.

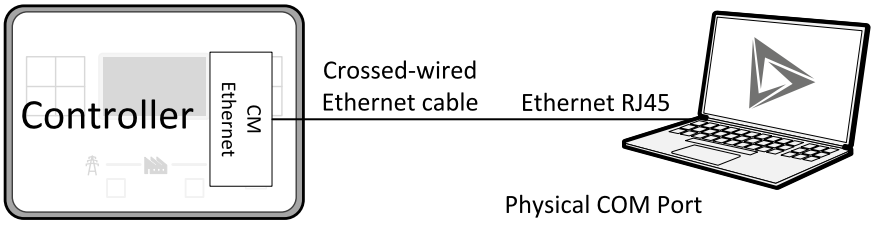


Image 6.4 Ethernet cable is used

Connection via USB

USB interface uses HID profile.

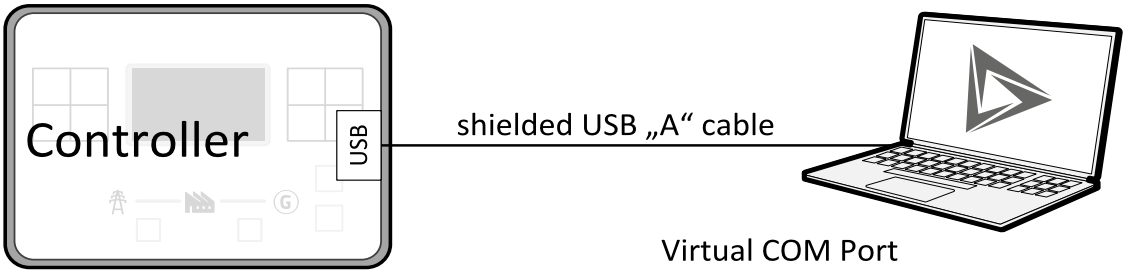


Image 6.5 Shielded USB type A cable is used

6.1.2 Remote communication

A PC can be connected to the controller also remotely via CM-GPRS or CM-Ethernet plug-in module.

IMPORTANT: Factory default password and access code are "0". It is highly recommended to change these parameters.

Ethernet LAN connection

Direct IP LAN connection is intended to be used if the CM-Ethernet module is reachable from the client computer by specifying the IP address at which the module can be contacted.

- If direct IP connection is to be used within a local network the CM-Ethernet must have static IP address in the respective local network.

Note: *If you have troubles with setting up static and public IP address for direct connection from Internet use AirGate connection instead.*

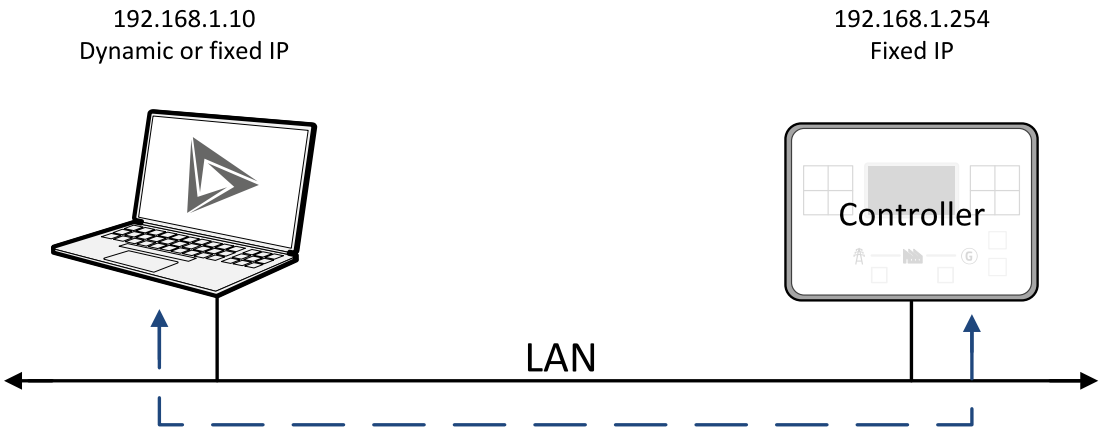


Image 6.6 Ethernet LAN connection

Setting-up static IP address

There are two basic ways to get the static IP address.

First way is to switch theCM-Ethernet to manual IP address mode. Adjust the setpoint **IP Address Mode (page 402)** to FIXED. In that case all setpoints of IP settings(**IP Address (page 402)**, **Subnet Mask (page 403)**, **Gateway IP (page 403)**, **DNS IP Address 1 (page 404)**) have to be adjusted manually. If this method is used several basic rules should be kept to avoid conflicts with the remaining network infrastructure:

- The static IP used in the controller must be selected in accordance with the local network in which CM-Ethernet is connected.
- The static IP used in the controller must be excluded from the pool of addresses which is assigned by DHCP server, which is in charge of the respective local network.
- The local infrastructure must generally allow using devices with manually assigned IP addresses.
- There must not be any other device using the same static IP address. This can be tested from a computer connected to the same network using "ping <required_ip_address>" command issued from the command line. The IP address is not occupied if there is not any response to the ping command.

Note: *The list above contains only basic rules. Other specific restrictions/rules may take place depending on the local network security policy, technology used, topology etc.*

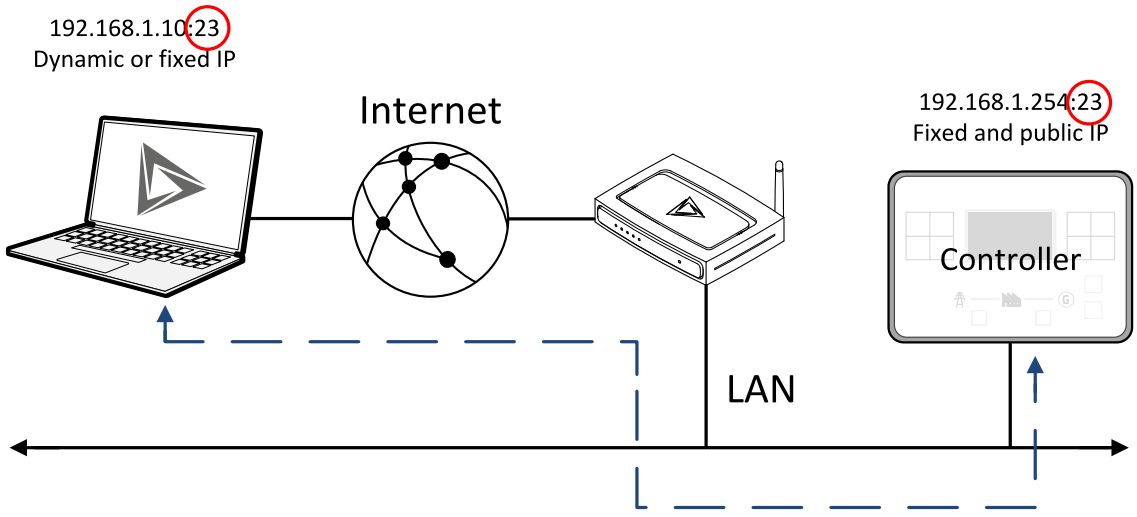
Next way is to switch the CM-Ethernet to automatic IP address mode. Adjust the setpoint **IP Address Mode (page 402)** to AUTOMATIC. In that case all IP settings are assigned by DHCP server. Then configure the DHCP server to assign always the same IP address (i.e. static IP address) to the particular CM-Ethernet according to it's MAC address.

Internet connection

Public static IP

If public static IP connection is to be used from the Internet, the IP address, which is entered into the client computer, must be static and public in scope of the Internet.

- If CM-Ethernet is connected to Internet via a local ethernet network then in most cases port forwarding must be created from the public IP address of the network gateway to the local IP address of CM-Ethernet at the port specified for ComAp protocol. Different port numbers can be used to create multiple port forwarding rules in the same local network.



AirGate

This connection type is intended for remote connection from InteliConfig,or any other ComAp PC tool over the Internet in situations, where obtaining fixed public IP address is not possible. Only two remote clients can be connected at the same time.

This connection type is active if AirGate connection is enabled. Setpoint **AirGate Address (page 408)** must contain AirGate server address. It can be entered in text form as well as numeric form. There is a public AirGate server available at address "airgate.comap.cz".

Once the controller is attached to the Internet and the AirGate server address is properly adjusted then the controller registers automatically to the server and an identification string AirGate ID is given to a controller, which is visible at the controller screen.

To connect your PC tool to the controller use the AirGate connection, put the the same AirGate address as in the controller into the AIRGATE ADDRESS field and use the AirGate ID displayed on the controller.

SMS

Event SMS

The InteliLite controller equipped with the CM-GPRS or CM-4G-GPS communication module is able to send Event SMS according to the setting of setpoint:

- **Event Message (page 398)**

Note: *Firstly setpoint **Telephone Number 1 (page 392)** has to be adjusted.*

The following events can be received by mobile phone:

- Engine Start/Stop
  - Manual Start/Stop
  - Remote Start/Stop
  - AMF Start/Stop (as Automatic Mains Failure Start/Stop)
  - Test Start/Stop Gen-set
- Mains Fail
- Mains Returned
- Load on Mains
- Load on Gen-set
- Test On Load

Message structure:

- Genset Name (hh:mm:ss dd.mm.yyyy)
- hh:mm:ss Mains Fail
- hh:mm:ss AMF Start
- hh:mm:ss Load on Genset
- hh:mm:ss Mains Returned
- hh:mm:ss Load on Mains
- hh:mm:ss AMF Stop

Alarm SMS

The InteliLite controller equipped with the CM-GPRS or CM-4G-GPS communication module is able to send Alarm SMS according to the setting of setpoints:

- **Wrn Message (page 399)**
- **Sd Messages (page 399)**
- **BOC Message (page 399)**

Note: *Firstly setpoint **Telephone Number 1 (page 392)** has to be adjusted.*

Message structure:

- Gen-set Name
- AL=(Alarm 1, Alarm 2, Alarm x)

Note: *Asterisk means that alarm is unconfirmed and exclamation mark means that alarm is active.*

SMS commands

To control the gen-set equipped with InteliLite controller and CM-GPRS or CM-4G-GPS communication module (or modem) via SMS requests, send an SMS in the structure of:

xxxx, yyyy, zzzz, etc.

SMS send to the telephone number of the SIM card in your CM-GPRS module (or modem). Where the "#" mark means the controller access code, "xxxx" means the Command 1, "yyyy" is Command 2, "zzzz" is Command 3, etc.

Note: *Access code is set up via InteliConfig.*

IMPORTANT: If wrong controller access code is set, then only help command is working.

start	Start the engine in MAN mode.
stop	Stop the engine in MAN mode.
fault reset	Acknowledging alarms and deactivating the horn output.
gcb close	Closing GCB in MAN and TEST mode.
gcb open	Opening GCB in MAN and TEST mode.
mcb close	Closing MCB in MAN and TEST mode
mcb open	Opening MCB in MAN and TEST mode
off	Switching to OFF mode.
man	Switching to MAN mode.
auto	Switching to AUTO mode.
test	Switching to TEST mode.
status	Get status information from controller unit.
help	Get a list of available SMS requests.

Note: *Between commands are internal delays adjusted due to system requirements.*

Example: When the controller, in AUTO mode, with a controller name of "InteliLite-Test", with the CM-GPRS module and access code "0" receives the SMS:
0 man, start, gcb close, gcb open, stop, auto
Controller mode will be changed to MANUAL mode. The engine will be started and GCB will close. Then GCB will open, the engine will stop and it will go into AUTO mode again.
The controller will send back the SMS (controller will respond to SMS after every command has been finished, not sooner.):
#InteliLite-Test: <OK>,<OK>,<OK>, <OK>,<OK>, <OK>
The value <OK> or <ERROR> means if the command has been performed succesfuly or not.

Event Email

The InteliLite controller equipped with the CM-Ethernet communication module is able to send Event Email according to the setting of setpoint:

- **Event Message (page 398)**

Note: *Firstly setpoints **Email Address 1 (page 395)** and **SMTP Sender Address (page 389)** (for CM-GPRS) or **SMTP Sender Address (page 401)** (for CM-Ethernet) have to be adjusted.*

Note: *#**Summer Time Mode (page 326)** and **Time Zone (page 398)** have to be adjusted for correct time in emails.*

Message structure:

Controller

Name: XXX

Serial number: XXX

SW branch: XXX

SW version: XXX

Application: XXX

Appl. version: XXX

Date: dd/mm/yyyy

Time: hh:mm:ss

Alarm list

Alarm 1

Alarm 2

Alarm 3

Events

---

hh:mm:ss Event 1

hh:mm:ss Event 2

hh:mm:ss Event 3

Alarm Email

The InteliLite controller equipped with the CM-Ethernet communication module is able to send Alarm Emails according to the setting of setpoints:

- **Wrn Message (page 399)**
- **Sd Messages (page 399)**
- **BOC Message (page 399)**

Note: *Firstly setpoints* ***Email Address 1 (page 395)*** *and* ***SMTP Sender Address (page 389)*** *(for CM-GPRS) or* ***SMTP Sender Address (page 401)*** *(for CM-Ethernet) have to be adjusted.*

Note: ***#Summer Time Mode (page 326)*** *and* ***Time Zone (page 398)*** *have to be adjusted for correct time in emails.*

Message structure:

Controller

Name: XXX

Serial number: XXX

SW branch: XXX

SW version: XXX

Application: XXX

Appl. version: XXX

Date: dd/mm/yyyy

Time: hh:mm:ss

Alarm list

Alarm 1

Alarm 2

Alarm 3

History events

---

0 dd/mm/yyyy hh:mm:ss.0 Event 1

-1 dd/mm/yyyy hh:mm:ss.0 Event 2

-2 dd/mm/yyyy hh:mm:ss.0 Event 3

Note: *Asterisk means that alarm is unconfirmed and exclamation mark means that alarm is active.*

Web Server

> **IMPORTANT: The web interface is based on HTTP protocol and is intended to be used only in private networks. It is not recommended to expose the web interface to the public Internet.**

The Web Server is designed for basic monitoring and adjustment of the controller using a web browser. Just put the controller IP address into the browser to display the main controller web page like http://192.168.1.254. You will be asked for the controller access code prior to entering the web pages.

> **IMPORTANT: Do not use the browser navigation buttons as "Back", "Forward" or "Reload". Use the links and the reload button located in the toolbar instead.**

Note: *Only two remote clients can be connected to the Web Server at one moment. If you close your web browser without disconnecting from the CM-Ethernet ("Exit" button at the web pages), the connection will be blocked for next 5 minutes.*

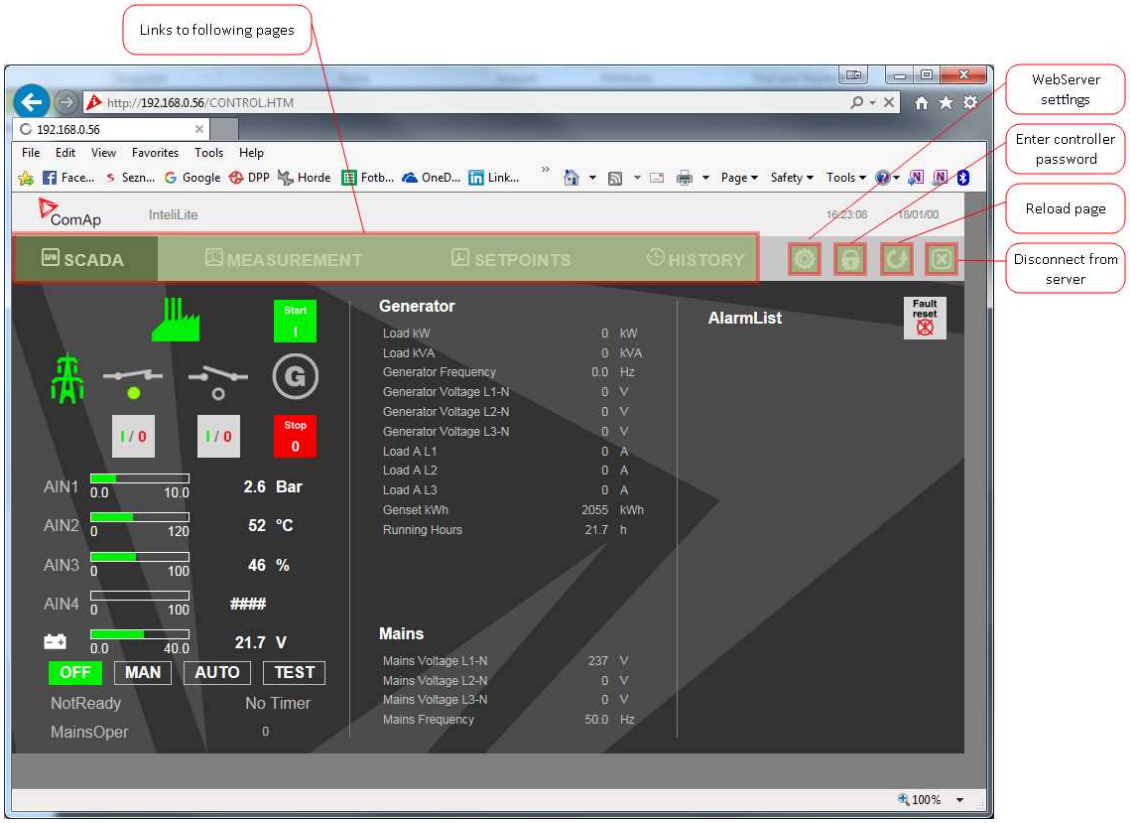


Image 6.7 Web Server main screen

Scada

Click to the SCADA link in the toolbar to display the scada page. The scada page is also the main page which is displayed by default if you just put the CM-Ethernet address into the browser (after entering the right access code).

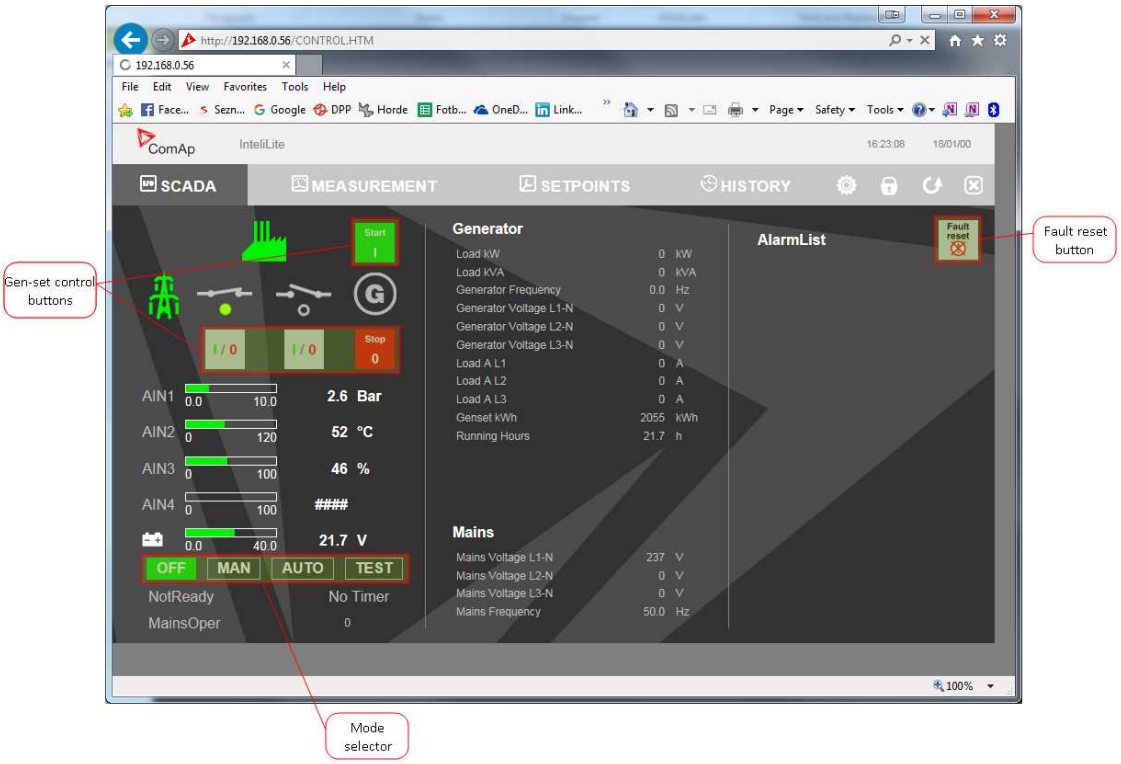


Image 6.8 Web Server - Scada screen

Measurement

Click to the MEASUREMENT link in the toolbar to display the measurement page. Then click to the required group name in the left box to display values of the group in the right box.

Note: *The measurement page is automatically refreshed every 60 seconds (this time cannot be changed).*

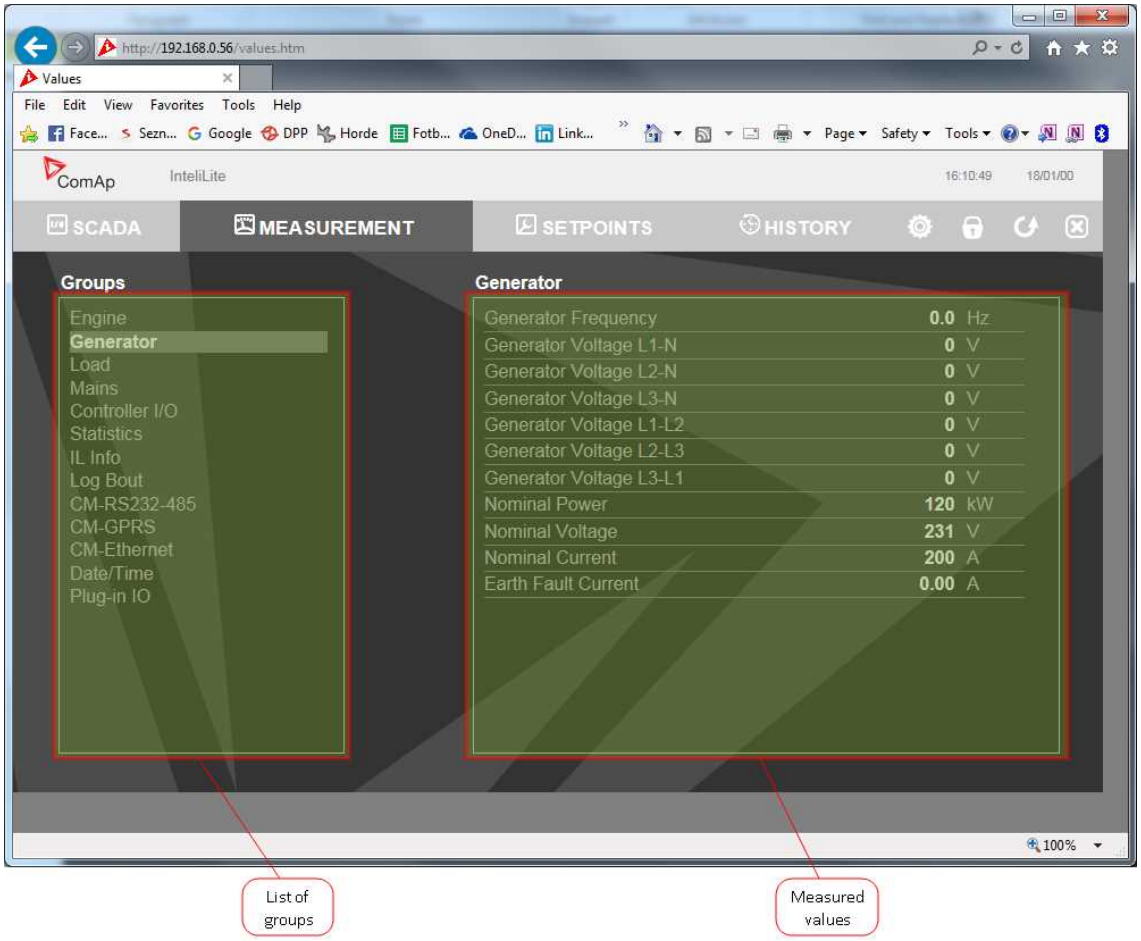


Image 6.9 Web Server - measurement screen

Setpoints

Click to the SETPOINTS link in the toolbar to display the setpoints page.

Click to the required group name in the left box to display setpoints of the group in the right box.

Click to the required setpoint name or value to change the value. If the respective setpoint is protected by password, which is indicated by a lock icon by the setpoint name, you have to click on the "Controller password" icon located in the toolbar and then enter valid password.

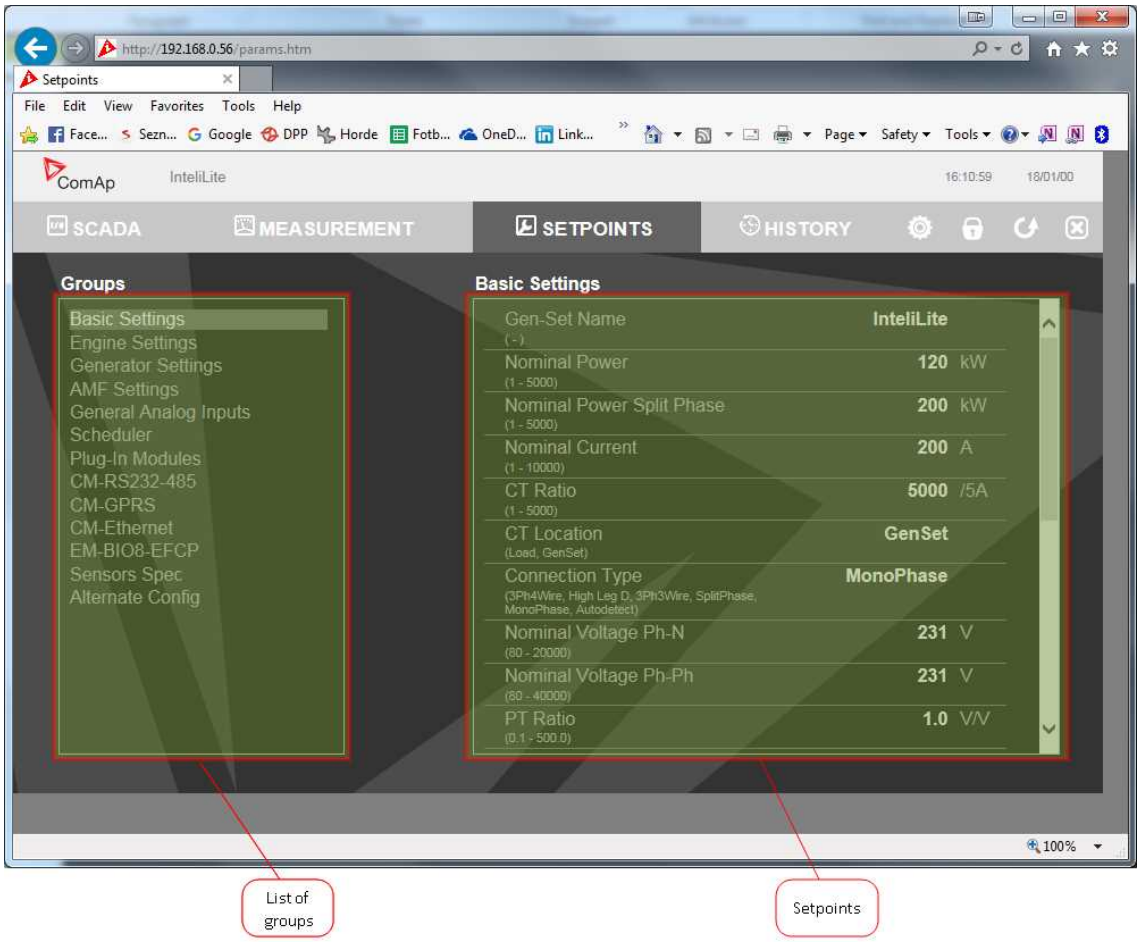


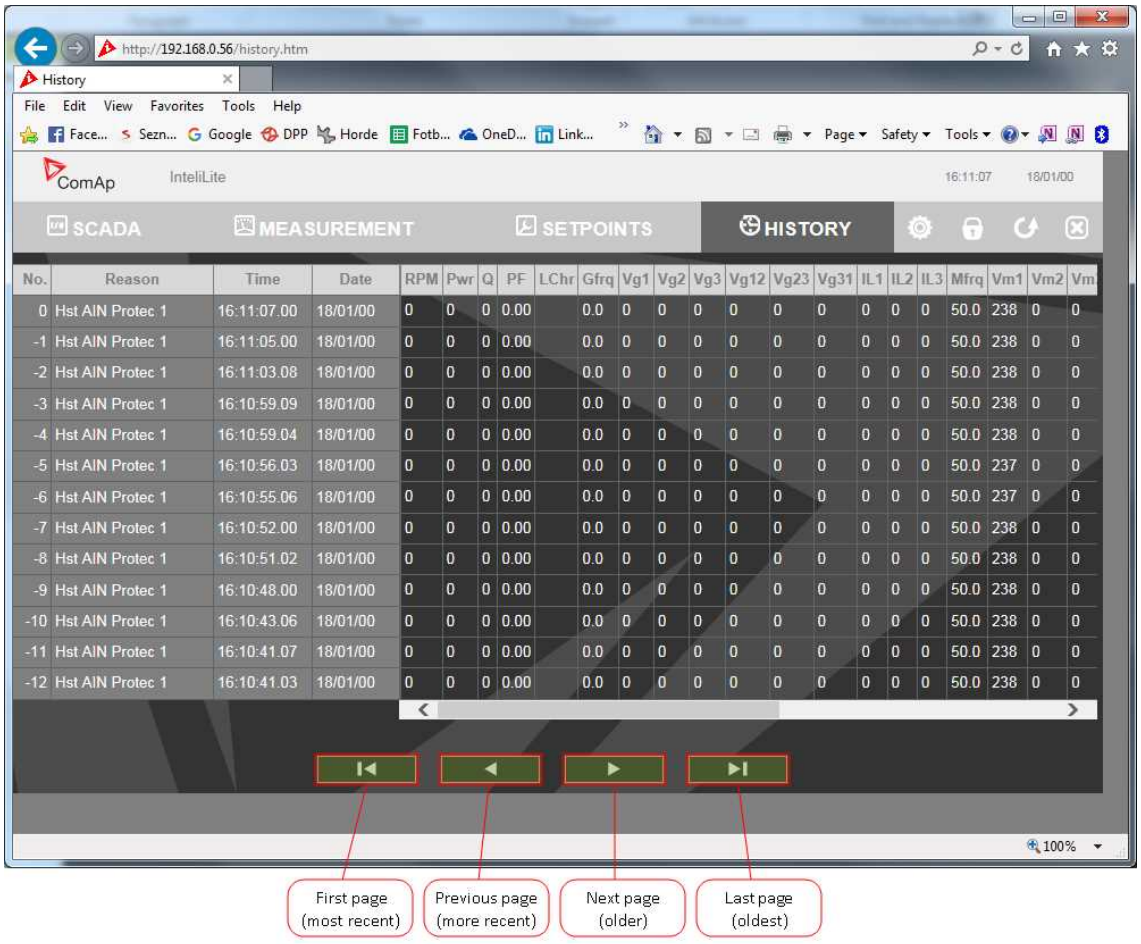
Image 6.10 Web Server - Setpoints screen

History

Click to the HISTORY link in the toolbar to display the history page.

Use the control buttons to move within the history file.

Note: *The history page is automatically refreshed every 60 seconds. If a new record appears in the controller, the web page will not show it immediately as e.g. InteliConfig.*



No.	Reason	Time	Date	RPM	Pwr	Q	PF	LChr	Gfrq	Vg1	Vg2	Vg3	Vg12	Vg23	Vg31	IL1	IL2	IL3	Mfrq	Vm1	Vm2	Vm
0	Hst AIN Protec 1	16:11:07.00	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-1	Hst AIN Protec 1	16:11:05.00	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-2	Hst AIN Protec 1	16:11:03.08	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-3	Hst AIN Protec 1	16:10:59.09	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-4	Hst AIN Protec 1	16:10:59.04	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-5	Hst AIN Protec 1	16:10:56.03	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	237	0	0
-6	Hst AIN Protec 1	16:10:55.06	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	237	0	0
-7	Hst AIN Protec 1	16:10:52.00	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-8	Hst AIN Protec 1	16:10:51.02	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-9	Hst AIN Protec 1	16:10:48.00	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-10	Hst AIN Protec 1	16:10:43.06	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-11	Hst AIN Protec 1	16:10:41.07	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0
-12	Hst AIN Protec 1	16:10:41.03	18/01/00	0	0	0	0.00		0.0	0	0	0	0	0	0	0	0	0	50.0	238	0	0

Image 6.11 Web Server - History screen

Web Server Adjustment

Click to the "Web Server settings" icon in the toolbar to display the settings page.

Select the controller language the web pages will appear in.

Select the rate of automatic refresh of the scada page.

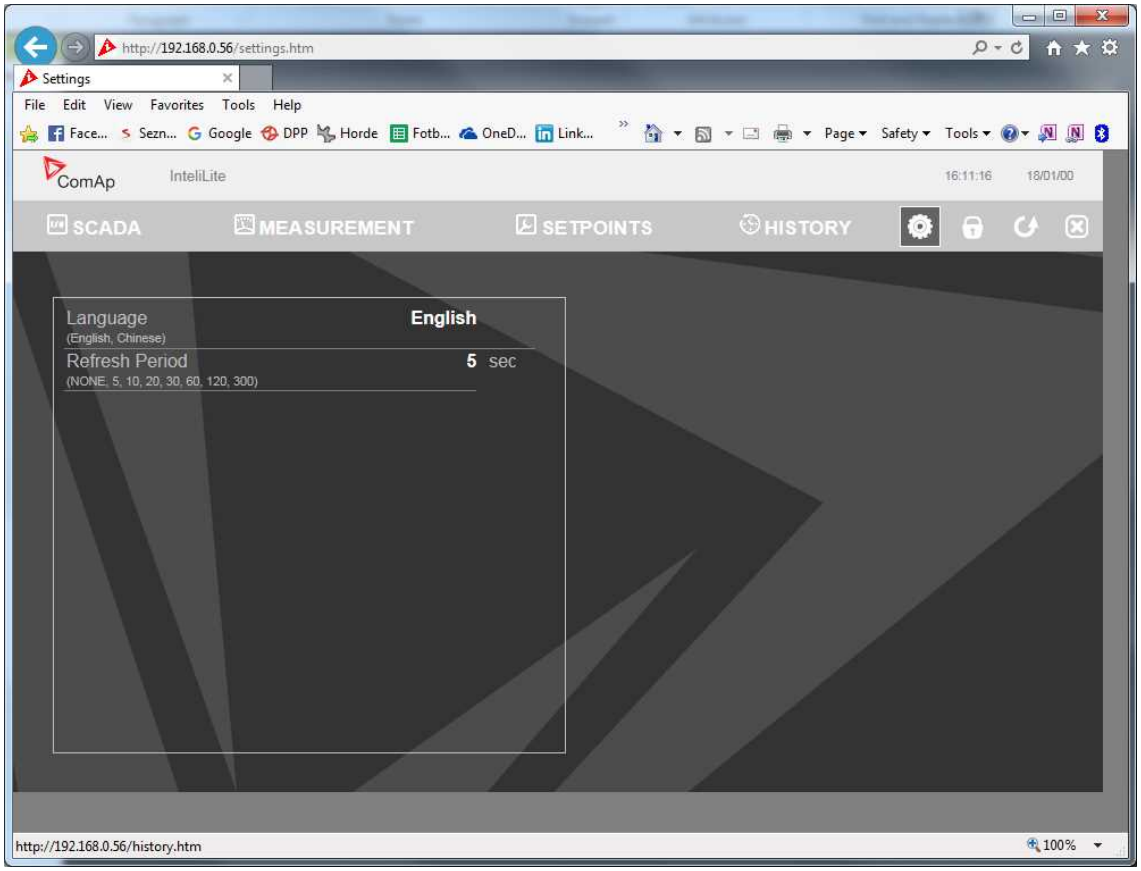


Image 6.12 Web Server - Adjustment screen

back to Communication

6.2 Connection to 3rd party systems

6.2.1 SNMP 166
6.2.2 MODBUS-RTU, MODBUS/TCP 168

back to Communication

6.2.1 SNMP

SNMP is an UDP-based client-server protocol used for providing data and events into a supervisory system (building management system). The controller plays the role of a „SNMP Agent“ while the supervisory system plays the role of a „SNMP Manager“.

- CM-Ethernet module is required for SNMP function
- Supported versions - SNMP v1 and SNMP v2c

The SNMP Agent function is to be enabled by the setpoint **SNMP Agent (page 405)** in the CM-Ethernet setpoint group. The setpoints **SNMP RD Community String (page 405)** and **SNMP WR Community String**

(page 406) in the same group can be used to customize the „community strings“ for the read and write operations which have function like „passwords“. All requests sent from the SNMP Manager have to contain community string which match with the community string adjusted in the controller otherwise the controller refuses the operation.

MIB table

The „MIB table“ (Management Information Base) is a table which gives to the Manager description of all objects provided by the Agent.

- The MIB table is specific for each controller type and configuration
- The MIB table is to be exported from the controller configuration using InteliConfig
- Controllers with identical firmware and configuration share also identical MIB table, however if the configuration and/or firmware is not identical the MIB table is different and must be exported separately for each controller.

The root node of the MIB table of InteliLite controller is enterprises.comapProjekt.il, which is 1.3.6.1.4.1.28634.14. Under this node there are following sub-nodes :

- Notifications group (SMI v2 only) contains definitions of all notification-type objects that the Agent may send to the Manager.
- GroupRdFix contains read-only objects that exist in all controller regardless of the firmware version/type and configuration.
- GroupRdCfg contains read-only objects that depend on the firmware version/type and configuration.
- GroupWrFix contains read-write objects that exist in all controller regardless of the firmware version/type and configuration.
- GroupWrCfg contains read-write objects that depend on the firmware version/type and configuration.
- GroupW contains write-only objects.
- NotificationData group contains objects that are accessible only as bindings of the notification messages.

SMI version

In InteliConfig the MIB table may be exported in two different formats – SMI v1 and SMI v2. The format which shall be used for export depends on the SNMP Manager and SMI version that it does support.

Typically, SMI v1 is used for SNMP v1 and vice versa, but it is not a rule and SMI v2 may be also used for SNMP v1.

SNMP reserved objects

Name	OID	Access	Data type	Meaning
pfActionArgument	groupWrFix.24550	read,write	Gauge32	Writing: command argument Reading: command return value
pfActionCommand	groupW.24551	write	Integer32	Command code 1)
pfPassword	groupW.24524	write	Integer32	Password

1) For list of commands, arguments and description of the procedure of invoking commands see the description of the MODBUS protocol.

SNMP notifications

Except the request-response communication model, in which the communication is controlled by the Manager, there are also messages that the Agent sends without any requests. These messages are called „Notifications“ and inform the Manager about significant events occurred in the Agent.

The controller can send notifications to two different SNMP Managers (two different IP addresses). The addresses are to be adjusted in the CM-Ethernet setpoint group by the setpoints **SNMP Traps IP Address 1 (page 406)** and **SNMP Traps IP Address 2 (page 407)**. If the Manager address is not adjusted the particular notification channel is off. The controller will send the notifications in format adjusted by the setpoint SNMP Trap Format.

- Each notification (kind of event) is identified by an unique identifier (Trap ID in SNMPv1 or Notification OID in SNMPv2). This unique identifier gives the specific meaning to the notification message, e.g. Protection 1. level - Fuel Level - alarm activated.
- All possible notifications and their identifiers are listed in the MIB table.
- The notification message also contains controller name, serial number and textual description of the event.

6.2.2 MODBUS-RTU, MODBUS/TCP

MODBUS protocol is used for integration of the controller into a building management system or for remote monitoring via 3rd party monitoring tools.

- MODBUS-RTU can be used on serial interfaces (CM-RS232-485 module is required). The MODBUS-RTU server must be activated by switching the setpoint **COM1 Mode (page 367)** or **COM2 Mode (page 369)** into the Modbus position. The serial speed for MODBUS-RTU communication is to be adjusted by the setpoint **COM1 MODBUS Communication Speed (page 368)** or **COM2 MODBUS Communication Speed (page 370)**.
- MODBUS/TCP can be used on the ethernet interface (CM-Ethernet module is required). Up to 2 clients can be connected simultaneously. The MODBUS/TCP server must be activated by the setpoint **MODBUS Server (page 405)**.

MODBUS, MODBUS/TCP protocol can be used simultaneously with Web connection and direct ethernet/AirGate connection.

> **IMPORTANT: Do not write setpoint repeatedly(e.g. power control form a PLC repeated writing of baseload setpoint via Modbus). The setpoints are stored in EEPROM memory. which can be overwritten up to 10^5 times without risk of damage or data loss, but may become damaged, when the allowed number of writing cycles is exceeded!**

Note: *Modbus-RTU serial communication mode is 8-N-1 - startbit 1, 8 data bits, no parity and 1 stopbit.*

Address space

The object address space is separated into several areas as described in the table below. The actual mapping of specific controller data objects to specific MODBUS addresses, which depends on configuration, can be exported into a text file from the appropriate controller archive using InteliConfig. There are several special registers with fixed meaning (reserved registers) which are listed in a separate table in this chapter.

MODBUS address	Meaning	Access	MODICON object type	MODBUS function
0000 .. 0999	Binary objects	Read only	Discrete Inputs	Read: 01, 02
1000 .. 2999	Values	Read only	Input Registers	Read: 03, 04
3000 .. 3999	Setpoints	Read/Write	Holding Registers	Read: 03, 04 Write: 06, 16
4200 .. 7167	Reserved registers	Read/Write, depends on each specific register	Input Registers Holding Registers	Read: 03, 04 Write: 06, 16

Mapping data types to registers

As there are multiple data types in the controller but only one data type in MODBUS (the register, which is 2 byte long), a mapping table is necessary to compose and decompose the MODBUS messages correctly.

Data type	Meaning	Number of registers	Data maping
Integer8	1-byte signed integer	1	MSB = sign extension LSB = value
Unsigned8	1-byte unsigned integer	1	MSB = 0 LSB = value
Integer16	2-byte signed integer	1	MSB = value, MSB LSB = value, LSB
Unsigned16	2-byte unsigned integer	1	MSB = value, MSB LSB = value, LSB
Integer32	4-byte signed integer	2	MSB1 = value, byte 3 (MSB) LSB1 = value, byte 2 MSB2 = value, byte 1 LSB2 = value, byte 0 (LSB)
Unsigned32	4-byte unsigned integer	2	MSB1 = value, byte 3 (MSB) LSB1 = value, byte 2 MSB2 = value, byte 1 LSB2 = value, byte 0 (LSB)
Binary8	8-bit binary value	1	MSB = 0 LSB = value, bits 0-7
Binary16	16-bit binary value	1	MSB = value, bits 8-15 LSB = value, bits 0-7
Binary32	32-bit binary value	2	MSB1 = value, bits 24-31 LSB1 = value, bits 16-23 MSB2 = value, bits 8-15 LSB2 = value, bits 0-7
Char	1-byte ASCII character	1	MSB = 0

Data type	Meaning	Number of registers	Data maping
			LSB = ASCII value of the character
StrList	Index into a list of strings	1	MSB = 0 LSB = index into the list
ShortStr	Zero-terminated string of max 15 ASCII characters.	8	MSB1 = ASCII value of the 1. character LSB1 = ASCII value of the 2. character MSB2 = ASCII value of the 3. character LSB2 = ASCII value of the 4. character …
LongStr	Zero-terminated string of max 31 ASCII characters.	16	MSB1 = ASCII value of the 1. character LSB1 = ASCII value of the 2. character MSB2 = ASCII value of the 3. character LSB2 = ASCII value of the 4. character …
Date	Date (dd-mm-yy)	2	MSB1 = BCD (dd) LSB1 = BCD (mm) MSB2 = BCD (yy) LSB2 = 0
Time	Time (hh-mm-ss)	2	MSB1 = BCD (hh) LSB1 = BCD (mm) MSB2 = BCD (ss) LSB2 = 0
Alarm	An item of the Alarmlist	27	MSB1 = reserved for future use LSB1 = reserved for future use MSB2 = Alarm level *) LSB2 = Alarm status **) MSB3 = alarm string ***) LSB3 = alarm string MSB4 = alarm string LSB5 = alarm string …

*) 1 .. level 1 (yellow), 2 .. level 2 (red), 3 .. sensor fail

**) Bit0 – alarm is active, Bit1 – alarm is confirmed

***) String encoding is UTF-8

Error codes (exception codes)

Exception code is returned by the controller (server) if the query sent from the client could not be completed successfuly.

The controller responds with the error codes in as follows:

- 01 – Ilegal function is returned if an incompatible type of operation is applied for a specific object, e.g. if function 03 is applied to a binary object.
- 02 – illegal address is returned if the client tries to perform an operation with a object address that is not related to any existing object or that is located inside an object which is composed by multiple addresses (registers).
- 04 – device error is returned in all other errorneous situations. More detailed specification of the problem can be consequently obtained by reading the registers 4205 – 4206.

Reserved registers

There are several registers with specific meaning. These registers are available in all controllers regardless of the configuration.

Register addresses	Number of registers	Access	Data type	Meaning
4200 - 4201	2	read/write	Time	RTC Time in BCD code
4202 - 4203	2	read/write	Date	RTC Date in BCD code
4204	1	read/write	Unsigned8	Index of the language that is used for text data provided by MODBUS (e.g. alarmlist messages).
4205 - 4206	2	read	Unsigned32	Last application error. To be read after the device returns the exception code 04. It contains specific information about the error.
4207 - 4208	2	read/write	Unsigned32	Writing:command argument Reading: command return value
4209	1	write	Unsigned16	Command code
4010	1	-	-	Not implemented
4211	1	write	Unsigned16	Password
4212 - 4213	2	read	Unsigned32	Communication status
4214	1	read	Unsigned8	Number of items in the Alarmlist
4215 - 4241	27	read	Alarm	1. record in alarm list
4242 - 4268	27	read	Alarm	2. record in alarm list
4269 - 4295	27	read	Alarm	3. record in alarm list
4296 - 4322	27	read	Alarm	4. record in alarm list
4323 - 4349	27	read	Alarm	5. record in alarm list
4350 - 4376	27	read	Alarm	6. record in alarm list
4377 - 4403	27	read	Alarm	7. record in alarm list
4404 - 4430	27	read	Alarm	8. record in alarm list
4431 - 4457	27	read	Alarm	9. record in alarm list
4458 - 4484	27	read	Alarm	10. record in alarm list
4485 - 4511	27	read	Alarm	11. record in alarm list
4512 - 4538	27	read	Alarm	12. record in alarm list

Register addresses	Number of registers	Access	Data type	Meaning
4539 - 4565	27	read	Alarm	13. record in alarm list
4566 - 4592	27	read	Alarm	14. record in alarm list
4593 - 4619	27	read	Alarm	15. record in alarm list
4620 - 4646	27	read	Alarm	16. record in alarm list

List of commands and arguments

"Commands" are used to invoke a specific action in the controller via the communication channel. The list of available actions is in the table below. The general procedure of writing a command via MODBUS is as follows:

1. (Optional) Write required level of password into the register 44212 (register address 4211). Use function 6. If the password is required or not depends on configuration of access rules. It can be adjusted/modified by InteliConfig.
2. Write the command argument into the registers 44208-44209 (register addresses 4207-4208). Use function 16.
3. Write the command code into the register 44210 (register address 4209). Use function 6.
4. (Optional) Read the command return value from the registers 44208-44209 (register addresses 4207-4208). Use function 3.
5. If the command was executed the return value is as listed in the table. If the command was accepted but there was an error during execution the return value indicates the reason:
   a. 0x00000001 – invalid argument
   b. 0x00000002 – command refused (e.g. controller not in MAN, breaker can not be closed in the specific situation etc.)

Action	Command code	Argument	Return value
Engine start *)	0x01	0x01FE0000	0x000001FF
Engine stop *)	0x01	0x02FD0000	0x000002FE
Fault reset *)	0x01	0x08F70000	0x000008F8
Horn reset *)	0x01	0x04FB0000	0x000004FC
GCB toggle *)	0x02	0x11EE0000	0x000011EF
GCB on	0x02	0x11EF0000	0x000011F0
GCB off	0x02	0x11F00000	0x000011F1
MCB toggle *)	0x02	0x12ED0000	0x000012EE
MCB on	0x02	0x12EE0000	0x000012EF
MCB off	0x02	0x12EF0000	0x000012F0

*) This action is an equivalent of pressing the front panel button

MODBUS examples

Modbus RTU examples

- Reading of Battery voltage
  - Export table of values from InteliConfig

Table: Values									
Allowed MODBUS functions: 03, 04									
Register(s)	Com.Obj.	Name	Dimension	Type	Len	Dec	Min	Max	Group
01053	8213	**BatteryVoltage**	**V**	Integer	2	**1**	0	400	Controller I/O

Request: (Numbers in Hex)							
01	03	04	1D	00	01	15	3C
Controller address	Modbus function	Register address $041D_{hex}$ = **1053**$_{dec}$		Number of registers		CRC	

Response: (Numbers in Hex)						
01	03	02	00	F0	B8	00
Controller address	Modbus function	Length of data 02_{hex} = 2 bytes read	Data $00F0_{hex}$ = **240**$_{dec}$		CRC	

We read value 240 from register 01053. From table of modbus registers we get dimension of read value and "Dec". Dec=1 means shift one decimal place to the right. So battery voltage is **24.0 V**.

- Reading Nominal power
  - Export table of values from InteliConfig

Table: Values									
Allowed MODBUS functions: 03, 04									
Register(s)	Com.Obj.	Name	Dimension	Type	Len	Dec	Min	Max	Group
01228	9018	**Nominal Power**	**kW**	Integer	2	**0**	0	32767	Generator

Request: (Numbers in Hex)							
01	03	04	CC	00	01	45	05
Controller address	Modbus function	Register address $04CC_{hex}$ = **1228**$_{dec}$		Number of registers		CRC	

Response: (Numbers in Hex)						
01	03	02	00	C8	B9	D2
Controller address	Modbus function	Length of data 02_{hex} = 2 bytes read	Data $00C8_{hex}$ = **200**$_{dec}$		CRC	

Read nominal power is 200 kW.

- Reading all binary inputs as modbus register

Table: Values									
Allowed MODBUS functions: 03, 04									
Register(s)	Com.Obj.	Name	Dimension	Type	Len	Dec	Min	Max	Group
01068	8235	**Binary Inputs**		Binary#2	2	**0**	-	-	Controller I/O

Request: (Numbers in Hex)							
01	03	04	2C	00	01	44	F3
Controller address	Modbus function	Register address $042C_{hex}$ = **1068**$_{dec}$		Number of registers		CRC	

Response: (Numbers in Hex)						
01	03	02	00	12	38	49
Controller address	Modbus function	Length of data 02_{hex} = 2 bytes read	Data 0012_{hex} = **00010010**$_{bin}$		CRC	

Binary inputs is 00010010. It means Binary input 2 and binary input 5 are active.

Note: *You can use modbus function 4 insted of 3, rest of data remain same (CRC differs).*

- Reading binary inputs as coil status.

Table: Binaries						
Allowed MODBUS functions: 01, 02						
Addresses Modbus Addr. Prot. Addr.	Source = Value = State	C.O.# State #	Name of Value Name of State	Bit #	Bit Name Activated by protection(s):	Group
00000	Value	8235	Binary Inputs	1	GCB Feedback	Controller I/O
00001	Value	8235	Binary Inputs	2	MCB Feedback	Controller I/O
00002	Value	8235	Binary Inputs	3	Emergency Stop	Controller I/O

We will read state of MCB Feedback binary input.

Request: (Numbers in Hex)							
01	01	00	01	00	01	AC	0A
Controller address	Modbus function	Register address 0001_{hex} = **0001_{dec}**		Number of registers		CRC	

Response: (Numbers in Hex)					
01	01	01	01	90	48
Controller address	Modbus function	Length of data 01_{hex} = 1 byte read	Data 01_{hex} = active	CRC	

The readed data is 01, it means this binary input is active.

Note: *You can use modbus function 2 insted of 1, rest of data remains same (CRC differs).*

Starting the engine

Before starting engine you may need to write password. Depends on your settings in controller.

Table **Reserved registers (page 171)**

Register addresses	Number of registers	Access	Data type	Meaning
4207 - 4208	2	read/write	Unsigned32	Writing:command argument Reading: command return value
4209	1	write	Unsigned16	Command code

Table **List of commands and arguments (page 172)**

Action	Command code	Argument	Return value
Engine start	0x01	0x01FE0000	0x000001FF
Engine stop	0x01	0x02FD0000	0x000002FE

Request 1/2: (Numbers in Hex)						
01	10	10	6F	00	03	06
Controller address	Modbus function $10_{hex} = 16_{dec}$	Register address $106F_{hex} = \mathbf{4207}_{dec}$		Number of registers		Data length in bytes

Request 2/2: (Numbers in Hex)							
01	FE	00	00	00	01	68	0B
Argument				Command code		CRC	

Note: *Command and argument may be written as one "packet" (function 16) or you can split it and write argument (function 16) and after that write command code (function 6).*

Password

This password is the same as in InteliConfig or directly in controller.

Table **Reserved registers (page 171)**

Register addresses	Number of registers	Access	Data type	Meaning
4211	1	write	Unsigned16	Password

Note: *Default password is "0".*

In this example the password is "1234".

Request: (Numbers in Hex)							
01	06	10	73	04	D2	7C	D1
Controller address	Modbus function	Register address 1073_{hex} = **4211**$_{dec}$		Password $04D2_{hex}$ = **1234**$_{dec}$		CRC	

Response for success: (Numbers in Hex)							
01	06	10	73	00	00	7C	D1
Controller address	Modbus function	Register address 1073_{hex} = **4211**$_{dec}$		Allways zero.		CRC	

Response for bad password: (Numbers in Hex)				
01	86	04	43	A3
Controller address	Modbus exception for function 6.	04 – device error **see Error codes (exception codes) on page 170**	CRC	

Nominal Power – writing

Table: Setpoints									
Allowed MODBUS functions: 03, 04, 06, 16									
Register(s)	Com.Obj.	Name	Dimension	Type	Len	Dec	Min	Max	Group
03008	8276	**Nominal Power**	**kW**	Unsigned	2	**0**	1	5000	Basic Settings

Request: (Numbers in Hex)							
01	06	0B	C0	00	64	8A	39
Controller address	Modbus function	Register address $0BC0_{hex}$ = **3008**$_{dec}$		Data 0064_{hex} = **100**$_{dec}$		CRC	

Response: (Numbers in Hex)							
01	06	0B	C0	00	00	8B	D2
Controller address	Modbus function	Register address $0BC0_{hex}$ = **3008**$_{dec}$		Allways zero		CRC	

Writen setpoint nominal power is 100 kW.

CRC calculation

The check field allows the receiver to check the validity of the message. The check field value is the Cyclical Redundancy Check (CRC) based on the polynomial $x^{16}+x^{15}+x^2+1$. CRC is counted from all message bytes preceding the check field.

Online CRC calculator: http://www.lammertbies.nl/comm/info/crc-calculation.html Use CRC-16 (Modbus)

Write LSB first.

For writing nominal power 100 kW the CRC is calculated from this data: $01060BC00064_{hex}$

Modbus TCP examples

- Reading of Battery voltage
  - Export table of values from InteliConfig

Table: Values									
Allowed MODBUS functions: 03, 04									
Register(s)	Com.Obj.	Name	Dimension	Type	Len	Dec	Min	Max	Group
01053	8213	**BatteryVoltage**	**V**	Integer	2	**1**	0	400	Controller I/O

Request: (Numbers in Hex)											
00	00	00	00	00	06	01	03	04	1D	00	01
transaction identifier (usually 0)		protocol identifier (usually 0)		Length of data bytes following		Controller address	Modbus function	Register address $041D_{hex}$ = **1053**$_{dec}$		Number of registers	

Request: (Numbers in Hex)											
00	00	00	00	00	06	01	03	04	1D	00	01
transaction identifier (usually 0)		protocol identifier (usually 0)		Length of data bytes following		Controller address	Modbus function	Register address $041D_{hex}$ = **1053**$_{dec}$		Number of registers	

Response: (Numbers in Hex)										
00	00	00	00	00	05	01	03	02	00	F0
transaction identifier (usually 0)		protocol identifier (usually 0)		Length of data bytes following		Controller address	Modbus function	Length of data 02_{hex} = 2 bytes read	Data $00F0_{hex}$ = **240**$_{dec}$	

We read value 240 from register 01053. From table of modbus registers we get dimension of read value and "Dec". Dec=1 means shift one decimal place to the right. So battery voltage is **24.0 V**.

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7 Technical data

Power supply

Power supply range	8-36 VDC
Power consumption	394 mA / 8 VDC 255 mA / 12 VDC 140 mA / 24 VDC 97 mA / 36 VDC
RTC battery	Replaceable
Fusing	Power terminal max. 3 A E-Stop max.12 A
Fusing E-Stop	12 A
Max. Power Dissipation	3.5 W

Operating conditions

Operating temperature	-20 ˚C to +70 ˚C
Operating temperature for Low Temp. version	-40 ˚C to +70 ˚C
Storage temperature	-30 ˚C to +80 ˚C
Protection degree (front panel)	IP 65
Operating humidity	95 % w/o condensation
Vibration	5-25 Hz, ±1.6 mm 25-100 Hz, a = 4 g
Shocks	a = 500 m/s^2
Surrounding air temperature rating 70°C	
Suitable for pollution degree 3	

D+ terminal

Max. output current	250 mA / 36 V
Charging fail threshold	Adjustable

Voltage measurement

Measurement inputs	3ph-n Gen voltage , 3ph-n Mains
Measurement range	277 V / 480 V AC (EU) 346 V / 600 V AC (US/Canada)
Linear measurement and protection range	381 V / 660 V
Accuracy	1 %
Frequency range	40-70 Hz (accuracy 0.1 Hz)
Input impedance	0.72 MΩ ph-ph , 0.36 MΩ ph-n

Communications

USB port	non-isolated
CAN 1	CAN bus, 250 kbps, max 200 m, 120 Ω termination option, non- isolated

Current measurement

Measurement inputs	3ph Gen current
Measurement range	5 A
Max. allowed current	10 A
Accuracy	1.5 % for full temperature range (1 % from 0 ˚C to 50 ˚C)
Input impedance	< 0.1 Ω

Binary inputs

Number	8, non-isolated
Close/Open indication	0-2 VDC close contact 6-36 VDC open contact

Binary outputs

Low current	6 low current output, non-isolated 0.5 A switching to positive supply voltage, BATT+
High current	2 high current output, non-isolated 5 A (60 °C), 4 A (70 °C) switching to positive supply voltage, BATT+

Analog inputs

Number	4, non-isolated
Type	Resistive
Resolution	0.1 Ω
Range	0-2500 Ω
Input impedance	170 Ω
Accuracy	±2 % from value in range 0-2500 Ω ±1.5 kΩ in range 2.5-15 kΩ

Magnetic pickup

Voltage input range	4 Vpk-pk to 50 Vpk-pk in range 4 Hz to 1 kHz 6 Vpk-pk to 50 Vpk-pk in range 1 kHz to 5 kHz 10 Vpk-pk to 50 Vpk-pk in range 5 kHz to 10 kHz
Frequency input range	4 Hz to 10 kHz
Frequency measurement tolerance	0.2 % from range 10 kHz

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8.1 Controller objects

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8.1.1 Setpoints

What setpoints are:

Setpoints are analog, binary or special data objects which are used for adjusting the controller to the specific environment. Setpoints are organized into groups according to their meaning. Setpoints can be adjusted from the controller front panel, PC, MODBUS, etc.

All setpoints can be protected by a password against unauthorized changes. Password protection can be assigned to the setpoints during the configuration procedure. See the chapter **Password (page 85)** in Operator guide for instructions on how to enter and modify a password.

> **IMPORTANT: Do not write setpoints repeatedly (e.g. power control from a PLC by repeated writing of baseload setpoint via Modbus). The setpoints are stored in EEPROM memory, which can be overwritten up to 10^5 times without risk of damage or data loss, but it may become damaged, when the allowed number of writing cycles is exceeded.**

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List of setpoints

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Group: Basic settings

Subgroup: Name

Gen-Set Name

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	0 .. 15 characters [-]		
Default value	InteliLite	**Alternative config**	NO
Step	[-]		
Comm object	8637	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

User defined name, used for the controller identification at remote phone or mobile connection. Gen-Set Name is maximally 15 characters long and can be entered using InteliConfig or from controller's configuration menu.

Note: *If the Gen-Set Name is "TurboRunHours", the running hours will be counted faster - 1 minute in real will represent 1 hour.*

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Subgroup: Power settings

Nominal Power Split Phase

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	1 .. 5 000 [kW]		
Default value	200 kW	**Alternative config**	Yes
Step	1 kW		
Comm object	9977	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 193)**		
Description			

Nominal power of the gen-set for detected split-phase or mono phase connection. Generator **Overload BOC (page 242)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 193)** is adjusted to Autodetect and Autodetect detects connection type as Monophase or SplitPhase.*

Note: *To lock this setpoint against editing you also have to lock setpoint **Nominal Power Split Phase 1 (page 357)**, **Nominal Power Split Phase 2 (page 361)** and **Nominal Power Split Phase 3 (page 365)**.*

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Nominal Power

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	1 .. 5 000 [kW]		
Default value	200 kW	**Alternative config**	Yes
Step	1 kW		
Comm object	8276	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Nominal power of the gen-set. Generator **Overload BOC (page 242)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint* ***Connection type (page 193)*** *is adjusted to 3Ph3Wire or High Leg D or 3Ph4Wire or when Autodetect detects connection type as 3Ph3Wire or High Leg D or 3Ph4Wire.*

Note: *To lock this setpoint against editing you also have to lock setpoint* ***Nominal Power 1 (page 357)***, ***Nominal Power 2 (page 361)*** *and* ***Nominal Power 3 (page 365)***.

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Subgroup: Current settings

Nominal Current

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	1 .. 10 000 [A]		
Default value	350 A	**Alternative config**	YES
Step	1 A		
Comm object	8275	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 193)**.		
Description			

It is current limit for mains current protections and means maximal continuous mains current. Nominal Current can be different from mains rated current value.

Note: *To lock this setpoint against editing you also have to lock setpoint* ***Nominal Current 1 (page 355)***, ***Nominal Current 2 (page 359)*** *and* ***Nominal Current 3 (page 363)***.

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CT Ratio

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	1 .. 5 000 [A/5A]		
Default value	2 000 A/5A	**Alternative config**	NO
Step	1 A/5A		
Comm object	8274	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Gen-set current transformers ratio.

Note: *Generator currents and power measurement is suppressed if current level is below 1% of CT range.*

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CT Location

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	Load / GenSet/ None [-]		
Default value	Gen-set	**Alternative config**	NO
Step	[-]		
Comm object	11625	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

Adjustment of location of current measurement.

- Load: Current CT´s are physically placed on Load (typically between GCB and MCB)
- GenSet: Current CT´s are physically placed on GenSet (typically before GCB)
- None: There are no current CT´s.

When option None is selected, following objects are hidded/changed:

- Current screen is hidden
- Generator Power screen is hidden
- Statistics screens - values Genset kWh, Genset kVArh, Mains kWh and Mains kWArh are hidden
- Mains screen - kW meter is replaced by generator voltage meter
  - Generator L1-N voltage is displayed for Monopahse, Splitphase L1L2, Splitphase L1L3 and High Leg delta connection types
  - Generator L1-L2 voltage is displayed for 3ph3w and 3ph4w connection types
- Group Load is hidden
- Group Statistics - values Genset kWh, Genset kVArh, Mains kWh and Mains kWArh are hidden

Note: *For more details about this function see chapter* ***CT Location (page 29)****.*

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Subgroup: Voltage settings

Connection type

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	Mono Phase / SplPhL1L2 / SplPhL1L3 / 3Ph3Wire / 3Ph4Wire / High Leg D / Autodetect [-]		
Default value	3Ph4Wire	**Alternative config**	YES
Step	[-]		
Comm object	11628	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Connection type:

Mono Phase	Single phase voltage measurement L1-N 1x CT (Current Transformer)
SplitPhase	Double Delta connection Split Phase Two phase voltage measurement L1,L2 with 180° phase shift 2x CT (Current Transformer)
SplPhL1L2	Double Delta connection Split Phase Two phase voltage measurement L1,L2 with 180° phase shift 2x CT (Current Transformer)
SplPhL1L3	Double Delta connection Split Phase Two phase voltage measurement L1,L3 with 180° phase shift 2x CT (Current Transformer)
3Ph4Wire	Grounded Star (Grounded Wye) connection – 3PY Three phase voltage measurement L1,L2,L3 with 120° phase shift 3x CT (Current Transformer)
3Ph3Wire	Ungrounded Delta connection Open Delta Ungrounded Wye Corner-Grounded Delta Split Phase Delta Three phase voltage measurement L1,L2,L3 with 120° phase shift No neutral is available 3x CT (Current Transformer)
High Leg D	High Leg Delta connection Three phase voltage measurement L1,L2,L3

	3x CT (Current Transformer)	
Autodetect	High Leg Delta	L1 >=100V; L1 <=160V L2 >=160V L3 >=100V; L3 <=160V
	or	
	3PH3Wire or 3Ph4Wire	L1 >= 100V L2 >= 100V L3 >= 100V
	or	
	3PH Low Y	L1 >=20V; L1 <=160V L2 >=20V; L2 <=160V L3 >=20V; L3 <=160V L1L2 < 300V L2L3 < 300V L3L1 < 300V
	or	
	3PH High Y	L1 > 160V L2 > 160V L3 > 160V L1L2 >= 300V L2L3 >= 300V L3L1 >= 300V
	or	
	SplPhL1L2	L1 >=100V L2 >=100V L3 <= 20V
	or	
	SplPhL1L3	L1 >=100V L2 <= 20V L3 >=100V
	or	
	Mono Phase	L1 >=100V L2 <= 20V L3 <= 20V
	or	
	Voltage Autodetect shutdown	

Note: *To lock this setpoint against editing you also have to lock setpoint* ***Connection Type 1 (page 353)***, ***Connection type 2 (page 357)*** *and* ***Connection type 3 (page 361)****.*

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Nominal Voltage Ph-N

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	80 .. 20 000 [V]		
Default value	231 V	**Alternative config**	YES
Step	1 V		
Comm object	8277	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 193)**.		
Description			
Nominal voltage (phase to neutral). ***Note:*** *To lock this setpoint against editing you also have to lock setpoint* ***Nominal Voltage Ph-N 1 (page 356)****,* ***Nominal Voltage Ph-N 2 (page 360)*** *and* ***Nominal Voltage Ph-N 3 (page 364)****.*			

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Nominal Voltage Ph-Ph

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	80 .. 40 000 [V]		
Default value	400 V	**Alternative config**	YES
Step	1 V		
Comm object	11657	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 193)**.		
Description			
Nominal system voltage (phase to phase). ***Note:*** *To lock this setpoint against editing you also have to lock setpoint* ***Nominal Voltage Ph-Ph 1 (page 356)****,* ***Nominal Voltage Ph-Ph 2 (page 360)*** *and* ***Nominal Voltage Ph-Ph 3 (page 364)****.*			

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PT Ratio

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	0,1 .. 500,0 [V/V]		
Default value	1,0 V/V	**Alternative config**	NO
Step	0,1 V/V		
Comm object	9579	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
Generator voltage potential transformers ratio. If no PTs are used, adjust the setpoint to 1.			

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Vm PT Ratio

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	0,1 .. 500,0 [V/V]		
Default value	1,0 V/V	**Alternative config**	NO
Step	0,1 V/V		
Comm object	9580	**Related applications**	AMF
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 199)**		
Description			
Mains voltage potential transformers ratio. If no PTs are used, adjust the setpoint to 1.			

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Subgroup: Frequency settings

Nominal Frequency

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	45 .. 65 [Hz]		
Default value	50 Hz	**Alternative config**	YES
Step	1 Hz		
Comm object	8278	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Nominal system frequency (usually 50 or 60 Hz). ***Note:*** *To lock this setpoint against editing you also have to lock setpoint* ***Nominal Frequency 1 (page 355)****,* ***Nominal Frequency 2 (page 359)*** *and* ***Nominal Frequency 3 (page 363)****.*			

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Gear Teeth

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	FGen->RPM / 1 .. 500 [-]		
Default value	120	**Alternative config**	NO
Step	1		
Comm object	8252	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

Number of teeth on the engine flywheel where the pick-up is installed. Set to zero if no pick-up is used and the Engine speed will be counted from the generator frequency.

> ***Note:*** *If no pickup is used, the D+ or W terminal should be used to prevent possible overcranking, which can occur if at least 25% of nominal generator voltage is not present immediately after exceeding firing speed.*

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Nominal RPM

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	100 .. 4 000 [RPM]		
Default value	1 500 RPM	**Alternative config**	YES
Step	1 RPM		
Comm object	8253	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

Nominal engine speed (RPM - revolutions per minute).

> ***Note:*** *To lock this setpoint against editing you also have to lock setpoint **Nominal RPM 1 (page 355)**, **Nominal RPM 2 (page 360)** and **Nominal RPM 3 (page 364)**.*

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Subgroup: Controller settings

Controller mode

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	OFF / MAN / AUTO / TEST [-]		
Default value	OFF	**Alternative config**	NO
Step	[-]		
Comm object	8315	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
This setpoint can be used for changing the Controller mode remotely, e.g. via MODBUS. Use the mode selector on the main screen for changing the mode from the front panel. Use mode selector in the control window for changing the mode from InteliConfig.			

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Power On Mode

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	Previous / OFF [-]		
Default value	Previous	**Alternative config**	NO
Step	[-]		
Comm object	13000	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts controller mode after power on of controller.

Previous	When controller is power on, than is switched into last mode before power off.
OFF	When controller is power on, than is switched into OFF mode.

Note: *Remote modes - In case that some LBI remote mode is activated during power on of controller than this LBI has higher priority than this setpoint - controller mode is forced into mode selected via LBI. After deactivation of LBI, controller is switched into value selected via setpoint Power On Mode*

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Operation Mode

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	AMF / MRS [-]		
Default value	AMF	**Alternative config**	NO
Step	[-]		
Comm object	12157	**Related applications**	AMF
Config level	Advanced		
Setpoint visibility	Always		
Description			

Based on this setpoint is defined basic controller function.

AMF	Normal AMF operation
MRS	When MRS mode is selected the controller will not perform AMF functions anymore. MCB button I/O will be inactive and also mains measurement and protections will be disabled. The controller will keep TEST mode and the gen-set in AUTO mode will be able to start by **REMOTE START/STOP (PAGE 564)** binary input.

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Controller Address

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	1 .. 32 [-]		
Default value	1	**Alternative config**	NO
Step	1		
Comm object	24537	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Controller identification number. It is possible to set controller address different from the default value (1) so that more IL controllers can be interconnected (via RS485) and accessed e.g. from MODBUS terminal.

Note: *When opening connection to the controller it's address has to correspond with the setting in PC tool.*

Note: *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*

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Reset To Manual

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	Disabled / Enabled [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	9983	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
If this function is enabled, the controller will switch automatically to MAN mode when there is a red alarm in the alarm list and fault reset button is pressed. This is a safety function that prevents the gen-set starting again automatically in specific cases when fault reset button is pressed. **Example:** Controller is in AUTO mode and there is red inactive unconfirmed alarm and fault reset button is pressed, controller will start automatically.			

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Backlight Timeout

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	Disabled / 1 .. 255 [min]		
Default value	Disabled	**Alternative config**	NO
Step	1 min		
Comm object	10121	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
The display backlight is switched off when this timer exceed. When setpoint is adjusted to disabled then the display will be backlighted all the time.			

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Horn Timeout

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	Disabled / 1 .. 599 [s]		
Default value	10 s	**Alternative config**	NO
Step	1 s		
Comm object	8264	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

Setting of horn behavior.

Disabled	Disabling the Horn sounding function
1 .. 599 [s]	Timeout for **HORN (PAGE 611)** binary output. The **HORN (PAGE 611)** output is opened when this timeout elapsed.

Note: *Horn timeout starts again from the beginning if a new alarm appears before previous Horn timeout has elapsed.*

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Zero Power Mode

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	Disabled / 1 - 360 [min]		
Default value	Disabled	**Alternative config**	NO
Step	1 min		
Comm object	8548	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 199)**		
Description			

The controller is switched to Zero Power Mode when there is no user interaction with the controller for the preset time period. Zero Power Mode is disabled in AMF automatic mode. For the controller wake up press button Start  or activate Binary Input 1. The controller will not switch to Zero Power Mode if generator is running. In Zero Power Mode binary outputs go to high impedance.

Note: *Power consumption of controller in Zero Power Mode is 0 mA. Controller is internally disconnected from power supply.*

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RunHoursSource

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	AUTO/ECU/INTERNAL [-]		
Default value	AUTO	**Alternative config**	NO
Step	[-]		
Comm object	13345	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint selects source of running hours

AUTO	If there is some ECU which send valid running hours, then this value is used. Otherwise value from internal counter is used.
ECU	Running hours are taken from ECU if ECU send valid data. It is not possible to set and reset this value in statistics.
INTERNAL	Running hours are taken from internal counter. It is possible to set and reset this value in statistics.

Note: *It is not necessary to restart controller when this setpoint is changed. Change of this setpoint should be applied immediately.*

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Screen Filter

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	Enable/Disabled [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	15889	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint enables/disables filter values on CU screen and PC tools.
List of values which are filtered when filter is ON.

- Generator Voltage L1-L2
- Generator Voltage L2-L3
- Generator Voltage L3-L1
- Generator Voltage L1-N
- Generator Voltage L2-N
- Generator Voltage L3-N
- Generator Frequency
- Load kVA
- Load kVA L1
- Load kVA L2
- Load kVA L3
- Load kVAr
- Load kVAr L1
- Load kVAr L2
- Load kVAr L3
- Load kW
- Load kW L1
- Load kW L2
- Load kW L3

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Subgroup: HMI Settings

Main Screen Line 1

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	RPM/PF/Run Hours/ATT/AIN1 [-]		
Default value	PF	**Alternative config**	NO
Step	[-]		
Comm object	13346	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
This setpoint adjusts line 1 on Mains screen.			

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Main Screen Line 2

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	RPM/PF/Run Hours/ATT/AIN1 [-]		
Default value	RPM	**Alternative config**	NO
Step	[-]		
Comm object	14628	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
This setpoint adjusts line 2 on Mains screen.			

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Group: Engine settings

Subgroup: Starting

Fuel Solenoid

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	Diesel / Gas [-]		
Default value	Diesel	**Alternative config**	NO
Step	[-]		
Comm object	9100	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

Determines behavior of the Binary output **FUEL SOLENOID (PAGE 602)**

Diesel:	Output closes before binary output **STARTER (PAGE 633)**. Lead of output is adjusted via setpoint **Fuel Solenoid Lead (page 214)**. The output opens if Emergency Stop comes or gen-set is stopped and in pause between repeated starts.
Gas: (Gaseous)	Output closes together with binary output **IGNITION (PAGE 612)** if RPM is over the 30 RPM (fixed value). Output opens after stop command or in pause between repeated start.

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Cranking Attempts

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	1 .. 10 [-]		
Default value	3	**Alternative config**	NO
Step	1		
Comm object	8255	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Maximal number of cranking attempts.

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Maximum Cranking Time

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	1 .. 255 [s]		
Default value	5 s	**Alternative config**	NO
Step	1 s		
Comm object	8256	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
Maximum time limit of cranking time. **IMPORTANT: There is a protection against broken pinion on starter. In case that there are no RPM after 5 seconds of starting, cranking is interrupted and cranking fail pause follows.**			

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Cranking Fail Pause

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	5 .. 60 [s]		
Default value	8 s	**Alternative config**	NO
Step	1 s		
Comm object	8257	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
Pause between **Cranking Attempts (page 205)**. **PRESTART (PAGE 621)** output is active in this pause until Cranking Fail Pause elapses.			

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Prestart Time

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 600 [s]		
Default value	2 s	**Alternative config**	NO
Step	1 s		
Comm object	8394	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Time of closing of the **PRESTART (PAGE 621)** output prior to the engine start. Set to zero if you want to leave the output **PRESTART (PAGE 621)** open.

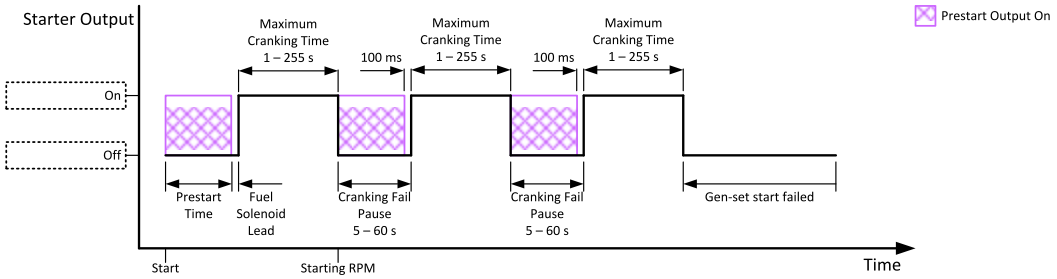


Image 8.1 Prestart Time

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Starting RPM

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	5 .. 50 [%]		
Default value	25%	**Alternative config**	NO
Step	1 % of **Nominal RPM (page 197)**		
Comm object	8254	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint defines the “firing” speed level as percent value of the **Nominal RPM (page 197)**. If this level is exceeded the engine is considered as started.

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Starting Oil Pressure

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	Disabled / 0,1 .. 10,0 [bar]		
Default value	4,5 bar	**Alternative config**	NO
Step	0,1 bar		
Comm object	9681	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Oil pressure limit for starting. The controller will stop cranking (**STARTER (PAGE 633)** goes OFF) if the oil pressure rises above this limit.

Option Disabled - when this option is selected, Oil Pressure value (value from CU analog Oil Pressure, value from ECU analog Oil pressure and state of binary input Oil Pressure) is not used for disengagement of starter and for engine running evaluation.

> **IMPORTANT: Value from analog input has higher priority than value from ECU.**

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Glow Plugs Time

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. **Prestart Time (page 207)** [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	14412	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint defines the time before starting when logical binary output **GLOW PLUGS (PAGE 609)** will be close.

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Idle RPM

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	100 .. 4000 [RPM]		
Default value	900 RPM	**Alternative config**	NO
Step	1 RPM		
Comm object	9946	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts idle speed of engine.

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Subgroup: Choke

Choke Function

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	Disabled /Fixed Time / Temp Based [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	15717	**Related applications**	MRS. AMF
Config level	Advanced		
Setpoint visibility	Only when LBO **CHOKE (PAGE 597)** is configured.		
Description			

This setpoint defines choke function behavior.

Disabled	Choke function is disabled and logical binary output **CHOKE (PAGE 597)** is activated under no circumstances.
Fixed Time	Choke time is fixedly defined by **Choke Time (page 209)** setpoint.
Temp Based	Choke time is calculated using actual engine (coolant) temperature. Setpoints **Choke Start Temp (page 210)** and **Choke Increment (page 211)** are taken into consideration.

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Choke Time

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0–3600 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	13011	**Related applications**	MRS. AMF
Config level	Advanced		
Setpoint visibility	Only when LBO **CHOKE (PAGE 597)** is configured and setpoint **Choke Function (page 209)** = Fixed Time.		
Description			

Defines time logical binary output **CHOKE (PAGE 597)** is activated for when fixed time is used. When setpoint **Choke Function (page 209)** is set to *Temp Based* value, *Choke Time* value have no effect.

> ***Note:*** *If setpoint **Choke Lead (page 213)** is set to nonzero value, total time the CHOKE output is activated still matches value set by Choke Time setpoint. This mean Choke Timeshould be longer than Choke Leadto ensure expected Choke behavior.*

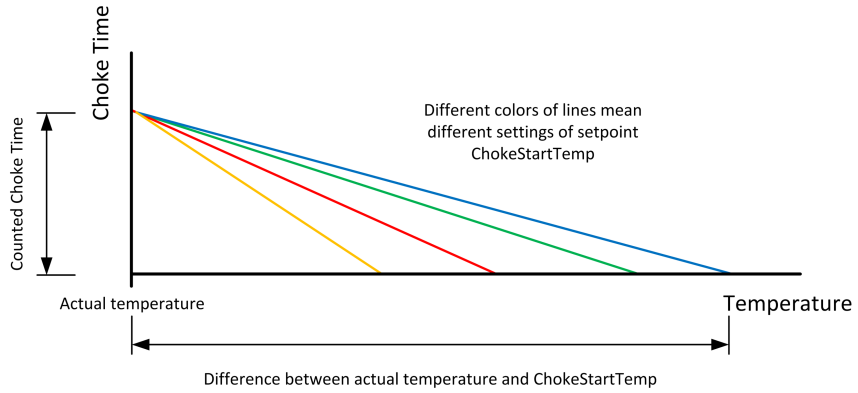
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Choke Start Temp

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	-20,0 .. 80,0 [°C]		
Default value	0,0 °C	**Alternative config**	NO
Step	0,1 °C		
Comm object	15716	**Related applications**	MRS. AMF
Config level	Advanced		
Setpoint visibility	Only when LBO **CHOKE (PAGE 597)** is configured and setpoint **Choke Function (page 209)** = Temp Based.		

Description

This setpoint adjust the base temperature for Choke function. When temperature will be higher than this setpoint, Choke Time will be always 0. When temperature will be lower than this setpoint, Choke Time will be calculated by curve adjusted via setpoint **Choke Increment (page 211)**. When setpoint **Choke Function (page 209)** is set to *Fixed Time* value, setpoint *Choke Start Temp* has no effect.



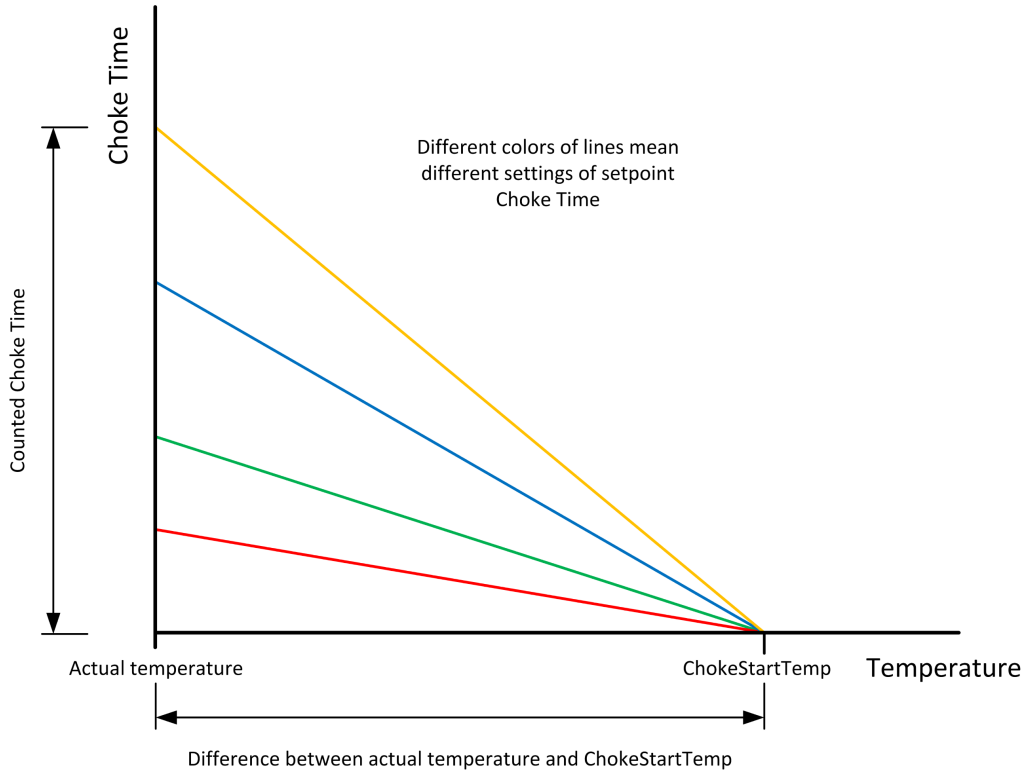
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Choke Increment

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0,00 .. 20,00 [s/°C]		
Default value	0,00 s/°C	**Alternative config**	NO
Step	0,01 s/°C		
Comm object	15715	**Related applications**	MRS. AMF
Config level	Advanced		
Setpoint visibility	Only when LBO **CHOKE (PAGE 597)** is configured and setpoint **Choke Function (page 209)** = Temp Based.		

Description

This setpoint adjust the maximal time of activation of binary output **CHOKE (PAGE 597)**. Calculated time depends on engine (coolant) temperature. Setpoint adjust curve which is used for calculating actual Choke Time. When setpoint **Choke Function (page 209)** is set to *Fixed Time* value, setpoint *Choke Increment* has no effect.



***Note:** If setpoint **Choke Lead (page 213)** is set to nonzero value, total time the CHOKE output is activated still matches calculated value (based on actual temperature and setpoints Choke Increment and **Choke Start Temp (page 210)**) This mean that adjusted parameters should ensure that calculated Choke Time will be longer than Choke Leadto ensure expected Choke behavior.*

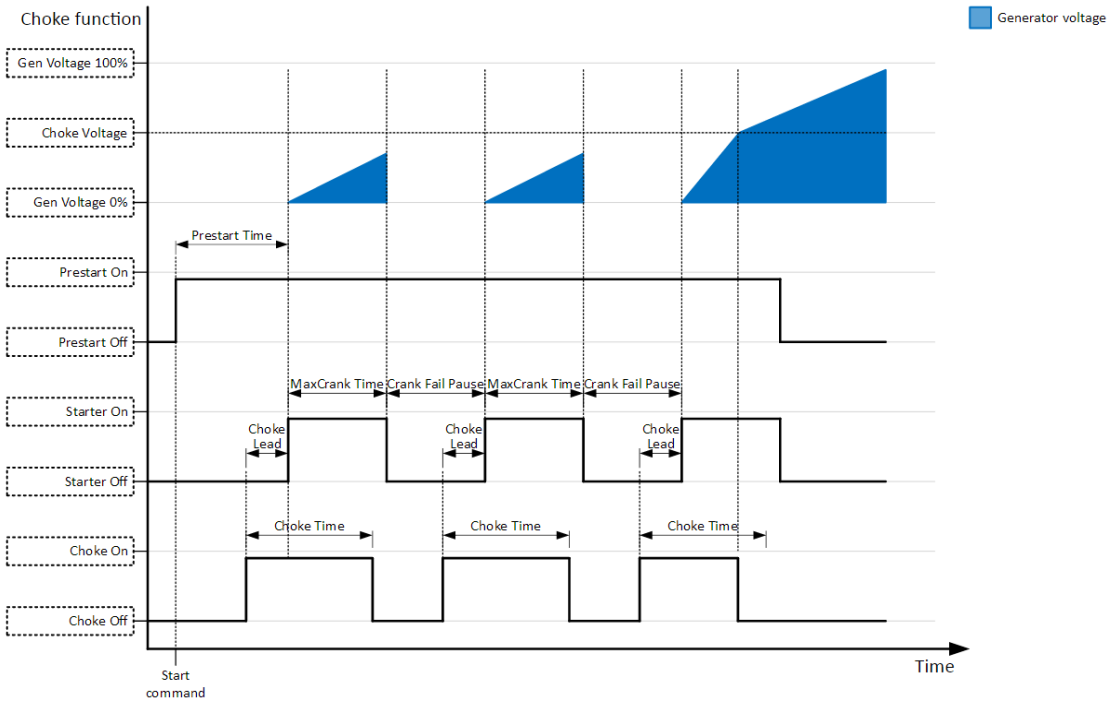
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Choke Voltage

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	Disabled / 1–100 [%]		
Default value	Disabled	**Alternative config**	NO
Step	1 %		
Comm object	15718	**Related applications**	MRS. AMF
Config level	Advanced		
Setpoint visibility	Only when LBO **CHOKE (PAGE 597)** is configured.		

Description

This setpoint adjust threshold level for deactivation of **CHOKE (PAGE 597)** binary output. When generator voltage is higher than this level, then logical binary output CHOKE is deactivated. In multiphase system it is sufficient to deactivate CHOKE LBO when at least one voltage crosses this threshold. In case setpoint *Choke Voltage* is set to *Disabled* value, no voltage is taken into account and CHOKE LBO isn't deactivated on the voltage basis.



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Choke Lead

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. Prestart Time [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	15774	**Related applications**	MRS. AMF
Config level	Advanced		
Setpoint visibility	Only when LBO **CHOKE (PAGE 597)** is configured.		
Description			

This setpoint adjust the lead of logical binary output CHOKE. **CHOKE (PAGE 597)** is activated before logical binary output **STARTER (PAGE 633)**.

> ***Note:*** *In case Choke Lead is longer than 8 s (cranking fail pause), Choke Lead will be limited to 8 s (cranking fail pause time). This limitation is applied only for cranking fail pause, Choke Lead in Prestart stays unchanged.*

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Subgroup: Starting Timers

Fuel Solenoid Lead

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0,0 .. 25,0 [s]		
Default value	0,5 s	**Alternative config**	NO
Step	0,1 s		
Comm object	10525	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

Delay between **FUEL SOLENOID (PAGE 602)** and **STARTER (PAGE 633)** logical binary outputs.**FUEL SOLENOID (PAGE 602)** is closed before **STARTER (PAGE 633)**. Lead time is adjusted via this setpoint.

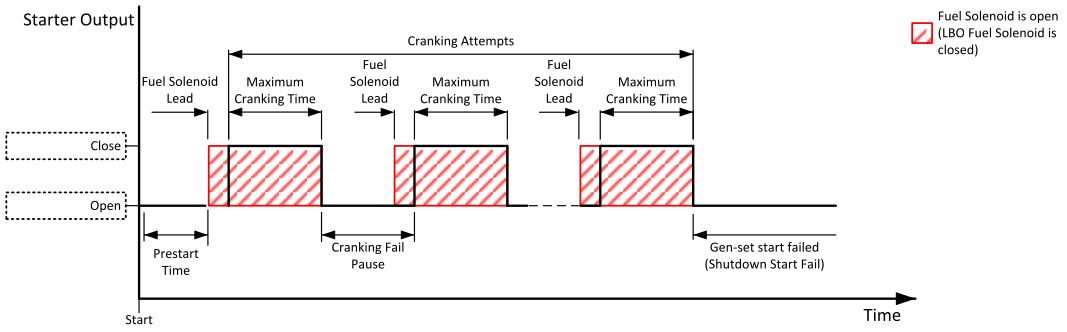


Image 8.2 Fuel Solenoid Lead

Note: *LBO **PRESTART (PAGE 621)** goes to logical zero when Fuel Solenoid Lead goes to logical one.*

Note: *This setpoint is used only for diesel **Fuel Solenoid (page 205)***

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Idle Time

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 600 [s]		
Default value	12 s	**Alternative config**	NO
Step	1 s		
Comm object	9097	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Idle Time delay starts when RPM exceeds **Starting RPM (page 207)**. Start fail is detected when during Idle state RPM decreases below 2 RPM.
The output **IDLE/NOMINAL (PAGE 612)** remains inactive during the idle period. Binary output Idle/Nominal opens during Cooling period again. This output can be used for switching the governor between idle and

nominal speed.

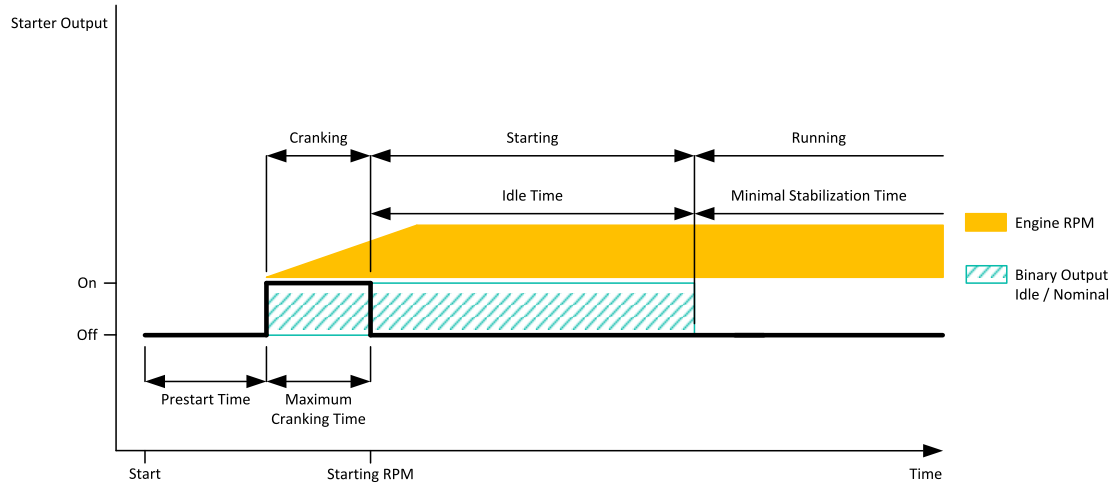


Image 8.3 Idle Time 1

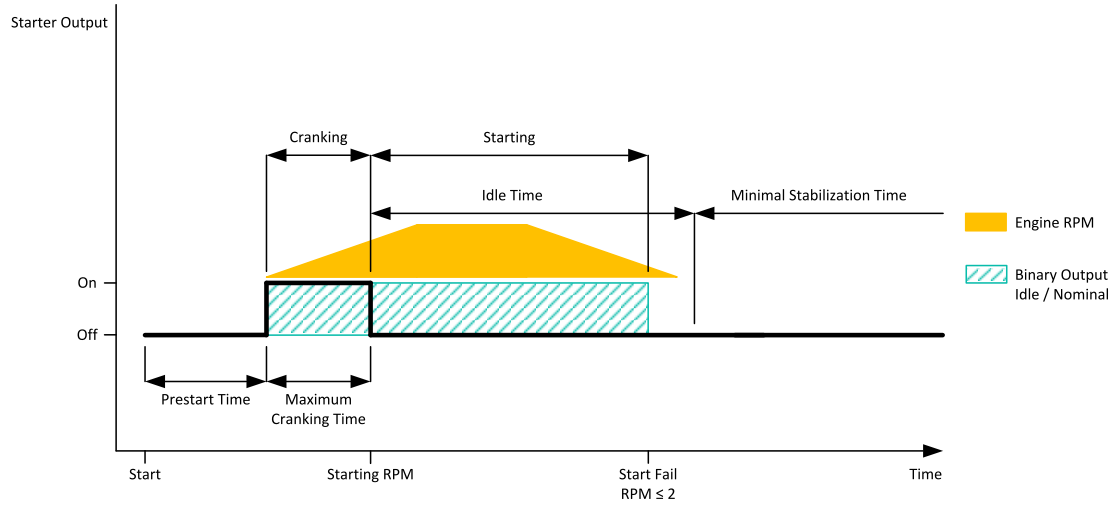


Image 8.4 Idle Time 2

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Minimal Stabilization Time

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	1 .. **Maximal Stabilization Time (page 217)** [s]		
Default value	2 s	**Alternative config**	NO
Step	1 s		
Comm object	8259	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

When the gen-set has been started and the idle timer has elapsed, the controller will wait for a period adjusted by this setpoint before closing GCB, even if the generator voltage and frequency are already in limits.

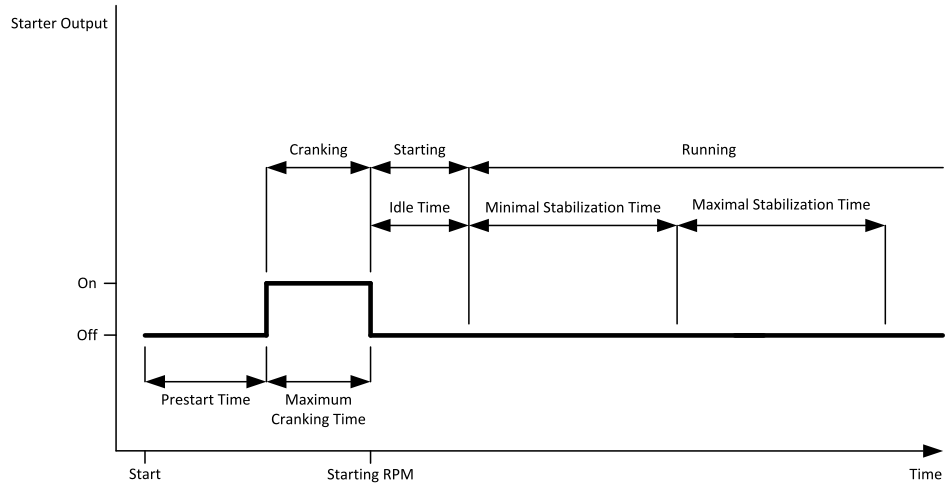


Image 8.5 Minimal Stabilization Time

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Maximal Stabilization Time

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	**Minimal Stabilization Time (page 216)** .. 300 [s]		
Default value	10 s	**Alternative config**	NO
Step	1 s		
Comm object	8313	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
When the gen-set has been started and the idle timer has elapsed, the generator voltage and frequency must get within limits within this period of time, otherwise an appropriate shutdown alarm (generator voltage and/or frequency) is issued.			

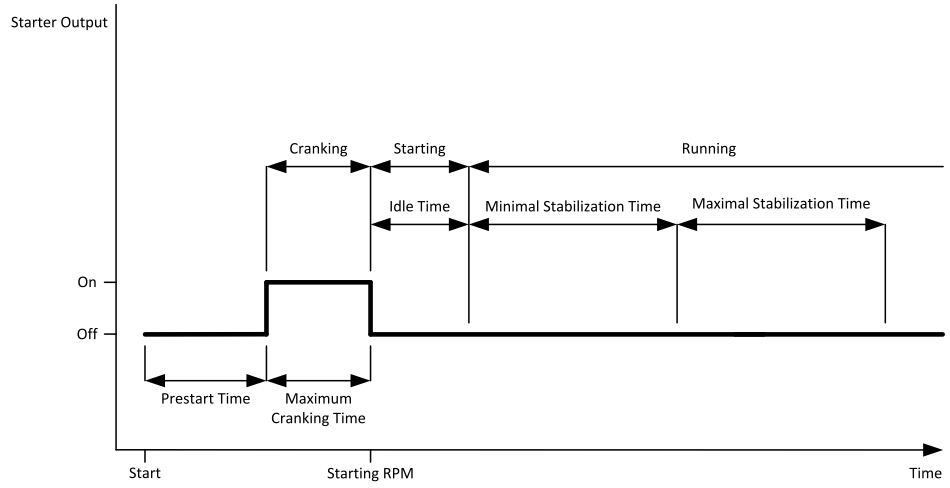


Image 8.6 Maximal Stabilization Time

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Protection Hold Off

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0,0 .. 300,0 [s]		
Default value	5,0 s	**Alternative config**	YES
Step	0,1 s		
Comm object	10023	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
During the start of the gen-set, some engine protections have to be blocked (e.g. Oil pressure). The protections are unblocked after the Protect Hold Off. The time starts after reaching Starting RPM.			

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Sd Ventilation Time

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 60 [s]		
Default value	5 s	**Alternative config**	NO
Step	1 s		
Comm object	9695	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
In case **Fuel Solenoid (page 205)** is set to GAS, the Sd Ventilation Time adjusts the time of the starter to be switched on for engine pre-ventilation in the case of a first start attempt after shutdown or controller switch-on.			

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Subgroup: Stopping

Cooling Speed

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	Idle / Nominal [-]		
Default value	Nominal	**Alternative config**	NO
Step	[-]		
Comm object	10046	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

Selects the function of the binary output **IDLE/NOMINAL (PAGE 612)** during engine cooling state.

Idle	Cooling is executed at Idle speed and generator protections are switched off.
Nominal	Cooling is executed at Nominal speed and generator protections are active.

Note: *When ECU is connected the predefined value 900 RPM for Idle speed is requested.*

Note: *Binary output **IDLE/NOMINAL (PAGE 612)** must be configured and connected to speed governor. Engine Idle speed must be adjusted on speed governor.*

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Subgroup: Stopping Timers

Cooling Time

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 3 600 [s]		
Default value	30 s	**Alternative config**	NO
Step	1 s		
Comm object	8258	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Runtime of the unloaded gen-set to cool the engine before stop.			

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Stop Time

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 600 [s]		
Default value	60 s	**Alternative config**	NO
Step	1 s		
Comm object	9815	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
Under normal conditions the engine must certainly stop within this period after the **FUEL SOLENOID (PAGE 602)** has been de-energized and the **STOP SOLENOID (PAGE 634)** energized. The Stop Solenoid output is deactivated 12 s after last running engine indication went off.			

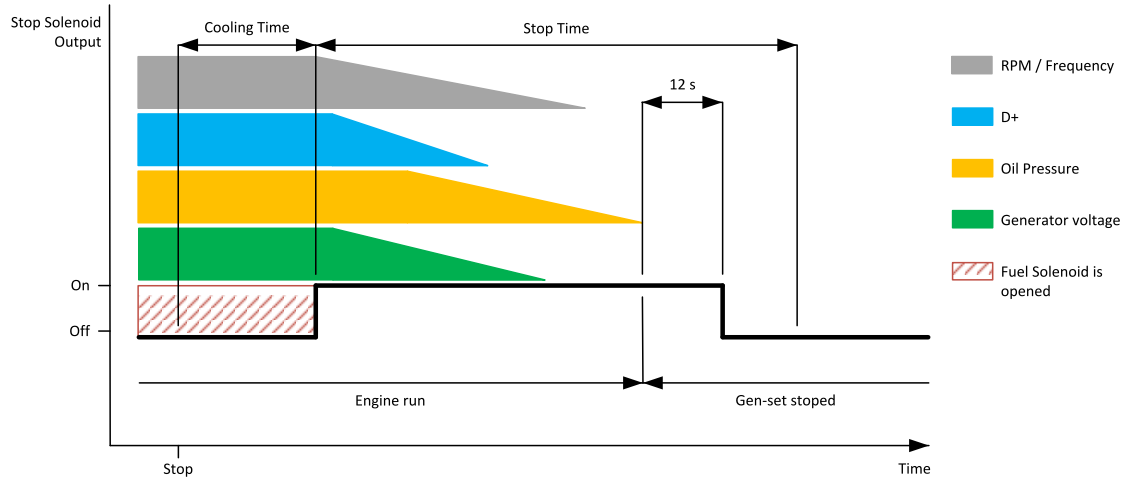


Image 8.7 Stop Time 1

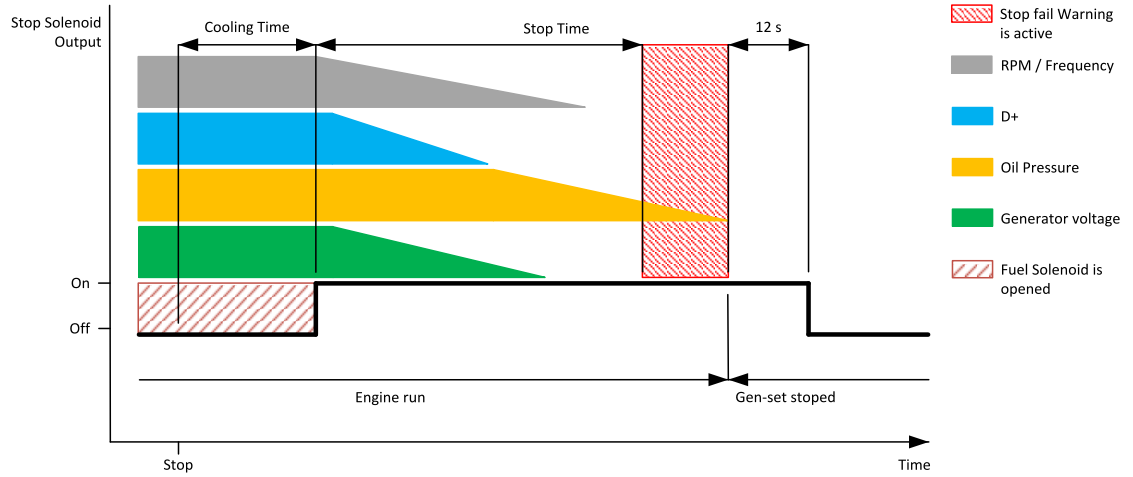


Image 8.8 Stop Time 2

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After Cooling Time

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 3 600 [s]		
Default value	180 s	**Alternative config**	NO
Step	1 s		
Comm object	8662	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Runtime of engine after cooling pump. Binary output Cooling pump is closed when the engine starts and opens AfterCool time delayed after gen-set stops.			

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Subgroup: D+ Function

D+ Function

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	Enabled / ChargeFail / Disabled [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	9683	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Behavior of D+ terminal.			

Enabled	The D+ terminal is used for both functions – “running engine” detection and charge fail detection.
ChargeFail	The D+ terminal is used for charge fail detection only
Disabled	The D+ terminal is not used.

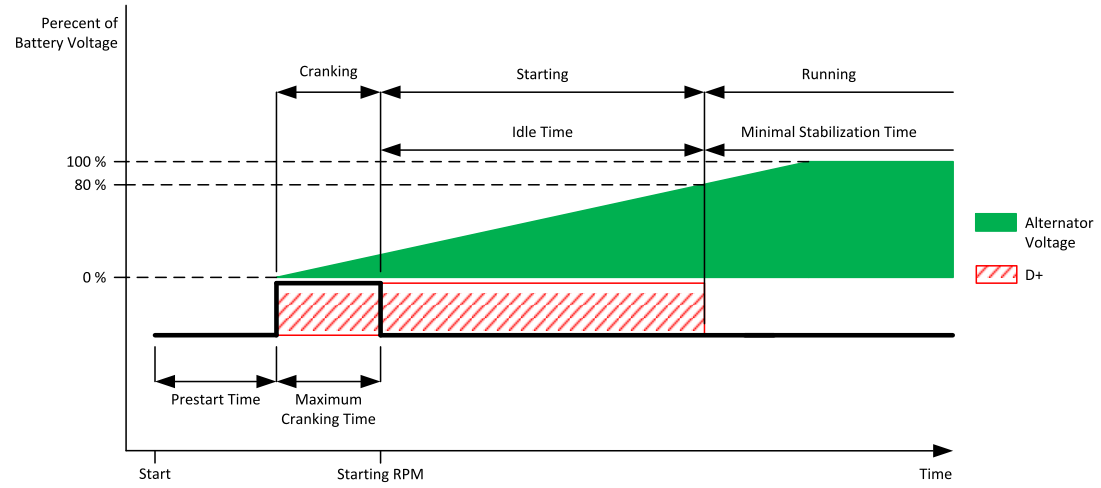


Image 8.9 D+ Function 1

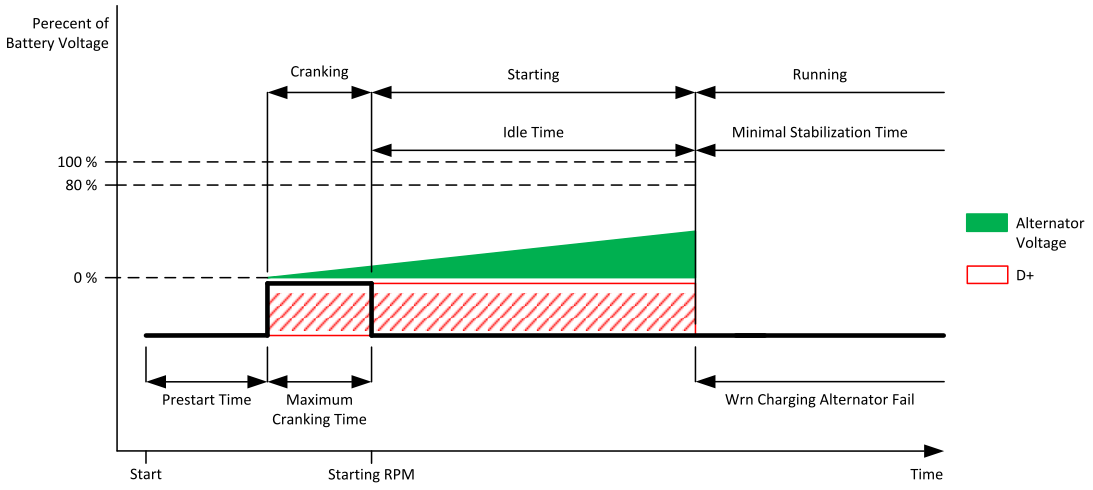


Image 8.10 D+ Function 2

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D+ Treshold

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0..100 [%]		
Default value	80 %	**Alternative config**	NO
Step	1 %		
Comm object	14959	**Related applications**	MRS. AMF
Config level	Advanced		
Setpoint visibility	Only if setpoint **D+ Function (page 220)** is not set to *Disabled* value.		
Description			
This setpoint adjusts threshold level for D+ function.			

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D+ Delay

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	1..255 [s]		
Default value	1 s	**Alternative config**	NO
Step	1 s		
Comm object	14960	**Related applications**	MRS. AMF
Config level	Advanced		
Setpoint visibility	Only if setpoint **D+ Function (page 220)** is not set to *Disabled* value.		
Description			
This setpoint adjusts delay for D+ function. This delay is used for: ▶ Alarm Charging Alternator Fail. ▶ For engine running condition - disengagement of starter			

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D+ Alarm Type

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	No Protec/Wrn/Sd [-]		
Default value	Wrn	**Alternative config**	NO
Step	[-]		
Comm object	15751	**Related applications**	MRS. AMF
Config level	Advanced		
Setpoint visibility	Only if setpoint **D+ Function (page 220)** is not set to *Disabled* value.		
Description			
This setpoint adjusts type of alarm Charging Alternator Fail.			

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Subgroup: Engine Protections

Overspeed Sd

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	**Underspeed Sd (page 223)** .. 200 [%]		
Default value	115%	**Alternative config**	NO
Step	1 % of **Nominal RPM (page 197)**		
Comm object	8263	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for over speed protection. Relative to the nominal speed.			

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Underspeed Sd

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. **Overspeed Sd (page 223)** [%]		
Default value	25%	**Alternative config**	NO
Step	1 % of **Nominal RPM (page 197)**		
Comm object	8260	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for underspeed protection. Relative to the nominal speed.			

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Overspeed Overshot

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 50 [%]		
Default value	20%	**Alternative config**	NO
Step	1 % of **Nominal RPM (page 197)**		
Comm object	14107	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint rise the upper limit of overspeed protection for the time which is defined in setpoint **Overspeed Overshot Period (page 224)**. In this time the upper limit of protection is **Overspeed Sd (page 223)** + Overspeed Overshoot.			

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Overspeed Overshot Period

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 255 [s]		
Default value	5 s	**Alternative config**	NO
Step	1 s		
Comm object	14108	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Overspeed Overshot (page 223)**		
Description			
Time for which is **Overspeed Overshot (page 223)** active. The timer starts in the same time when starter starts. ***Note:*** *The setpoint is visible only, if* ***Overspeed Overshot (page 223)*** *is greater than 0.*			

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Oil Pressure Wrn

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	12895	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **OIL PRESSURE (PAGE 670)** is configured		
Description			
Warning or history threshold level for **OIL PRESSURE (PAGE 670)**.			

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Oil Pressure Sd

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	12779	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **OIL PRESSURE (PAGE 670)** is configured		
Description			
Shutdown threshold level for **OIL PRESSURE (PAGE 670)**.			

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Oil Pressure Delay

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	3 s	**Alternative config**	NO
Step	1 s		
Comm object	14341	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **OIL PRESSURE (PAGE 670)** is configured or logical binary input **OIL PRESSURE (PAGE 561)** is configured		
Description			
Delay for **OIL PRESSURE (PAGE 670)**.			

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ECU Oil Pressure Wrn

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	the range is defined by ECU sensor curve		
Default value	the value is defined by ECU sensor curve	**Alternative config**	YES
Step	the step is defined by ECU sensor curve		
Comm object	14426	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Warning threshold level for Oil pressure which is send from ECU.			

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ECU Oil Pressure Sd

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	the range is defined by ECU sensor curve		
Default value	the value is defined by ECU sensor curve	**Alternative config**	NO
Step	the step is defined by ECU sensor curve		
Comm object	14425	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Shutdown threshold level for Oil pressure which is send from ECU.			

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ECU Oil Pressure Delay

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	3 s	**Alternative config**	NO
Step	1 s		
Comm object	14427	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Delay for Oil pressure which is send from ECU.			

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Coolant Temperature Wrn

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	12896	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **COOLANT TEMP (PAGE 667)** is configured		
Description			
Warning or history threshold level for **COOLANT TEMP (PAGE 667)**.			

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Coolant Temperature Sd

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	12780	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **COOLANT TEMP (PAGE 667)** is configured		
Description			
Shutdown or BOC threshold level for **COOLANT TEMP (PAGE 667)**.			

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Coolant Temperature Delay

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	5 s	**Alternative config**	NO
Step	1 s		
Comm object	14342	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **COOLANT TEMP (PAGE 667)** is configured or logical binary input **COOLANT TEMP (PAGE 551)** is configured		
Description			
Delay for **COOLANT TEMP (PAGE 667)**.			

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ECU Coolant Temperature Wrn

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	the range is defined by ECU sensor curve		
Default value	the value is defined by ECU sensor curve	**Alternative config**	NO
Step	the step is defined by ECU sensor curve		
Comm object	14429	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Warning threshold level for Coolant temperature which is send from ECU.			

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ECU Coolant Temperature Sd

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	the range is defined by ECU sensor curve		
Default value	the value is defined by ECU sensor curve	**Alternative config**	NO
Step	the step is defined by ECU sensor curve		
Comm object	14428	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Shutdown or BOC threshold level for Coolant temperature which is send from ECU.			

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ECU Coolant Temperature Delay

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	5 s	**Alternative config**	NO
Step	1 s		
Comm object	14430	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Delay for Coolant temperature which is send from ECU.			

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Temperature Switch On

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	the range is define by sensor curve (analog or ECU)		
Default value	the value is defined by sensor curve (analog or ECU)	**Alternative config**	NO
Step	the step is defined by sensor curve (analog or ECU)		
Comm object	8688	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **TEMPERATURE SWITCH (PAGE 636)** is configured.		
Description			

Threshold level for switching the binary output **TEMPERATURE SWITCH (PAGE 636)** on.

Note: *Value from analog input has higher priority than ECU.*

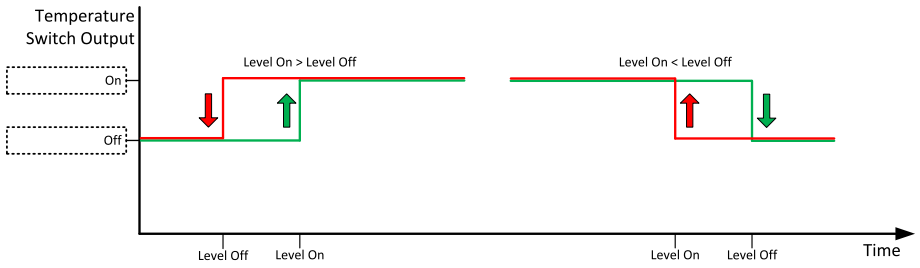


Image 8.11 Temperature Switch

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Temperature Switch Off

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	the range is define by sensor curve (analog or ECU)		
Default value	the value is defined by sensor curve (analog or ECU)	**Alternative config**	NO
Step	the step is defined by sensor curve (analog or ECU)		
Comm object	8689	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **TEMPERATURE SWITCH (PAGE 636)** is configured.		
Description			
Threshold level for switching the binary output **TEMPERATURE SWITCH (PAGE 636)** off. ***Note:*** *Value from analog input has higher priority than ECU.*			

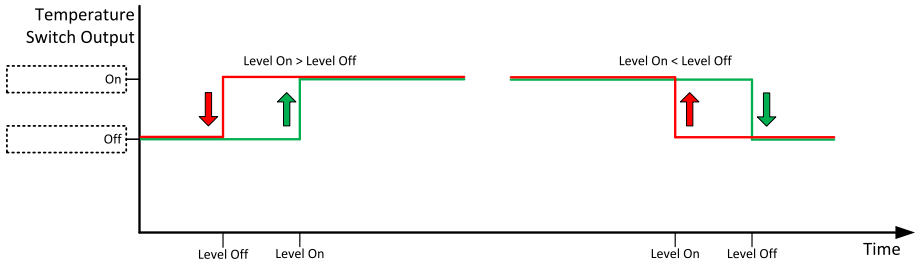


Image 8.12 Temperature Switch

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Coolant Temperature Low Wrn

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	YES
Step	the step is defined by analog sensor curve		
Comm object	9684	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Visible only if the logical analog input **COOLANT TEMP (PAGE 667)** is configured		
Description			
Threshold level for lower limit of **COOLANT TEMP (PAGE 667)**.			

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Coolant Temperature Low Delay

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	5 s	**Alternative config**	YES
Step	1 s		
Comm object	10270	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Visible only if the logical analog input **COOLANT TEMP (PAGE 667)** is configured		
Description			
Delay for **Coolant Temperature Low Wrn (page 229)**.			

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Fuel Level Wrn

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	12897	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **FUEL LEVEL (PAGE 668)** is configured		
Description			
Warning or history threshold level for **FUEL LEVEL (PAGE 668)**.			

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Fuel Level Sd

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	12898	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **FUEL LEVEL (PAGE 668)** is configured		
Description			
Shutdown or BOC threshold level for **FUEL LEVEL (PAGE 668)**.			

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Fuel Level Delay

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	10 s	**Alternative config**	NO
Step	1 s		
Comm object	14343	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **FUEL LEVEL (PAGE 668)** is configured or logical binary input **FUEL LEVEL (PAGE 555)** is configured		
Description			
Delay for **FUEL LEVEL (PAGE 668)**.			

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ECU Fuel Level Wrn

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	the range is defined by ECU sensor curve		
Default value	the value is defined by ECU sensor curve	**Alternative config**	NO
Step	the step is defined by ECU sensor curve		
Comm object	14432	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Warning threshold level for Fuel level which is send from ECU.			

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ECU Fuel Level Sd

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	the range is defined by ECU sensor curve		
Default value	the value is defined by ECU sensor curve	**Alternative config**	NO
Step	the step is defined by ECU sensor curve		
Comm object	14431	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Shutdown or BOC threshold level for Fuel level which is send from ECU.			

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ECU Fuel Level Delay

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	10 s	**Alternative config**	NO
Step	1 s		
Comm object	14433	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if ECU is configuredd		
Description			
Delay for Fuel level which is send from ECU.			

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Fuel Tank Volume

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 10 000 [l]		
Default value	200 l	**Alternative config**	YES
Step	1 l		
Comm object	11103	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Visible only if the logical analog input **FUEL LEVEL (PAGE 668)** is or ECU is configured		
Description			
Define a capacity of gen-set fuel tank.			

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Maximal Fuel Drop

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	Disabled / 1 .. 50 [%/h]		
Default value	25 %/h	**Alternative config**	NO
Step	1%/h		
Comm object	12373	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
Setpoint indicates the maximum allowable drop of fuel in fuel tank per running hour. When the engine is not running the maximal allowed fuel drop-off is preset to 5% of total tank volume per hour.			

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Maximal Fuel Drop Delay

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 600 [s]		
Default value	5 s	**Alternative config**	NO
Step	s		
Comm object	14683	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
When the value of fuel drop per hour is higher than **Maximal Fuel Drop (page 232)** this delay stars count down. After count down of this delay alarm **Wrn Fuel Theft (page 694)** is activated.			

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Fuel Pump On

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. **Fuel Pump Off (page 234)** [%]		
Default value	20 %	**Alternative config**	NO
Step	1 %		
Comm object	10100	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Visible only if the logical binary output **FUEL PUMP (PAGE 602)** is configured and logical binary input **FUEL PUMP ON/OFF (PAGE 555)** isn't configured		
Description			
Threshold level for switching the binary output **FUEL PUMP (PAGE 602)** on.			

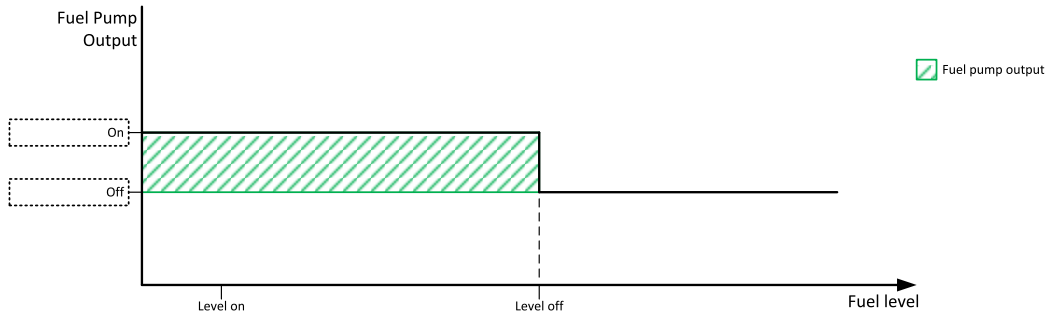


Image 8.13 Fuel Pump On

IMPORTANT: When binary input FUEL PUMP ON/OFF (PAGE 555) is configured then binary output FUEL PUMP (PAGE 602) is control by this binary input. Setpoints Fuel Pump On and Fuel Pump Off (page 234) are not evaluated!

Note: *Value from analog input has higher priority than ECU.*

Note: *This setpoint is visible only if the logical binary output FUEL PUMP (PAGE 602) is configured.*

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Fuel Pump Off

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	**Fuel Pump On (page 233)** .. 100 [%]		
Default value	90 %	**Alternative config**	NO
Step	1 %		
Comm object	10101	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Visible only if the logical binary output **FUEL PUMP (PAGE 602)** is configured and logical binary input **FUEL PUMP ON/OFF (PAGE 555)** isn't configured		

Description

Threshold level for switching the binary output **FUEL PUMP (PAGE 602)** off.

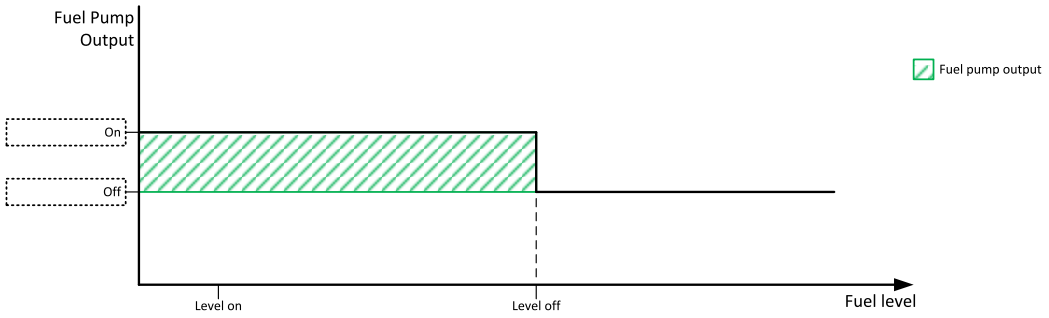


Image 8.14 Fuel Pump Off

> **IMPORTANT: When binary input FUEL PUMP ON/OFF (PAGE 555) is configured then binary output FUEL PUMP (PAGE 602) is control by this binary input. Setpoints Fuel Pump On (page 233) and Fuel Pump Off are not evaluated!**

Note: *Value from analog input has higher priority than ECU.*

Note: *This setpoint is visible only if the logical binary output FUEL PUMP (PAGE 602) is configured.*

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Transfer Wrn Delay

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	Disabled / 1 .. 60 [s]		
Default value	30 s	**Alternative config**	YES
Step	1 s		
Comm object	10685	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Visible only if the logical binary output **FUEL PUMP (PAGE 602)** is configured		
Description			
If the controller does not see the fuel increase during fuel transfer within this time alarm **Wrn Fuel Transfer Failed (page 709)** will be displayed and the **FUEL PUMP (PAGE 602)** will be turned off. Alarm **Wrn Fuel Transfer Failed (page 709)** will be displayed but this alarm becomes immediately inactive and it will be possible to delete this message by the Fault reset button. If the fault is deleted the controller will initiate the transfer again.			

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Subgroup: Maintenance

Maintenance Timer 1

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	-10 000 ... 9 999 [h] / Disabled		
Default value	1 000 h	**Alternative config**	NO
Step	1 h		
Comm object	11616	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Maintenance timer 1 counts down when engine is running. If reaches zero, an alarm appears, but the timer still counting down into negative values. When the value 10000 is set, than the Maintenance function is disabled and counter does not count. Counter value disappear from controllers statistics.			

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Maintenance Timer 2

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	-10 000 ... 9 999 [h] / Disabled		
Default value	1 000 h	**Alternative config**	NO
Step	1 h		
Comm object	11617	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Maintenance timer 2 counts down when engine is running. If reaches zero, an alarm appears, but the timer still counting down into negative values. When the value 10000 is set, than the Maintenance function is disabled and counter does not count. Counter value disappear from controllers statistics.			

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Maintenance Timer 3

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	-10 000 ... 9 999 [h] / Disabled		
Default value	1 000 h	**Alternative config**	NO
Step	1 h		
Comm object	11618	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Maintenance timer 3 counts down when engine is running. If reaches zero, an alarm appears, but the timer still counting down into negative values. When the value 10000 is set, than the Maintenance function is disabled and counter does not count. Counter value disappear from controllers statistics.			

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Subgroup: Battery Protections

Battery Undervoltage

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	8,0 V .. **Battery Overvoltage (page 237)** [V]		
Default value	18,0 V	**Alternative config**	NO
Step	0,1 V		
Comm object	8387	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning threshold for low battery voltage.			

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Battery Overvoltage

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	**Battery Undervoltage (page 236)** .. 40,0 [V]		
Default value	36,0 V	**Alternative config**	NO
Step	0,1 V		
Comm object	9587	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning threshold for high battery voltage.			

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Battery <> Voltage Delay

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 600 [s]		
Default value	5 s	**Alternative config**	NO
Step	1 s		
Comm object	8383	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for **Battery Undervoltage (page 236)** and **Battery Overvoltage (page 237)** protection.			

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Battery Charger Fail Delay

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 15 [min]		
Default value	5 min	**Alternative config**	NO
Step	1 min		
Comm object	11374	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Conditioned with LBI **BATTERY CHARGER (PAGE 526)**		
Description			
Delay for LBI **BATTERY CHARGER (PAGE 526)**.			

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Subgroup: Pulse Counters

Conversion Coefficient Pulse 1

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 ... 1 000 [-]		
Default value	1	**Alternative config**	NO
Step	1		
Comm object	10994	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Only if LBI **PULSE COUNTER 1 (PAGE 562)** is configured		
Description			
This setpoint adjusts the rate of increasing of the Pulse Counter 1 function. The module counts pulses at the input **PULSE COUNTER 1 (PAGE 562)** and if the input pulses counter reaches value given by this setpoint, the counter value **Pulse Counter 1 (page 496)** is increased by 1 and input pulses counter is reset to 0. Both counter value and input pulses counter are stored in the nonvolatile memory.			

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Conversion Coefficient Pulse 2

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 ... 1 000 [-]		
Default value	1	**Alternative config**	NO
Step	1		
Comm object	10995	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Only if LBI **PULSE COUNTER 2 (PAGE 562)** is configured		
Description			
This setpoint adjusts the rate of increasing of the Pulse Counter 2 function. The module counts pulses at the input **PULSE COUNTER 2 (PAGE 562)** and if the input pulses counter reaches value given by this setpoint, the counter value **Pulse Counter 2 (page 496)** is increased by 0,1 and input pulses counter is reset to 0. Both counter value and input pulses counter are stored in the nonvolatile memory.			

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Subgroup: Power switch

Power Switch On

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 32 000 [kW]		
Default value	100 kW	**Alternative config**	NO
Step	1 kW		
Comm object	11658	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Visible only if the logical binary output **POWER SWITCH (PAGE 621)** is configured.		

Description
Threshold level for switching the binary output **POWER SWITCH (PAGE 621)** on.

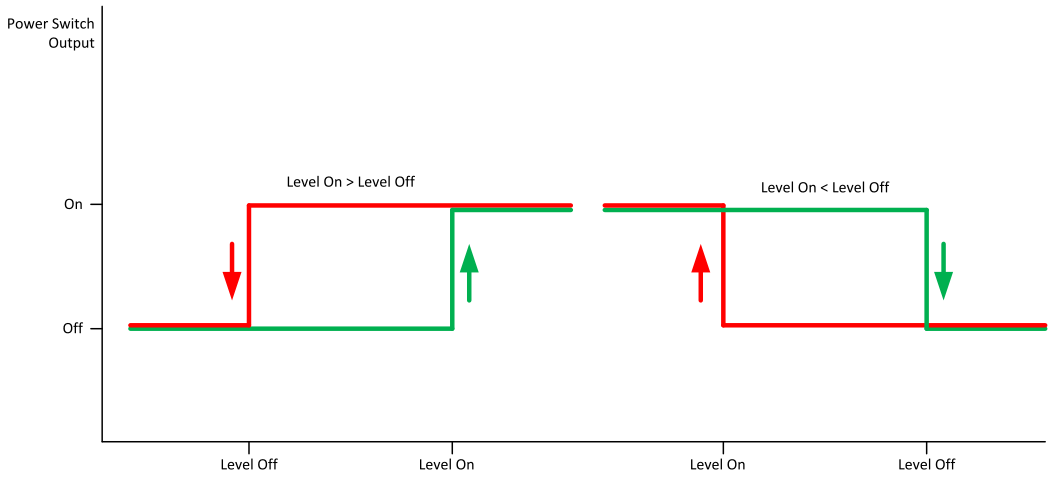


Image 8.15 Power Switch Level On < Level Off

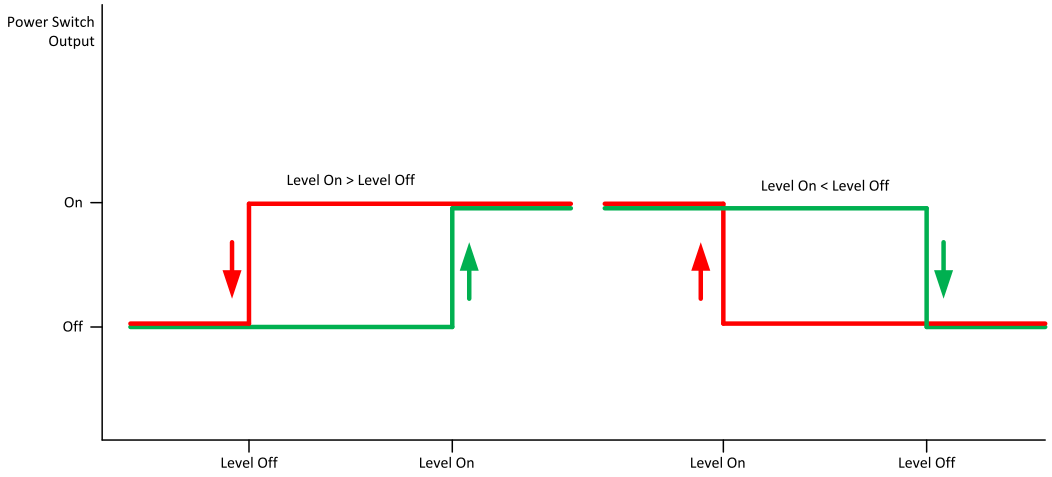


Image 8.16 Power Switch Level On > Level Off

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Power Switch Off

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 32 000 [kW]		
Default value	50 kW	**Alternative config**	NO
Step	1 kW		
Comm object	11659	**Related applications**	AMF, MRS

Config level	Advanced
Setpoint visibility	Visible only if the logical binary output **POWER SWITCH (PAGE 621)** is configured.
Description	

Threshold level for switching the binary output **POWER SWITCH (PAGE 621)** on.

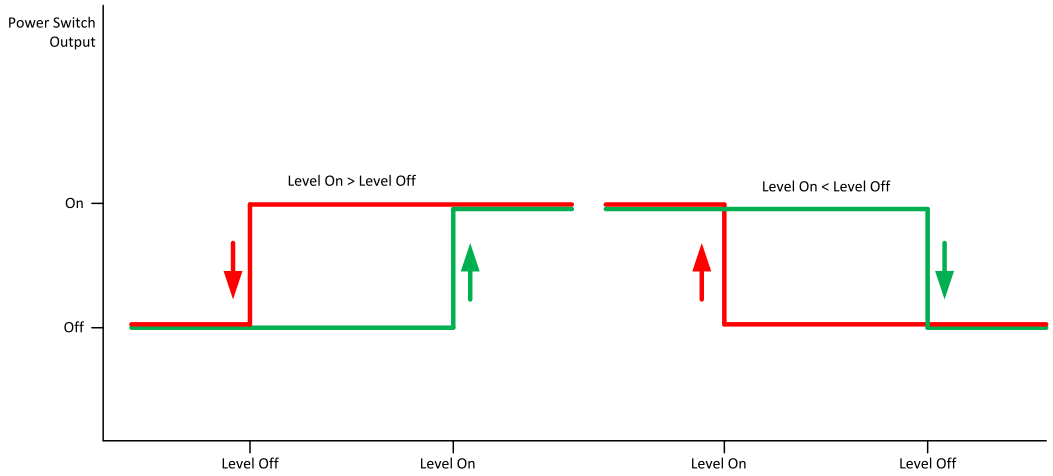


Image 8.17 Power Switch Level On < Level Off

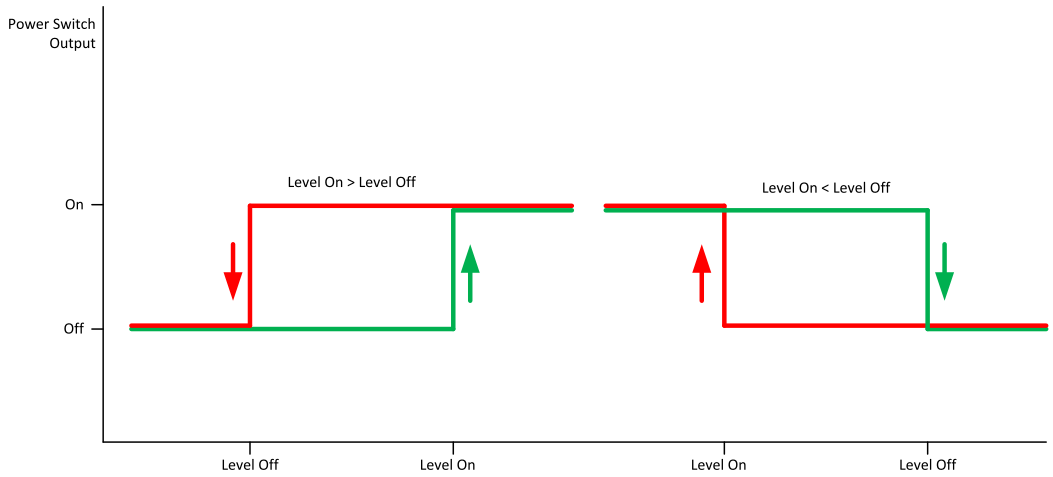


Image 8.18 Power Switch Level On > Level Off

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Subgroup: Ventilation

Ventilation Pulse Time

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0–3600 [s]		
Default value	30 s	**Alternative config**	NO
Step	1 s		
Comm object	15767	**Related applications**	MRS. AMF
Config level	Advanced		
Setpoint visibility	Only when logical binary output **VENTILATION ON PULSE (PAGE 637)** or **VENTILATION OFF PULSE (PAGE 636)** is configured.		
Description			
This setpoint defines duration of pulse generated on logical binary outputs **VENTILATION ON PULSE (PAGE 637)** or **VENTILATION OFF PULSE (PAGE 636)** at the moment when logical binary output **VENTILATION (PAGE 636)** is activated or deactivated respectively.			

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Subgroup: ECU Settings

ECU Speed Adjustment

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 100 [%]		
Default value	50 %	**Alternative config**	NO
Step	1 %		
Comm object	9948	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Visible only if ECU is configured		
Description			
Enables to adjust engine speed in ECU via CAN bus. Nominal speed corresponds to 50%. This setpoint should be used only for Volvo Penta and Scania engines. It has no effect on other engine brands. ***Note:*** *To lock this setpoint against editing you also have to lock setpoint **ECU Speed Adjustment 1 (page 366)**, **ECU Speed Adjustment 2 (page 366)** and **ECU Speed Adjustment 3 (page 367)**.*			

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Group: Generator settings

Subgroup: Overload Protection

Overload BOC

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	**Overload Wrn (page 242)** .. 200 [%]		
Default value	120 %	**Alternative config**	NO
Step	1 % of **Nominal Power (page 191)**		
Comm object	8280	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold level for generator overload (in % of Nominal power) protection. Protection is BOC (Breaker Open and gen-set Cooldown). ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

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Overload Wrn

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	0 .. **Overload BOC (page 242)** [%]		
Default value	120 %	**Alternative config**	NO
Step	1 % of **Nominal Power (page 191)**		
Comm object	9685	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold level for generator overload (in % of Nominal power) protection. This is only warning.			

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Overload Delay

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	0,0 .. 600,0 [s]		
Default value	5,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8281	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for **Overload BOC (page 242)****Overload BOC (page 242)** and **Overload Wrn (page 242)** protection.			

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Subgroup: Current Protection

Short Circuit BOC

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	100 .. 500 [%]		
Default value	250 %	**Alternative config**	NO
Step	1 % of **Nominal Current (page 191)**		
Comm object	8282	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
BOC occurs when generator current reaches this preset threshold. ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

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Short Circuit BOC Delay

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	0,00 .. 10,00 [s]		
Default value	0,04 s	**Alternative config**	YES
Step	0,01 s		
Comm object	9991	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
Delay for **Short Circuit BOC (page 243)** protection.			

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IDMT Overcurrent Delay

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	1,0 .. 600,0 [s]		
Default value	4,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8283	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

IDMT curve shape selection. IDMT Overcurrent Delay is a reaction time of IDMT protection for 200% overcurrent I_{gen} =2***Nominal Current (page 191)**

IDMT is “very inverse” over current protection. Reaction time is not constant but depends on over current level according to the following formula:

$$\text{Reaction time} = \frac{\text{Overcurrent IDMT Delay} * \text{Nominal Current}}{I_{gen} * \text{Nominal Current}}$$

***Note:** Reaction time is limited to 3600 s = 60 minutes. IDMT protection is not active for Reaction time values longer than 60 minutes.*

I_{gen} is maximal value of all measured phases of generator current.

Table 8.1 EXAMPLE of Reaction time for different over current levels

	Overcurrent IDMT Delay	Overcurrent		
		≤ 100 %	101 %	110 %
Reaction time	0,2 s	No action	20 s	2 s
	2 s	No action	200 s	20 s
	20 s	No action	2000 s	200 s

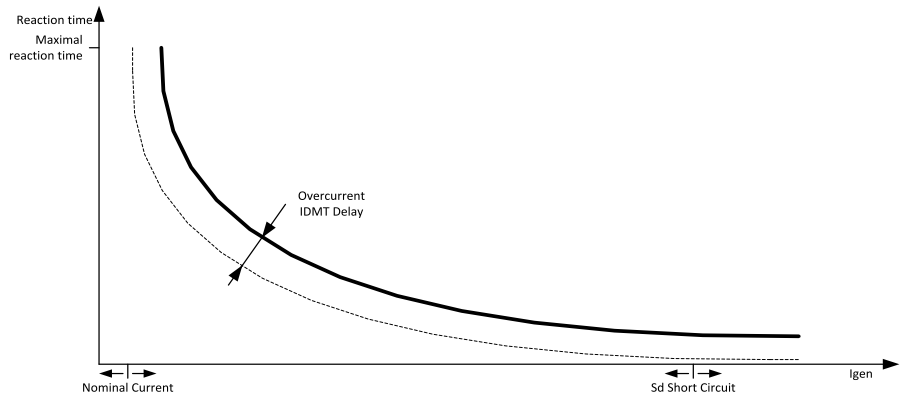


Image 8.19 IDMT Overcurrent Delay

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Current Unbalance BOC

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	1 .. 200 [%] of **Nominal Current (page 191)**		
Default value	50 %	**Alternative config**	NO
Step	1 % of **Nominal Current (page 191)**		
Comm object	8284	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 193)**		
Description			
Threshold for generator current asymmetry (unbalance). Protection is BOC (Breaker Open and genset Cooldown). ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

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Current Unbalance BOC Delay

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	0,0 .. 600,0 [s]		
Default value	5,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8285	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 193)**		
Description			
Delay for **Current Unbalance BOC (page 245)** protection.			

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Subgroup: Voltage Protection

Generator Overvoltage Sd

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	**Generator Overvoltage Wrn (page 246)** .. 200 [%]		
Default value	110 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 195)** or **Nominal Voltage Ph-Ph (page 195)**		
Comm object	8291	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator overvoltage protection. All three phases are checked. Maximum out of three is used. ***Note:*** *Phase to phase and phase to neutral voltages are used for this protection.*			

back to List of setpoints

Generator Overvoltage Wrn

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	**Generator Undervoltage Wrn (page 247)** .. **Generator Overvoltage Sd (page 245)** [%]		
Default value	110 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 195)** or **Nominal Voltage Ph-Ph (page 195)**		
Comm object	9686	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator overvoltage protection. All three phases are checked. Maximum out of three is used. ***Note:*** *Phase to phase and phase to neutral voltages are used for this protection.*			

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Generator Undervoltage BOC

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	0 .. **Generator Undervoltage Wrn (page 247)** [%]		
Default value	70 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 195)** or **Nominal Voltage Ph-Ph (page 195)**		
Comm object	8293	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator undervoltage protection. All three phases are checked. Minimum out of three is used. ***Note:*** *Phase to phase and phase to neutral voltages are used for this protection.* ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

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Generator Undervoltage Wrn

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	**Generator Undervoltage BOC (page 246)** .. **Generator Overvoltage Wrn (page 246)** [%]		
Default value	70 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 195)** or **Nominal Voltage Ph-Ph (page 195)**		
Comm object	9687	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator undervoltage protection. All three phases are checked. Minimum out of three is used. ***Note:*** *Phase to phase and phase to neutral voltages are used for this protection.*			

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Generator <> Voltage Delay

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	0,0 .. 600,0 [s]		
Default value	3,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	9103	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for **Generator Overvoltage Sd (page 245)**, **Generator Overvoltage Wrn (page 246)**, **Generator Undervoltage BOC (page 246)** and **Generator Undervoltage Wrn (page 247)** protection.			

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Voltage Unbalance BOC

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	1 .. 200 [%] of **Nominal Voltage Ph-Ph (page 195)**		
Default value	10 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-Ph (page 195)**		
Comm object	8288	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 193)**		
Description			
Threshold for generator voltage unbalance alarm. ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

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Voltage Unbalance BOC Delay

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	0,0 .. 600,0 [s]		
Default value	3,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8289	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 193)**		
Description			
Delay for **Voltage Unbalance BOC (page 247)** protection.			

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Subgroup: Frequency Protection

Generator Overfrequency BOC

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	**Generator Overfrequency Wrn (page 248)** .. 200,0 [%]		
Default value	110,0 %	**Alternative config**	NO
Step	0,1 % of **Nominal Frequency (page 196)**		
Comm object	8296	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator phase L1 overfrequency. ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

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Generator Overfrequency Wrn

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	**Generator Underfrequency Wrn (page 249)** .. **Generator Overfrequency BOC (page 248)** [%]		
Default value	110,0 %	**Alternative config**	NO
Step	0,1 % of **Nominal Frequency (page 196)**		
Comm object	9688	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator phase L1 overfrequency.			

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Generator Underfrequency BOC

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	0,0 .. **Generator Underfrequency Wrn (page 249)** [%]		
Default value	85,0 %	**Alternative config**	NO
Step	0,1 % of **Nominal Frequency (page 196)**		
Comm object	8298	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator phase L1 underfrequency. ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

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Generator Underfrequency Wrn

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	**Generator Underfrequency BOC (page 249)** .. **Generator Overfrequency Wrn (page 248)** [%]		
Default value	85,0 %	**Alternative config**	NO
Step	0,1 % of **Nominal Frequency (page 196)**		
Comm object	9689	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator phase L1 underfrequency.			

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Generator <> Frequency Delay

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	0,0 .. 600,0 [s]		
Default value	3,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8297	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for **Generator Overfrequency BOC (page 248)**, **Generator Overfrequency Wrn (page 248)**, **Generator Underfrequency Wrn (page 249)** and **Generator Underfrequency BOC (page 249)** protection.			

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Group: Protections

Subgroup: Overload Protection

Overload Protection

Setpoint group	Protections	**Related FW**	1.9.0
Range [units]	Enabled/Disabled/By LBI [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15664	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator Overload protection.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoints **Overload BOC (page 242)**, **Overload Wrn (page 242)** and **Overload Delay (page 242)**.
Disabled:	Protection is disabled.
By LBI:	Protection is enabled or disabled by the state of LBI **PROTECTION ENABLE (PAGE 561)**.

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Subgroup: Current Protection

Short Circuit Protection

Setpoint group	Protections	**Related FW**	1.9.0
Range [units]	Enabled / Disabled / By LBI [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15665	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator Short Circuit protection.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoints **Short Circuit BOC (page 243)** and **Short Circuit BOC Delay (page 243)**.
Disabled:	Protection is disabled.
By LBI:	Protection is enabled or disabled by the state of LBI **PROTECTION ENABLE (PAGE 561)**.

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IDMT Overcurrent Protection

Setpoint group	Protections	**Related FW**	1.9.0
Range [units]	Enabled / Disabled / By LBI[-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15666	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator IDMT Overcurrent protection.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoint **IDMT Overcurrent Delay (page 244)**.
Disabled:	Protection is disabled.
By LBI:	Protection is enabled or disabled by the state of LBI **PROTECTION ENABLE (PAGE 561)**.

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Current Unbalance Protection

Setpoint group	Protections	**Related FW**	1.9.0
Range [units]	Enabled / Disabled / By LBI[-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15667	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator Current Unbalance protection.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoints **Current Unbalance BOC (page 245)** and **Current Unbalance BOC Delay (page 245)**.
Disabled:	Protection is disabled.
By LBI:	Protection is enabled or disabled by the state of LBI **PROTECTION ENABLE (PAGE 561)**.

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Subgroup: Voltage Protection

Generator <> Voltage Protection

Setpoint group	Protections	**Related FW**	1.9.0
Range [units]	Enabled / Disabled / By LBI [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15668	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator Generator <> Voltage protection. GCB closing is blocked, if the protection is disabled!

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoints **Generator Overvoltage Sd (page 245)**, **Generator Overvoltage Wrn (page 246)**, **Generator Undervoltage BOC (page 246)**, **Generator Undervoltage Wrn (page 247)** and **Generator <> Voltage Delay (page 247)**.
Disabled:	Protection is disabled.
By LBI:	Protection is enabled or disabled by the state of LBI **PROTECTION ENABLE (PAGE 561)**.

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Voltage Unbalance Protection

Setpoint group	Protections	**Related FW**	1.9.0
Range [units]	Enabled / Disabled / By LBI [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15669	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator Voltage Unbalance protection.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoints **Voltage Unbalance BOC (page 247)** and **Voltage Unbalance BOC Delay (page 248)**.
Disabled:	Protection is disabled.
By LBI:	Protection is enabled or disabled by the state of LBI **PROTECTION ENABLE (PAGE 561)**.

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Subgroup: Frequency Protection

Generator Frequency Protection

Setpoint group	Protections	**Related FW**	1.9.0
Range [units]	Enabled / Disabled / By LBI [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15670	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator Generator Frequency protection. GCB closing is blocked, if the protection is disabled!.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoints **Generator Overfrequency BOC (page 248)**, **Generator Overfrequency Wrn (page 248)**, **Generator Underfrequency BOC (page 249)**, **Generator Underfrequency Wrn (page 249)**, and **Generator <> Frequency Delay (page 249)**.
Disabled:	Protection is disabled.
By LBI:	Protection is enabled or disabled by the state of LBI **PROTECTION ENABLE (PAGE 561)**.

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Subgroup: Speed Protection

Underspeed Protection

Setpoint group	Protections	**Related FW**	1.9.0
Range [units]	Enabled / Disabled / By LBI [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15671	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator Underspeed protection.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoint **Underspeed Sd (page 223)**.
Disabled:	Protection is disabled.
By LBI:	Protection is enabled or disabled by the state of LBI **PROTECTION ENABLE (PAGE 561)**.

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Overspeed Protection

Setpoint group	Protections	**Related FW**	1.9.0
Range [units]	Enabled / Disabled / By LBI [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15672	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator Overspeed protection.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoint **Overspeed Sd (page 223)**.
Disabled:	Protection is disabled.
By LBI:	Protection is enabled or disabled by the state of LBI **PROTECTION ENABLE (PAGE 561)**.

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Group: AMF settings

Subgroup: AMF Timers

Emergency Start Delay

Setpoint group	AMF settings	**Related FW**	1.9.0
Range [units]	0 .. 6 000 [s]		
Default value	5 s	**Alternative config**	NO
Step	1 s		
Comm object	8301	**Related applications**	AMF
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 199)**		
Description			
Delay after the mains failure to the start command of the gen-set.			

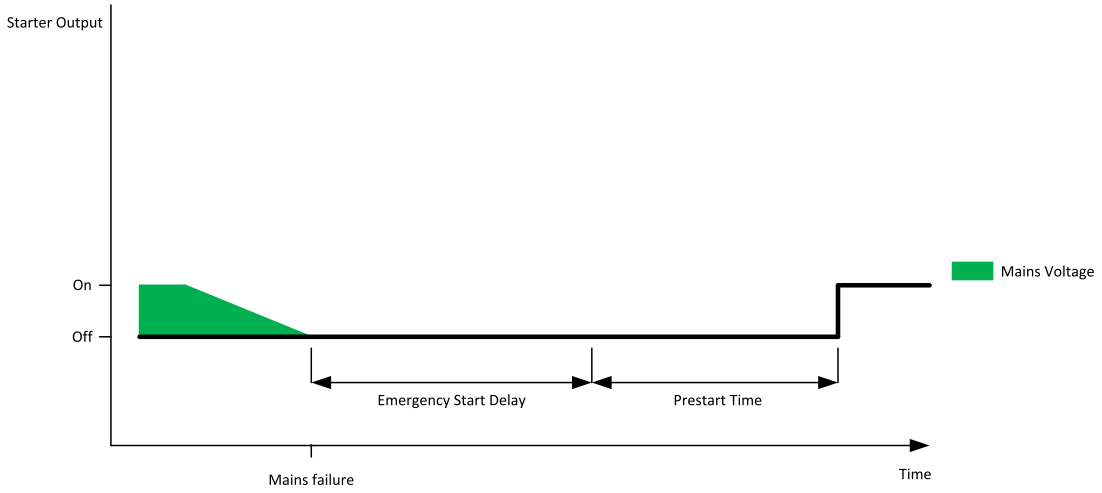


Image 8.20 Emergency Start Delay

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Mains Return Delay

Setpoint group	AMF settings	**Related FW**	1.9.0
Range [units]	1 .. 3 600 [s]		
Default value	20 s	**Alternative config**	NO
Step	1 s		
Comm object	8302	**Related applications**	AMF
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 199)**		
Description			
This setpoint adjust the delay, how long mains has to be returned after mains fail to start load transfer to mains.			

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Transfer Delay

Setpoint group	AMF settings	**Related FW**	1.9.0
Range [units]	0,0 .. 600,0 [s]		
Default value	1,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8303	**Related applications**	AMF
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 199)**		

Description

Delay after GCB opening to MCB closing during the return procedure. Delay after MCB opening to GCB closing if the setpoint **MCB Opens On (page 263)** is set to GENRUN.

The time charts bellow show recommended setting of Transfer Delay setpoint.

If the Transfer Delay setpoint is set shorter than the time required for opening of the circuit breaker, the controller closes **GCB CLOSE/OPEN (PAGE 604)** output straight away (100 ms) after the **MCB FEEDBACK (PAGE 560)** input deactivates.

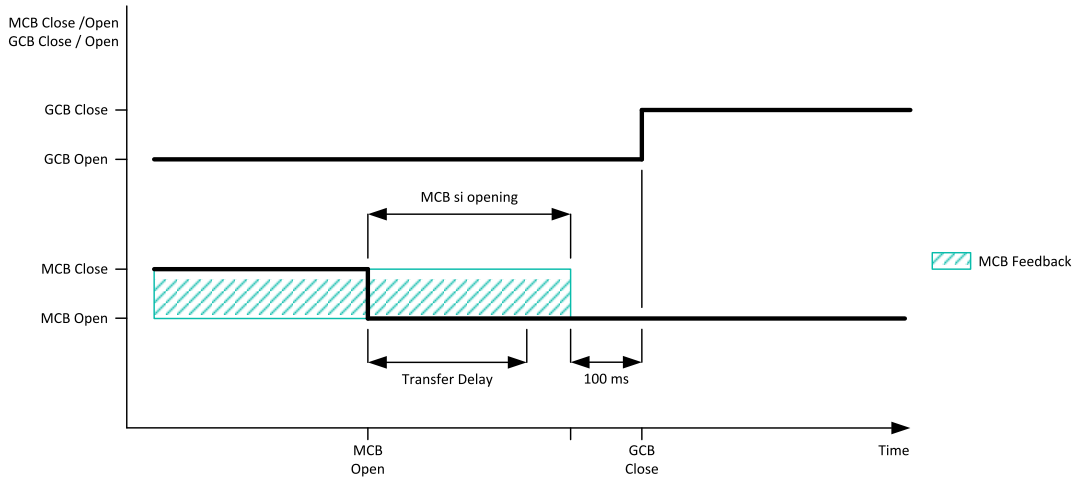


Image 8.21 Transfer Delay 1

If some delay between **MCB FEEDBACK (PAGE 560)** deactivation and closing of **GCB CLOSE/OPEN (PAGE 604)** output is required, then the Transfer Delay must be set to sum of “MCB opening” + “Delay” time.

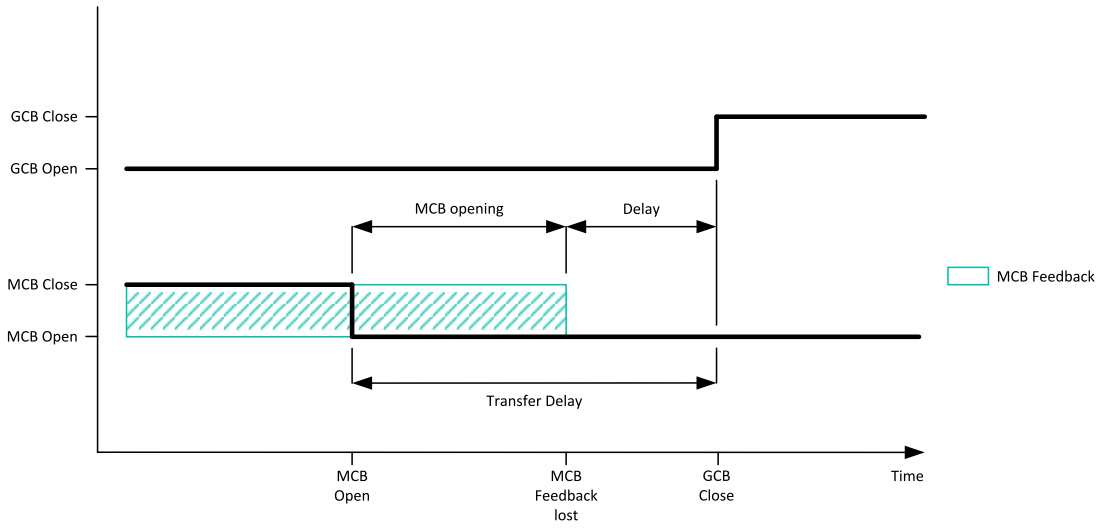


Image 8.22 Transfer Delay 2

This delay is also used in dual operation function. This delay is used when load from first gen-set is transferred to second gen-set. Delay starts to countdown when GCB of first gen-set is open. When this delay countdown, GCB of second gen-set is closed. This delay is important for correct function of external interlock.

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MCB Close Delay

Setpoint group	AMF settings	**Related FW**	1.9.0
Range [units]	0,0 .. 600,0 [s]		
Default value	1,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8389	**Related applications**	AMF
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 199)**		
Description			
Delay after mains returns to MCB closing, if the gen-set is not running(e.g. is in start-up procedure)			

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Subgroup: AMF Voltage Conditions

Mains Overvoltage

Setpoint group	AMF settings	**Related FW**	1.9.0
Range [units]	**Mains Undervoltage (page 258)** .. 150 [%]		
Default value	110 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-Ph (page 195)**		
Comm object	8305	**Related applications**	AMF
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 199)**		
Description			
Threshold for mains overvoltage. All three phases are checked. Maximum out of three is used.			

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Mains Undervoltage

Setpoint group	AMF settings	**Related FW**	1.9.0
Range [units]	50 .. **Mains Overvoltage (page 258)** [%]		
Default value	60 %	**Alternative config**	YES
Step	1 % of **Nominal Voltage Ph-Ph (page 195)**		
Comm object	8307	**Related applications**	AMF
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 199)**		
Description			
Threshold for mains undervoltage. All three phases are checked. Minimum voltage out of three phases is used.			

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Mains < > Voltage Delay

Setpoint group	AMF settings	**Related FW**	1.9.0
Range [units]	0,0 .. 600,0 [s]		
Default value	2,0 s	**Alternative config**	YES
Step	0,1 s		
Comm object	8306	**Related applications**	AMF
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 199)**		
Description			
Delay for **Mains Undervoltage (page 258)** and **Mains Overvoltage (page 258)** protection.			

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Mains Voltage Unbalance

Setpoint group	AMF settings	**Related FW**	1.9.0
Range [units]	1 .. 150 [%] of **Nominal Voltage Ph-Ph (page 195)**		
Default value	10 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-Ph (page 195)**		
Comm object	8446	**Related applications**	AMF
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 199)**		
Description			
Threshold for mains voltage unbalance.			

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Mains Voltage Unbalance Delay

Setpoint group	AMF settings	**Related FW**	1.9.0
Range [units]	0,0 .. 600,0 [s]		
Default value	2,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8447	**Related applications**	AMF
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 199)**		
Description			
Delay for **Mains Voltage Unbalance (page 259)** protection.			

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Subgroup: AMF Frequency Conditions

Mains Overfrequency

Setpoint group	AMF settings	**Related FW**	1.9.0
Range [units]	**Mains Underfrequency (page 260)** .. 150 [%]		
Default value	102,0 %	**Alternative config**	NO
Step	1,0 % of **Nominal Frequency (page 196)**		
Comm object	8310	**Related applications**	AMF
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 199)**		
Description			
Threshold for mains overfrequency.			

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Mains Underfrequency

Setpoint group	AMF settings	**Related FW**	1.9.0
Range [units]	50 .. **Mains Overfrequency (page 259)** [%]		
Default value	98,0 %	**Alternative config**	NO
Step	1,0 % of **Nominal Frequency (page 196)**		
Comm object	8312	**Related applications**	AMF
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 199)**		
Description			
Threshold for mains underfrequency.			

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Mains < > Frequency Delay

Setpoint group	AMF settings	**Related FW**	1.9.0
Range [units]	0,0 .. 600,0 [s]		
Default value	0,5 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8311	**Related applications**	AMF
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 199)**		
Description			
Delay for **Mains Underfrequency (page 260)** and **Mains Overfrequency (page 259)** protection.			

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Subgroup: AMF Settings

Return From Island

Setpoint group	AMF settings	**Related FW**	1.9.0
Range [units]	Manual / Auto [-]		
Default value	Auto	**Alternative config**	NO
Step	[-]		
Comm object	9590	**Related applications**	AMF
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 199)**		
Description			

Setpoint adjust the behavior of closing MCB when the mains returns.

Manual	Controller remains in AUT mode and the manual return to Mains is done via MCB button. Manual Restore (page 706) message is displayed in alarmlist to notify operator - it will disappear automatically after MCB close button is pushed. ***Note:*** *Select MANUAL in case you need to manually control the moment when the load is transferred back to the mains.*
Auto	No automatic mode change is performed.

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MCB Logic

Setpoint group	AMF settings	**Related FW**	1.9.0
Range [units]	Close On / Close Off [-]		
Default value	Close Off	**Alternative config**	NO
Step	[-]		
Comm object	8444	**Related applications**	AMF
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 199)**		
Description			

The set point influences the behavior of the output **MCB CLOSE/OPEN (PAGE 614)**.

Close On When the output **MCB CLOSE/OPEN (PAGE 614)** is closed – MCB should be closed.

Close Off When the output **MCB CLOSE/OPEN (PAGE 614)** is closed – MCB should be opened.

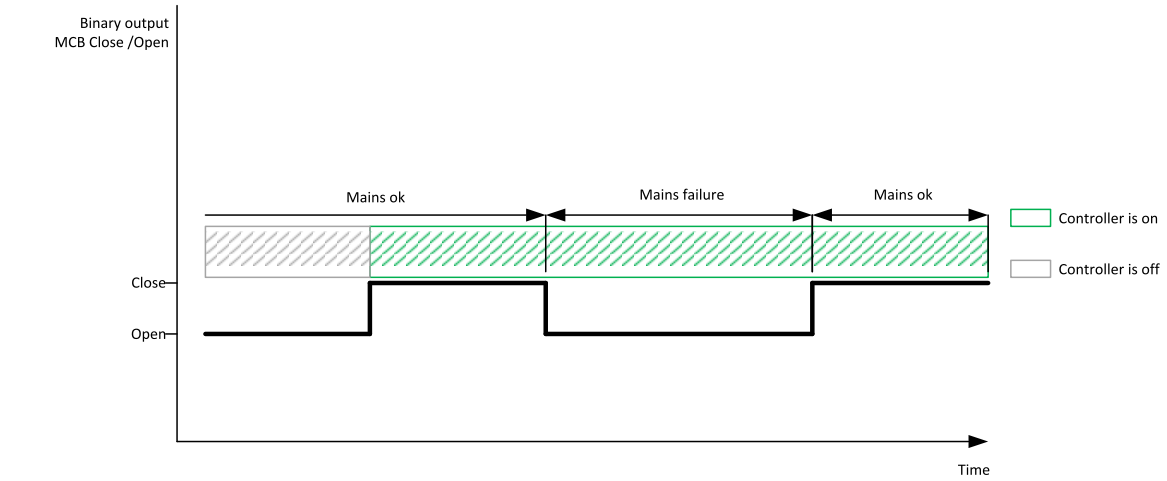


Image 8.23 MCB Logic 1

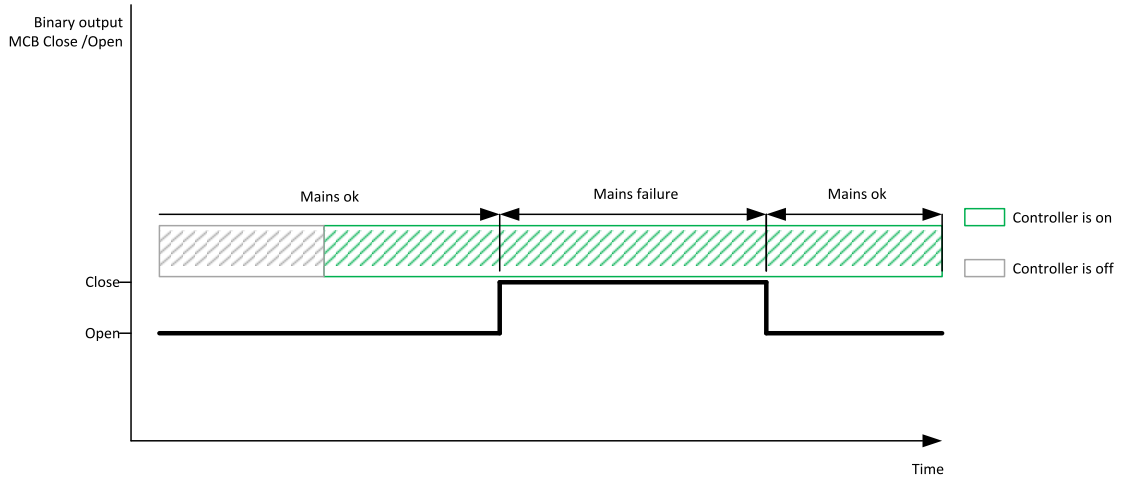


Image 8.24 MCB Logic 2

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MCB Opens On

Setpoint group	AMF settings	**Related FW**	1.9.0
Range [units]	Mains Fail / Gen Run [-]		
Default value	Gen Run	**Alternative config**	NO
Step	[-]		
Comm object	9850	**Related applications**	AMF
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 199)**		
Description			

Setpoint adjust the behavior of opening MCB in AUTO mode when there is mains fail.

Mains Fail — The command to open the MCB is given immediately after mains fail condition is evaluated.

If the mains will return into parameters after MCB was opened and before GCB is closed, timer **MCB Close Delay (page 257)** is applied before MCB closing.

Gen Run — MCB will be opened when engine will be running and it will be possible to transfer load from Mains to gen-set (after stabilisation phase).

Note: *This option should be used for MCBs using 230V control and not equipped with the undervoltage coil.*

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Group: Dual Operation

Subgroup: Dual Operation

Running Hours Max Difference

Setpoint group	Dual Operation	**Related FW**	1.9.0
Range [units]	0,1 .. 1000,0 [h]		
Default value	10 h	**Alternative config**	NO
Step	0,1 h		
Comm object	16039	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **COM1 Mode (page 367)** and **COM2 Mode (page 369)**		
Description			

This setpoint adjusts the maximal allowed difference of dual operation running hours between Master and Slave. When difference is higher, swap of load between controllers should be done.

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Running Hours Base

Setpoint group	Dual Operation	**Related FW**	1.9.0
Range [units]	-10 000,0 .. 10 000,0 [h]		
Default value	0 h	**Alternative config**	NO
Step	0,1 h		
Comm object	16040	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **COM1 Mode (page 367)** and **COM2 Mode (page 369)**		
Description			

This setpoint modifies the running hours of controller used in dual operation function. Negative value is decrement from running hours, positive value is increment to running hours.

> **Example:**
> Master controller has 1000 h.
> Slave controller has 100 h.
> Adjust setpoint of slave controller to 900 h to have both controllers on "0" running hours in dual operation.

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Swap Gen-sets

Setpoint group	Dual Operation	**Related FW**	1.9.0
Range [units]	Enabled / Disabled [-]		
Default value	Enabled h	**Alternative config**	NO
Step	[-]		
Comm object	16041	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **COM1 Mode (page 367)** and **COM2 Mode (page 369)**		
Description			

This setpoint enables or disables swapping of gen-sets on load in dual operation.

Enabled	Master and Slave are swapped based on their actual running hours.
Disabled	Master and Slave are not swapped. Controller with lower running hours starts and then runs until mains returns or until controller shutdown - then second controller starts.

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Master Error Protection

Setpoint group	Dual Operation	**Related FW**	1.9.0
Range [units]	Monitoring / AL Indic / Wrn [-]		
Default value	AL Indic	**Alternative config**	NO
Step	[-]		
Comm object	16042	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **COM1 Mode (page 367)** and **COM2 Mode (page 369)**		
Description			
This setpoint adjust the type of protection for **Dual Operation Master Fail (page 703)** alarm.			

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Slave Error Protection

Setpoint group	Dual Operation	**Related FW**	1.9.0
Range [units]	Monitoring / AL Indic / Wrn [-]		
Default value	AL Indic	**Alternative config**	NO
Step	[-]		
Comm object	16043	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **COM1 Mode (page 367)** and **COM2 Mode (page 369)**		
Description			
This setpoint adjust the type of protection for **Dual Operation Slave Fail (page 703)** alarm.			

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Group: General Analog Inputs

General Analog Input 1

Analog Protection 1 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9259	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT01 (PAGE 640)** is configured		
Description			
Warning or history threshold level for **AIN PROT01 (PAGE 640)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT01 (PAGE 640)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 1 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9260	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT01 (PAGE 640)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT01 (PAGE 640)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT01 (PAGE 640)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 1 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9261	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT01 (PAGE 640)** is configured		
Description			
Delay for **AIN PROT01 (PAGE 640)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT01 (PAGE 640)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Switch 1 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	11407	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH01 (PAGE 582)** is configured		
Description			
Threshold level for switching the binary output **AIN SWITCH01 (PAGE 582)** on. The value is measured from **AIN SWITCH 01 (PAGE 660)** analog input.			

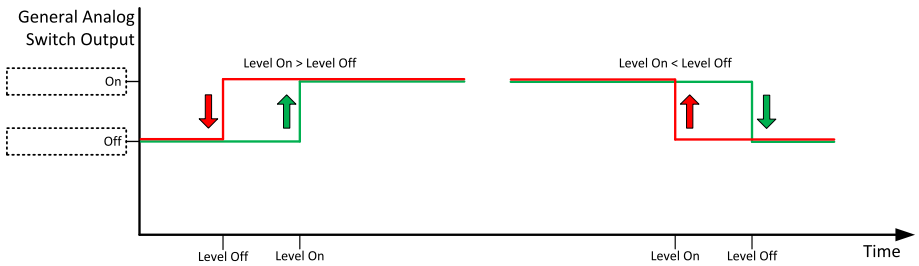


Image 8.25 General analog input 1 switch

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Analog Switch 1 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	11410	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH01 (PAGE 582)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH01 (PAGE 582)** off. The value is measured from **AIN SWITCH 01 (PAGE 660)** analog input.



Image 8.26 General analog input 1 switch

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General Analog Input 2

Analog Protection 2 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9262	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT02 (PAGE 641)** is configured		
Description			

Warning or history threshold level for **AIN PROT02 (PAGE 641)**.

Note: *These setpoints are used only if LAI **AIN PROT02 (PAGE 641)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 2 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9263	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT02 (PAGE 641)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT02 (PAGE 641)**.			
Note: *These setpoints are used only if LAI **AIN PROT02 (PAGE 641)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 2 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9264	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT02 (PAGE 641)** is configured		
Description			
Delay for **AIN PROT02 (PAGE 641)**.			
Note: *These setpoints are used only if LAI **AIN PROT02 (PAGE 641)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Switch 2 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	11408	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH02 (PAGE 583)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 02 (PAGE 660)** on. The value is measured from **AIN SWITCH 02 (PAGE 660)** analog input.



Image 8.27 General analog input 2 switch

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Analog Switch 2 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	11411	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH02 (PAGE 583)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 02 (PAGE 660)** off. The value is measured from **AIN SWITCH 02 (PAGE 660)** analog input.



Image 8.28 General analog input 2 switch

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General Analog Input 3

Analog Protection 3 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9265	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT03 (PAGE 642)** is configured		
Description			

Warning or history threshold level for **AIN PROT03 (PAGE 642)**.

Note: *These setpoints are used only if LAI **AIN PROT03 (PAGE 642)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 3 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9266	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT03 (PAGE 642)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT03 (PAGE 642)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT03 (PAGE 642)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 3 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9267	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT03 (PAGE 642)** is configured		
Description			
Delay for **AIN PROT03 (PAGE 642)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT03 (PAGE 642)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Switch 3 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	11409	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH03 (PAGE 583)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 03 (PAGE 660)** on. The value is measured from **AIN SWITCH 03 (PAGE 660)** analog input.



Image 8.29 General analog input 3 switch

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Analog Switch 3 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	11412	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH03 (PAGE 583)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 03 (PAGE 660)** off. The value is measured from **AIN SWITCH 03 (PAGE 660)** analog input.



Image 8.30 General analog input 3 switch

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General Analog Input 4

Analog Protection 4 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9268	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT04 (PAGE 643)** is configured		
Description			

Warning or history threshold level for **AIN PROT04 (PAGE 643)**.

Note: *These setpoints are used only if LAI **AIN PROT04 (PAGE 643)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 4 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9269	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT04 (PAGE 643)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT04 (PAGE 643)**.			
Note: *These setpoints are used only if LAI **AIN PROT04 (PAGE 643)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 4 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9270	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT04 (PAGE 643)** is configured		
Description			
Delay for **AIN PROT04 (PAGE 643)**.			
Note: *These setpoints are used only if LAI **AIN PROT04 (PAGE 643)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Switch 4 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14385	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 04 (PAGE 661)** on. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.

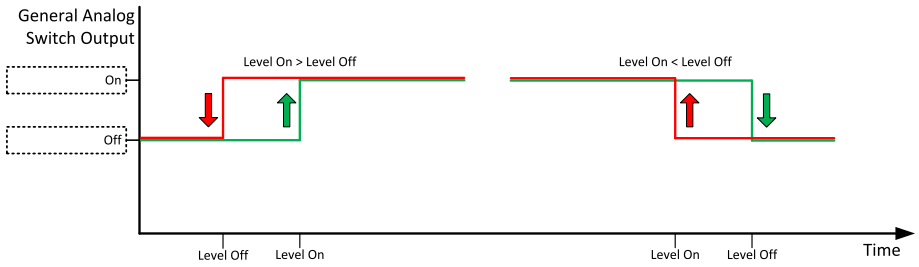


Image 8.31 General analog input 4 switch

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Analog Switch 4 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14386	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 04 (PAGE 661)** off. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.32 General analog input 4 switch

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General Analog Input 5

Analog Protection 5 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9271	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT05 (PAGE 644)** is configured		
Description			

Warning or history threshold level for **AIN PROT05 (PAGE 644)**.

Note: *These setpoints are used only if LAI **AIN PROT05 (PAGE 644)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 5 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9272	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT05 (PAGE 644)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT05 (PAGE 644)**.			

Note: *These setpoints are used only if LAI **AIN PROT05 (PAGE 644)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 5 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9273	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT05 (PAGE 644)** is configured		
Description			
Delay for **AIN PROT05 (PAGE 644)**.			

Note: *These setpoints are used only if LAI **AIN PROT05 (PAGE 644)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Switch 5 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14963	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 05 (PAGE 661)** on. The value is measured from **AIN SWITCH 05 (PAGE 661)** analog input.



Image 8.33 General analog input 4 switch

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Analog Switch 5 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14979	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 05 (PAGE 661)** off. The value is measured from **AIN SWITCH 05 (PAGE 661)** analog input.



Image 8.34 General analog input 4 switch

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General Analog Input 6

Analog Protection 6 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9274	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT06 (PAGE 645)** is configured		
Description			

Warning or history threshold level for **AIN PROT06 (PAGE 645)**.

Note: *These setpoints are used only if LAI **AIN PROT06 (PAGE 645)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 6 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9275	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT06 (PAGE 645)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT06 (PAGE 645)**.			
Note: *These setpoints are used only if LAI **AIN PROT06 (PAGE 645)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 6 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9276	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT06 (PAGE 645)** is configured		
Description			
Delay for **AIN PROT06 (PAGE 645)**.			
Note: *These setpoints are used only if LAI **AIN PROT06 (PAGE 645)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Switch 6 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14964	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 06 (PAGE 661)** on. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.35 General analog input 4 switch

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Analog Switch 6 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14980	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 06 (PAGE 661)** off. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.36 General analog input 4 switch

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General Analog Input 7

Analog Protection 7 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9277	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT07 (PAGE 646)** is configured		
Description			

Warning or history threshold level for **AIN PROT07 (PAGE 646)**.

Note: *These setpoints are used only if LAI **AIN PROT07 (PAGE 646)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 7 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9278	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT07 (PAGE 646)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT07 (PAGE 646)**.			
Note: *These setpoints are used only if LAI **AIN PROT07 (PAGE 646)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 7 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9279	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT07 (PAGE 646)** is configured		
Description			
Delay for **AIN PROT07 (PAGE 646)**.			
Note: *These setpoints are used only if LAI **AIN PROT07 (PAGE 646)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Switch 7 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14965	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 07 (PAGE 662)** on. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.37 General analog input 4 switch

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Analog Switch 7 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14981	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 07 (PAGE 662)** off. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.38 General analog input 4 switch

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General Analog Input 8

Analog Protection 8 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9280	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT08 (PAGE 647)** is configured		
Description			

Warning or history threshold level for **AIN PROT08 (PAGE 647)**.

Note: *These setpoints are used only if LAI **AIN PROT08 (PAGE 647)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 8 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9281	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT08 (PAGE 647)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT08 (PAGE 647)**.			
Note: *These setpoints are used only if LAI **AIN PROT08 (PAGE 647)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 8 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9282	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT08 (PAGE 647)** is configured		
Description			
Delay for **AIN PROT08 (PAGE 647)**.			
Note: *These setpoints are used only if LAI **AIN PROT08 (PAGE 647)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Switch 8 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14966	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 08 (PAGE 662)** on. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.39 General analog input 4 switch

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Analog Switch 8 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14982	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 08 (PAGE 662)** off. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.40 General analog input 4 switch

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General Analog Input 9

Analog Protection 9 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9283	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT09 (PAGE 648)** is configured		
Description			

Warning or history threshold level for **AIN PROT09 (PAGE 648)**.

Note: *These setpoints are used only if LAI **AIN PROT09 (PAGE 648)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 9 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9284	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT09 (PAGE 648)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT09 (PAGE 648)**.			
Note: *These setpoints are used only if LAI **AIN PROT09 (PAGE 648)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 9 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9285	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT09 (PAGE 648)** is configured		
Description			
Delay for **AIN PROT09 (PAGE 648)**.			
Note: *These setpoints are used only if LAI **AIN PROT09 (PAGE 648)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Switch 9 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14967	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 09 (PAGE 662)** on. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.41 General analog input 4 switch

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Analog Switch 9 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14983	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 09 (PAGE 662)** off. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.42 General analog input 4 switch

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General Analog Input 10

Analog Protection 10 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9286	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT10 (PAGE 649)** is configured		
Description			

Warning or history threshold level for **AIN PROT10 (PAGE 649)**.

Note: *These setpoints are used only if LAI **AIN PROT10 (PAGE 649)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 10 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9287	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT10 (PAGE 649)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT10 (PAGE 649)**.			
Note: *These setpoints are used only if LAI **AIN PROT10 (PAGE 649)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 10 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9288	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT10 (PAGE 649)** is configured		
Description			
Delay for **AIN PROT10 (PAGE 649)**.			
Note: *These setpoints are used only if LAI **AIN PROT10 (PAGE 649)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Switch 10 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14968	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 10 (PAGE 663)** on. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.43 General analog input 4 switch

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Analog Switch 10 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14984	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 10 (PAGE 663)** off. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.44 General analog input 4 switch

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General Analog Input 11

Analog Protection 11 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9289	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT11 (PAGE 650)** is configured		
Description			

Warning or history threshold level for **AIN PROT11 (PAGE 650)**.

Note: *These setpoints are used only if LAI **AIN PROT11 (PAGE 650)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 11 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9290	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT11 (PAGE 650)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT11 (PAGE 650)**.			
Note: *These setpoints are used only if LAI **AIN PROT11 (PAGE 650)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 11 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9291	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT11 (PAGE 650)** is configured		
Description			
Delay for **AIN PROT11 (PAGE 650)**.			
Note: *These setpoints are used only if LAI **AIN PROT11 (PAGE 650)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Switch 11 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14969	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 11 (PAGE 663)** on. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.45 General analog input 4 switch

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Analog Switch 11 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14985	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 11 (PAGE 663)** off. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.46 General analog input 4 switch

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General Analog Input 12

Analog Protection 12 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9292	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT12 (PAGE 651)** is configured		
Description			

Warning or history threshold level for **AIN PROT12 (PAGE 651)**.

Note: *These setpoints are used only if LAI **AIN PROT12 (PAGE 651)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 12 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9293	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT12 (PAGE 651)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT12 (PAGE 651)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT12 (PAGE 651)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 12 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9294	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT12 (PAGE 651)** is configured		
Description			
Delay for **AIN PROT12 (PAGE 651)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT12 (PAGE 651)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Switch 12 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14970	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 12 (PAGE 663)** on. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.47 General analog input 4 switch

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Analog Switch 12 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14986	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 12 (PAGE 663)** off. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.48 General analog input 4 switch

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General Analog Input 13

Analog Protection 13 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9295	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT13 (PAGE 652)** is configured		
Description			

Warning or history threshold level for **AIN PROT13 (PAGE 652)**.

Note: *These setpoints are used only if LAI **AIN PROT13 (PAGE 652)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 13 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9296	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT13 (PAGE 652)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT13 (PAGE 652)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT13 (PAGE 652)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 13 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9297	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT13 (PAGE 652)** is configured		
Description			
Delay for **AIN PROT13 (PAGE 652)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT13 (PAGE 652)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Switch 13 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14971	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 13 (PAGE 664)** on. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.49 General analog input 4 switch

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Analog Switch 13 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14987	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 13 (PAGE 664)** off. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.50 General analog input 4 switch

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General Analog Input 14

Analog Protection 14 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9298	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT14 (PAGE 653)** is configured		
Description			

Warning or history threshold level for **AIN PROT14 (PAGE 653)**.

Note: *These setpoints are used only if LAI **AIN PROT14 (PAGE 653)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 14 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9299	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT14 (PAGE 653)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT14 (PAGE 653)**.			

Note: *These setpoints are used only if LAI **AIN PROT14 (PAGE 653)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 14 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9300	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT14 (PAGE 653)** is configured		
Description			
Delay for **AIN PROT14 (PAGE 653)**.			

Note: *These setpoints are used only if LAI **AIN PROT14 (PAGE 653)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Switch 14 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14972	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 14 (PAGE 664)** on. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.51 General analog input 4 switch

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Analog Switch 14 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14988	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 14 (PAGE 664)** off. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.52 General analog input 4 switch

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General Analog Input 15

Analog Protection 15 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9301	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT15 (PAGE 654)** is configured		
Description			

Warning or history threshold level for **AIN PROT15 (PAGE 654)**.

Note: *These setpoints are used only if LAI **AIN PROT15 (PAGE 654)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 15 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9302	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT15 (PAGE 654)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT15 (PAGE 654)**.			
Note: *These setpoints are used only if LAI **AIN PROT15 (PAGE 654)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 15 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9303	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT15 (PAGE 654)** is configured		
Description			
Delay for **AIN PROT15 (PAGE 654)**.			
Note: *These setpoints are used only if LAI **AIN PROT15 (PAGE 654)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Switch 15 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14973	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 15 (PAGE 664)** on. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.53 General analog input 4 switch

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Analog Switch 15 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14989	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 15 (PAGE 664)** off. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.54 General analog input 4 switch

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General Analog Input 16

Analog Protection 16 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9304	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT16 (PAGE 655)** is configured		
Description			

Warning or history threshold level for **AIN PROT16 (PAGE 655)**.

Note: *These setpoints are used only if LAI **AIN PROT16 (PAGE 655)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 16 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9305	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT16 (PAGE 655)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT16 (PAGE 655)**.			

Note: *These setpoints are used only if LAI **AIN PROT16 (PAGE 655)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 16 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9306	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT16 (PAGE 655)** is configured		
Description			
Delay for **AIN PROT16 (PAGE 655)**.			

Note: *These setpoints are used only if LAI **AIN PROT16 (PAGE 655)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Switch 16 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14974	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 16 (PAGE 665)** on. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.55 General analog input 4 switch

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Analog Switch 16 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14990	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 16 (PAGE 665)** off. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.56 General analog input 4 switch

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General Analog Input 17

Analog Protection 17 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9307	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT17 (PAGE 656)** is configured		
Description			

Warning or history threshold level for **AIN PROT17 (PAGE 656)**.

Note: *These setpoints are used only if LAI **AIN PROT17 (PAGE 656)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 17 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9308	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT17 (PAGE 656)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT17 (PAGE 656)**.			
Note: *These setpoints are used only if LAI **AIN PROT17 (PAGE 656)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 17 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9309	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT17 (PAGE 656)** is configured		
Description			
Delay for **AIN PROT17 (PAGE 656)**.			
Note: *These setpoints are used only if LAI **AIN PROT17 (PAGE 656)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Switch 17 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14975	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 17 (PAGE 665)** on. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.57 General analog input 4 switch

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Analog Switch 17 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14991	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 17 (PAGE 665)** off. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.58 General analog input 4 switch

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General Analog Input 18

Analog Protection 18 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9310	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT18 (PAGE 657)** is configured		
Description			

Warning or history threshold level for **AIN PROT18 (PAGE 657)**.

Note: *These setpoints are used only if LAI **AIN PROT18 (PAGE 657)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 18 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9311	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT18 (PAGE 657)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT18 (PAGE 657)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT18 (PAGE 657)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 18 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9312	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT18 (PAGE 657)** is configured		
Description			
Delay for **AIN PROT18 (PAGE 657)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT18 (PAGE 657)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Switch 18 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14976	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 18 (PAGE 665)** on. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.59 General analog input 4 switch

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Analog Switch 18 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14992	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 18 (PAGE 665)** off. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.60 General analog input 4 switch

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General Analog Input 19

Analog Protection 19 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9313	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT19 (PAGE 658)** is configured		
Description			

Warning or history threshold level for **AIN PROT19 (PAGE 658)**.

Note: *These setpoints are used only if LAI **AIN PROT19 (PAGE 658)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 19 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9314	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT19 (PAGE 658)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT19 (PAGE 658)**.			
Note: *These setpoints are used only if LAI **AIN PROT19 (PAGE 658)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 19 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9315	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT19 (PAGE 658)** is configured		
Description			
Delay for **AIN PROT19 (PAGE 658)**.			
Note: *These setpoints are used only if LAI **AIN PROT19 (PAGE 658)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Switch 19 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14977	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 19 (PAGE 666)** on. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.61 General analog input 4 switch

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Analog Switch 19 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14993	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 19 (PAGE 666)** off. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.62 General analog input 4 switch

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General Analog Input 20

Analog Protection 20 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9316	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT20 (PAGE 659)** is configured		
Description			

Warning or history threshold level for **AIN PROT20 (PAGE 659)**.

Note: *These setpoints are used only if LAI **AIN PROT20 (PAGE 659)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 20 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	9317	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT20 (PAGE 659)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT20 (PAGE 659)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT20 (PAGE 659)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 20 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	0 .. 900 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	9318	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical analog input **AIN PROT20 (PAGE 659)** is configured		
Description			
Delay for **AIN PROT20 (PAGE 659)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT20 (PAGE 659)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Switch 20 On

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14978	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 20 (PAGE 666)** on. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.63 General analog input 4 switch

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Analog Switch 20 Off

Setpoint group	General Analog Inputs	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	the value is defined by analog sensor curve	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	14994	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if the logical binary output **AIN SWITCH04 (PAGE 584)** is configured		
Description			

Threshold level for switching the binary output **AIN SWITCH 20 (PAGE 666)** off. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.



Image 8.64 General analog input 4 switch

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Group: Scheduler

Subgroup: Time & Date

Time

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	HH:MM:SS [-]		
Default value	0:0:0	**Alternative config**	NO
Step	[-]		
Comm object	24554	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Real time clock adjustment.

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Date

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	DD/MM/YYYY [-]		
Default value	1.1.2015	**Alternative config**	NO
Step	[-]		
Comm object	24553	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Actual date adjustment.			

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Time Stamp Period

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	0 .. 240 [min]		
Default value	60 min	**Alternative config**	NO
Step	1 min		
Comm object	8979	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Time interval for periodic history records. ***Note:*** *History record is made only when engine is running.*			

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#Summer Time Mode

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Disabled / Winter / Summer / Winter - S / Summer - S [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	8727	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

Behavior of switching between winter and summer time.

Disable	Automatic switching between summer and wintertime is disabled.
Winter (Summer)	Automatic switching between summer and wintertime is enabled and it is set to winter (summer) season.
Winter - S (Summer - S)	Modification for southern hemisphere.

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Subgroup: Timer 1

Timer 1 Function

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Disable / No Func / TEST / Test OnLd / MFail Blk / Mode OFF [-]		
Default value	Disable	**Alternative config**	NO
Step	[-]		
Comm object	15358	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		

Description

It is possible to choose from following timer functions. Binary output **EXERCISE TIMER 1 (PAGE 601)** is always activated when Timer is active regardless of chosen timer function. Timer functions require controller running in AUTO mode.

Timer 1 has higher priority over Timer 2. So if **Timer 1 Function (page 327)** is configured for OFF mode and **Timer 2 Function (page 334)** is over the same time configured for AUTO mode, controller will work in OFF mode.

Controller activates timer whenever it is powered up even in period, where timer should be already running.

Disable	The Timer is disabled.
No Func	There is no any other function, only binary output of timer is activated.
TEST	When this option is chosen then the binary output of timer is internally connected to the binary input Remote TEST.
TEST OnLd	When this option is chosen then the binary output of timer is internally connected to the Remote TEST On Load binary input.
MFail Blk	When this option is chosen then the binary output of timer is internally connected to the Mains Fail Block binary input.
Mode OFF	When this option is chosen then the binary output of timer is internally connected to the Remote OFF binary input.

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Timer 1 Setup

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	[-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	10969	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Related setpoints for timer 1 are:

- **Timer 1 Function (page 327)**
- **Timer 1 Repetition (page 328)**
- **Timer 1 First Occur. Date (page 329)**
- **Timer 1 First Occur. Time (page 329)**
- **Timer 1 Duration (page 329)**
- **Timer 1 Repeated (page 330)**
- **Timer 1 Repeat Day (page 333)**
- **Timer 1 Day (page 332)**
- **Timer 1 Repeated Day In Week (page 333)**
- **Timer 1 Repeat Day In Month (page 333)**
- **Timer 1 Repeat Week In Month (page 334)**
- **Timer 1 Refresh Period (page 331)**
- **Timer 1 Weekends (page 332)**

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Timer 1 Repetition

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Off / Once / Repeated [-]		
Default value	Off	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 327)**		
Description			

Defines repetition of **Timer 1 Function (page 327)**.

Off	**Timer 1 Function (page 327)** will not be activated.
Once	**Timer 1 Function (page 327)** will be activated only one time.
Repeated	**Timer 1 Function (page 327)** will be repeatedly activated.

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Timer 1 First Occur. Date

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	[DD/MM/YYYY]		
Default value	01/01/2000	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 327)**		
Description			
Date of first occurrence of **Timer 1 Function (page 327)**.			

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Timer 1 First Occur. Time

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	[HH:MM]		
Default value	00:00	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 327)**		
Description			
Time of first occurrence of **Timer 1 Function (page 327)**.			

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Timer 1 Duration

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	[HH:MM]		
Default value	00:00	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 327)**		
Description			
Timer 1 Function (page 327) duration time.			

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Timer 1 Repeated

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Daily / Weekly / Monthly / Short Period [-]		
Default value	Daily	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 327)**		
Description			

Repeated interval of **Timer 1 Function (page 327)**.

Daily	**Timer 1 Function (page 327)** is repeated every day.
Weekly	**Timer 1 Function (page 327)** is repeated every week in chosen days.
Monthly	**Timer 1 Function (page 327)** is repeated in chosen day every month or in chosen days of chosen week of month
Short Period	**Timer 1 Function (page 327)** is repeated in adjusted period.

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Timer 1 Refresh Period

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	[-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 327)**		
Description			

Refresh period of **Timer 1 Function (page 327)**. Meaning of this setpoint depends on type of repetition adjusted in **Timer 1 Repeated (page 330)**.

Daily	Range [units]: 1 .. 1000 [day]. This setpoint adjust that every X day the timer will be activated. **Example:** If you have daily repetition and you set this setpoint to 2, then every second day from first occurrence of **Timer 1 Function (page 327)**, the **Timer 1 Function (page 327)** will be activated.
Weekly	Range [units]: 1 .. 60 [week]. This setpoint adjust that every X week the timer will be activated. **Example:** If you have weekly repetition and you set this setpoint to 2, then every second week from first occurrence of **Timer 1 Function (page 327)**, the **Timer 1 Function (page 327)** will be activated in selected days adjusted by **Timer 1 Day (page 332)**.
Monthly	Range [units]: 1 .. 12 [month]. This setpoint adjust that every X month the timer will be activated. **Example:** If you have monthly repetition and you set this setpoint to 2, then every second month from first occurrence of **Timer 1 Function (page 327)**, the **Timer 1 Function (page 327)** will be activated in selected day of month adjusted by **Timer 1 Repeat Day In Month (page 333)** or in selected days of week of month adjusted by **Timer 1 Day (page 332)** and **Timer 1 Repeat Week In Month (page 334)**.
Short Period	Range [units]: [HH:MM]. This setpoint adjust that every X short period the timer will be activated. **Example:** If you have short period repetition and you set this setpoint to 2, then every second minute from first occurrence of **Timer 1 Function (page 327)**, the **Timer 1 Function (page 327)** will be activated.

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Timer 1 Weekends

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Including / Skip / Postpone [-]		
Default value	Including	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 327)**		
Description			

Behavior of **Timer 1 Function (page 327)** on weekends.

Including	**Timer 1 Function (page 327)** counter is running on the weekends and **Timer 1 Function (page 327)** can be active.
Skip	**Timer 1 Function (page 327)** counter is running on the weekends but **Timer 1 Function (page 327)** isn't active.
Postpone	**Timer 1 Function (page 327)** counter isn't running on the weekends and **Timer 1 Function (page 327)** isn't active. If the activation of timer is counted on the weekend, than timer will be activated after weekend. Another activation of timer is counted from original date of first occurrence date.

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Timer 1 Day

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Monday / Tuesday / Wednesday / Thursday / Friday / Saturday/ Sunday[-]		
Default value	All OFF	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 327)**		
Description			

Use this setpoint to include or exclude individual days of week. To select the day use Up and Down buttons. To change the value of day use Enter button.

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Timer 1 Repeat Day

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Repeated Day / Repeated Day In Week [-]		
Default value	Repeated Day	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 327)**		
Description			

Use this setpoint to adjust behavior of monthly repetition of the **Timer 1 Function (page 327)**.

Repeated Day	Chose one day in month when **Timer 1 Function (page 327)** will be activated.
Repeated Day In Week	Chose days in one week when **Timer 1 Function (page 327)** will be activated.

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Timer 1 Repeated Day In Week

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Monday / Tuesday / Wednesday / Thursday / Friday / Saturday/ Sunday[-]		
Default value	All OFF	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 327)**		
Description			

Use this setpoint to select the day of week when timer will be activated.

Note: *More day can be selected. Timer will be activated on the day which happened like the first.*

List of setpoints (page 185)

Timer 1 Repeat Day In Month

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	1..31 [day]		
Default value	0	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 327)**		
Description			

Use this setpoint to chose the day in month when the **Timer 1 Function (page 327)** will be activated.

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Timer 1 Repeat Week In Month

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	1 .. 5 [week]		
Default value	1 week	**Alternative config**	NO
Step	1 week		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 1 Function (page 327)**		
Description			
This setpoint adjust the week of month in which the **Timer 1 Function (page 327)** will be activated.			

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Subgroup: Timer 2

Timer 2 Function

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Disable / No Func / TEST / Test OnLd / MFail Blk / Mode OFF [-]		
Default value	No Func	**Alternative config**	NO
Step	[-]		
Comm object	15359	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

It is possible to choose from following Timer functions. Binary output **EXERCISE TIMER 2 (PAGE 601)** is always activated when Timer is active regardless of chosen timer function. Timer functions require controller running in AUTO mode.

Timer 1 has higher priority over Timer 2. So if **Timer 1 Function (page 327)** is configured for OFF mode and **Timer 2 Function (page 334)** is over the same time configured for AUTO mode, controller will work in OFF mode.

Controller activates timer whenever it is powered up even in period, where timer should be already running.

Disable	The Timer is disabled.
No Func	There is no any other function, only binary output of timer is activated.
TEST	When this option is chosen then the binary output of timer is internally connected to the binary input Remote TEST.
TEST OnLd	When this option is chosen then the binary output of timer is internally connected to the Remote TEST On Load binary input.
MFail Blk	When this option is chosen then the binary output of timer is internally connected to the Mains Fail Block binary input.
Mode OFF	When this option is chosen then the binary output of timer is internally connected to the Remote OFF binary input.

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Timer 2 Setup

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	[-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	10970	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Related setpoints for timer 2 are:

- **Timer 2 Function (page 334)**
- **Timer 2 Repetition (page 335)**
- **Timer 2 First Occur. Date (page 336)**
- **Timer 2 First Occur. Time (page 336)**
- **Timer 2 Duration (page 336)**
- **Timer 2 Repeated (page 337)**
- **Timer 2 Repeat Day (page 340)**
- **Timer 2 Day (page 339)**
- **Timer 2 Repeated Day In Week (page 340)**
- **Timer 2 Repeat Day In Month (page 340)**
- **Timer 2 Repeat Week In Month (page 341)**
- **Timer 2 Refresh Period (page 338)**
- **Timer 2 Weekends (page 339)**

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Timer 2 Repetition

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Off / Once / Repeated [-]		
Default value	Off	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 334)**		
Description			

Defines repetition of **Timer 2 Function (page 334)**.

Off	**Timer 2 Function (page 334)** will not be activated.
Once	**Timer 2 Function (page 334)** will be activated only one time.
Repeated	**Timer 2 Function (page 334)** will be repeatedly activated.

List of setpoints (page 185)

Timer 2 First Occur. Date

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	[DD/MM/YYYY]		
Default value	01/01/2000	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 334)**		
Description			
Date of first occurrence of**Timer 2 Function (page 334)**.			

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Timer 2 First Occur. Time

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	[HH:MM]		
Default value	00:00	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 334)**		
Description			
Time of first occurrence of **Timer 2 Function (page 334)**.			

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Timer 2 Duration

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	[HH:MM]		
Default value	00:00	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 334)**		
Description			
Timer 2 Function (page 334) duration time.			

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Timer 2 Repeated

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Daily / Weekly / Monthly / Short Period [-]		
Default value	Daily	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 334)**		
Description			

Repeated interval of **Timer 2 Function (page 334)**.

Daily	**Timer 2 Function (page 334)** is repeated every day.
Weekly	**Timer 2 Function (page 334)** is repeated every week in chosen days.
Monthly	**Timer 2 Function (page 334)** is repeated in chosen day every month or in chosen days of chosen week of month
Short Period	**Timer 2 Function (page 334)** is repeated in adjusted period.

List of setpoints (page 185)

Timer 2 Refresh Period

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	[-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 334)**		

Description

Refresh period of **Timer 2 Function (page 334)**. Meaning of this setpoint depends on type of repetition adjusted in **Timer 2 Repeated (page 337)**.

Daily

Range [units]: 1 .. 1000 [day]. This setpoint adjust that every X day the timer will be activated.

> **Example:** If you have daily repetition and you set this setpoint to 2, then every second day from first occurrence of **Timer 2 Function (page 334)**, the **Timer 2 Function (page 334)** will be activated.

Weekly

Range [units]: 1 .. 60 [week]. This setpoint adjust that every X week the timer will be activated.

> **Example:** If you have weekly repetition and you set this setpoint to 2, then every second week from first occurrence of **Timer 2 Function (page 334)**, the **Timer 2 Function (page 334)** will be activated in selected days adjusted by **Timer 2 Day (page 339)**.

Monthly

Range [units]: 1 .. 12 [month]. This setpoint adjust that every X month the timer will be activated.

> **Example:** If you have monthly repetition and you set this setpoint to 2, then every second month from first occurrence of **Timer 2 Function (page 334)**, the **Timer 2 Function (page 334)** will be activated in selected day of month adjusted by **Timer 2 Repeat Day In Month (page 340)** or in selected days of week of month adjusted by **Timer 2 Day (page 339)** and **Timer 2 Repeat Week In Month (page 341)**.

Short Period

Range [units]: [HH:MM]. This setpoint adjust that every X short period the timer will be activated.

> **Example:** If you have short period repetition and you set this setpoint to 2, then every second minute from first occurrence of **Timer 2 Function (page 334)**, the **Timer 2 Function (page 334)** will be activated.

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Timer 2 Weekends

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Including / Skip / Postpone [-]		
Default value	Including	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 334)**		
Description			

Behavior of **Timer 2 Function (page 334)** on weekends.

Including	**Timer 2 Function (page 334)** counter is running on the weekends and **Timer 2 Function (page 334)** can be active.
Skip	**Timer 2 Function (page 334)** counter is running on the weekends but **Timer 2 Function (page 334)** isn't active.
Postpone	**Timer 2 Function (page 334)** counter isn't running on the weekends and **Timer 2 Function (page 334)** isn't active. If the activation of timer is counted on the weekend, than timer will be activated after weekend. Another activation of timer is counted from original date of first occurrence date.

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Timer 2 Day

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Monday / Tuesday / Wednesday / Thursday / Friday / Saturday/ Sunday[-]		
Default value	All OFF	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 334)**		
Description			

Use this setpoint to include or exclude individual days of week. To select the day use Up and Down buttons. To change the value of day use Enter button.

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Timer 2 Repeat Day

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Repeated Day / Repeated Day In Week [-]		
Default value	Repeated Day	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 334)**		
Description			

Use this setpoint to adjust behavior of monthly repetition of the **Timer 2 Function (page 334)**.

Repeated Day	Chose one day in month when **Timer 2 Function (page 334)** will be activated.
Repeated Day In Week	Chose days in one week when **Timer 2 Function (page 334)** will be activated.

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Timer 2 Repeated Day In Week

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Monday / Tuesday / Wednesday / Thursday / Friday / Saturday/ Sunday[-]		
Default value	All OFF	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 334)**		
Description			

Use this setpoint to select the day of week when timer will be activated.

Note: *More day can be selected. Timer will be activated on the day which happened like the first.*

List of setpoints (page 185)

Timer 2 Repeat Day In Month

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	1..31 [day]		
Default value	0	**Alternative config**	NO
Step	[-]		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 334)**		
Description			

Use this setpoint to chose the day in month when the **Timer 2 Function (page 334)** will be activated.

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Timer 2 Repeat Week In Month

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	1 .. 5 [week]		
Default value	1 week	**Alternative config**	NO
Step	1 week		
Comm object	0	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Timer 2 Function (page 334)**		
Description			
This setpoint adjust the week of month in which the **Timer 2 Function (page 334)** will be activated.			

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Subgroup: Rental Timers

Rental Timer 1

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Disabled / 1 .. 8 760 [h]		
Default value	Disabled	**Alternative config**	NO
Step	1 h		
Comm object	14326	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

Another engine start is not allowed when this timer elapsed. This timer is based on engine running hours. The alarm **Rental Timer 1 Elapsed (page 691)** will be recorded in alarm list and the binary output **AL RENTAL TIMER 1 (PAGE 580)** will close.

> **IMPORTANT: To reset Rental Timer 1 (page 341) we have to set up Rental Timer 1 (page 341) again. It means go to setpoint group Scheduler and to the setpoint Rental Timer 1 (page 341). Then press enter button ↵, change the value if it is necessary and press enter button ↵ again.**

When the **Rental Timer 1 (page 341)** elapsed during engine run the gen-set will not stop immediately. The adjustable **Rental Timer BOC (page 345)**timer will start in this moment. The engine will be cooled and stopped when the **Rental Timer BOC (page 345)** time elapsed.

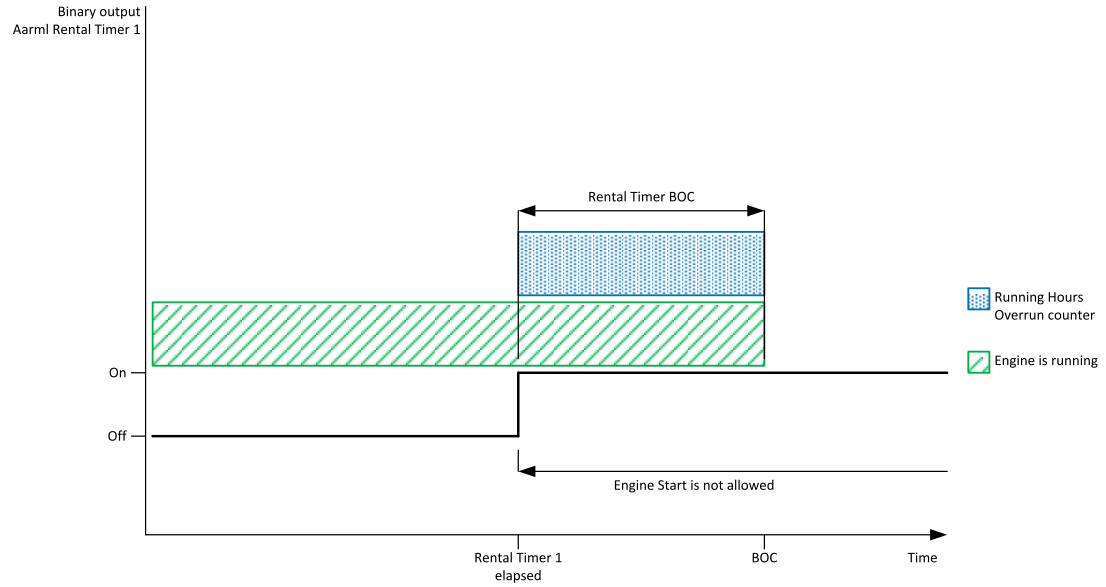


Image 8.65 Rental Timer 1

The Running Hours Overrun counter will start increment when the engine is continue running after the **Rental Timer 1 (page 341)** elapsed.

> ***Note:*** *There is no priority between Rental Timer 1 and Rental Timer 2. The sooner timer will activated the **Rental Timer BOC (page 345)** protection.*

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Rental Timer 1 Wrn

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Disabled / 1.. **Rental Timer 1 (page 341)** [h]		
Default value	Disabled	**Alternative config**	NO
Step	1 h		
Comm object	14332	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Rental Timer 1 (page 341)**		
Description			

Alarm **Wrn Rental Timer 1 (page 701)** comes up after xx running hours from adjusting the **Rental Timer 1 (page 341)**. Hours are adjusted by this setpoint.

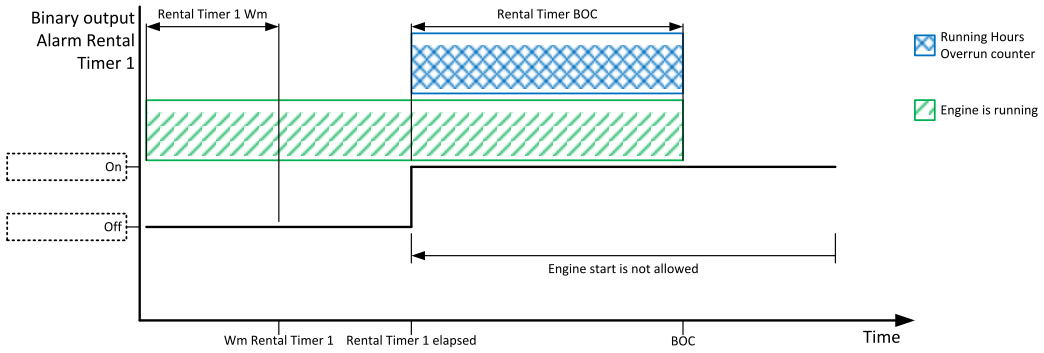


Image 8.66 Rental Timer 1 Wrn

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Rental Timer 2

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	[DD/MM/YYYY]		
Default value	01/01/2015	**Alternative config**	NO
Step	1 day		
Comm object	14367	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

Another engine start is not allowed when this timer elapsed. This timer is based on date. At the midnight of the last day the alarm **Rental Timer 2 Elapsed (page 691)** will be recorded in alarm list and the binary output **AL RENTAL TIMER 2 (PAGE 581)** will close.

> **IMPORTANT: To reset Rental Timer 2 (page 343) we have to set up Rental Timer 2 (page 343) again. It means go to setpoint group Scheduler and to the setpoint Rental Timer 2 (page 343). Then press enter button ↵, change the value if it is necessary and press enter button ↵ again.**

> **IMPORTANT: To disable Rental Timer 2 (page 343) set date to 01/01/2015.**

When the **Rental Timer 2 (page 343)** elapsed during engine run the gen-set will not stop immediately. The adjustable **Rental Timer BOC (page 345)** timer will start in this moment. The engine will be cooled and stopped when the **Rental Timer BOC (page 345)** time elapsed.

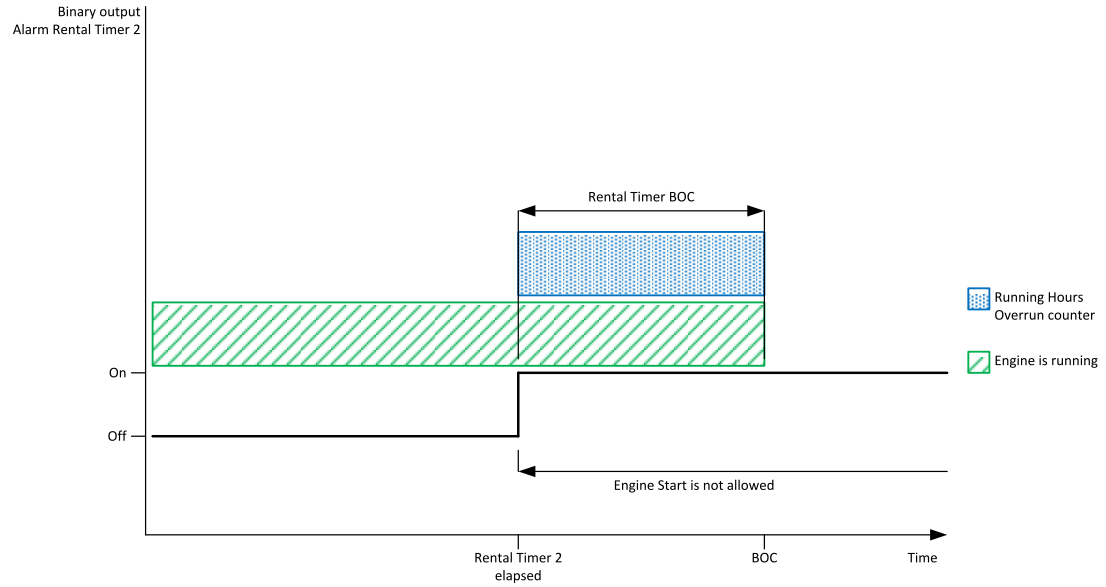


Image 8.67 Rental Timer 2

The Running Hours Overrun counter will start increment when the engine is continue running after the **Rental Timer 2 (page 343)** elapsed.

Note: *There is no priority between Rental Timer 1 and Rental Timer 2. The sooner timer will activated the* ***Rental Timer BOC (page 345)*** *protection.*

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Rental Timer 2 Wrn

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Disabled / 01/01/2015 .. **Rental Timer 2 (page 343)** [DD/MM/YYYY]		
Default value	01/01/2015	**Alternative config**	NO
Step	1 day		
Comm object	14368	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Rental Timer 2 (page 343)**		
Description			

Alarm **Wrn Rental Timer 2 (page 701)** comes up xx days before the **Rental Timer 2 (page 343)**. Days are adjusted by this setpoint.

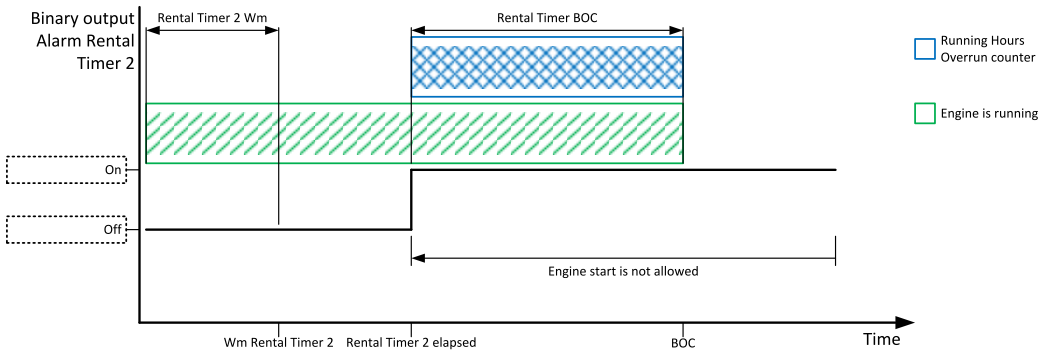


Image 8.68 Rental Timer 2 Wrn

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Rental Timer BOC

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Disabled / 1 .. 210 [h]		
Default value	24 h	**Alternative config**	NO
Step	1 h		
Comm object	14334	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoints **Rental Timer 1 (page 341)** and **Rental Timer 2 (page 343)**		
Description			

This timer will start after **Rental Timer 1 (page 341)** or **Rental Timer 2 (page 343)** elapsed in case that the engine is still running. When this timer elapsed the engine is cooled and stopped.

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Group: Geo-Fencing

Home Latitude

Setpoint group	Geo-Fencing	**Related FW**	1.9.0
Range [units]	-90,0000..90,0000 [°]		
Default value	0,0000 °	**Alternative config**	NO
Step	0,0001 °		
Comm object	14606	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint adjust latitude of "home" position. Home is position where gen-set should runs. Positions on north hemisphere have positive value, position on south hemisphere have negative value.

Note: *This value with* ***Home Longitude (page 346)*** *are used for counting* ***Fence Radius 1 (page 347)*** *and* ***Fence Radius 2 (page 347)****.*

Note: *This value can be also obtained automatically via logical binary input* ***GEO HOME POSITION (PAGE 556)****. In case of activation of this binary input for at least 2 seconds, setpoint will be adjusted automatically from actual coordinates from GPS signal.*

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Home Longitude

Setpoint group	Geo-Fencing	**Related FW**	1.9.0
Range [units]	-180,0000..180,0000 [°]		
Default value	0,0000 °	**Alternative config**	NO
Step	0,0001 °		
Comm object	14607	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint adjust longitude of "home" position. Home is position where gen-set should runs. Positions on east hemisphere have positive value, position on west hemisphere have negative value.

Note: *This value with* ***Home Latitude (page 346)*** *are used for counting* ***Fence Radius 1 (page 347)*** *and* ***Fence Radius 2 (page 347)****.*

Note: *This value can be also obtained automatically via logical binary input* ***GEO HOME POSITION (PAGE 556)****. In case of activation of this binary input for at least 2 seconds, setpoint will be adjusted automatically from actual coordinates from GPS signal.*

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Fence Radius 1

Setpoint group	Geo-Fencing	**Related FW**	1.9.0
Range [units]	0,0..99,9 [km]		
Default value	0,0 km	**Alternative config**	NO
Step	0,1 km		
Comm object	11677	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Radius for circle area 1. When the gen-set leaves this area, **Fence 1 Protection (page 349)** is activated after **Fence 1 Delay (page 347)**. ***Note:*** *The center of this circle area is defined by "Home" position - setpoints* ***Home Longitude (page 346)*** *and* ***Home Latitude (page 346)****.*			

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Fence Radius 2

Setpoint group	Geo-Fencing	**Related FW**	1.9.0
Range [units]	0,0..99,9 [km]		
Default value	0,0 km	**Alternative config**	NO
Step	0,1 km		
Comm object	14608	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Radius for circle area 2. When the gen-set leaves this area, **Fence 2 Protection (page 350)** is activated after **Fence 2 Delay (page 348)**. ***Note:*** *The center of this circle area is defined by "Home" position - setpoints* ***Home Longitude (page 346)*** *and* ***Home Latitude (page 346)****.*			

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Fence 1 Delay

Setpoint group	Geo-Fencing	**Related FW**	1.9.0
Range [units]	0..3600 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	11682	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Delay for **Fence 1 Protection (page 349)**.			

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Fence 2 Delay

Setpoint group	Geo-Fencing	**Related FW**	1.9.0
Range [units]	0..3600 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	14609	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Delay for **Fence 2 Protection (page 350)**.			

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Geo-Fencing

Setpoint group	Geo-Fencing	**Related FW**	1.9.0
Range [units]	Disabled / Enabled / LBI Enable [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	11681	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint enables or disables geo-fencing function.

Disabled	**Fence 1 Protection (page 349)** and **Fence 2 Protection (page 350)** are disabled.
Enabled	**Fence 1 Protection (page 349)** and **Fence 2 Protection (page 350)** are enabled.
LBI Enable	**Fence 1 Protection (page 349)** and **Fence 2 Protection (page 350)** are enabled only when logical binary input .**GEO-FENCING ENABLED (PAGE 557)** is active.

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Fence 1 Protection

Setpoint group	Geo-Fencing	**Related FW**	1.9.0
Range [units]	HistRecOnl / Wrn / Sd / BOC[-]		
Default value	HistRecOnl	**Alternative config**	NO
Step	[-]		
Comm object	14610	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

Protection type for geo-fencing 1 protection. Fence of circle area is adjusted by setpoint **Fence Radius 1 (page 347)**. Delay for protection is adjusted by setpoint **Fence 1 Delay (page 347)**.

Protection types

HistRecOnl	Position of gen-set is only measured and displayed on the LCD screen but not used for protection. History record is made if position is out of **Fence Radius 1 (page 347)**.
Wrn	Position of gen-set is used for warning protection only. Protection is activated when position of the gen-set is out of **Fence Radius 1 (page 347)**.
Sd	Position of gen-set is used for shutdown protection. Protection is activated when position of the gen-set is out of **Fence Radius 1 (page 347)**.
BOC	Position of gen-set is used for BOC (Breaker Open and Cooling) protection. Protection is activated when position of the gen-set is out of **Fence Radius 1 (page 347)**.

Note: *Protection is activated also when GPS signal is lost for **Fence 1 Delay (page 347)**.*

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Fence 2 Protection

Setpoint group	Geo-Fencing	**Related FW**	1.9.0
Range [units]	HistRecOnl / Wrn / Sd / BOC[-]		
Default value	HistRecOnl	**Alternative config**	NO
Step	[-]		
Comm object	14611	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

Protection type for geo-fencing 2 protection. Fence of circle area is adjusted by setpoint **Fence Radius 2 (page 347)**. Delay for protection is adjusted by setpoint **Fence 2 Delay (page 348)**.

Protection types

HistRecOnl	Position of gen-set is only measured and displayed on the LCD screen but not used for protection. History record is made if position is out of **Fence Radius 2 (page 347)**.
Wrn	Position of gen-set is used for warning protection only. Protection is activated when position of the gen-set is out of **Fence Radius 2 (page 347)**.
Sd	Position of gen-set is used for shutdown protection. Protection is activated when position of the gen-set is out of **Fence Radius 2 (page 347)**.
BOC	Position of gen-set is used for BOC (Breaker Open and Cooling) protection. Protection is activated when position of the gen-set is out of **Fence Radius 2 (page 347)**.

Note: *Protection is activated also when GPS signal is lost for **Fence 2 Delay (page 348)**.*

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Group: Plug-In Modules

Slot A

Setpoint group	Plug-In Modules	**Related FW**	1.9.0
Range [units]	ENABLED / DISABLED [-]		
Default value	ENABLED	**Alternative config**	NO
Step	[-]		
Comm object	24280	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

This setpoint enable or disable module in slot A.

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Slot B

Setpoint group	Plug-In Modules	**Related FW**	1.9.0
Range [units]	ENABLED / DISABLED [-]		
Default value	ENABLED	**Alternative config**	NO
Step	[-]		
Comm object	24279	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint enable or disable module in slot B.			

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Group: CU AIN Calibration

Subgroup: Analog Input 1

CU AIN1 Calibration

Setpoint group	CU AIN Calibration	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	0 (number of decimal is given by sensor curve)	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	8431	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Calibrating constant to adjust the measured value of controller analog inputs. Physical dimension of calibrating constant is corresponding to Analog input. ***Note:*** *Unit is adjusted via InteliConfig in configuration of analog input 1.*			

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Subgroup: Analog Input 2

CU AIN2 Calibration

Setpoint group	CU AIN Calibration	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	0 (number of decimal is given by sensor curve)	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	8407	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Calibrating constant to adjust the measured value of controller analog inputs. Physical dimension of calibrating constant is corresponding to Analog input. ***Note:*** *Unit is adjusted via InteliConfig in configuration of analog input 2.*			

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Subgroup: Analog Input 3

CU AIN3 Calibration

Setpoint group	CU AIN Calibration	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	0 (number of decimal is given by sensor curve)	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	8467	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Calibrating constant to adjust the measured value of controller analog inputs. Physical dimension of calibrating constant is corresponding to Analog input. ***Note:*** *Unit is adjusted via InteliConfig in configuration of analog input 3.*			

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Subgroup: Analog Input 4

CU AIN4 Calibration

Setpoint group	CU AIN Calibration	**Related FW**	1.9.0
Range [units]	the range is defined by analog sensor curve		
Default value	0 (number of decimal is given by sensor curve)	**Alternative config**	NO
Step	the step is defined by analog sensor curve		
Comm object	8793	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Calibrating constant to adjust the measured value of controller analog inputs. Physical dimension of calibrating constant is corresponding to Analog input.

Note: *Unit is adjusted via InteliConfig in configuration of analog input 4.*

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Group: Alternate Config

Subgroup: Basic settings

Connection Type 1

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	Mono Phase / SplPhL1L2 / SplPhL1L3 / 3Ph3Wire / 3Ph4Wire / High Leg D / Autodetect [-]		
Default value	3Ph4Wire	**Alternative config**	YES
Step	[-]		
Comm object	12058	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Connection type:

Mono Phase	Single phase voltage measurement L1-N 1x CT (Current Transformer)
SplitPhase	Double Delta connection Split Phase Two phase voltage measurement L1,L2 with 180° phase shift 2x CT (Current Transformer)
SplPhL1L2	Double Delta connection Split Phase Two phase voltage measurement L1,L2 with 180° phase shift

	2x CT (Current Transformer)
SplPhL1L3	Double Delta connection Split Phase Two phase voltage measurement L1,L3 with 180° phase shift 2x CT (Current Transformer)
3Ph4Wire	Grounded Star (Grounded Wye) connection – 3PY Three phase voltage measurement L1,L2,L3 with 120° phase shift 3x CT (Current Transformer)
3Ph3Wire	Ungrounded Delta connection Open Delta Ungrounded Wye Corner-Grounded Delta Split Phase Delta Three phase voltage measurement L1,L2,L3 with 120° phase shift No neutral is available 3x CT (Current Transformer)
High Leg D	High Leg Delta connection Three phase voltage measurement L1,L2,L3 3x CT (Current Transformer)
Autodetect	High Leg Delta L1 >=100V; L1 <=140V L2 >=140V L3 >=100V; L3 <=140V or 3PH3Wire or 3Ph4Wire L1 >=100V L2 >=100V L3 >=100V or SplPhL1L2 L1 >=100V L2 >=100V L3 <= 20V or SplPhL1L3 L1 >=100V L2 <= 20V L3 >=100V or Mono Phase L1 >=100V L2 <= 20V L3 <= 20V or ***Voltage Autodetect*** shutdown

Note: *This value is used when binary input* ***ALTERNATE CONFIG 2 (PAGE 525)*** *is active.*

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Nominal Current 1

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	1 .. 10 000 [A]		
Default value	350 A	**Alternative config**	YES
Step	1 A		
Comm object	12049	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

It is current limit for generator current protections and means maximal continuous generator current. Nominal Current can be different from generator rated current value.

Note: *This value is used when any other alternate configuration is not active.*

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Nominal Frequency 1

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	45 .. 65 [Hz]		
Default value	50 Hz	**Alternative config**	YES
Step	1 Hz		
Comm object	9913	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Nominal system frequency (usually 50 or 60 Hz).

Note: *This value is used when any other alternate configuration is not active.*

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Nominal RPM 1

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	100 .. 4000 [RPM]		
Default value	1 500 RPM	**Alternative config**	YES
Step	1 RPM		
Comm object	9915	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

Nominal engine speed (RPM - revolutions per minute).

Note: *This value is used when any other alternate configuration is not active.*

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Nominal Voltage Ph-N 1

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	80 .. 20000 [V]		
Default value	231 V	**Alternative config**	YES
Step	1 V		
Comm object	12052	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection Type 1 (page 353)**.		
Description			
Nominal system voltage (phase to neutral). ***Note:*** *This value is used when any other alternate configuration is not active.*			

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Nominal Voltage Ph-Ph 1

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	80 .. 40000 [V]		
Default value	400 V	**Alternative config**	YES
Step	1 V		
Comm object	12055	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection Type 1 (page 353)**.		
Description			
Nominal system voltage (phase to phase). ***Note:*** *This value is used when any other alternate configuration is not active.*			

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Nominal Power 1

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	1 .. 5 000 [kW]		
Default value	200 kW	**Alternative config**	Yes
Step	1 kW		
Comm object	12046	**Related applications**	AMF, MRS,
Config level	Standard		
Setpoint visibility	Always		
Description			

Nominal power of the gen-set. Generator **Overload BOC (page 242)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 193)** is adjusted to Monophase or Splitphase or 3Ph3Wire or High Leg D or 3Ph4Wire or when Autodetect detects connection type as 3Ph3Wire or High Leg D or 3Ph4Wire.*

Note: *This value is used when any other alternate configuration is not active.*

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Nominal Power Split Phase 1

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	1 .. 5 000 [kW]		
Default value	200 kW	**Alternative config**	Yes
Step	1 kW		
Comm object	15771	**Related applications**	AMF, MRS,
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 193)**		
Description			

Nominal power of the gen-set for detected split-phase or mono phase connection. Generator **Overload BOC (page 242)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 193)** is adjusted to Autodetect and Autodetect detects connection type as Monophase or Splitphase.*

Note: *This value is used when any other alternate configuration is not active.*

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Connection type 2

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	Mono Phase / SplPhL1L2 / SplPhL1L3 / 3Ph3Wire / 3Ph4Wire / High Leg D / Autodetect [-]		
Default value	3Ph4Wire	**Alternative config**	YES
Step	[-]		
Comm object	12059	**Related applications**	AMF, MRS
Config level	Standard		

Setpoint visibility	Always
Description	

Connection type:

Mono Phase	Single phase voltage measurement L1-N 1x CT (Current Transformer)	
SplitPhase	Double Delta connection Split Phase Two phase voltage measurement L1,L2 with 180° phase shift 2x CT (Current Transformer)	
SplPhL1L2	Double Delta connection Split Phase Two phase voltage measurement L1,L2 with 180° phase shift 2x CT (Current Transformer)	
SplPhL1L3	Double Delta connection Split Phase Two phase voltage measurement L1,L3 with 180° phase shift 2x CT (Current Transformer)	
3Ph4Wire	Grounded Star (Grounded Wye) connection – 3PY Three phase voltage measurement L1,L2,L3 with 120° phase shift 3x CT (Current Transformer)	
3Ph3Wire	Ungrounded Delta connection Open Delta Ungrounded Wye Corner-Grounded Delta Split Phase Delta Three phase voltage measurement L1,L2,L3 with 120° phase shift No neutral is available 3x CT (Current Transformer)	
High Leg D	High Leg Delta connection Three phase voltage measurement L1,L2,L3 3x CT (Current Transformer)	
Autodetect	High Leg Delta	L1 >=100V; L1 <=140V L2 >=140V L3 >=100V; L3 <=140V
	or	
	3PH3Wire or 3Ph4Wire	L1 >=100V L2 >=100V L3 >=100V
	or	
	SplPhL1L2	L1 >=100V

	or	L2 >=100V L3 <= 20V
	SplPhL1L3	L1 >=100V L2 <= 20V L3 >=100V
	or	
	Mono Phase	L1 >=100V L2 <= 20V L3 <= 20V
	or	
	Voltage Autodetect shutdown	

Note: *This value is used when binary input* ***ALTERNATE CONFIG 2*** *(PAGE 525) is active.*

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Nominal Current 2

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	1 .. 10000 [A]		
Default value	350 A	**Alternative config**	YES
Step	1 A		
Comm object	12050	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

It is current limit for generator current protections and means maximal continuous generator current. Nominal Current can be different from generator rated current value.

Note: *This value is used when binary input* ***ALTERNATE CONFIG 2*** *(PAGE 525) is active.*

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Nominal Frequency 2

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	45 .. 65 [Hz]		
Default value	50 Hz	**Alternative config**	YES
Step	1 Hz		
Comm object	9914	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Nominal system frequency (usually 50 or 60 Hz).

Note: *This value is used when binary input* ***ALTERNATE CONFIG 2*** *(PAGE 525) is active.*

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Nominal RPM 2

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	100 .. 4000 [RPM]		
Default value	1 500 RPM	**Alternative config**	YES
Step	1 RPM		
Comm object	9916	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
Nominal engine speed (RPM - revolutions per minute). ***Note:*** *This value is used when binary input* ***ALTERNATE CONFIG 2 (PAGE 525)*** *is active.*			

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Nominal Voltage Ph-N 2

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	80 .. 20000 [V]		
Default value	231 V	**Alternative config**	YES
Step	1 V		
Comm object	12053	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type 2 (page 357)**.		
Description			
Nominal system voltage (phase to neutral). ***Note:*** *This value is used when binary input* ***ALTERNATE CONFIG 2 (PAGE 525)*** *is active.*			

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Nominal Voltage Ph-Ph 2

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	80 .. 40000 [V]		
Default value	400 V	**Alternative config**	YES
Step	1 V		
Comm object	12056	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type 2 (page 357)**.		
Description			
Nominal system voltage (phase to phase). ***Note:*** *This value is used when binary input* ***ALTERNATE CONFIG 2 (PAGE 525)*** *is active.*			

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Nominal Power 2

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	1 .. 5 000 [kW]		
Default value	200 kW	**Alternative config**	Yes
Step	1 kW		
Comm object	12047	**Related applications**	AMF, MRS,
Config level	Standard		
Setpoint visibility	Always		
Description			

Nominal power of the gen-set. Generator **Overload BOC (page 242)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 193)** is adjusted to Monophase or Splitphase or 3Ph3Wire or High Leg D or 3Ph4Wire or when Autodetect detects connection type as 3Ph3Wire or High Leg D or 3Ph4Wire.*

Note: *This value is used when binary input **ALTERNATE CONFIG 2 (PAGE 525)** is active.*

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Nominal Power Split Phase 2

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	1 .. 5 000 [kW]		
Default value	200 kW	**Alternative config**	Yes
Step	1 kW		
Comm object	15772	**Related applications**	AMF, MRS,
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 193)**		
Description			

Nominal power of the gen-set for detected split-phase or mono phase connection. Generator **Overload BOC (page 242)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 193)** is adjusted to Autodetect and Autodetect detects connection type as Monophase or Splitphase.*

Note: *This value is used when binary input **ALTERNATE CONFIG 2 (PAGE 525)** is active.*

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Connection type 3

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	Mono Phase / SplPhL1L2 / SplPhL1L3 / 3Ph3Wire / 3Ph4Wire / High Leg D / Autodetect [-]		
Default value	3Ph4Wire	**Alternative config**	YES
Step	[-]		
Comm object	12060	**Related applications**	AMF, MRS
Config level	Standard		

Setpoint visibility	Always
Description	

Connection type:

Mono Phase	Single phase voltage measurement L1-N 1x CT (Current Transformer)	
SplitPhase	Double Delta connection Split Phase Two phase voltage measurement L1,L2 with 180° phase shift 2x CT (Current Transformer)	
SplPhL1L2	Double Delta connection Split Phase Two phase voltage measurement L1,L2 with 180° phase shift 2x CT (Current Transformer)	
SplPhL1L3	Double Delta connection Split Phase Two phase voltage measurement L1,L3 with 180° phase shift 2x CT (Current Transformer)	
3Ph4Wire	Grounded Star (Grounded Wye) connection – 3PY Three phase voltage measurement L1,L2,L3 with 120° phase shift 3x CT (Current Transformer)	
3Ph3Wire	Ungrounded Delta connection Open Delta Ungrounded Wye Corner-Grounded Delta Split Phase Delta Three phase voltage measurement L1,L2,L3 with 120° phase shift No neutral is available 3x CT (Current Transformer)	
High Leg D	High Leg Delta connection Three phase voltage measurement L1,L2,L3 3x CT (Current Transformer)	
Autodetect	High Leg Delta or 3PH3Wire or 3Ph4Wire or SplPhL1L2	L1 >=100V; L1 <=140V L2 >=140V L3 >=100V; L3 <=140V L1 >=100V L2 >=100V L3 >=100V L1 >=100V

	or	L2 >=100V L3 <= 20V
	SplPhL1L3	L1 >=100V L2 <= 20V L3 >=100V
	or	
	Mono Phase	L1 >=100V L2 <= 20V L3 <= 20V
	or	
	Voltage Autodetect shutdown	

Note: *This value is used when binary input* ***ALTERNATE CONFIG 3*** *(PAGE 525) is active.*

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Nominal Current 3

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	1 .. 10 000 [A]		
Default value	350 A	**Alternative config**	YES
Step	1 A		
Comm object	12051	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

It is current limit for generator current protections and means maximal continuous generator current. Nominal Current can be different from generator rated current value.

Note: *This value is used when binary input* ***ALTERNATE CONFIG 3*** *(PAGE 525) is active.*

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Nominal Frequency 3

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	45 .. 65 [Hz]		
Default value	50 Hz	**Alternative config**	YES
Step	1 Hz		
Comm object	15197	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Nominal system frequency (usually 50 or 60 Hz).

Note: *This value is used when binary input* ***ALTERNATE CONFIG 3*** *(PAGE 525) is active.*

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Nominal RPM 3

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	100 .. 4 000 [RPM]		
Default value	1 500 RPM	**Alternative config**	YES
Step	1 RPM		
Comm object	15196	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
Nominal engine speed (RPM - revolutions per minute). ***Note:*** *This value is used when binary input* ***ALTERNATE CONFIG 3 (PAGE 525)*** *is active.*			

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Nominal Voltage Ph-N 3

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	80 .. 20 000 [V]		
Default value	231 V	**Alternative config**	YES
Step	1 V		
Comm object	12054	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type 3 (page 361)**.		
Description			
Nominal system voltage (phase to neutral). ***Note:*** *This value is used when binary input* ***ALTERNATE CONFIG 3 (PAGE 525)*** *is active.*			

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Nominal Voltage Ph-Ph 3

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	80 .. 40 000 [V]		
Default value	400 V	**Alternative config**	YES
Step	1 V		
Comm object	12057	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type 3 (page 361)**.		
Description			
Nominal system voltage (phase to phase). ***Note:*** *This value is used when binary input* ***ALTERNATE CONFIG 3 (PAGE 525)*** *is active.*			

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Nominal Power 3

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	1 .. 5 000 [kW]		
Default value	200 kW	**Alternative config**	Yes
Step	1 kW		
Comm object	12048	**Related applications**	AMF, MRS,
Config level	Standard		
Setpoint visibility	Always		
Description			

Nominal power of the gen-set. Generator **Overload BOC (page 242)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 193)** is adjusted to Monophase or Splitphase or 3Ph3Wire or High Leg D or 3Ph4Wire or when Autodetect detects connection type as 3Ph3Wire or High Leg D or 3Ph4Wire.*

Note: *This value is used when binary input **ALTERNATE CONFIG 3 (PAGE 525)** is active.*

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Nominal Power Split Phase 3

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	1 .. 5 000 [kW]		
Default value	200 kW	**Alternative config**	Yes
Step	1 kW		
Comm object	15773	**Related applications**	AMF, MRS,
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 193)**		
Description			

Nominal power of the gen-set for detected split-phase or mono phase connection. Generator **Overload BOC (page 242)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 193)** is adjusted to Autodetect and Autodetect detects connection type as Monophase or Splitphase.*

Note: *This value is used when binary input **ALTERNATE CONFIG 3 (PAGE 525)** is active.*

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Subgroup: Engine settings

ECU Speed Adjustment 1

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 100 [%]		
Default value	50 %	**Alternative config**	NO
Step	1 %		
Comm object	14337	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Visible only if ECU is configured		
Description			
Enables to adjust engine speed in ECU via CAN bus. Nominal speed corresponds to 50%. This setpoint should be used only for Volvo Penta and Scania engines. It has no effect on other engine brands. ***Note:*** *This value is used when any other alternate configuration is not active.*			

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ECU Speed Adjustment 2

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 100 [%]		
Default value	50 %	**Alternative config**	NO
Step	1 %		
Comm object	14338	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Visible only if ECU is configured		
Description			
Enables to adjust engine speed in ECU via CAN bus. Nominal speed corresponds to 50%. This setpoint should be used only for Volvo Penta and Scania engines. It has no effect on other engine brands. ***Note:*** *This value is used when binary input* ***ALTERNATE CONFIG 2 (PAGE 525)*** *is active.*			

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ECU Speed Adjustment 3

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. 100 [%]		
Default value	50 %	**Alternative config**	NO
Step	1 %		
Comm object	15199	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Visible only if ECU is configured		
Description			

Enables to adjust engine speed in ECU via CAN bus. Nominal speed corresponds to 50%. This setpoint should be used only for Volvo Penta and Scania engines. It has no effect on other engine brands.

Note: *This value is used when binary input* ***ALTERNATE CONFIG 3*** *(****PAGE 525****) is active.*

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Group: CM-RS232-485

COM1 Mode

Setpoint group	CM-RS232-485	**Related FW**	1.9.0
Range [units]	Direct / MODBUS / DualSlave / Dual Master [-]		
Default value	Direct	**Alternative config**	NO
Step	[-]		
Comm object	24522	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

Communication protocol switch for the COM1 channel.

Direct	InteliConfig communication protocol via serial cable.
MODBUS	MODBUS protocol.
DualSlave	Dual operation protocol - slave function
DualMaster	Dual operation protocol - master function

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COM1 Communication Speed

Setpoint group	CM-RS232-485	**Related FW**	1.9.0
Range [units]	9600 / 19200 / 38400 / 57600 / 115200[bps]		
Default value	57600 bps	**Alternative config**	NO
Step	[-]		
Comm object	24341	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **COM1 Mode (page 367)**		
Description			
If the direct mode is selected on COM1 channel, the direct communication speed of controller part of line can be adjusted here. Speed of second part of line has to be adjusted to the same value. ***Note:*** *Winscope supports only 19200, 38400, 57600 speeds.*			

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COM1 MODBUS Communication Speed

Setpoint group	CM-RS232-485	**Related FW**	1.9.0
Range [units]	9600 / 19200 / 38400 / 57600 / 115200 [bps]		
Default value	9600 bps	**Alternative config**	NO
Step	[-]		
Comm object	24477	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **COM1 Mode (page 367)**		
Description			
If the MODBUS mode is selected on COM1 channel, the MODBUS communication speed can be adjusted here.			

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COM2 Mode

Setpoint group	CM-RS232-485	**Related FW**	1.9.0
Range [units]	Direct / MODBUS / DualSlave / Dual Master [-]		
Default value	Direct	**Alternative config**	NO
Step	[-]		
Comm object	24451	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

Communication protocol switch for the COM2 channel.

Direct	InteliConfig communication protocol via serial cable.
MODBUS	MODBUS protocol.
DualSlave	Dual operation protocol - slave function
DualMaster	Dual operation protocol - master function

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COM2 Communication Speed

Setpoint group	CM-RS232-485	**Related FW**	1.9.0
Range [units]	9600 / 19200 / 38400 / 57600 / 115200[bps]		
Default value	57600 bps	**Alternative config**	NO
Step	[-]		
Comm object	24340	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **COM2 Mode (page 369)**		
Description			

If the direct mode is selected on COM2 channel, the direct communication speed of controller part of line can be adjusted here. Speed of second part of line has to be adjusted to the same value.

Note: *Winscope supports only 19200, 38400, 57600 speeds.*

List of setpoints (page 185)

COM2 MODBUS Communication Speed

Setpoint group	CM-RS232-485	**Related FW**	1.9.0
Range [units]	9600 / 19200 / 38400 / 57600 / 115200 [bps]		
Default value	9600 bps	**Alternative config**	NO
Step	[-]		
Comm object	24420	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **COM2 Mode (page 369)**		
Description			
If the MODBUS mode is selected on COM2 channel, the MODBUS communication speed can be adjusted here.			

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Group: CM-GPRS

Internet Connection

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	Email+SMS / SMS Only [-]		
Default value	Email+SMS	**Alternative config**	NO
Step	[-]		
Comm object	24315	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint adjust the communication mode of module.

Email+SMS	Controller is connected to the Internet and is able to send e-mails as well as SMS. The controller is also accessible via AirGate. Internet-enabled SIM card must be used. Also **APN Name (page 384)** has to be adjusted.
SMS Only	Only SMS are sent. Internet-enabled SIM card is not required.

> **IMPORTANT: When this setpoint is changed the controller has to be restarted to apply changes.**

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APN Name

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24363	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)**		
Description			
APN (Access Point Name) of the GPRS/4G network, provided by GSM operator.			

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APN User Name

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..15 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24361	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)**		
Description			
User name for the GPRS/4G Access Point if authentication is required. But mostly it is not required and should be left blank.			

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APN User Password

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..15 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24360	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)**		
Description			
User password for the GPRS/4G Access Point if authentication is required. But mostly it is not required and should be left blank.			

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Email Address 1

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24298	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

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Email Address 2

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24297	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

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Email Address 3

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24145	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

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Email Address 4

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24144	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

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Message Language

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	[-]		
Default value	English	**Alternative config**	NO
Step	[-]		
Comm object	24299	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Use this setpoint to set the language of SMS and e-mail. ***Note:*** *Numbers correspond with languages in language list. See the chapter for* ***Language selection (page 92)*** *more information.* This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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SMTP User Name

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24313	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)**		
Description			
Use this setpoint to enter the username for the SMTP server. Leave the setpoint blank if the SMTP server does not require authentication.			

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SMTP User Password

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..15 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24312	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)**		
Description			
Use this setpoint to enter the password for the SMTP server. Leave the setpoint blank if the SMTP server does not require authentication.			

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SMTP Server Address

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	airgate.comap.cz:9925	**Alternative config**	NO
Step	[-]		
Comm object	24311	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)**		
Description			

This setpoint is used for entering the domain name (e.g. smtp.yourprovider.com) or IP address (e.g. 74.125.39.109) or number of port (with colon like a first mark) of the SMTP server. Ask your internet provider or IT manager for this information.

> ***Note:*** *You may use also any public SMTP server which does not require connection over SSL/TLS channels. If the device is connected to AirGate the AirGate SMTP server at "airgate.comap.cz" may be used. Ports 25 and 9925 are supported. After controller connects to AirGate for the first time (or with new public IP address), it may not be able to send emails for first 5-10 minutes.*

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SMTP Sender Address

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24310	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS module)		
Description			

Enter an existing email address into this setpoint. This address will be used as sender address in active e-mails that will be sent from the controller.

> ***Note:*** *It is not needed to enter an existing email address, nevertheless valid email format needs to be followed.*

> **IMPORTANT: This item is obligatory when emails are configured.**

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Time Zone

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	GMT-12:00 .. GMT+13:00 [hours]		
Default value	GMT+1:00 hour	**Alternative config**	NO
Step	[-]		
Comm object	24366	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint is used to select the time zone where the controller is located. See your computer time zone setting (click on the time indicator located in the rightmost position of the Windows task bar) if you are not sure about your time zone.

Note: *If the time zone is not selected properly the active e-mails may contain incorrect information about sending time, which may result in confusion when the respective problem actually occurred.*

Note: *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*

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Event Message

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	10926	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint enables or disables Event Messages.

This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.

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Wrn Message

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	8482	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Wrn Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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BOC Message

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	10566	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables BOC Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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Sd Messages

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	8484	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Sd Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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Telephone Number 1

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24296	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Enter in this setpoint either a valid GSM phone number where the alarm messages shall be sent. For GSM numbers use either the national format (i.e. the number you would dial if you wanted to make a local call) or the full international format beginning with a “+” character followed by the country prefix. **IMPORTANT: Telephone number has to be entered without spaces.**			

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Telephone Number 2

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24295	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Enter in this setpoint either a valid GSM phone number where the alarm messages shall be sent. For GSM numbers use either the national format (i.e. the number you would dial if you wanted to make a local call) or the full international format beginning with a “+” character followed by the country prefix. **IMPORTANT: Telephone number has to be entered without spaces.**			

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Telephone Number 3

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24143	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Enter in this setpoint either a valid GSM phone number where the alarm messages shall be sent. For GSM numbers use either the national format (i.e. the number you would dial if you wanted to make a local call) or the full international format beginning with a “+” character followed by the country prefix. **IMPORTANT: Telephone number has to be entered without spaces.**			

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Telephone Number 4

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24142	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Enter in this setpoint either a valid GSM phone number where the alarm messages shall be sent. For GSM numbers use either the national format (i.e. the number you would dial if you wanted to make a local call) or the full international format beginning with a “+” character followed by the country prefix. **IMPORTANT: Telephone number has to be entered without spaces.**			

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DNS IP Address

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	Valid IP address [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24314	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)**		
Description			
The setpoint is used to adjust the domain name server (DNS), which is needed to translate domain names in email addresses and server names into correct IP addresses.			

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AirGate Connection

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	DISABLED / ENABLED [-]		
Default value	ENABLED	**Alternative config**	NO
Step	[-]		
Comm object	24273	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)**		
Description			

This setpoint enable or disable AirGate connection via CM-GPRS or via CM-4G-GPS.

DISABLED:	Only SMS are sent. Internet-enabled SIM card is not required. AirGate is not used.
ENABLED	This mode uses the “AirGate” service. Internet-enabled SIM card must be used. The AirGate server address is adjusted by the setpoint **AirGate Address (page 408)**.

> **IMPORTANT: When this setpoint is changed the controller has to be restarted to apply changes.**

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AirGate Address

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	[-]		
Default value	airgate.comap.cz	**Alternative config**	NO
Step	[-]		
Comm object	24364	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS module)		
Description			
This setpoint is used for entering the domain name or IP address of the AirGate server. Use the free AirGate server provided by ComAp at airgate.comap.cz. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

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ComAp TCP Port

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	0 .. 65 535[-]		
Default value	23	**Alternative config**	NO
Step	[-]		
Comm object	24374	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS module)		
Description			
This setpoint is used to adjust the port number, which is used for Ethernet connection to a PC with any of ComAp PC program (i.e. InteliConfig). This setpoint should be adjusted to 23, which is the default port used by all ComAp PC programs. A different value should be used only in special situations as e.g. sharing one public IP address among many controllers or to overcome a firewall restrictions. **IMPORTANT: If AirGate is used, this setpoint has to be adjusted to 23.** ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

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Group: CM-4G-GPS

Internet Connection

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	Email+SMS / SMS Only [-]		
Default value	Email+SMS	**Alternative config**	NO
Step	[-]		
Comm object	24315	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint adjust the communication mode of module.

Email+SMS	Controller is connected to the Internet and is able to send e-mails as well as SMS. The controller is also accessible via AirGate. Internet-enabled SIM card must be used. Also **APN Name (page 384)** has to be adjusted.
SMS Only	Only SMS are sent. Internet-enabled SIM card is not required.

> **IMPORTANT: When this setpoint is changed the controller has to be restarted to apply changes.**

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Required Connection Type

Setpoint group	CM-4G-GPS	**Related FW**	1.9.0
Range [units]	2G/3G/4G/Automatic [-]		
Default value	Automatic	**Alternative config**	NO
Step	[-]		
Comm object	24132	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint adjusts preferred connection type of CM-4G-GPS module.

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APN Name

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24363	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)**		
Description			
APN (Access Point Name) of the GPRS/4G network, provided by GSM operator.			

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APN User Name

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..15 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24361	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)**		
Description			
User name for the GPRS/4G Access Point if authentication is required. But mostly it is not required and should be left blank.			

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APN User Password

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..15 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24360	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)**		
Description			
User password for the GPRS/4G Access Point if authentication is required. But mostly it is not required and should be left blank.			

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Email Address 1

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24298	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

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Email Address 2

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24297	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

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Email Address 3

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24145	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

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Email Address 4

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24144	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

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Message Language

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	[-]		
Default value	English	**Alternative config**	NO
Step	[-]		
Comm object	24299	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Use this setpoint to set the language of SMS and e-mail. ***Note:*** *Numbers correspond with languages in language list. See the chapter for* ***Language selection (page 92)*** *more information.* This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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SMTP User Name

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24313	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)**		
Description			
Use this setpoint to enter the username for the SMTP server. Leave the setpoint blank if the SMTP server does not require authentication.			

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SMTP User Password

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..15 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24312	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)**		
Description			
Use this setpoint to enter the password for the SMTP server. Leave the setpoint blank if the SMTP server does not require authentication.			

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SMTP Server Address

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	airgate.comap.cz:9925	**Alternative config**	NO
Step	[-]		
Comm object	24311	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)**		
Description			

This setpoint is used for entering the domain name (e.g. smtp.yourprovider.com) or IP address (e.g. 74.125.39.109) or number of port (with colon like a first mark) of the SMTP server. Ask your internet provider or IT manager for this information.

> ***Note:*** *You may use also any public SMTP server which does not require connection over SSL/TLS channels. If the device is connected to AirGate the AirGate SMTP server at "airgate.comap.cz" may be used. Ports 25 and 9925 are supported. After controller connects to AirGate for the first time (or with new public IP address), it may not be able to send emails for first 5-10 minutes.*

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SMTP Sender Address

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24310	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS module)		
Description			

Enter an existing email address into this setpoint. This address will be used as sender address in active e-mails that will be sent from the controller.

> ***Note:*** *It is not needed to enter an existing email address, nevertheless valid email format needs to be followed.*

> **IMPORTANT: This item is obligatory when emails are configured.**

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Time Zone

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	GMT-12:00 .. GMT+13:00 [hours]		
Default value	GMT+1:00 hour	**Alternative config**	NO
Step	[-]		
Comm object	24366	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint is used to select the time zone where the controller is located. See your computer time zone setting (click on the time indicator located in the rightmost position of the Windows task bar) if you are not sure about your time zone. ***Note:*** *If the time zone is not selected properly the active e-mails may contain incorrect information about sending time, which may result in confusion when the respective problem actually occurred.* ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

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Event Message

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	10926	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Event Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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Wrn Message

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	8482	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Wrn Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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BOC Message

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	10566	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables BOC Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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Sd Messages

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	8484	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Sd Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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Telephone Number 1

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24296	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Enter in this setpoint either a valid GSM phone number where the alarm messages shall be sent. For GSM numbers use either the national format (i.e. the number you would dial if you wanted to make a local call) or the full international format beginning with a “+” character followed by the country prefix. **IMPORTANT: Telephone number has to be entered without spaces.**			

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Telephone Number 2

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24295	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Enter in this setpoint either a valid GSM phone number where the alarm messages shall be sent. For GSM numbers use either the national format (i.e. the number you would dial if you wanted to make a local call) or the full international format beginning with a “+” character followed by the country prefix. **IMPORTANT: Telephone number has to be entered without spaces.**			

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Telephone Number 3

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24143	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Enter in this setpoint either a valid GSM phone number where the alarm messages shall be sent. For GSM numbers use either the national format (i.e. the number you would dial if you wanted to make a local call) or the full international format beginning with a “+” character followed by the country prefix. **IMPORTANT: Telephone number has to be entered without spaces.**			

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Telephone Number 4

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24142	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Enter in this setpoint either a valid GSM phone number where the alarm messages shall be sent. For GSM numbers use either the national format (i.e. the number you would dial if you wanted to make a local call) or the full international format beginning with a “+” character followed by the country prefix. **IMPORTANT: Telephone number has to be entered without spaces.**			

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AirGate Connection

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.9.0
Range [units]	DISABLED / ENABLED [-]		
Default value	ENABLED	**Alternative config**	NO
Step	[-]		
Comm object	24273	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)**		
Description			

This setpoint enable or disable AirGate connection via CM-GPRS or via CM-4G-GPS.

DISABLED:	Only SMS are sent. Internet-enabled SIM card is not required. AirGate is not used.
ENABLED	This mode uses the “AirGate” service. Internet-enabled SIM card must be used. The AirGate server address is adjusted by the setpoint **AirGate Address (page 408)**.

> **IMPORTANT: When this setpoint is changed the controller has to be restarted to apply changes.**

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AirGate Address

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	[-]		
Default value	airgate.comap.cz	**Alternative config**	NO
Step	[-]		
Comm object	24364	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS module)		
Description			

This setpoint is used for entering the domain name or IP address of the AirGate server. Use the free AirGate server provided by ComAp at airgate.comap.cz.

> ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*

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ComAp TCP Port

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	0 .. 65 535[-]		
Default value	23	**Alternative config**	NO
Step	[-]		
Comm object	24374	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS module)		
Description			

This setpoint is used to adjust the port number, which is used for Ethernet connection to a PC with any of ComAp PC program (i.e. InteliConfig). This setpoint should be adjusted to 23, which is the default port used by all ComAp PC programs. A different value should be used only in special situations as e.g. sharing one public IP address among many controllers or to overcome a firewall restrictions.

> **IMPORTANT: If AirGate is used, this setpoint has to be adjusted to 23.**

Note: *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*

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Group: CM-Ethernet

Email Address 1

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24298	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS and CM-4G-GPS modules)		
Description			

Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send.

Note: *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*

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Email Address 2

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24297	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

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Email Address 3

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24145	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

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Email Address 4

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	0..63 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24144	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS and CM-4G-GPS modules)		
Description			
Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent. Leave this setpoint blank if alarm and event email should not be send. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

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Message Language

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	[-]		
Default value	English	**Alternative config**	NO
Step	[-]		
Comm object	24299	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Use this setpoint to set the language of SMS and e-mail. ***Note:*** *Numbers correspond with languages in language list. See the chapter for* ***Language selection (page 92)*** *more information.* This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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Time Zone

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	GMT-12:00 .. GMT+13:00 [hours]		
Default value	GMT+1:00 hour	**Alternative config**	NO
Step	[-]		
Comm object	24366	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint is used to select the time zone where the controller is located. See your computer time zone setting (click on the time indicator located in the rightmost position of the Windows task bar) if you are not sure about your time zone. ***Note:*** *If the time zone is not selected properly the active e-mails may contain incorrect information about sending time, which may result in confusion when the respective problem actually occurred.* ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

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Event Message

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	10926	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Event Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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Wrn Message

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	8482	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Wrn Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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BOC Message

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	10566	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables BOC Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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Sd Messages

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	8484	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Sd Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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SMTP UserName

Setpoint group	CM-Ethernet	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24370	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Use this setpoint to enter the username for the SMTP server. Leave the setpoint blank if the SMTP server does not require authentication.			

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SMTP User Password

Setpoint group	CM-Ethernet	**Related FW**	1.9.0
Range [units]	0..15 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24369	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Use this setpoint to enter the password for the SMTP server. Leave the setpoint blank if the SMTP server does not require authentication.			

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SMTP Server Address

Setpoint group	CM-Ethernet	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	airgate.comap.cz:9925	**Alternative config**	NO
Step	[-]		
Comm object	24368	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint is used for entering the domain name (e.g. smtp.yourprovider.com) or IP address (e.g. 74.125.39.109) or number of port (with colon like a first mark) of the SMTP server. Ask your internet provider or IT manager for this information.

> ***Note:*** *You may use also any public SMTP server which does not require connection over SSL/TLS channels. If the device is connected to AirGate the AirGate SMTP server at "airgate.comap.cz" may be used. Ports 25 and 9925 are supported. After controller connects to AirGate for the first time (or with new public IP address), it may not be able to send emails for first 5-10 minutes.*

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SMTP Sender Address

Setpoint group	CM-Ethernet	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24367	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

Enter an existing email address into this setpoint. This address will be used as sender address in active e-mails that will be sent from the controller.

> ***Note:*** *It is not needed to enter an existing email address, nevertheless valid email format needs to be followed.*

> **IMPORTANT: This item is obligatory when emails are configured.**

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IP Address Mode

Setpoint group	CM-Ethernet	**Related FW**	1.9.0
Range [units]	FIXED / AUTOMATIC [-]		
Default value	AUTOMATIC	**Alternative config**	NO
Step	[-]		
Comm object	24259	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

The setpoint is used to select the method how the ethernet connection is adjusted.

DISABLED: The Ethernet connection is fixed by means of the setpoints IP Addr, NetMask, GateIP, DNS IP Address.

This method should be used for a classic Ethernet or internet connection. When this type of connection opens, the controller is specified by its IP address. This means that it would be inconvenient if the IP address were not fixed (static).

ENABLED: The Ethernet connection setting is obtained **automatically from the DHCP server**. The obtained settings are then copied to the related setpoints. If the process of obtaining the settings from the DHCP server is not successful, the value *000.000.000.000* is copied to the setpoint IP address and the module continues to try to obtain the settings.

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IP Address

Setpoint group	CM-Ethernet	**Related FW**	1.9.0
Range [units]	Valid IP address [-]		
Default value	192.168.1.254	**Alternative config**	NO
Step	[-]		
Comm object	24376	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **IP Address Mode (page 402)**		
Description			

The setpoint is used to set the address when you are in static mode.

If **IP Address Mode (page 402)** is FIXED this setpoint is used to adjust the IP address of the ethernet interface of the controller. Ask your IT specialist for help with this setting.

If **IP Address Mode (page 402)** is AUTOMATIC this setpoint is inactive. The IP address is assigned by the DHCP server.

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Subnet Mask

Setpoint group	CM-Ethernet	**Related FW**	1.9.0
Range [units]	Valid IP address [-]		
Default value	255.255.255.0	**Alternative config**	NO
Step	[-]		
Comm object	24375	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **IP Address Mode (page 402)**		
Description			
The setpoint is used to select the method how the Subnet Mask is adjusted. If **IP Address Mode (page 402)** is FIXED this setpoint is used to adjust the Subnet Mask. Ask your IT specialist for help with this setting. If **IP Address Mode (page 402)** is AUTOMATIC this setpoint is inactive. The Subnet Mask is assigned by the DHCP server.			

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Gateway IP

Setpoint group	CM-Ethernet	**Related FW**	1.9.0
Range [units]	Valid IP address [-]		
Default value	192.168.1.1	**Alternative config**	NO
Step	[-]		
Comm object	24373	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **IP Address Mode (page 402)**		
Description			
The setpoint is used to select the method how the Gateway IP is adjusted. If **IP Address Mode (page 402)** is DISABLE this setpoint is used to adjust the IP address of the gateway of the network segment where the controller is connected. If **IP Address Mode (page 402)** is ENABLED this setpoint is used to display the gateway IP address which has been assigned by the DHCP server. A gateway is a device which connects the respective segment with the other segments and/or Internet.			

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DNS IP Address 1

Setpoint group	CM-Ethernet	**Related FW**	1.9.0
Range [units]	Valid IP address [-]		
Default value	8.8.8.8	**Alternative config**	NO
Step	[-]		
Comm object	24362	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
The setpoint is used to select the method how the DNS Address 1 is adjusted. If **IP Address Mode (page 402)** is FIXED this setpoint is used to adjust the domain name server (DNS), which is needed to translate domain names in email addresses and server names into correct IP addresses. If **IP Address Mode (page 402)** is AUTOMATIC this setpoint is inactive. The DNS server IP address is assigned by the DHCP server.			

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DNS IP Address 2

Setpoint group	CM-Ethernet	**Related FW**	1.9.0
Range [units]	Valid IP address [-]		
Default value	8.8.8.8	**Alternative config**	NO
Step	[-]		
Comm object	24331	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
The setpoint is used to select the method how the DNS Address 2 is adjusted. If **IP Address Mode (page 402)** is FIXED this setpoint is used to adjust the domain name server (DNS), which is needed to translate domain names in email addresses and server names into correct IP addresses. If **IP Address Mode (page 402)** is AUTOMATIC this setpoint is inactive. The DNS server IP address is assigned by the DHCP server.			

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MODBUS Server

Setpoint group	CM-Ethernet	**Related FW**	1.9.0
Range [units]	DISABLED / ENABLED [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	24337	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Enable or disable MODBUS communication via ethernet interface.			

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SNMP Agent

Setpoint group	CM-Ethernet	**Related FW**	1.9.0
Range [units]	DISABLED / ENABLED [-]		
Default value	DISABLED	**Alternative config**	NO
Step	[-]		
Comm object	24336	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Enable or disable SNMP v1 Agent.			

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SNMP RD Community String

Setpoint group	CM-Ethernet	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	public	**Alternative config**	NO
Step	[-]		
Comm object	24335	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **SNMP Agent (page 405)**		
Description			
SNMP Community String only for reading.			

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SNMP WR Community String

Setpoint group	CM-Ethernet	**Related FW**	1.9.0
Range [units]	0..31 characters [-]		
Default value	private	**Alternative config**	NO
Step	[-]		
Comm object	24334	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **SNMP Agent (page 405)**		
Description			
SNMP Community String for writing and reading.			

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SNMP Trap Format

Setpoint group	CM-Ethernet	**Related FW**	1.9.0
Range [units]	SNMPv1 Trap / SNMPv2 Not / SNMPv2 Inf [-]		
Default value	SNMP v1 Trap	**Alternative config**	NO
Step	[-]		
Comm object	24136	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint adjusts type of SNMP traps.			

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SNMP Traps IP Address 1

Setpoint group	CM-Ethernet	**Related FW**	1.9.0
Range [units]	Valid IP address [-]		
Default value	DISABLED	**Alternative config**	NO
Step	[-]		
Comm object	24294	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
IP address 1 for receiving SNMP Traps. Leave this setpoint blank if SNMP traps should not be send.			

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SNMP Traps IP Address 2

Setpoint group	CM-Ethernet	**Related FW**	1.9.0
Range [units]	Valid IP address [-]		
Default value	DISABLED	**Alternative config**	NO
Step	[-]		
Comm object	24293	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
IP address 2 for receiving SNMP Traps. Leave this setpoint blank if SNMP traps should not be send.			

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AirGate Connection

Setpoint group	CM-Ethernet	**Related FW**	1.9.0
Range [units]	DISABLED / ENABLED [-]		
Default value	ENABLED	**Alternative config**	NO
Step	[-]		
Comm object	24365	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint selects the Ethernet connection mode.

DISABLED:	This is a standard mode in which the controller listens to the incoming traffic and answers the TCP/IP queries addressed to it. This mode requires the controller to be accessible from the remote device (PC), i.e. it must be accessible at a public and static IP address if you want to connect to it from the internet.
ENABLED	This mode enables the AirGate service. The AirGate server address is adjusted by the setpoint **AirGate Address (page 408)**. Also the standard TCP/IP is enabled.

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AirGate Address

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	[-]		
Default value	airgate.comap.cz	**Alternative config**	NO
Step	[-]		
Comm object	24364	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS module)		
Description			
This setpoint is used for entering the domain name or IP address of the AirGate server. Use the free AirGate server provided by ComAp at airgate.comap.cz. ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

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ComAp TCP Port

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.9.0
Range [units]	0 .. 65 535[-]		
Default value	23	**Alternative config**	NO
Step	[-]		
Comm object	24374	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **Internet Connection (page 383)** (CM-GPRS module)		
Description			
This setpoint is used to adjust the port number, which is used for Ethernet connection to a PC with any of ComAp PC program (i.e. InteliConfig). This setpoint should be adjusted to 23, which is the default port used by all ComAp PC programs. A different value should be used only in special situations as e.g. sharing one public IP address among many controllers or to overcome a firewall restrictions. **IMPORTANT: If AirGate is used, this setpoint has to be adjusted to 23.** ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*			

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Web Interface

Setpoint group	CM-Ethernet	**Related FW**	1.9.0
Range [units]	Disabled / Enabled [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	24110	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed + conditioned by the setpoint **IP Address Mode (page 402)**		
Description			
The setpoint is used to enable/disable WebServer function.			

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Group: EM-BIO8-EFCP

Earth Fault Current Protection

Setpoint group	EM-BIO8-EFCP	**Related FW**	1.9.0
Range [units]	DISABLED / ENABLED [-]		
Default value	ENABLED	**Alternative config**	NO
Step	[-]		
Comm object	11631	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint can block or allow Earth fault Current protection.

DISABLED	Earth fault current protection is blocked.
ENABLED	Earth fault current protection is allowed. Behavior of Earth fault current protection is set by these setpoints: **Earth Fault CT Input Range (page 410)**, **Earth Fault CT Ratio (page 410)**, **Earth Fault Delay (page 410)** and **Earth Fault Sd (page 411)**.

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Earth Fault Delay

Setpoint group	EM-BIO8-EFCP	**Related FW**	1.9.0
Range [units]	0,03 .. 5,00 [s]		
Default value	0,10 s	**Alternative config**	NO
Step	0,01 s		
Comm object	11633	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Delay for Earth Fault Current protection.			

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Earth Fault CT Input Range

Setpoint group	EM-BIO8-EFCP	**Related FW**	1.9.0
Range [units]	1 [A] / 5 [A]		
Default value	5 A	**Alternative config**	NO
Step	[-]		
Comm object	14340	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
There are 2 physical inputs for **Earth Fault Current Protection (page 409)**. Value of this setpoint has to be set on value of physical input which is presently in use.			

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Earth Fault CT Ratio

Setpoint group	EM-BIO8-EFCP	**Related FW**	1.9.0
Range [units]	1 .. 2000 [1/(1or5)A]		
Default value	500 1/(1or5)A	**Alternative config**	NO
Step	1A/1A; 1A/5A		
Comm object	14339	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Earth Fault current transformer ratio. ***Note:*** *Type of units depends on setpoint* ***Earth Fault CT Input Range (page 410)*** *which have to be set before this setpoint.*			

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Earth Fault Sd

Setpoint group	EM-BIO8-EFCP	**Related FW**	1.9.0
Range [units]	0,03 .. 5,00 [A]		
Default value	0,30 A	**Alternative config**	NO
Step	0,01 [A]		
Comm object	11632	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Limit value for Earth Fault Current protection.			

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Group: PLC

PLC Setpoint 1

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10440	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

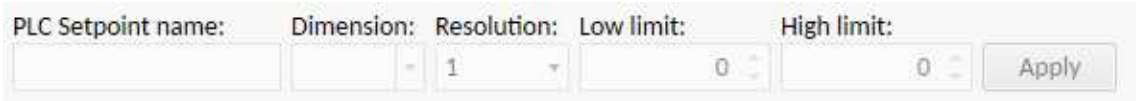


Image 8.69 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 2

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10441	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

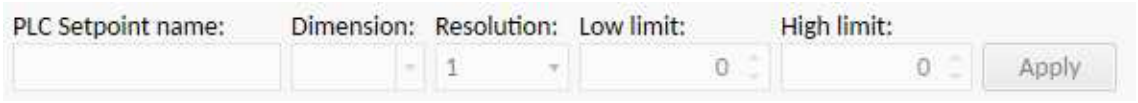


Image 8.70 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 3

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10442	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

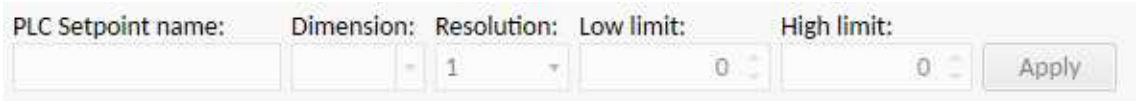


Image 8.71 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 4

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10443	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

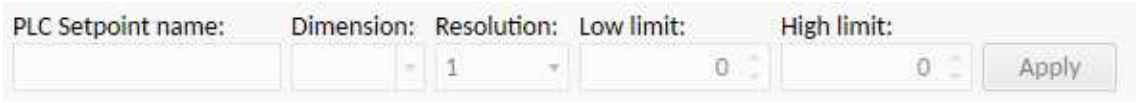


Image 8.72 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 5

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10444	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

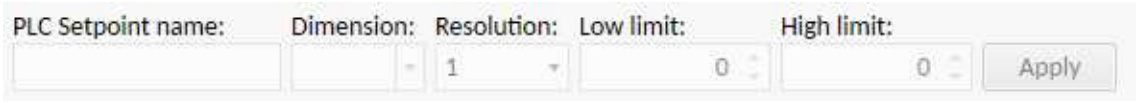


Image 8.73 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 6

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10445	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

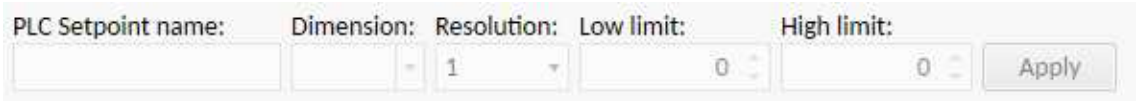


Image 8.74 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 7

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10446	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

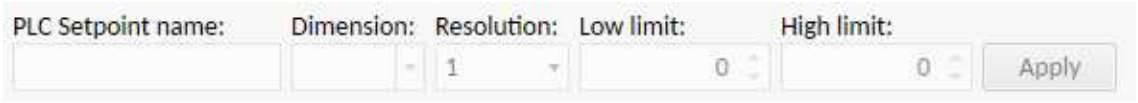


Image 8.75 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 8

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10447	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

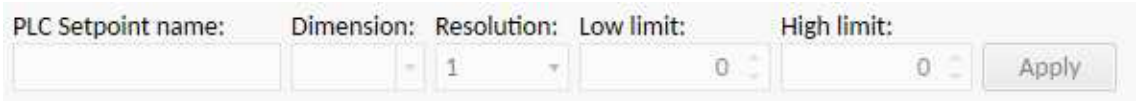


Image 8.76 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 9

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10448	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

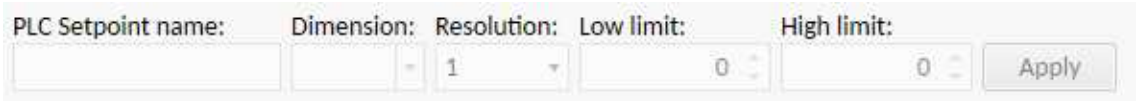


Image 8.77 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 10

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10449	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

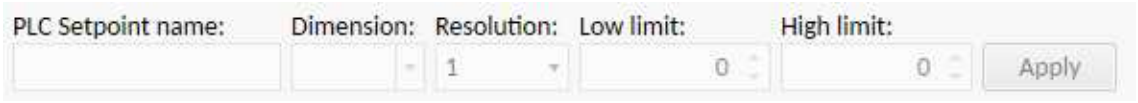


Image 8.78 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 11

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10450	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

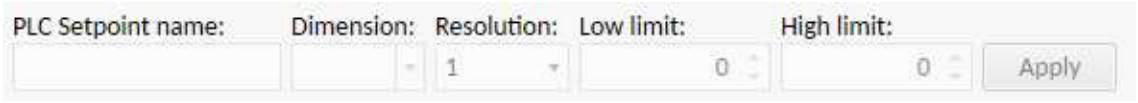


Image 8.79 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 12

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10451	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

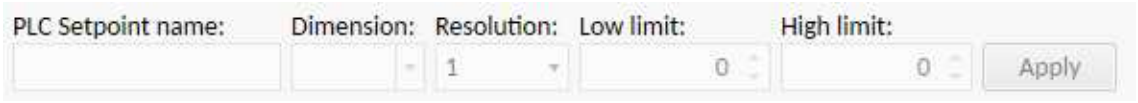


Image 8.80 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 13

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10452	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

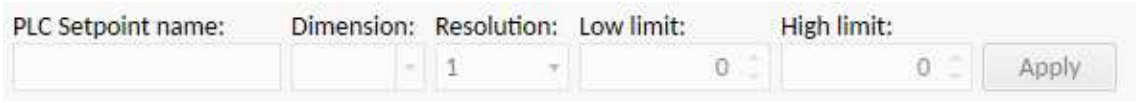


Image 8.81 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 14

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10453	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

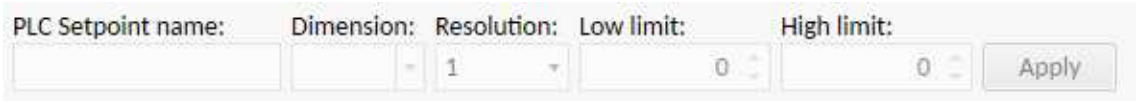


Image 8.82 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 15

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10454	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

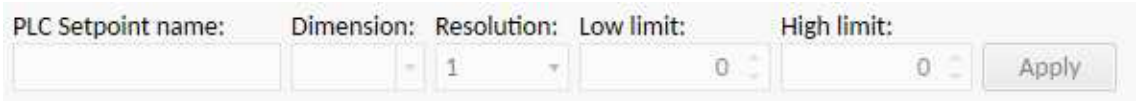


Image 8.83 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 16

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10455	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

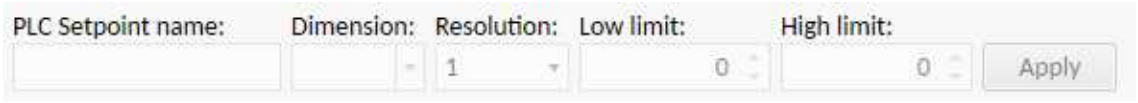


Image 8.84 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 17

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10456	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

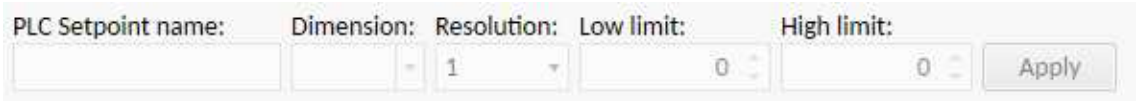


Image 8.85 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 18

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10457	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

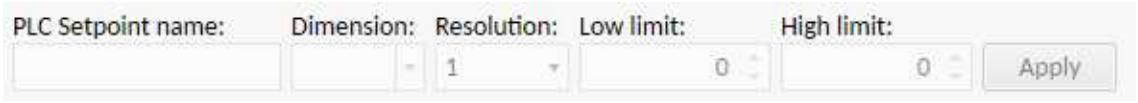


Image 8.86 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 19

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10458	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

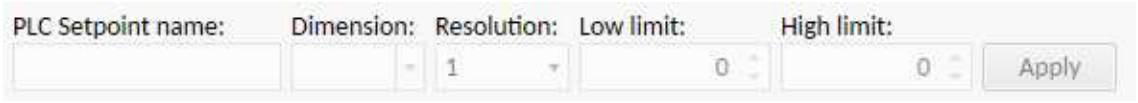


Image 8.87 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 20

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10459	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

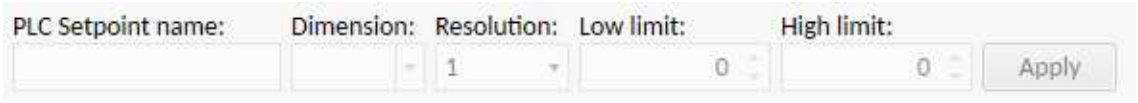


Image 8.88 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 21

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10460	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

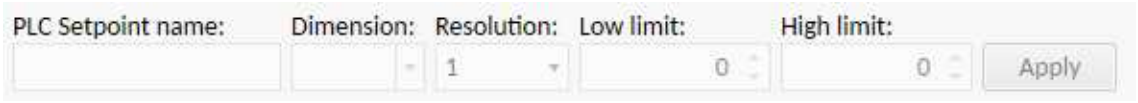


Image 8.89 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 22

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10461	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

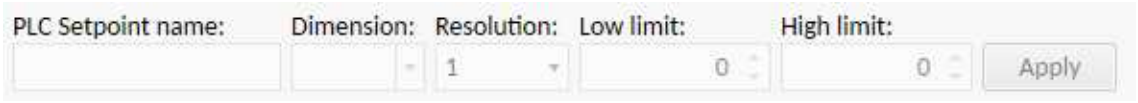


Image 8.90 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 23

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10462	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

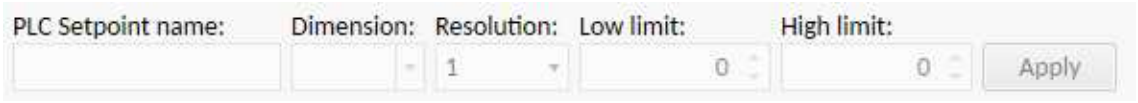


Image 8.91 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 24

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10463	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

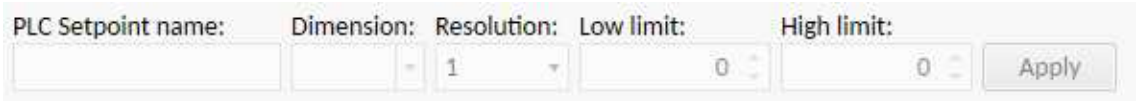


Image 8.92 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 25

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10464	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

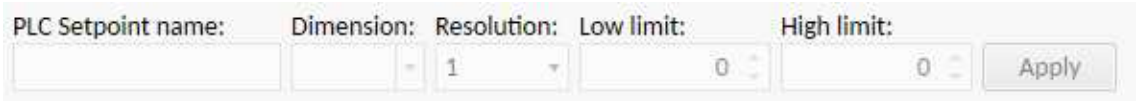


Image 8.93 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 26

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10465	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

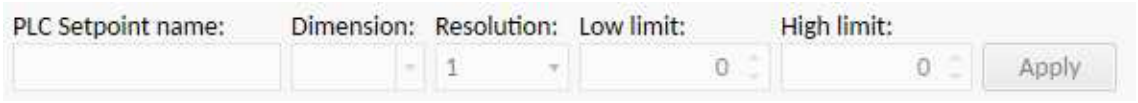


Image 8.94 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 27

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10466	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

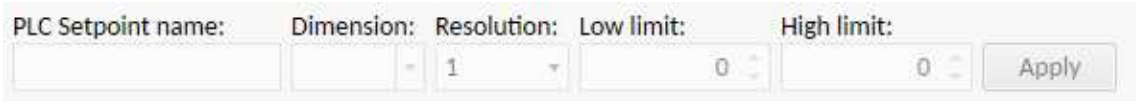


Image 8.95 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 28

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10467	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

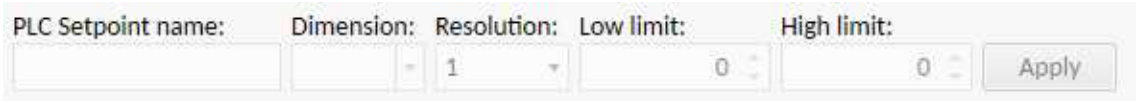


Image 8.96 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 29

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10468	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

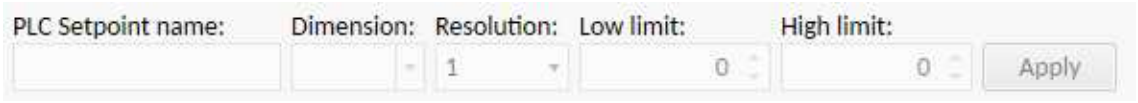


Image 8.97 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 30

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10469	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

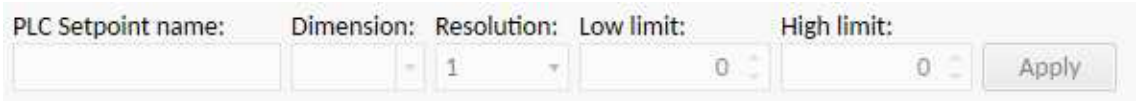


Image 8.98 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 31

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10470	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

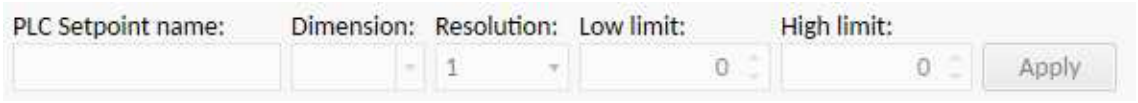


Image 8.99 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 32

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10471	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

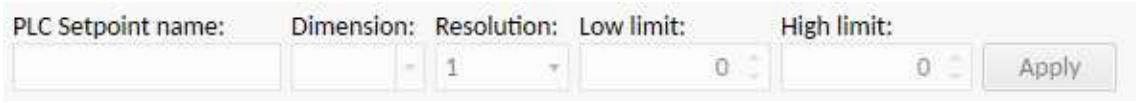


Image 8.100 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 33

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10472	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

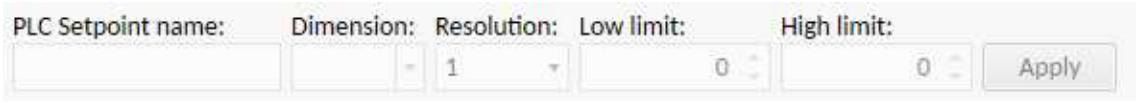


Image 8.101 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 34

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10473	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

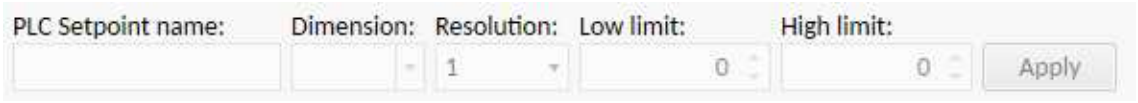


Image 8.102 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 35

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10474	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

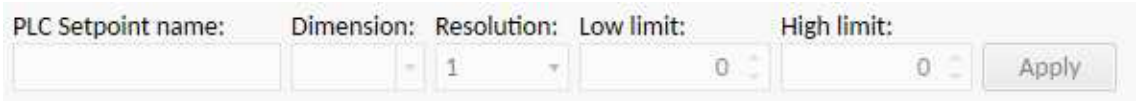


Image 8.103 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 36

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10475	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

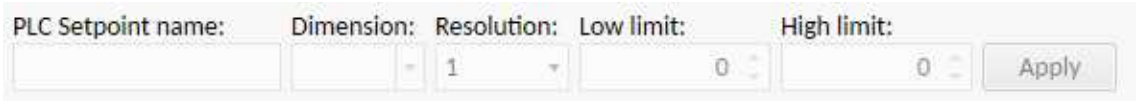


Image 8.104 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 37

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10476	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

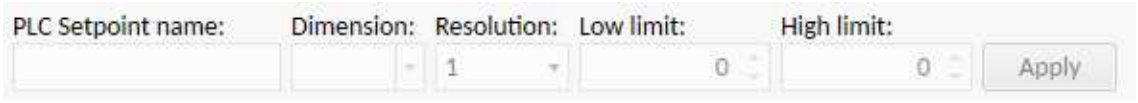


Image 8.105 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 38

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10477	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

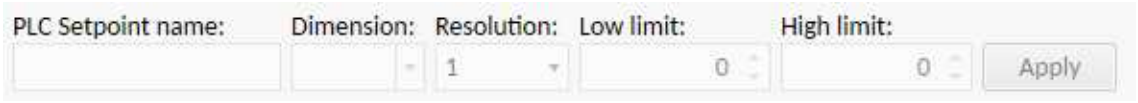


Image 8.106 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 39

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10478	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

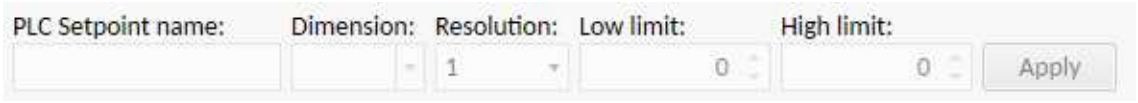


Image 8.107 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 40

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10479	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

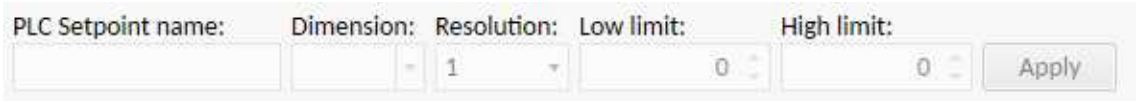


Image 8.108 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 41

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10480	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

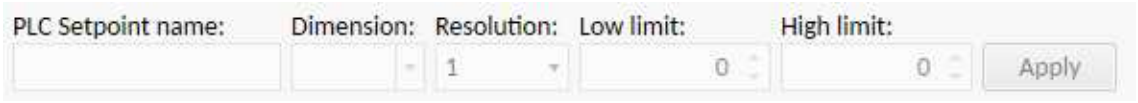


Image 8.109 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 42

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10481	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

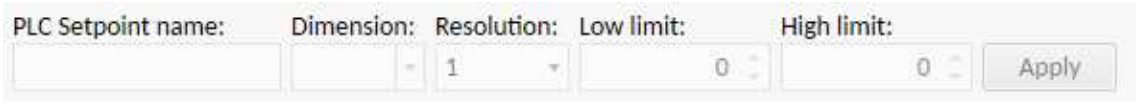


Image 8.110 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 43

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10482	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

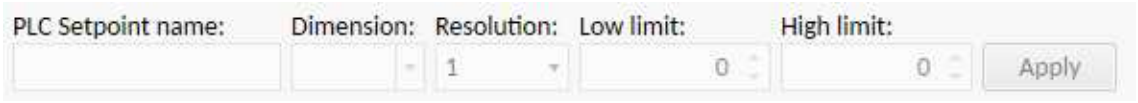


Image 8.111 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 44

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10483	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

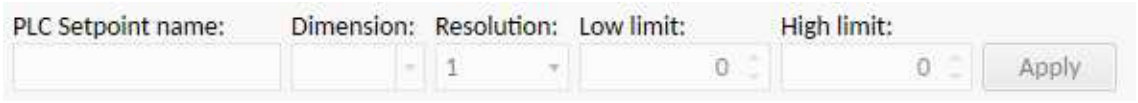


Image 8.112 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 45

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10484	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

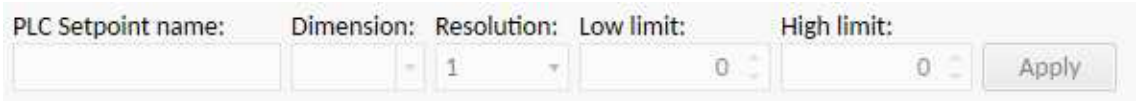


Image 8.113 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 46

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10485	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

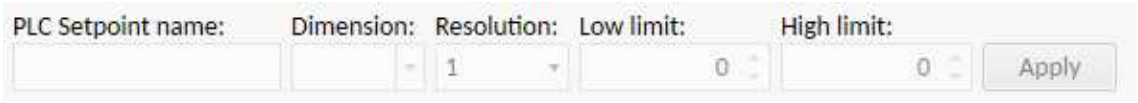


Image 8.114 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 47

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10486	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

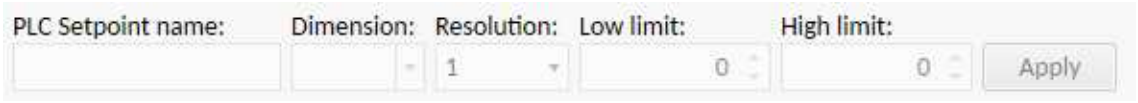


Image 8.115 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 48

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10487	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

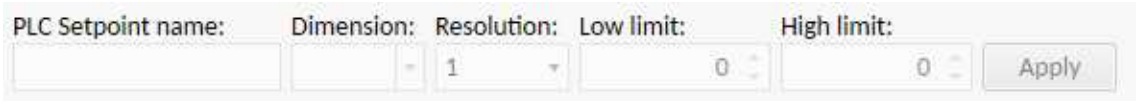


Image 8.116 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 49

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10488	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

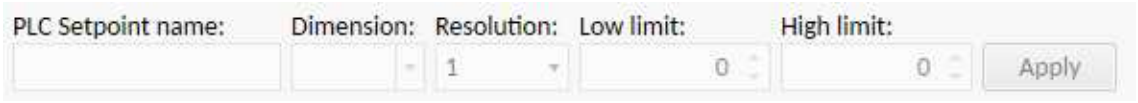


Image 8.117 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 50

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10489	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

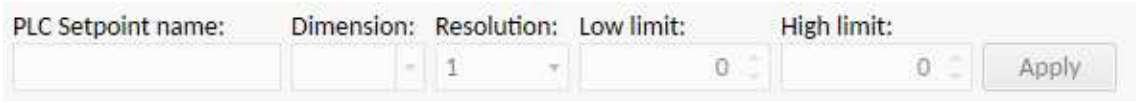


Image 8.118 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 51

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10490	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

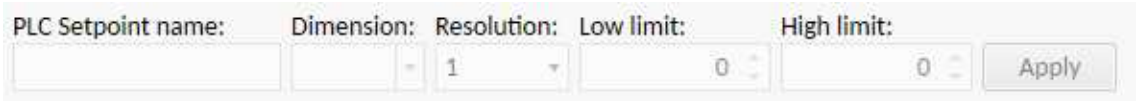


Image 8.119 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 52

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10491	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

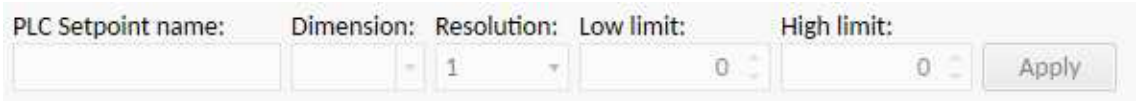


Image 8.120 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 53

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10492	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

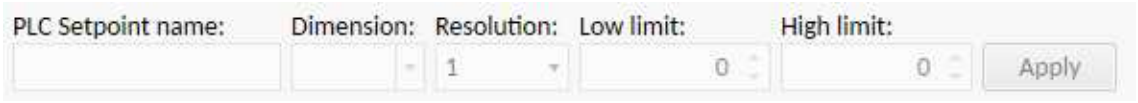


Image 8.121 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 54

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10493	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

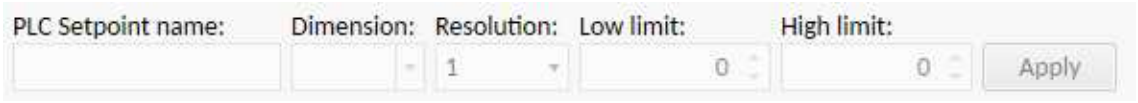


Image 8.122 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 55

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10494	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

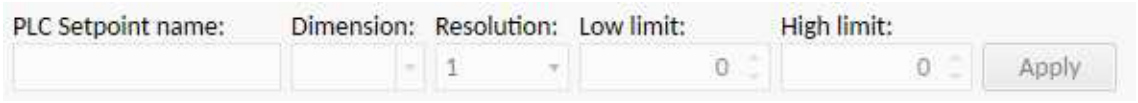


Image 8.123 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 56

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10495	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

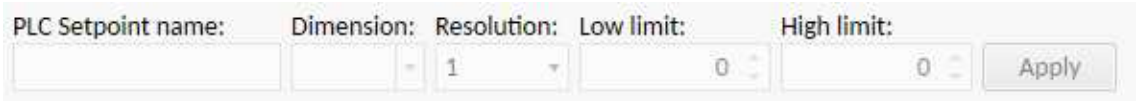


Image 8.124 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 57

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10496	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

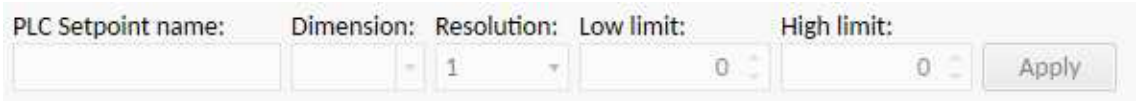


Image 8.125 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 58

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10497	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

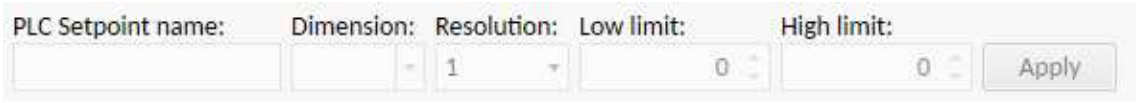


Image 8.126 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 59

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10498	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

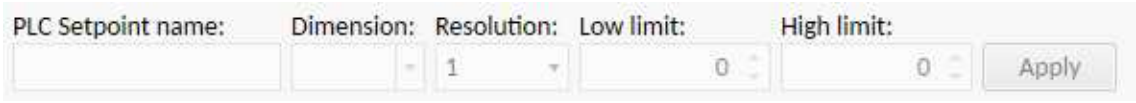


Image 8.127 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 60

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10499	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

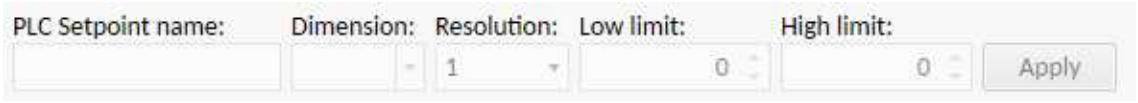


Image 8.128 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 61

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10500	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

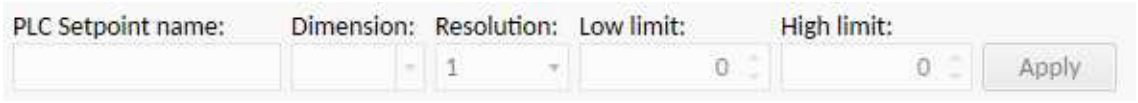


Image 8.129 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

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PLC Setpoint 62

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10501	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

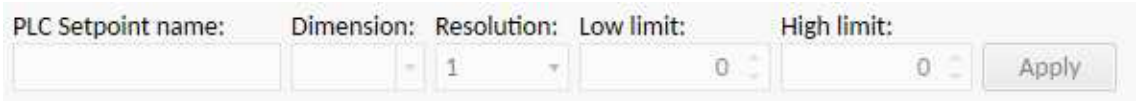


Image 8.130 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 63

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10502	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

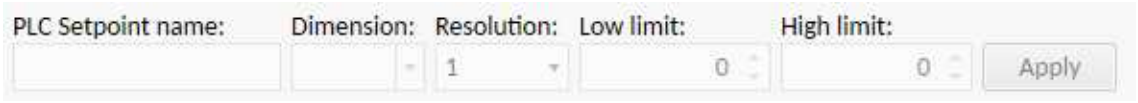


Image 8.131 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

PLC Setpoint 64

Setpoint group	PLC	**Related FW**	1.9.0
Range [units]	Depends on resolution of value [-]		
Default value	Depends on resolution of value [-]	**Alternative config**	NO
Step	Depends on resolution of value [-]		
Comm object	10503	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant setpoint is used in PLC		
Description			

Adjustable value for input in PLC logic.

Configuration of setpoint:

Configuration is made via configuration PC tool InteliConfig

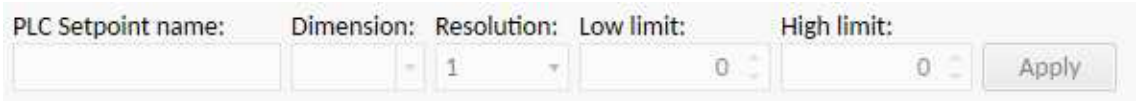


Image 8.132 Screen of configuration from InteliConfig

PLC Setpoint name	Name of the setpoint (0..32 characters)
Dimension	Dimension of value of the setpoint.
Resolution	Resolution of the value of the setpoint. Resolution adjust number of decimal places in low and high limit.
Low limit	The lowest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.
High limit	The highest value of setpoint. Digit place of this value can be decrease or increase by resolution of setpoint.

back to List of setpoints

8.1.2 Values

What values are:

Values (or quantities) are analog or binary data objects, measured or computed by the controller, that are intended for reading from the controller screen, PC, MODBUS, etc. Values are organized into groups according to their meaning.

Invalid flag

If valid data is not available for a particular value, the invalid flag is set to it. This situation may be due to the following:

- The value is not being evaluated in the scope of the current application and configuration.
- Sensor fail has been detected on an analog input.
- The configured ECU or extension module does not provide the particular value.
- The communication with the ECU or extension module is interrupted.

A value containing the invalid flag is displayed as "#####" in InteliConfig and on the controller screen. If such a value is read out via MODBUS, it will contain the data 32768 in the case of signed values and 65535 in the case of unsigned values.

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Cell ErrorRate 507
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Group: Engine

DEF Level

Value group	Engine	**Related FW**	1.9.0
Units	%		
Comm object	14522	**Related applications**	AMF, MRS
Description			
The level of diesel exhaust fluid tank.			

back to List of values

DPFAshLoad

Value group	Engine	**Related FW**	1.9.0
Units	%		
Comm object	12483	**Related applications**	AMF, MRS
Description			
The rate of ash in DPF (Diesel particulate filter).			

back to List of values

DPFSootLoad

Value group	Engine	**Related FW**	1.9.0
Units	%		
Comm object	12484	**Related applications**	AMF, MRS
Description			
The rate of soot in DPF (Diesel particulate filter).			

back to List of values

ECU-BIN 1

Value group	Engine	**Related FW**	1.9.0
Units	Depends on ECU value		
Comm object	10153	**Related applications**	AMF, MRS
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU-BIN 2

Value group	Engine	**Related FW**	1.9.0
Units	Depends on ECU value		
Comm object	10154	**Related applications**	AMF, MRS
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU-BIN 3

Value group	Engine	**Related FW**	1.9.0
Units	Depends on ECU value		
Comm object	10155	**Related applications**	AMF, MRS
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU-BIN 4

Value group	Engine	**Related FW**	1.9.0
Units	Depends on ECU value		
Comm object	10156	**Related applications**	AMF, MRS
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU-BIN 5

Value group	Engine	**Related FW**	1.9.0
Units	Depends on ECU value		
Comm object	10157	**Related applications**	AMF, MRS
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU-BIN 6

Value group	Engine	**Related FW**	1.9.0
Units	Depends on ECU value		
Comm object	10158	**Related applications**	AMF, MRS
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU-BIN 7

Value group	Engine	**Related FW**	1.9.0
Units	Depends on ECU value		
Comm object	10159	**Related applications**	AMF, MRS
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU-BIN 8

Value group	Engine	**Related FW**	1.9.0
Units	Depends on ECU value		
Comm object	10160	**Related applications**	AMF, MRS
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU-BIN 9

Value group	Engine	**Related FW**	1.9.0
Units	Depends on ECU value		
Comm object	10161	**Related applications**	AMF, MRS
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU-BIN-EXT-1

Value group	Engine	Related FW	1.9.0
Units	Depends on ECU value		
Comm object	10173	Related applications	AMF, MRS
Description			
This is one of the inputs, which are defined by ECU. Order of values depends on type of ECU. ***Note:*** *Usually there are engine speed[RPM], fuel rate[L/h], coolant temperature[°C], intake temperature [°C], oil pressure[bar], boost pressure[bar], load[%], oil temperature[°C] etc.*			

back to List of values

ECU Frequency Select

Value group	Engine	Related FW	1.9.0
Units	-		
Comm object	12926	Related applications	AMF, MRS
Description			
Shows selected frequency of ECU. The value is calculated from setpoint **Nominal Frequency (page 196)** ▶ If is **Nominal Frequency (page 196)** in range from 45 Hz to 54 Hz, is considered as 50 Hz application. The value is set to 0. ▶ If is **Nominal Frequency (page 196)** in range from 55 Hz to 65 Hz, is considered as 60 Hz application. The value is set to 1.			

back to List of values

ECU State

Value group	Engine	Related FW	1.9.0
Units	-		
Comm object	10034	Related applications	AMF, MRS
Description			
Shows binary status (0 or 1) of ECU: ▶ ECU Yellow Lamp ▶ ECU Red Lamp ▶ Wait To Start			

back to List of values

RPM

Value group	Engine	Related FW	1.9.0
Units	RPM		
Comm object	10123	Related applications	AMF, MRS
Description			

This value contains the current engine speed. The value is obtained from one of the following sources:

- ECU, if an ECU is configured
- Pickup input
- Generator frequency

back to List of values

Speed Request

Value group	Engine	Related FW	1.9.0
Units	%		
Comm object	10137	Related applications	AMF, MRS
Description			

Engine speed control via CAN bus.

Speed request	Requested speed	Accelerator pedal position
0%	1350 RPM	0%
50%	1500 RPM	50%
100%	1650 RPM	100%

back to List of values

Speed Required RPM

Value group	Engine	Related FW	1.9.0
Units	RPM		
Comm object	10006	Related applications	AMF, MRS
Description			

Requested engine speed.

back to List of values

Group: Generator

Generator Frequency

Value group	Generator	Related FW	1.9.0
Units	Hz		
Comm object	8210	Related applications	AMF, MRS
Description			

Frequency of generator.

back to List of values

Generator Voltage L1-L2

Value group	Generator	**Related FW**	1.9.0
Units	V		
Comm object	9628	**Related applications**	AMF, MRS
Description			
Generator phase to phase voltage between L1 and L2 phases.			

back to List of values

Generator Voltage L1-N

Value group	Generator	**Related FW**	1.9.0
Units	V		
Comm object	8192	**Related applications**	AMF, MRS
Description			
Generator voltage on phase 1.			

back to List of values

Generator Voltage L2-L3

Value group	Generator	**Related FW**	1.9.0
Units	V		
Comm object	9629	**Related applications**	AMF, MRS
Description			
Generator phase to phase voltage between L2 and L3 phases.			

back to List of values

Generator Voltage L2-N

Value group	Generator	**Related FW**	1.9.0
Units	V		
Comm object	8193	**Related applications**	AMF, MRS
Description			
Generator voltage on phase 2.			

back to List of values

Generator Voltage L3-L1

Value group	Generator	**Related FW**	1.9.0
Units	V		
Comm object	9630	**Related applications**	AMF, MRS
Description			
Generator phase to phase voltage between L3 and L1 phases.			

back to List of values

Generator Voltage L3-N

Value group	Generator	Related FW	1.9.0
Units	V		
Comm object	8194	Related applications	AMF, MRS
Description			
Generator voltage on phase 3.			

back to List of values

Nominal Current

Value group	Generator	Related FW	1.9.0
Units	A		
Comm object	9978	Related applications	AMF, MRS
Description			
Generator nominal current.			

back to List of values

Nominal Power

Value group	Generator	Related FW	1.9.0
Units	V		
Comm object	9018	Related applications	AMF, MRS
Description			
Generator nominal power.			

back to List of values

Nominal Voltage

Value group	Generator	Related FW	1.9.0
Units	V		
Comm object	9917	Related applications	AMF, MRS
Description			
Generator nominal voltage.			

back to List of values

Earth Fault Current

Value group	Generator	Related FW	1.9.0
Units	A		
Comm object	14325	Related applications	AMF, MRS
Description			
Measured value of fault for evaluation of earth fault protection.			

back to List of values

Group: Load

Load A L1

Value group	Load	Related FW	1.9.0
Units	A		
Comm object	8198	Related applications	AMF, MRS
Description			
Load current phase L1. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Load A L2

Value group	Load	Related FW	1.9.0
Units	A		
Comm object	8199	Related applications	AMF, MRS
Description			
Load current phase L2. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Load A L3

Value group	Load	Related FW	1.9.0
Units	A		
Comm object	8200	Related applications	AMF, MRS
Description			
Load current phase L3. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Load Characteristic

Value group	Load	Related FW	1.9.0
Units	[-]		
Comm object	8395	Related applications	AMF, MRS
Description			
Character of the load. “L” means inductive load, “C” is capacitive and “R” is resistive load (power factor = 1).			

back to List of values

Load Characteristic L1

Value group	Load	Related FW	1.9.0
Units	[-]		
Comm object	8626	Related applications	AMF, MRS
Description			
Character of the generator load in the L1 phase. “L” means inductive load, “C” is capacitive and “R” is resistive load (power factor = 1).			

back to List of values

Load Characteristic L2

Value group	Load	Related FW	1.9.0
Units	[-]		
Comm object	8627	Related applications	AMF, MRS
Description			
Character of the generator load in the L2 phase. “L” means inductive load, “C” is capacitive and “R” is resistive load (power factor = 1).			

back to List of values

Load Characteristic L3

Value group	Load	Related FW	1.9.0
Units	[-]		
Comm object	8628	Related applications	AMF, MRS
Description			
Character of the generator load in the L3 phase. “L” means inductive load, “C” is capacitive and “R” is resistive load (power factor = 1).			

back to List of values

Load kVA

Value group	Load	Related FW	1.9.0
Units	kVA		
Comm object	8565	Related applications	AMF, MRS
Description			
Load apparent power. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Load kVA L1

Value group	Load	Related FW	1.9.0
Units	kVA		
Comm object	8530	Related applications	AMF, MRS
Description			
Load apparent power L1. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Load kVA L2

Value group	Load	Related FW	1.9.0
Units	kVA		
Comm object	8531	Related applications	AMF, MRS
Description			
Load apparent power L2. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Load kVA L3

Value group	Load	Related FW	1.9.0
Units	kVA		
Comm object	8532	Related applications	AMF, MRS
Description			
Load apparent power L3. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Load kVAr

Value group	Load	Related FW	1.9.0
Units	kVAr		
Comm object	8203	Related applications	AMF, MRS
Description			
Load reactive power. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Load kVAr L1

Value group	Load	Related FW	1.9.0
Units	kVAr		
Comm object	8527	Related applications	AMF, MRS
Description			
Load reactive power in phase L1. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Load kVAr L2

Value group	Load	Related FW	1.9.0
Units	kVAr		
Comm object	8528	Related applications	AMF, MRS
Description			
Load reactive power in phase L2. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Load kVAr L3

Value group	Load	Related FW	1.9.0
Units	kVAr		
Comm object	8529	Related applications	AMF, MRS
Description			
Load reactive power in phase L3. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Load kW

Value group	Load	Related FW	1.9.0
Units	kW		
Comm object	8202	Related applications	AMF, MRS
Description			
Load active power. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Load kW L1

Value group	Load	**Related FW**	1.9.0
Units	kW		
Comm object	8524	**Related applications**	AMF, MRS
Description			
Load active power in phase L1. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Load kW L2

Value group	Load	**Related FW**	1.9.0
Units	kW		
Comm object	8525	**Related applications**	AMF, MRS
Description			
Load active power in phase L2. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Load kW L3

Value group	Load	**Related FW**	1.9.0
Units	kW		
Comm object	8526	**Related applications**	AMF, MRS
Description			
Load active power in phase L3. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Load Power Factor

Load	Load	**Related FW**	1.9.0
Units	[-]		
Comm object	8204	**Related applications**	AMF, MRS
Description			
Generator power factor.			

back to List of values

Load Power Factor L1

Load	Load	**Related FW**	1.9.0
Units	[-]		
Comm object	8533	**Related applications**	AMF, MRS
Description			
Generator power factor in phase L1.			

back to List of values

Load Power Factor L2

Load	Load	**Related FW**	1.9.0
Units	[-]		
Comm object	8534	**Related applications**	AMF, MRS
Description			
Generator power factor in phase L2.			

back to List of values

Load Power Factor L3

Load	Load	**Related FW**	1.9.0
Units	[-]		
Comm object	8535	**Related applications**	AMF, MRS
Description			
Generator power factor in phase L3.			

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Group: Mains

Mains Frequency

Value group	Mains	**Related FW**	1.9.0
Units	Hz		
Comm object	8211	**Related applications**	AMF
Description			
Frequency of mains.			

back to List of values

Mains Voltage L1-L2

Value group	Mains	**Related FW**	1.9.0
Units	V		
Comm object	9631	**Related applications**	AMF
Description			
Mains phase to phase voltage between L1 and L2 phases.			

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Mains Voltage L1-N

Value group	Mains	**Related FW**	1.9.0
Units	V		
Comm object	8195	**Related applications**	AMF
Description			
Mains voltage on phase 1.			

back to List of values

Mains Voltage L2-L3

Value group	Mains	**Related FW**	1.9.0
Units	V		
Comm object	9632	**Related applications**	AMF
Description			
Mains phase to phase voltage between L2 and L3 phases.			

back to List of values

Mains Voltage L2-N

Value group	Mains	**Related FW**	1.9.0
Units	V		
Comm object	8196	**Related applications**	AMF
Description			
Mains voltage on phase 2.			

back to List of values

Mains Voltage L3-L1

Value group	Mains	**Related FW**	1.9.0
Units	V		
Comm object	9633	**Related applications**	AMF
Description			
Mains phase to phase voltage between L3 and L1 phases.			

back to List of values

Mains Voltage L3-N

Value group	Mains	**Related FW**	1.9.0
Units	V		
Comm object	8197	**Related applications**	AMF
Description			
Mains voltage on phase 3.			

back to List of values

Group: Dual Operation

Running Hours To Swap

Value group	Dual Operation	**Related FW**	1.9.0
Units			
Comm object	16046	**Related applications**	AMF, MRS
Description			
This value shows how long it will take until the swap between gen-sets will be made.			

back to List of values

Master Running Hours

Value group	Dual Operation	**Related FW**	1.9.0
Units			
Comm object	16044	**Related applications**	AMF, MRS
Description			
This is actual value of running hours of Master controller used in dual operation function (**Running Hours (page 497)** + **Running Hours Base (page 264)**).			

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Slave Running Hours

Value group	Dual Operation	**Related FW**	1.9.0
Units			
Comm object	16045	**Related applications**	AMF, MRS
Description			
This is actual value of running hours of Slave controller used in dual operation function (**Running Hours (page 497)** + **Running Hours Base (page 264)**).			

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Group: Controler I/O

Analog Input 1

Value group	Controler I/O	**Related FW**	1.9.0
Units	Configurable		
Comm object	9151	**Related applications**	AMF, MRS
Description			
This is the value of the analog input 1 of the controller.			

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Analog Input 2

Value group	Controler I/O	**Related FW**	1.9.0
Units	Configurable		
Comm object	9152	**Related applications**	AMF, MRS
Description			
This is the value of the analog input 2 of the controller.			

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Analog Input 3

Value group	Controler I/O	**Related FW**	1.9.0
Units	Configurable		
Comm object	9153	**Related applications**	AMF, MRS
Description			
This is the value of the analog input 3 of the controller.			

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Analog Input 4

Value group	Controler I/O	**Related FW**	1.9.0
Units	Configurable		
Comm object	9154	**Related applications**	AMF, MRS
Description			
This is the value of the analog input 4 of the controller.			

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Battery Volts

Value group	Controler I/O	**Related FW**	1.9.0
Units	V		
Comm object	8213	**Related applications**	AMF, MRS
Description			
Controller supply voltage.			

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Binary Inputs

Value group	Controler I/O	**Related FW**	1.9.0
Units	[-]		
Comm object	8235	**Related applications**	AMF, MRS
Description			
State of the binary inputs of the controller.			

back to List of values

Binary Outputs

Value group	Controler I/O	**Related FW**	1.9.0
Units	[-]		
Comm object	8239	**Related applications**	AMF, MRS
Description			
State of the binary outputs of the controller.			

back to List of values

D+

Value group	Controler I/O	**Related FW**	1.9.0
Units	V		
Comm object	10603	**Related applications**	AMF, MRS
Description			
D+ terminal voltage.			

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Group: Statistics

Genset kVArh

Value group	Statistics	**Related FW**	1.9.0
Units	kVArh		
Comm object	8539	**Related applications**	AMF, MRS
Description			
Counter of gen-set reactive power. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Genset kWh

Value group	Statistics	**Related FW**	1.9.0
Units	kWh		
Comm object	8205	**Related applications**	AMF, MRS
Description			
Counter of gen-set active power. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Mains kVArh

Value group	Statistics	Related FW	1.9.0
Units	kVArh		
Comm object	11026	Related applications	AMF
Description			
Counter of mains reactive power. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Mains kWh

Value group	Statistics	Related FW	1.9.0
Units	kWh		
Comm object	11025	Related applications	AMF
Description			
Counter of mains active power. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Maintenance 1

Value group	Statistics	Related FW	1.9.0
Units	hours		
Comm object	11616	Related applications	AMF, MRS
Description			
Countdown until next maintenance 1. Initial value can be set in **Maintenance Timer 1 (page 235)**.			

back to List of values

Maintenance 2

Value group	Statistics	Related FW	1.9.0
Units	hours		
Comm object	11617	Related applications	AMF, MRS
Description			
Countdown until next maintenance 2. Initial value can be set in **Maintenance Timer 2 (page 236)**.			

back to List of values

Maintenance 3

Value group	Statistics	**Related FW**	1.9.0
Units	hours		
Comm object	11618	**Related applications**	AMF, MRS
Description			
Countdown until next maintenance 3. Initial value can be set in **Maintenance Timer 3 (page 236)**.			

back to List of values

Num E-Stops

Value group	Statistics	**Related FW**	1.9.0
Units	[-]		
Comm object	11195	**Related applications**	AMF, MRS
Description			
Emergency stop alarms counter.			

back to List of values

Num Starts

Value group	Statistics	**Related FW**	1.9.0
Units	[-]		
Comm object	8207	**Related applications**	AMF, MRS
Description			
Engine start commands counter. The counter is increased by 1 even if the particular start command will take more than one attempt.			

back to List of values

Pulse Counter 1

Value group	Statistics	**Related FW**	1.9.0
Units	-		
Comm object	10986	**Related applications**	AMF, MRS
Description			
This is the value of **PULSE COUNTER 1 (PAGE 562)** function.			

back to List of values

Pulse Counter 2

Value group	Statistics	**Related FW**	1.9.0
Units	-		
Comm object	10987	**Related applications**	AMF, MRS
Description			
This is the value of **PULSE COUNTER 2 (PAGE 562)** function.			

back to List of values

Rental 1

Value group	Statistics	Related FW	1.9.0
Units	hours		
Comm object	14328	Related applications	AMF, MRS
Description			
Remaining hours of **Rental Timer 1 (page 341)**.			

back to List of values

Rental 2

Value group	Statistics	Related FW	1.9.0
Units	days		
Comm object	14369	Related applications	AMF, MRS
Description			
Remaining days of **Rental Timer 2 (page 343)**.			

back to List of values

Running Hours

Value group	Statistics	Related FW	1.9.0
Units	hours		
Comm object	8206	Related applications	AMF, MRS
Description			
Engine operation hours counter. The engine hours are incremented in the controller while the engine is running.			

back to List of values

Shutdowns

Value group	Statistics	Related FW	1.9.0
Units	[-]		
Comm object	11196	Related applications	AMF, MRS
Description			
Shutdown alarms counter. This counter counts all occurrences of a shutdown alarm, not only real shutdowns of the gen-set, i.e. the counter is increased by 2 if two shutdown alarms appear simultaneously.			

back to List of values

Time Till Empty

Value group	Statistics	**Related FW**	1.9.0
Units	days		
Comm object	13770	**Related applications**	AMF, MRS
Description			

Assessment in days when the fuel tank will be empty.

Note: *This value is based on setpoint* ***Fuel Tank Volume (page 232)*** *and value from ECU Fuel Rate. For correct calculation of this value is necessary to have configured ECU which send Fuel Rate value, otherwise this value can't be calculated.*

back to List of values

Time Till Empty

Value group	Statistics	**Related FW**	1.9.0
Units	hours		
Comm object	13771	**Related applications**	AMF, MRS
Description			

Assessment in hours when the fuel tank will be empty.

Note: *This value is based on setpoint* ***Fuel Tank Volume (page 232)*** *and value from ECU Fuel Rate. For correct calculation of this value is necessary to have configured ECU which send Fuel Rate value, otherwise this value can't be calculated.*

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Time Till Empty

Value group	Statistics	**Related FW**	1.9.0
Units	minutes		
Comm object	13772	**Related applications**	AMF, MRS
Description			

Assessment in minutes when the fuel tank will be empty.

Note: *This value is based on setpoint* ***Fuel Tank Volume (page 232)*** *and value from ECU Fuel Rate. For correct calculation of this value is necessary to have configured ECU which send Fuel Rate value, otherwise this value can't be calculated.*

back to List of values

Total Fuel Consumption

Value group	Statistics	**Related FW**	1.9.0
Units	L		
Comm object	9040	**Related applications**	AMF, MRS
Description			

Value containing total amount of consumed fuel by engine. The controller automatically updates this value every 30 s. The controller can calculate it in three ways:

- Direct reading from ECU
- Calculation based on actual fuel consumption reading from ECU
- Calculation from fuel level drop in tank (using Fuel Level Analog Input + **Fuel Tank Volume (page 232)** setpoint)

Note: *The accuracy of Total Fuel Consumption depends on the precision of ECU values or precision of* ***Fuel Tank Volume (page 232)*** *and fuel level sensor.*

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Group: IL Info

Application

Value group	IL Info	**Related FW**	1.9.0
Units	[-]		
Comm object	8480	**Related applications**	AMF, MRS
Description			

The value contains actual application in controller.

back to List of values

Breaker State

Value group	IL Info	**Related FW**	1.9.0
Units	[-]		
Comm object	9245	**Related applications**	AMF, MRS
Description			

The value contains actual “breaker state” message which is shown on the main screen of the controller.

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Connection Type

Value group	IL Info	**Related FW**	1.9.0
Units	[-]		
Comm object	12944	**Related applications**	AMF, MRS
Description			

The text of this value represents the connection type which is adjusted in setpoint **Connection type (page 193)**.

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Engine State

Value group	IL Info	Related FW	1.9.0
Units	[-]		
Comm object	9244	Related applications	AMF, MRS
Description			
The value contains actual “engine state” message which is shown on the main screen of the controller.			

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FW Branch

Value group	IL Info	Related FW	1.9.0
Units	[-]		
Comm object	8707	Related applications	AMF, MRS
Description			
The value contains actual branch of firmware in controller.			

back to List of values

FW Version

Value group	IL Info	Related FW	1.9.0
Units	[-]		
Comm object	24339	Related applications	AMF, MRS
Description			
Major and minor firmware version number.			

back to List of values

ID String

Value group	IL Info	Related FW	1.9.0
Units	[-]		
Comm object	24501	Related applications	AMF, MRS
Description			
Name of controller which is used in InteliConfig in command bar.			

back to List of values

Password Decode

Value group	IL Info	Related FW	1.9.0
Units	[-]		
Comm object	24202	Related applications	AMF, MRS
Description			
This value contains a number which can be used for retrieving a lost password. Send this number together with the controller serial number to your distributor if you have lost your password.			

back to List of values

SPI Module A

Value group	IL Info	**Related FW**	1.9.0
Units	[-]		
Comm object	14447	**Related applications**	AMF, MRS
Description			
The name of plug-in module which is inserted in slot A.			

back to List of values

SPI Module B

Value group	IL Info	**Related FW**	1.9.0
Units	[-]		
Comm object	14448	**Related applications**	AMF, MRS
Description			
The name of plug-in module which is inserted in slot B.			

back to List of values

Timer Text

Value group	IL Info	**Related FW**	1.9.0
Units	[-]		
Comm object	10040	**Related applications**	AMF, MRS
Description			
The value contains the numeric code of the “Current process timer” text which is shown on the main screen of the controller. The assignment of texts to the codes can be obtained using InteliConfig. Open any connection (also offline with a previously saved archive) and go to the Tools ribbon -> Generate CFG image (all). The resulting file will contain the assignment of texts to the codes.			

back to List of values

Timer Value

Value group	IL Info	**Related FW**	1.9.0
Units	[HH:MM:SS]		
Comm object	14147	**Related applications**	AMF, MRS
Description			
The value contains the "Current process timer" value which is shown on the main screen of the controller.			

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Group: Log Bout

Log Bout 1

Value group	Log Bout	**Related FW**	1.9.0
Units	[-]		
Comm object	9143	**Related applications**	AMF, MRS
Description			
State of binary outputs.			

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Log Bout 2

Value group	Log Bout	**Related FW**	1.9.0
Units	[-]		
Comm object	9144	**Related applications**	AMF, MRS
Description			
State of binary outputs.			

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Log Bout 3

Value group	Log Bout	**Related FW**	1.9.0
Units	[-]		
Comm object	9145	**Related applications**	AMF, MRS
Description			
State of binary outputs.			

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Log Bout 4

Value group	Log Bout	**Related FW**	1.9.0
Units	[-]		
Comm object	9146	**Related applications**	AMF, MRS
Description			
State of binary outputs.			

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Log Bout 5

Value group	Log Bout	**Related FW**	1.9.0
Units	[-]		
Comm object	9147	**Related applications**	AMF, MRS
Description			
State of binary outputs.			

back to List of values

Log Bout 6

Value group	Log Bout	**Related FW**	1.9.0
Units	[-]		
Comm object	9148	**Related applications**	AMF, MRS
Description			
State of binary outputs.			

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Log Bout 7

Value group	Log Bout	**Related FW**	1.9.0
Units	[-]		
Comm object	9149	**Related applications**	AMF, MRS
Description			
State of binary outputs.			

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Log Bout 8

Value group	Log Bout	**Related FW**	1.9.0
Units	[-]		
Comm object	9150	**Related applications**	AMF, MRS
Description			
State of binary outputs.			

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Log Bout 9

Value group	Log Bout	**Related FW**	1.9.0
Units	[-]		
Comm object	11896	**Related applications**	AMF, MRS
Description			
State of binary outputs.			

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Log Bout 10

Value group	Log Bout	**Related FW**	1.9.0
Units	[-]		
Comm object	11897	**Related applications**	AMF, MRS
Description			
State of binary outputs.			

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Log Bout 11

Value group	Log Bout	Related FW	1.9.0
Units	[-]		
Comm object	11898	Related applications	AMF, MRS
Description			
State of binary outputs.			

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Log Bout 12

Value group	Log Bout	Related FW	1.9.0
Units	[-]		
Comm object	11899	Related applications	AMF, MRS
Description			
State of binary outputs.			

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Group: CM-GPRS

AirGate Status

Value group	CM-GPRS; CM-4G-GPS (4G part)	Related FW	1.9.0
Units	[-]		
Comm object	24308	Related applications	AMF, MRS
Description			

Diagnostic code for AirGate connection. Helps in troubleshooting.

Code	Description
0	SIM card is not inserted
1	Controller registered, waiting for authorization
2	Not possible to register, controller blacklisted
3	Not possible to register, server has no more capacity
4	Not possible to register, other reason
5	Controller registered and authorized

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AirGate ID

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.9.0
Units	[-]		
Comm object	24309	**Related applications**	AMF, MRS
Description			
Identification string generated by AirGate server for the purpose of establishing communication via InteliConfig or any other supported PC tool.			

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Connection Type

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.9.0
Units	[-]		
Comm object	24146	**Related applications**	AMF, MRS
Description			
The type of data connection.			

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Cell Diag Code

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.9.0
Units	[-]		
Comm object	24288	**Related applications**	AMF, MRS
Description			

Diagnostic code for the CM-GPRS or CM-4G-GPS module.

GSM Diag Code – Common list of diagnostic codes for cellular modules

Code	Description
0	OK. No error.
1	Not possible to hang up.
2	Modul is switched off
3	Module is switched on
4	Module – error in initialization
5	Module – not possible to set the APN
6	Module – not possible to connect to GPRS network
7	Module – not possible to retrieve IP address
8	Module – not accepted DNS IP address
9	Error in modem detection
10	Error in initialization of analog modem
11	SIM card is locked (Possibly PIN code required, PIN needs to be deactivated) or

	unknown status of SIM locking
12	No GSM signal
13	Not possible to read the SIM card parameters
14	GSM modem did not accepted particular initialization command, possibly caused by locked SIM card
15	Unknown modem
16	Bad answer to complement initialization string
17	Not possible to read GSM signal strength
18	CDMA modem not detected
19	No CDMA network
20	Unsuccessful registration to CDMA network
21	SIMCom/ME909s: can´t read FW version
22	SIMCom: GSM signal not found
23	SIMCom: can´t detect module speed
24	SIMCom: HW reset issued
25	PUK is required
26	Error of SIM card detected
27	ME909s: can't set module bps
28	ME909s: can't set link configuration
29	ME909s: can't do power-off
30	ME909s: can't do power-on
31	ME909s: can't do hardware reset
32	ME909s: ME909s not started
33	ME909s: switch off issued
34	ME909s: switch on issued
35	ME909s: HW reset issued
36	ME909s: can't switch echo off
37	ME909s: can't find out state of registration
38	ME909s: GSM signal not found
39	ME909s: no SIM memory for SMS
40	ME909s: waiting for registration
41	Can't read operator name
42	ME909s: can't set flow control
43	APN not typed
255	Only running communication is needed to indicate

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Cell ErrorRate

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.9.0
Units	%		
Comm object	24300	**Related applications**	AMF, MRS
Description			
This value contains information about relative quality of the cellular signal received by the CM-GPRS module or by CM-4G-GPS module. The lower value means higher quality of signal.			

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Cell Signal Lev

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.9.0
Units	%		
Comm object	24302	**Related applications**	AMF, MRS
Description			
This value contains information about relative strength of the cellular signal received by the CM-GPRS module or by CM-4G-GPS module. It is a relative value helping to find the best signal and for troubleshooting cases.			

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Cell Status

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.9.0
Units	[-]		
Comm object	24290	**Related applications**	AMF, MRS
Description			
The text of this value represents the status of the GSM modem.			

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Last Email Result

Value group	CM-GPRS; CM-4G-GPS (4G part)	Related FW	1.9.0
Units	[-]		
Comm object	24307	**Related applications**	AMF, MRS

Description

Result of last email, which was sent by controller.

Code	Description
0	Email was successfully sent.
2	It is not possible to establish connection with SMTP server.
3	SMTP server is not ready for communication.
4	Maximum length of data can't be read.
5	No appeal to send command.
6	Command can't be send.
7	Command can't be send.
8	HELO command was refused.
11	AUTH LOGIN command was refused.
12	Wrong user name.
13	Wrong password.
14	MAIL FROM command was refused.
15	RCPT TO command was refused.
16	DATA command was refused.
17	Sending of email failed.
18	SMTP server refused the data of email.
19	SMTP server refused the data of email.
20	QUIT command was refused.
21	Lost of connection.
23	Error during closing the connection.
24	No answer from server.
25	It is impossible to create data for command DATA.
26	It is impossible to read data for command DATA.
28	Error of encoding.
29	There was no attempt to send email.

back to List of values

Operator

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.9.0
Units	[-]		
Comm object	24147	**Related applications**	AMF, MRS
Description			
The name of operator which to SIM card is connected. ***Note:*** *If roaming service is used then prefix "R" is added before the name of operator.*			

back to List of values

Group: CM-4G-GPS

Altitude

Value group	CM-4G-GPS (GPS part)	**Related FW**	1.9.0
Units	m		
Comm object	24266	**Related applications**	AMF, MRS
Description			
Actual GPS altitude.			

back to List of values

HomePosDist

Value group	CM-4G-GPS (GPS part)	**Related FW**	1.9.0
Units	km		
Comm object	11680	**Related applications**	AMF, MRS
Description			
Actual distance from home position. Home position is adjusted via setpoints **Home Latitude (page 346)** and **Home Longitude (page 346)** or by binary input **GEO HOME POSITION (PAGE 556)**.			

back to List of values

Latitude

Value group	CM-4G-GPS (GPS part)	**Related FW**	1.9.0
Units	[-]		
Comm object	24268	**Related applications**	AMF, MRS
Description			
Actual GPS latitude. Positions on north hemisphere have positive value, position on south hemisphere have negative value.			

back to List of values

Longitude

Value group	CM-4G-GPS (GPS part)	**Related FW**	1.9.0
Units	[-]		
Comm object	24267	**Related applications**	AMF, MRS
Description			
Actual GPS longitude. Positions on east hemisphere have positive value, position on west hemisphere have negative value.			

back to List of values

Satellites

Value group	CM-4G-GPS (GPS part)	**Related FW**	1.9.0
Units	[-]		
Comm object	24265	**Related applications**	AMF, MRS
Description			
Number of available satellites for GPS location.			

back to List of values

AirGate ID

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.9.0
Units	[-]		
Comm object	24309	**Related applications**	AMF, MRS
Description			
Identification string generated by AirGate server for the purpose of establishing communication via InteliConfig or any other supported PC tool.			

back to List of values

AirGate Status

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.9.0
Units	[-]		
Comm object	24308	**Related applications**	AMF, MRS
Description			

Diagnostic code for AirGate connection. Helps in troubleshooting.

Code	Description
0	SIM card is not inserted
1	Controller registered, waiting for authorization
2	Not possible to register, controller blacklisted
3	Not possible to register, server has no more capacity
4	Not possible to register, other reason
5	Controller registered and authorized

back to List of values

Connection Type

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.9.0
Units	[-]		
Comm object	24146	**Related applications**	AMF, MRS
Description			

The type of data connection.

back to List of values

Cell Diag Code

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.9.0
Units	[-]		
Comm object	24288	**Related applications**	AMF, MRS
Description			

Diagnostic code for the CM-GPRS or CM-4G-GPS module.

GSM Diag Code – Common list of diagnostic codes for cellular modules

Code	Description
0	OK. No error.
1	Not possible to hang up.
2	Modul is switched off
3	Module is switched on

4	Module – error in initialization
5	Module – not possible to set the APN
6	Module – not possible to connect to GPRS network
7	Module – not possible to retrieve IP address
8	Module – not accepted DNS IP address
9	Error in modem detection
10	Error in initialization of analog modem
11	SIM card is locked (Possibly PIN code required, PIN needs to be deactivated) or unknown status of SIM locking
12	No GSM signal
13	Not possible to read the SIM card parameters
14	GSM modem did not accepted particular initialization command, possibly caused by locked SIM card
15	Unknown modem
16	Bad answer to complement initialization string
17	Not possible to read GSM signal strength
18	CDMA modem not detected
19	No CDMA network
20	Unsuccessful registration to CDMA network
21	SIMCom/ME909s: can´t read FW version
22	SIMCom: GSM signal not found
23	SIMCom: can´t detect module speed
24	SIMCom: HW reset issued
25	PUK is required
26	Error of SIM card detected
27	ME909s: can't set module bps
28	ME909s: can't set link configuration
29	ME909s: can't do power-off
30	ME909s: can't do power-on
31	ME909s: can't do hardware reset
32	ME909s: ME909s not started
33	ME909s: switch off issued
34	ME909s: switch on issued
35	ME909s: HW reset issued
36	ME909s: can't switch echo off
37	ME909s: can't find out state of registration
38	ME909s: GSM signal not found
39	ME909s: no SIM memory for SMS
40	ME909s: waiting for registration

41	Can't read operator name
42	ME909s: can't set flow control
43	APN not typed
255	Only running communication is needed to indicate

back to List of values

Cell ErrorRate

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.9.0
Units	%		
Comm object	24300	**Related applications**	AMF, MRS
Description			
This value contains information about relative quality of the cellular signal received by the CM-GPRS module or by CM-4G-GPS module. The lower value means higher quality of signal.			

back to List of values

Cell Signal Lev

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.9.0
Units	%		
Comm object	24302	**Related applications**	AMF, MRS
Description			
This value contains information about relative strength of the cellular signal received by the CM-GPRS module or by CM-4G-GPS module. It is a relative value helping to find the best signal and for troubleshooting cases.			

back to List of values

Cell Status

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.9.0
Units	[-]		
Comm object	24290	**Related applications**	AMF, MRS
Description			
The text of this value represents the status of the GSM modem.			

back to List of values

Last Email Result

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.9.0
Units	[-]		
Comm object	24307	**Related applications**	AMF, MRS
Description			

Result of last email, which was sent by controller.

Code	Description
0	Email was successfully sent.
2	It is not possible to establish connection with SMTP server.
3	SMTP server is not ready for communication.
4	Maximum length of data can't be read.
5	No appeal to send command.
6	Command can't be send.
7	Command can't be send.
8	HELO command was refused.
11	AUTH LOGIN command was refused.
12	Wrong user name.
13	Wrong password.
14	MAIL FROM command was refused.
15	RCPT TO command was refused.
16	DATA command was refused.
17	Sending of email failed.
18	SMTP server refused the data of email.
19	SMTP server refused the data of email.
20	QUIT command was refused.
21	Lost of connection.
23	Error during closing the connection.
24	No answer from server.
25	It is impossible to create data for command DATA.
26	It is impossible to read data for command DATA.
28	Error of encoding.
29	There was no attempt to send email.

back to List of values

Operator

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.9.0
Units	[-]		
Comm object	24147	**Related applications**	AMF, MRS
Description			
The name of operator which to SIM card is connected. ***Note:*** *If roaming service is used then prefix "R" is added before the name of operator.*			

back to List of values

Group: CM-Ethernet

AirGate Status

Value group	CM-Ethernet	**Related FW**	1.9.0
Units	[-]		
Comm object	24344	**Related applications**	AMF, MRS
Description			

Diagnostic code for AirGate connection. Helps in troubleshooting.

Code	Description
0	Ethernet cable is disconnected
1	Controller registered, waiting for authorization
2	Not possible to register, controller blacklisted
3	Not possible to register, server has no more capacity
4	Not possible to register, other reason
5	Controller registered and authorized

back to List of values

AirGate ID

Value group	CM-EthernetInfo	**Related FW**	1.9.0
Units	[-]		
Comm object	24345	**Related applications**	AMF, MRS
Description			
Identification string generated by AirGate server for the purpose of establishing communication via InteliConfig or any other supported PC tool.			

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Current DNS

Value group	CM-Ethernet	**Related FW**	1.9.0
Units	[-]		
Comm object	24181	**Related applications**	AMF, MRS
Description			
Current domain name server.			

back to List of values

ETH Interface Status

Value group	CM-Ethernet	**Related FW**	1.9.0
Units	[-]		
Comm object	24180	**Related applications**	AMF, MRS
Description			
Current status of ethernet communication.			

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Current Gateway

Value group	CM-Ethernet	**Related FW**	1.9.0
Units	[-]		
Comm object	24182	**Related applications**	AMF, MRS
Description			
Current gateway address.			

back to List of values

Current IP Address

Value group	CM-Ethernet	**Related FW**	1.9.0
Units	[-]		
Comm object	24184	**Related applications**	AMF, MRS
Description			
Current IP address of the controller.			

back to List of values

Last Email Result

Value group	CM-Ethernet	Related FW	1.9.0
Units	[-]		
Comm object	24332	Related applications	AMF, MRS
Description			

Result of last email, which was sent by controller.

Code	Description
0	Email was successfully sent.
2	It is not possible to establish connection with SMTP server.
3	SMTP server is not ready for communication.
8	HELO command was refused.
9	EHLO command was refused.
11	AUTH LOGIN command was refused.
12	Wrong user name.
13	Wrong password.
14	MAIL FROM command was refused.
15	RCPT TO command was refused.
16	DATA command was refused.
17	Sending of email failed.
20	QUIT command was refused.
25	It is impossible to create data for command DATA.
26	It is impossible to read data for command DATA.
27	Email address can't be read.
30	SMTP server address translation error (from DNS server).
31	Error reading email content data (24327).

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MAC Address

Value group	CM-Ethernet	Related FW	1.9.0
Units	[-]		
Comm object	24333	Related applications	AMF, MRS
Description			

Current MAC address of the controller ethernet interface.

back to List of values

Current Subnet Mask

Value group	CM-Ethernet	**Related FW**	1.9.0
Units	[-]		
Comm object	24183	**Related applications**	AMF, MRS
Description			
Current subnet mask.			

back to List of values

Group: Date/Time

Time

Value group	Date/Time	**Related FW**	1.9.0
Units	HH:MM:SS		
Comm object	24554	**Related applications**	AMF, MRS
Description			
Shows setup time.			

back to List of values

Date

Value group	Date/Time	**Related FW**	1.9.0
Units	DD.MM.YYYY		
Comm object	24553	**Related applications**	AMF, MRS
Description			
Shows setup date.			

back to List of values

Group: Plug-In I/O

EM BIO A

Value group	Plug-In I/O	**Related FW**	1.9.0
Units	[-]		
Comm object	14291	**Related applications**	AMF, MRS
Description			
Binary inputs from extension module in slot A.			

back to List of values

EM BIO B

Value group	Plug-In I/O	**Related FW**	1.9.0
Units	[-]		
Comm object	14292	**Related applications**	AMF, MRS
Description			
Binary inputs from extension module in slot B.			

back to List of values

Group: PLC

PLC Resource 1

Value group	PLC	**Related FW**	1.9.0
Units	[-]		
Comm object	10504	**Related applications**	AMF, MRS
Description			
Internal state of PLC countdowns (e.g. state of block Timer etc.).			

back to List of values

PLC Resource 2

Value group	PLC	**Related FW**	1.9.0
Units	[-]		
Comm object	10505	**Related applications**	AMF, MRS
Description			
Internal state of PLC countdowns (e.g. state of block Timer etc.).			

back to List of values

PLC Resource 3

Value group	PLC	**Related FW**	1.9.0
Units	[-]		
Comm object	10506	**Related applications**	AMF, MRS
Description			
Internal state of PLC countdowns (e.g. state of block Timer etc.).			

back to List of values

PLC Resource 4

Value group	PLC	**Related FW**	1.9.0
Units	[-]		
Comm object	10507	**Related applications**	AMF, MRS
Description			
Internal state of PLC countdowns (e.g. state of block Timer etc.).			

back to List of values

PLC Resource 5

Value group	PLC	**Related FW**	1.9.0
Units	[-]		
Comm object	10508	**Related applications**	AMF, MRS
Description			
Internal state of PLC countdowns (e.g. state of block Timer etc.).			

back to List of values

PLC Resource 6

Value group	PLC	**Related FW**	1.9.0
Units	[-]		
Comm object	10509	**Related applications**	AMF, MRS
Description			
Internal state of PLC countdowns (e.g. state of block Timer etc.).			

back to List of values

PLC Resource 7

Value group	PLC	**Related FW**	1.9.0
Units	[-]		
Comm object	10510	**Related applications**	AMF, MRS
Description			
Internal state of PLC countdowns (e.g. state of block Timer etc.).			

back to List of values

PLC Resource 8

Value group	PLC	**Related FW**	1.9.0
Units	[-]		
Comm object	10511	**Related applications**	AMF, MRS
Description			
Internal state of PLC countdowns (e.g. state of block Timer etc.).			

back to List of values

PLC-BOUT 1

Value group	PLC	**Related FW**	1.9.0
Units	[-]		
Comm object	10424	**Related applications**	AMF, MRS
Description			
State of binary outputs of PLC.			

back to List of values

PLC-BOUT 2

Value group	PLC	**Related FW**	1.9.0
Units	[-]		
Comm object	10425	**Related applications**	AMF, MRS
Description			
State of binary outputs of PLC.			

back to List of values

PLC-BOUT 3

Value group	PLC	**Related FW**	1.9.0
Units	[-]		
Comm object	10426	**Related applications**	AMF, MRS
Description			
State of binary outputs of PLC.			

back to List of values

PLC-BOUT 4

Value group	PLC	**Related FW**	1.9.0
Units	[-]		
Comm object	10427	**Related applications**	AMF, MRS
Description			
State of binary outputs of PLC.			

back to List of values

PLC-BOUT 5

Value group	PLC	**Related FW**	1.9.0
Units	[-]		
Comm object	10428	**Related applications**	AMF, MRS
Description			
State of binary outputs of PLC.			

back to List of values

PLC-BOUT 6

Value group	PLC	**Related FW**	1.9.0
Units	[-]		
Comm object	10429	**Related applications**	AMF, MRS
Description			
State of binary outputs of PLC.			

back to List of values

PLC-BOUT 7

Value group	PLC	Related FW	1.9.0
Units	[-]		
Comm object	10430	Related applications	AMF, MRS
Description			
State of binary outputs of PLC.			

back to List of values

8.1.3 Logical binary inputs

What Logical binary inputs are:

Logical binary inputs are inputs for binary values and functions.

Alphabetical groups of Logical binary inputs

LBI: A 525
LBI: B 526
LBI: C 550
LBI: D 552
LBI: E 553
LBI: F 554
LBI: G 555
LBI: H 557
LBI: I 557
LBI: L 558
LBI: M 559
LBI: N 561
LBI: O 561
LBI: P 561
LBI: R 562
LBI: S 565

For full list of Logical binary inputs go to the chapter **Logical binary inputs alphabetically (page 524)**.

Logical binary inputs alphabetically

Access Lock 525
Alternate Config 2 525
Alternate Config 3 525
AMF Function 525
AMF Start Block 526
Battery Charger 526
BIN Protection 1 526
BIN Protection 02 527
BIN Protection 03 527
BIN Protection 04 528
BIN Protection 05 528
BIN Protection 06 529
BIN Protection 07 529
BIN Protection 08 530
BIN Protection 09 530
BIN Protection 10 531
BIN Protection 11 531
BIN Protection 12 532
BIN Protection 13 532
BIN Protection 14 533
BIN Protection 15 533
BIN Protection 16 534
BIN Protection 17 534
BIN Protection 18 535
BIN Protection 19 535
BIN Protection 20 536
BIN Protection 21 536
BIN Protection 22 537
BIN Protection 23 537
BIN Protection 24 538
BIN Protection 25 538
BIN Protection 26 539
BIN Protection 27 539
BIN Protection 28 540
BIN Protection 29 540
BIN Protection 30 541
BIN Protection 31 541
BIN Protection 32 542
BIN Protection 33 542
BIN Protection 34 543
BIN Protection 35 543
BIN Protection 36 544
BIN Protection 37 544
BIN Protection 38 545
BIN Protection 39 545
BIN Protection 40 546
BIN Protection 41 546
BIN Protection 42 547
BIN Protection 43 547
BIN Protection 44 548
BIN Protection 45 548
BIN Protection 46 549
BIN Protection 47 549
BIN Protection 48 550
Choke Inhibit 550
Coolant Temp 551
Dark Mode 552
Dual Swap Gen-sets 552
Dual Top Priority 552
ECU Key Switch 553
ECU Speed Down 553
ECU Speed Up 553
Emergency MAN 553
Emergency Stop 554
Fault Reset Button 554
Force Regeneration 554
Fuel Level 555
Fuel Pump On/Off 555
GCB Button 555
GCB Feedback 556
Geo Home Position 556
Geo-Fencing Enabled 557
Horn Reset Button 557
Idle Speed 557
Lang Selection 1 558
Lang Selection 2 558
Lang Selection 3 559
Mains Fail Block 559
MCB Button 559
MCB Feedback 560
Not Used 561
Oil Pressure 561
Protection Enable 561
Pulse Counter 1 562
Pulse Counter 2 562
Regeneration Inhib 562
Remote AUTO 563
Remote Ctrl Lock 563
Remote MAN 563
Remote OFF 564
Remote Start/Stop 564
Rem TEST On Load 565
Remote TEST 565
Sd Override 565
Start Button 565
Stop Button 566

LBI: A

Access Lock

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1		
Description			

When this input is closed, no setpoints can be adjusted from controller's front panel and controller mode (OFF / MAN / AUTO / TEST) cannot be changed.

> ***Note:*** *Access Lock does not protect setpoints and mode changing from InteliConfig. To avoid unqualified changes the selected setpoints have to be password protected.*
> *Also the buttons Fault Reset and Horn Reset are not blocked at all and buttons Start and Stop in MAN mode are not blocked.*

back to Logical binary inputs alphabetically

Alternate Config 2

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	859		
Description			

This binary input can switch between configuration sets. When this binary input is active, setpoints in Alternate Config group are switched to the second set (setpoints with number 2).

> **IMPORTANT: If LBO ECU POWER RELAY (PAGE 600) is used, change of alternate configuration can be made only in prestart phase. So prestart has to be set up for enough long time.**

back to Logical binary inputs alphabetically

Alternate Config 3

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	860		
Description			

This binary input can switch between configuration sets. When this binary input is active, setpoints in Alternate Config group are switched to the third set (setpoints with number 3).

> **IMPORTANT: If LBO ECU POWER RELAY (PAGE 600) is used, change of alternate configuration can be made only in prestart phase. So prestart has to be set up for enough long time.**

back to Logical binary inputs alphabetically

AMF Function

Related FW	1.9.0	**Related applications**	AMF
Comm object	692		
Description			

This binary input can switch controller function between AMF and MRS.

> ***Note:*** *Binary input "AMF function" has higher priority than the setpoint **Operation Mode (page 199)** in Basic settings.*

back to Logical binary inputs alphabetically

AMF Start Block

Related FW	1.9.0	Related applications	AMF
Comm object	211		
Description			
This binary input can allow or block the AMF start. In case of running gen-set in AUTO mode gen-set goes to cooling procedure and stops.			

back to Logical binary inputs alphabetically

LBI: B

Battery Charger

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	623		
Description			
When binary input is active and its delay **Battery Charger Fail Delay (page 237)** is out of time then alarm **Battery Charger Fail (page 689)** is activated, written into history log and logical binary output **AL BATTERY CHARGER (PAGE 572)** is activated.			

back to Logical binary inputs alphabetically

BIN Protection 1

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9999		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 02

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9998		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 03

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9997		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 04

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9996		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 05

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9995		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 06

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9994		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 07

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9993		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 08

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9992		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

BIN Protection 09

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9991		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 10

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9990		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 11

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9989		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 12

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9988		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 13

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9987		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 14

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9986		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 15

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9985		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 16

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9984		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 17

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9983		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 18

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9982		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 19

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9981		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 20

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9980		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 21

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9979		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 22

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9978		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 23

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9977		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 24

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9976		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 25

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9975		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 26

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9974		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 27

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9973		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 28

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9972		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 29

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9971		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 30

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9970		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 31

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9969		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 32

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9968		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 33

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9967		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 34

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9966		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 35

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9965		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 36

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9964		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 37

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9963		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 38

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9962		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 39

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9961		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 40

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9960		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 41

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9959		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 42

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9958		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 43

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9957		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 44

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9956		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 45

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9955		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 46

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9954		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 47

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9953		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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BIN Protection 48

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	9952		
Description			

This binary input is for general input function used as alarm.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
AL Indic	Binary input is not used for protection. Only alarmlist record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

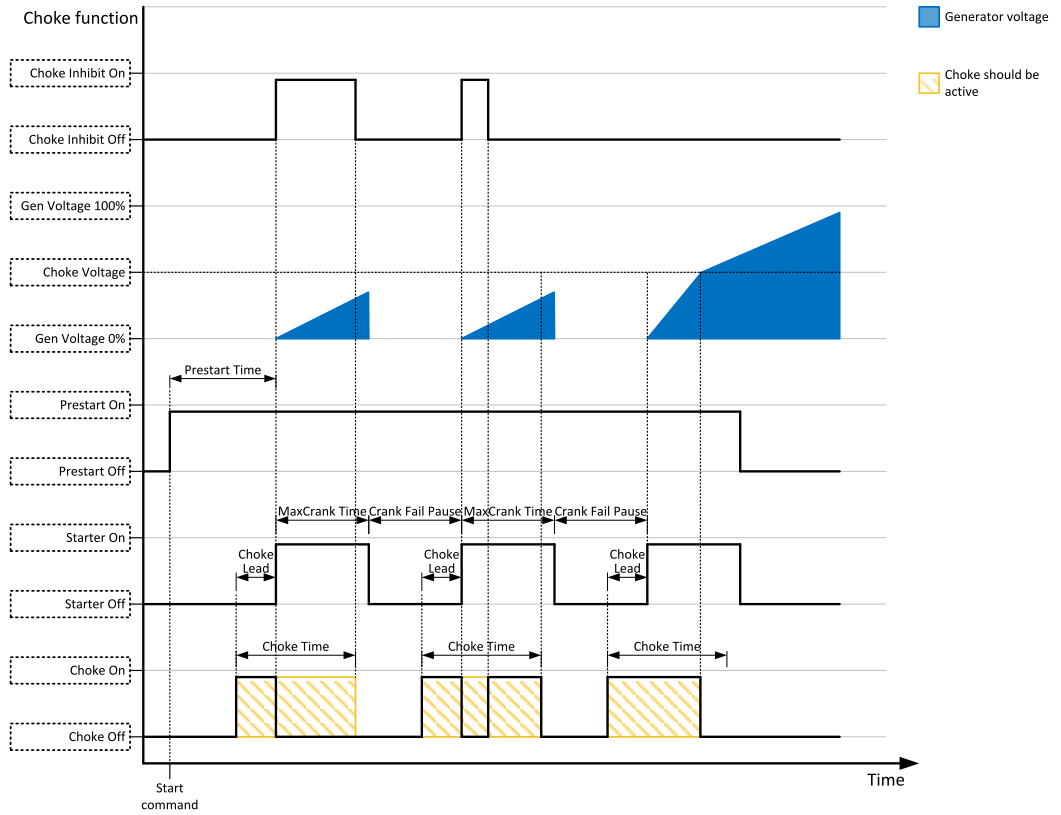
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LBI: C

Choke Inhibit

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	946		
Description			

Logical binary input CHOKE INHIBIT prevent Choke functionality when logical binary output **CHOKE (PAGE 597)** is activated. If CHOKE INHIBIT is activated when CHOKE LBO is active, CHOKE LBO is deactivated immediately and vice versa if LBI CHOKE INHIBIT is deactivated and LBO CHOKE should be active then is activated.



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Coolant Temp

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	625		
Description			

Binary input for **COOLANT TEMP (PAGE 667)** protection.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

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LBI: D

Dark Mode

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	930		
Description			

This binary input activates function of dark mode. It means that backlight of display is turn of (information on controller screens are not affected) and LEDs (Mains, Generator, Load, Breakers, etc.) are turn off (LEDs don't react on normal condition of their activation and deactivation).

Note: *After deactivation of dark mode, backlight of display is turned on and than behaves normally.*

Note: *After deactivation of dark mode, Front Face status LEDs are turned on due to current situation of gen-set.*

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Dual Swap Gen-sets

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	947		
Description			

This LBI enables or disables swapping of gen-sets on load in dual operation. This LBI has higher priority then setpoint **Swap Gen-sets (page 264)**. This LBI is accepted only in Master controller.

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Dual Top Priority

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	954		
Description			

This LBI defines, which gen-set has higher priority in dual operation mode. If this LBI is active on one gen-set, this gen-set is used in dual operation function (running hours values are not used to decide, which gen-set should start).

Setpoint **Swap Gen-sets (page 264)** or LBI **DUAL SWAP GEN-SETS (PAGE 552)** has higher priority than this LBI.

> **Example:** Engine 1 is running. LBI Top Priority is activated on engine 2. If swapping of gen-sets is disabled, nothing happens. If swapping of gen-sets is enabled, engine 2 is started and engine 1 is stopped.

Note: *If this LBI is active on both gen-sets, the behavior is not changed. Decision is based on running hours values.*

back to Logical binary inputs alphabetically

LBI: E

ECU Key Switch

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	951		
Description			
This binary input is used to switch on **ECU POWER RELAY (PAGE 600)**, when engine start is not requested. It is intended to enable engine values reading, when engine doesn't run. When this binary input is active, binary output **ECU POWER RELAY (PAGE 600)** is active too. When this binary input is inactive, function of **ECU POWER RELAY (PAGE 600)** is not affected.			

back to Logical binary inputs alphabetically

ECU Speed Down

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	164		
Description			
This binary input is used to set the setpoint **ECU Speed Adjustment (page 241)** by binary inputs. When the LBI is activated the setpoint is decreased by 2%.			

back to Logical binary inputs alphabetically

ECU Speed Up

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	165		
Description			
This binary input is used to set the setpoint **ECU Speed Adjustment (page 241)** by binary inputs. When the LBI is activated the setpoint is increase by 2%.			

back to Logical binary inputs alphabetically

Emergency MAN

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	45		
Description			

This input is designed to allow the gen-set or breakers to be controlled externally, not by the controller. This feature can be useful in case of some failure, which disables the gen-set or breakers to be controlled by the controller, but the gen-set itself is operational.

The controller behaves in the following way:

- Shows the text EmergMan in the engine status on the main screen.
- Stops all functions regarding the gen-set or breaker control, deactivates all outputs related to it.
- Stop Fail alarm is not being evaluated and stop solenoid is not activated if nonzero speed is detected.
- When the input is deactivated, the controller takes control according to the situation in the moment of deactivation, i.e. the gen-set remains running loaded if it was running and GCB was closed in the moment the input was deactivated.

back to Logical binary inputs alphabetically

Emergency Stop

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	40		
Description			
The shutdown procedure will start immediately when this input is activated. Input is inverted (NC = normaly closed) in default configuration. ***Note:*** *In case of controller hardware or software fail, safe stop of the engine doesn't have to be ensured. To back-up the Emergency Stop function it is recommended to connect separate circuit for disconnection of Fuel Solenoid and Starter signals.* For more detail see chapter recommended wiring.			

back to Logical binary inputs alphabetically

LBI: F

Fault Reset Button

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	191		
Description			
Binary input has the same function as Fault Reset button on the InteliLite front panel.			

back to Logical binary inputs alphabetically

Force Regeneration

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	680		
Description			
When this binary input is activated, the controller send request for force regeneration of DPF (diesel particulate filter) to ECU. ***Note:*** *ECU with Tier IV support is required for proper functionality.*			

back to Logical binary inputs alphabetically

Fuel Level

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	626		
Description			

Binary input for **FUEL LEVEL (PAGE 668)** protection.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
BOC	Binary input is used for BOC (Breaker Open and Cooling) protection.
Sd	Binary input is used for shutdown protection.

back to Logical binary inputs alphabetically

Fuel Pump On/Off

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	694		
Description			

This binary input is used for manual control of binary output **FUEL PUMP (PAGE 602)**. The output is deactivated automatically as soon as fuel level reaches 100%.

Note: *This binary input is basically designed for ON and OFF switch (switch with arrestment in these positions) because controller reacts to rising and falling edge of signal in this input.*

> **IMPORTANT: When binary input FUEL PUMP ON/OFF (PAGE 555) is configured then binary output FUEL PUMP (PAGE 602) is control by this binary input. Setpoints Fuel Pump On (page 233) and Fuel Pump Off (page 234) are not evaluated!**

> **IMPORTANT: It is necessary to configure analog input FUEL LEVEL (PAGE 668) for proper function of this binary input.**

back to Logical binary inputs alphabetically

LBI: G

GCB Button

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	193		
Description			

Binary input has the same function as GCB button I/O on the InteliLite front panel. It is evaluated in MAN mode only.

back to Logical binary inputs alphabetically

GCB Feedback

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	63		
Description			

Use this input for indication whether the generator circuit breaker is open or closed.

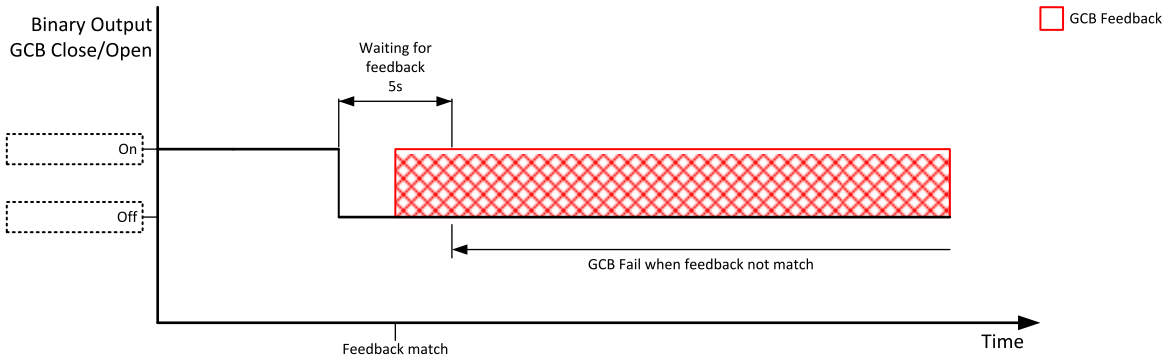


Image 8.133 GCB Feedback 1

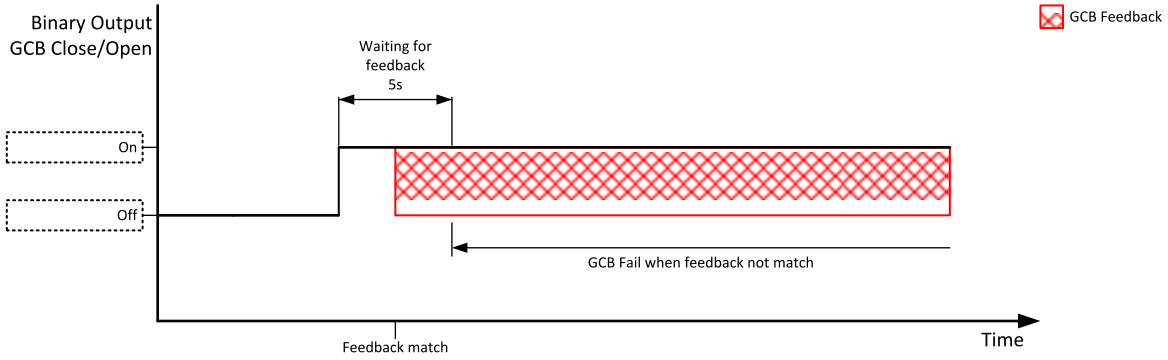


Image 8.134 GCB Feedback 2

Note: *InteliLite controller can work even without breaker feedbacks, in this case do not configure the feedback to binary inputs.*

back to Logical binary inputs alphabetically

Geo Home Position

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	219		
Description			

This binary input can be used to adjust home position of gen-set. In case that binary input is active, setpoints **Home Latitude (page 346)** and **Home Longitude (page 346)** are adjusted automatically from actual coordinates from GPS signal.

Note: *Input has to be activated for at least 2 seconds.*

back to Logical binary inputs alphabetically

Geo-Fencing Enabled

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	218		
Description			
This binary input enables or disables **Fence 1 Protection (page 349)** and **Fence 2 Protection (page 350)** if **Geo-Fencing (page 348)** is adjusted to value "LBI Enable".			

back to Logical binary inputs alphabetically

LBI: H

Horn Reset Button

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	192		
Description			
Binary input has the same function as Horn reset button on the InteliLite front panel.			

back to Logical binary inputs alphabetically

LBI: I

Idle Speed

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	624		
Description			
This binary input changes cooling speed from nominal to idle.			

back to Logical binary inputs alphabetically

LBI: L

Lang Selection 1

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	107		

Description

Use this binary input with binary input **LANG SELECTION 2 (PAGE 558)** and **LANG SELECTION 3 (PAGE 559)** to choose required language of controller. The system is based on binary numbers.

Binary input	Binary number	Active language
Language Selection 1 is active	1	First language (English)
LANG SELECTION 2 (PAGE 558) is active	2	Second language
Language Selection 1 and **LANG SELECTION 2 (PAGE 558)** are active	3	Third language
LANG SELECTION 3 (PAGE 559) is active	4	Fourth language
Language Selection 1 and **LANG SELECTION 3 (PAGE 559)** are active	5	Fifth language

back to Logical binary inputs alphabetically

Lang Selection 2

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	108		

Description

Use this binary input with binary input **LANG SELECTION 1 (PAGE 558)** and **LANG SELECTION 3 (PAGE 559)** to choose required language of controller. The system is based on binary numbers.

Binary input	Binary number	Active language
LANG SELECTION 1 (PAGE 558) is active	1	First language (English)
Lang Selection 2 is active	2	Second language
LANG SELECTION 1 (PAGE 558) and Lang Selection 2 are active	3	Third language
LANG SELECTION 3 (PAGE 559) is active	4	Fourth language
LANG SELECTION 1 (PAGE 558) and **LANG SELECTION 3 (PAGE 559)** are active	5	Fifth language

back to Logical binary inputs alphabetically

Lang Selection 3

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	109		
Description			

Use this binary input with binary input **LANG SELECTION 1 (PAGE 558)** and **LANG SELECTION 2 (PAGE 558)** to choose required language of controller. The system is based on binary numbers.

Binary input	Binary number	Active language
Language Selection 1 is active	1	First language (English)
LANG SELECTION 2 (PAGE 558) is active	2	Second language
Language Selection 1 and **LANG SELECTION 2 (PAGE 558)** are active	3	Third language
Lang Selection 3 (page 1) is active	4	Fourth language
LANG SELECTION 1 (PAGE 558) and Lang Selection 3 (page 1) are active	5	Fifth language

back to Logical binary inputs alphabetically

LBI: M

Mains Fail Block

Related FW	1.9.0	Related applications	AMF
Comm object	622		
Description			

If the input is closed, the automatic start of the gen-set at Mains failure is blocked. In case of running gen-set in AUTO mode, timer **Mains Return Delay (page 255)** is started and when it elapses GCB is opened, gen-set goes to cooling procedure and stops. When GCB is opened after **Transfer Delay (page 256)** the MCB is closed.

Note: *This input simulates healthy Mains.*

back to Logical binary inputs alphabetically

MCB Button

Related FW	1.9.0	Related applications	AMF
Comm object	194		
Description			

This binary input has the same function as MCB button I/O on the InteliLite front panel. It is evaluated in MAN mode only.

back to Logical binary inputs alphabetically

MCB Feedback

Related FW	1.9.0	Related applications	AMF
Comm object	65		

Description

Use this input for indication whether the mains circuit breaker is open or closed.

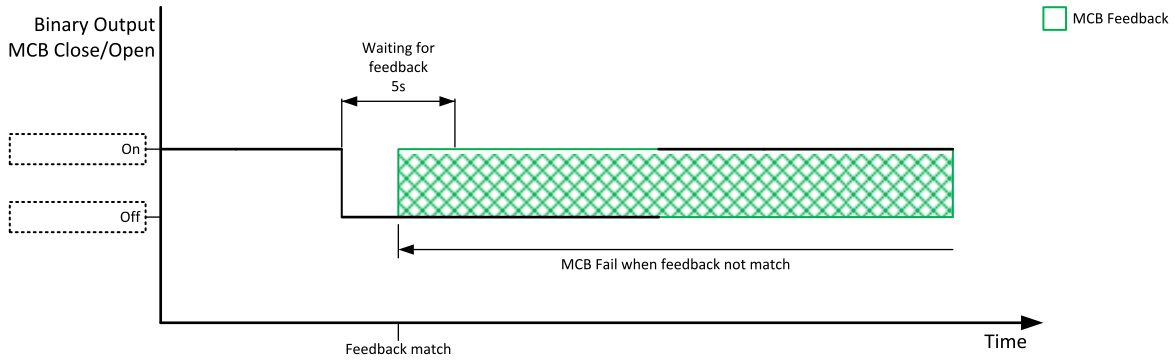


Image 8.135 MCB Feedback 1

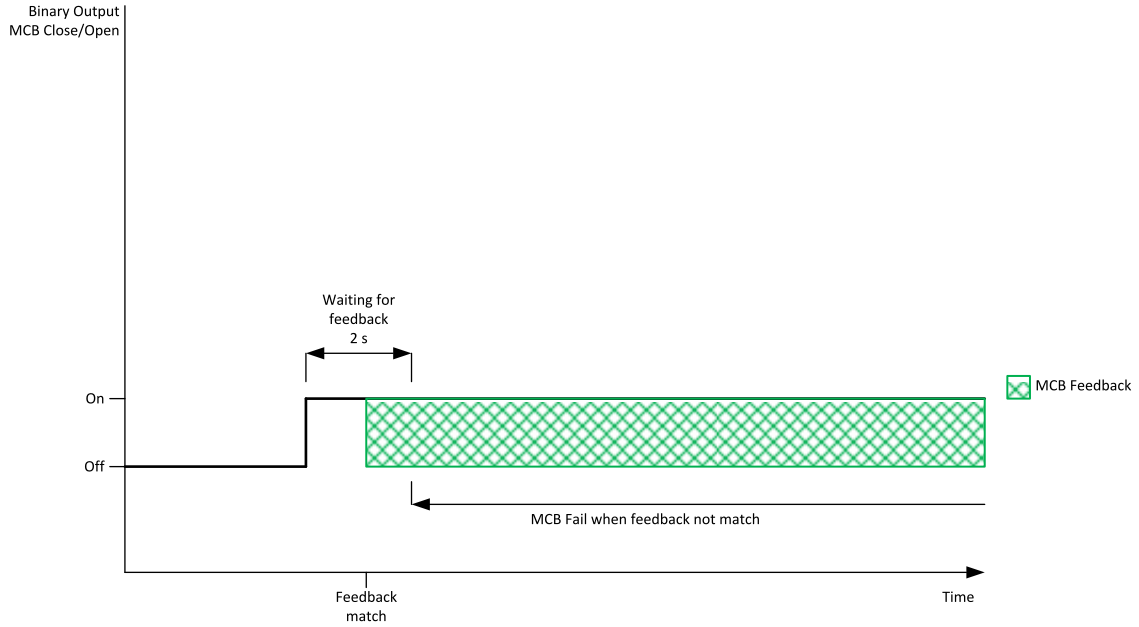


Image 8.136 MCB Feedback 2

Note: *InteliLite controller can work even without breaker feedbacks, in this case do not configure the feedback to binary inputs.*

back to Logical binary inputs alphabetically

LBI: N

Not Used

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	184		
Description			
Binary input has no function. Use this configuration when binary input is not used.			

back to Logical binary inputs alphabetically

LBI: O

Oil Pressure

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	43		
Description			

Binary input for **OIL PRESSURE (PAGE 670)** protection.

Protection types

Monitoring	Binary input is not used for protection or any other function. Signal is only monitored.
HistRecOnl	Binary input is not used for protection. Only history record is made if binary input is active.
Wrn	Binary input is used for warning protection only.
Sd	Binary input is used for shutdown protection.

IMPORTANT: This binary input is also used for evaluating engine running condition.

Example: Normally close connection - when LBI is closed then oil pressure is OK and is higher than starting oil pressure.

Note: *In case that you want to use binary input of oil pressure sensor just for protection please use one of the* ***BIN PROTECTION 1 (PAGE 526)****.*

back to Logical binary inputs alphabetically

LBI: P

Protection Enable

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	920		
Description			
This logic binary input enables or disables protections adjusted as LBI Enable.			

back to Logical binary inputs alphabetically

Pulse Counter 1

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	87		
Description			
This is the input of the Pulse Counter 1 function. The module counts pulses at the input and if the input pulses counter reaches value given by the setpoint **Conversion Coefficient Pulse 1 (page 238)** the counter value **Pulse Counter 1 (page 496)** is increased by 1 and input pulses counter is reset to 0. Both counter value and input pulses counter are stored in the nonvolatile memory.			

back to Logical binary inputs alphabetically

Pulse Counter 2

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	88		
Description			
This is the input of the Pulse Counter 2 function. The module counts pulses at the input and if the input pulses counter reaches value given by the setpoint **Conversion Coefficient Pulse 2 (page 238)** the counter value **Pulse Counter 2 (page 496)** is increased by 0,1 and input pulses counter is reset to 0. Both counter value and input pulses counter are stored in the nonvolatile memory.			

back to Logical binary inputs alphabetically

LBI: R

Regeneration Inhib

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	679		
Description			
When this binary input is activated, the controller sends request to inhibit regeneration of DPF (diesel particulate filter) to ECU. ***Note:*** *ECU with Tier IV support is required for proper functionality.*			

back to Logical binary inputs alphabetically

Remote AUTO

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	620		
Description			
The controller is switched to the AUTO mode (there are four modes OFF / MAN / AUTO / TEST) when this binary input is closed. When opens controller is switched back to previous mode. This binary input has the lowest priority from Remote OFF / MAN / AUTO / TEST binary inputs Remote control priority: ▶ Remote OFF (Highest priority) ▶ Remote TEST ▶ Remote MAN ▶ Remote AUTO (Lowest Priority)			

back to Logical binary inputs alphabetically

Remote Ctrl Lock

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	4		
Description			
If the input is active, the controller will not accept any actions regarding the system control – e.g. writing of commands and setpoint changes via remote communication interfaces.			

back to Logical binary inputs alphabetically

Remote MAN

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	618		
Description			
The controller is switched to the MAN mode (there are four modes OFF / MAN / AUTO / TEST) when this binary input is closed. When opens controller is switched back to previous mode. Remote control priority: ▶ Remote OFF (Highest priority) ▶ Remote TEST ▶ Remote MAN ▶ Remote AUTO (Lowest Priority)			

back to Logical binary inputs alphabetically

Remote OFF

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	617		
Description			

The controller is switched to the OFF mode (there are four modes OFF / MAN / AUTO / TEST) when this binary input is closed. When opens controller is switched back to previous mode.

Remote control priority:

- Remote OFF (Highest priority)
- Remote TEST
- Remote MAN
- Remote AUTO (Lowest Priority)

back to Logical binary inputs alphabetically

Remote Start/Stop

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	38		
Description			

Use this input to start and stop the gen-set in AUTO mode.

Note: *If the binary input Remote Start/Stop is active and engine is running and mains failure occurs, the MCB breaker opens, after* ***Transfer Delay (page 256)*** *the GCB breaker is closed. Once the mains is OK, the* ***Mains Return Delay (page 255)*** *elapses and the GCB breaker is opened. Then after* ***Transfer Delay (page 256)*** *is MCB breaker closed. Gen-set remains running as long as binary input Rem Start/Stop is active. For more details see timing diagram below.*

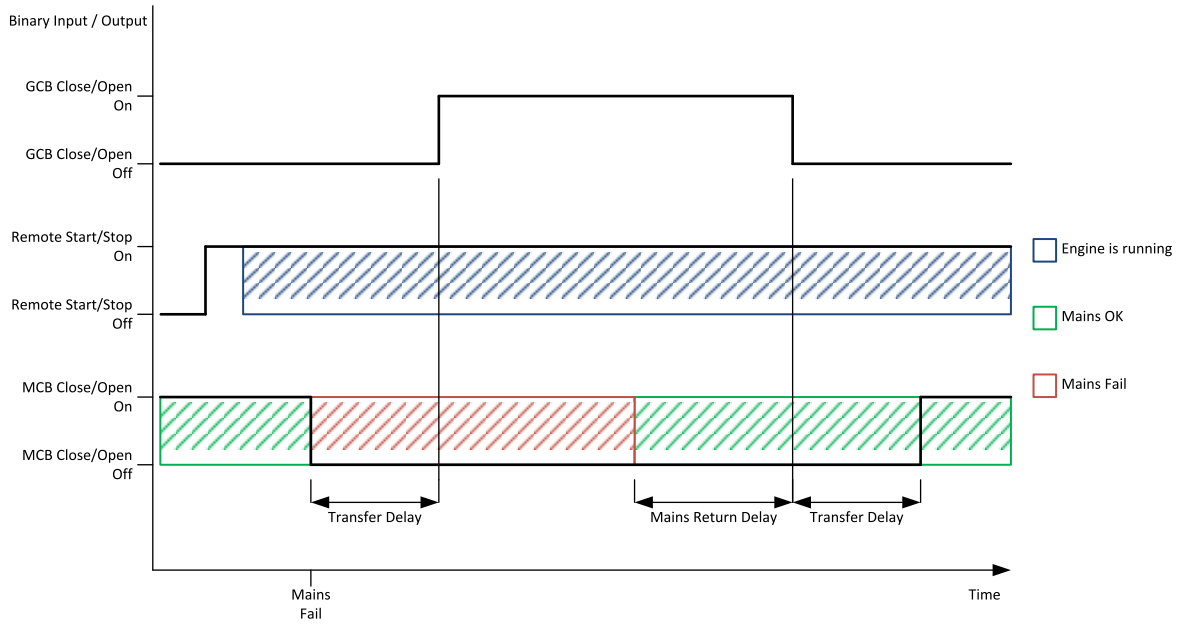


Image 8.137 Remote Start/Stop

back to Logical binary inputs alphabetically

Rem TEST On Load

Related FW	1.9.0	**Related applications**	AMF
Comm object	61		
Description			
When input is closed, the controller automatically transfers load from the mains to the gen-set. Load is automatically transferred back to the mains when any gen-set shut down protection activates.			

back to Logical binary inputs alphabetically

Remote TEST

Related FW	1.9.0	**Related applications**	AMF
Comm object	621		
Description			

The controller is switched to the TEST mode (there are four modes OFF / MAN / AUTO / TEST) when this binary input is closed. When opens controller is switched back to previous mode.

Remote control priority:

- Remote OFF (Highest priority)
- Remote TEST
- Remote MAN
- Remote AUTO (Lowest Priority)

back to Logical binary inputs alphabetically

LBI: S

Sd Override

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	44		
Description			

If this input is active, all alarms except Emergency Stop and Overspeed are suppressed. The suppressed alarms will be displayed in the alarm list, but they will not take effect regarding the gen-set control.

> ***Note:*** *Sd Override (page 565) is indicated in the alarm list if Sd Override mode is active to inform the operator that the engine is not protected.*

> **IMPORTANT: MISUSE OF THIS INPUT CAN CAUSE DAMAGE TO THE GEN-SET!**

back to Logical binary inputs alphabetically

Start Button

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	189		
Description			

Binary input has the same function as Start Button  on the InteliLite front panel. It is evaluated in MAN mode only.

back to Logical binary inputs alphabetically

Stop Button

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	190		
Description			
Binary input has the same function as Stop Button  on the InteliLite front panel. It is evaluated in MAN Mode only.			

back to Logical binary inputs alphabetically

8.1.4 Logical binary outputs

What Logical binary outputs are:

Logical binary outputs are outputs for binary values and functions.

Alphabetical groups of Logical binary outputs

LBO: A 570
LBO: B 593
LBO: C 597
LBO: D 598
LBO: E 599
LBO: F 602
LBO: G 604
LBO: H 611
LBO: I 612
LBO: M 614
LBO: N 620
LBO: P 621
LBO: R 623
LBO: S 632
LBO: T 636
LBO: V 636

For full list of Logical binary outputs go to the chapter **Logical binary outputs alphabetically (page 568)**.

Logical binary outputs alphabetically

Air Valves 570
AL AIN 1 Sd+BOC 570
AL AIN 1 Wrn 570
AL AIN 2 Sd+BOC 571
AL AIN 2 Wrn 571
AL AIN 3 Sd+BOC 571
AL AIN 3 Wrn 571
AL AIN 4 Sd+BOC 571
AL AIN 4 Wrn 572
AL Battery Flat 572
AL Battery Charger 572
AL Battery Overvoltage 572
AL Battery Undervoltage 572
AL Battery Voltage 573
AL Common BOC 573
AL Common Fls 573
AL Common Sd 573
AL Common Wrn 574
AL CoolantTemp Low 574
AL CoolantTemp Sd 574
AL CoolantTemp Wrn 574
AL D+ Fail 575
AL Dual Master Fail 575
AL Dual Slave Fail 575
AL Earth Fault 575
AL Fence 1 575
AL Fence 2 576
AL Fuel Level Sd 576
AL Fuel Level Wrn 576
AL Gen Freq Wrn 576
AL Gen Frequency 576
AL Gen Overfrequency 577
AL Gen Overvoltage 577
AL Gen Underfrequency 577
AL Gen Undervoltage 577
AL Gen Voltage Wrn 577
AL Gen Voltage 578
AL Mains Fail 578
AL Mains Frequency 578
AL Mains Voltage 578
AL Maintenance 1 578
AL Maintenance 2 579
AL Maintenance 3 579
AL Oil Press Sd 579
AL Oil Press Wrn 579
AL Overcurrent 579
AL Overload BOC 580
AL Overload Wrn 580
AL Overspeed 580
AL Rental Timer 1 580
AL Rental Timer 2 581
AL Start Fail 581
AL Stop Fail 581
AL Underspeed 581
Alarm 582
AIN Switch01 582
AIN Switch02 583
AIN Switch03 583
AIN Switch04 584
AIN Switch05 584
AIN Switch06 585
AIN Switch07 585
AIN Switch08 586
AIN Switch09 586
AIN Switch10 587
AIN Switch11 587
AIN Switch12 588
AIN Switch13 588
AIN Switch14 589
AIN Switch15 589
AIN Switch16 590
AIN Switch17 590
AIN Switch18 591
AIN Switch19 591
AIN Switch20 592
ATT DEF Level Lamp 592
ATT Filter Lamp 592
ATT HEST Lamp 592
ATT Inhibited Lamp 593
ATT SCR Error Lamp 593
BIN 1 Status 593
BIN 2 Status 594
BIN 3 Status 594
BIN 4 Status 595
BIN 5 Status 595
BIN 6 Status 596
BIN 7 Status 596
BIN 8 Status 597
Choke 597
Cooling Pump 598
Cooling 598
Dual Operation Error 598
Dual Operation OK 598
ECU Communic Error 599
ECU Communic OK 599
ECU Power Relay 600
ECU Red Lamp 600
ECU Run Stop 601
ECU Wait To Start 601
ECU Yellow Lamp 601
Exercise Timer 1 601
Exercise Timer 2 601
Fault Reset 602
Frequency Select 602
Fuel Pump 602
Fuel Solenoid 602
GCB Close/Open 604
GCB OFF Coil 606
GCB ON Coil 607
GCB UV Coil 607
Generator Healthy 609

Glow Plugs 609
Heartbeat 611
Horn 611
Idle/Nominal 612
Ignition 612
Ignition On 613
Mains Healthy 614
Manual Ready 614
MCB Close/Open 614
MCB OFF Coil 616
MCB ON Coil 617
MCB UV Coil 618
Mode AUTO 619
Mode MAN 620
Mode OFF 620
Mode TEST 620
Not In AUTO 620
Not Used 620
Power Switch 621
Prestart 621
Ready To AMF 623
Ready To Load 623
Ready 623
Regen Needed 624
Remote Control 01 624
Remote Control 02 624
Remote Control 03 625
Remote Control 04 625
Remote Control 05 626
Remote Control 06 626
Remote Control 07 627
Remote Control 08 627
Remote Control 09 628
Remote Control 10 628
Remote Control 11 629
Remote Control 12 629
Remote Control 13 630
Remote Control 14 630
Remote Control 15 631
Remote Control 16 631
Running 632
Sd Override 632
Starter 633
Still Log 0 633
Still Log 1 633
Stop Pulse 634
Stop Solenoid 634
Supplying Load 635
Swap Start 635
Temperature Switch 636
Ventilation 636
Ventilation Off Pulse 636
Ventilation On Pulse 637

LBO: A

Air Valves

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1247		
Description			
This output closes together with binary output **PRESTART (PAGE 621)** and opens after the engine is stopped or in case that engine is not ready.			

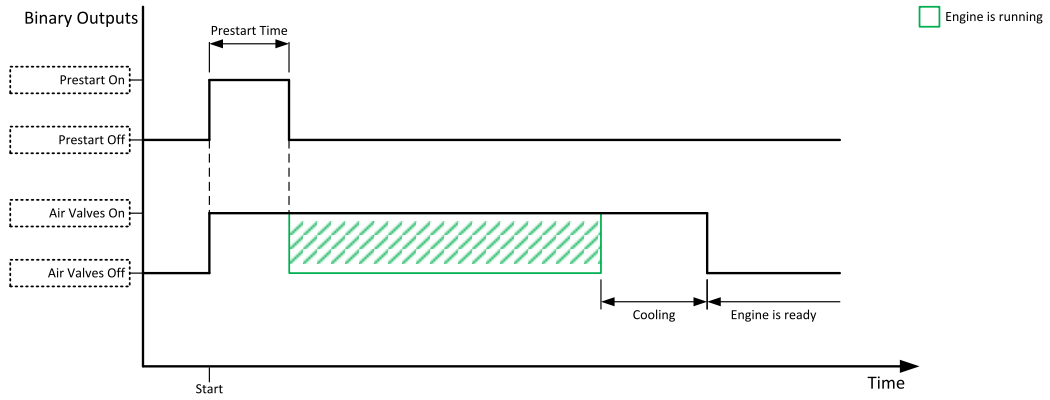


Image 8.138 Air Valves

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AL AIN 1 Sd+BOC

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1386		
Description			
The output is closed when there is the shutdown or BOC alarm from the analog input 1 of the controller present in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL AIN 1 Wrn

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1382		
Description			
The output is closed when there is the warning alarm from the analog input 1 of the controller present in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL AIN 2 Sd+BOC

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1387		
Description			
The output is closed when there is the shutdown or BOC alarm from the analog input 2 of the controller present in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL AIN 2 Wrn

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1383		
Description			
The output is closed when there is the warning alarm from the analog input 2 of the controller present in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL AIN 3 Sd+BOC

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1388		
Description			
The output is closed when there is the shutdown or BOC alarm from the analog input 3 of the controller present in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL AIN 3 Wrn

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1384		
Description			
The output is closed when there is the warning alarm from the analog input 3 of the controller present in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL AIN 4 Sd+BOC

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1389		
Description			
The output is closed when there is the shutdown or BOC alarm from the analog input 4 of the controller present in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL AIN 4 Wrn

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1385		
Description			
The output is closed when there is the warning alarm from the analog input 4 of the controller present in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL Battery Flat

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1292		
Description			
This output is active when the Sd Battery Flat (page 712) or Wrn Battery < Voltage (page 692) alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Battery Charger

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1272		
Description			
This output is active when the Battery Charger Fail (page 689) alarm is present in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL Battery Overvoltage

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1995		
Description			
This output is active when the Wrn Battery > Voltage (page 692) alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Battery Undervoltage

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1994		
Description			
This output is active when the Wrn Battery < Voltage (page 692) alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Battery Voltage

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1293		
Description			
This output is active when the Wrn Battery > Voltage (page 692) or Wrn Battery < Voltage (page 692) alarm is present in the alarmlist or isn't confirm.			

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AL Common BOC

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9		
Description			
Output closes when any BOC alarm appears. The output opens, if: ▶ No BOC alarm is active and ▶ Fault reset button is pressed			

back to Logical binary outputs alphabetically

AL Common FIs

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	6		
Description			
Output closes when any sensor fail alarm appears. The output opens, if: ▶ No sensor fail alarm is active and ▶ Fault reset button is pressed			

back to Logical binary outputs alphabetically

AL Common Sd

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	4		
Description			
Output closes when any shutdown alarm appears. The output opens, if: ▶ No shutdown alarm is active and ▶ Fault reset button is pressed			

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AL Common Wrn

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	3		
Description			
Output closes when any warning alarm appears. The output opens, if: ▶ No warning alarm is active and ▶ Fault reset button is pressed			

back to Logical binary outputs alphabetically

AL CoolantTemp Low

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1295		
Description			
The output is closed when there is the Wrn Coolant Temperature Low (page 693) alarm from the COOLANT TEMP (PAGE 667) in the alarmlist or isn't confirmed.			

Logical binary outputs alphabetically (page 568)

AL CoolantTemp Sd

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1421		
Description			
The output is closed when there is the shutdown or BOC alarm from the COOLANT TEMP (PAGE 667) in the alarmlist or isn't confirmed.			

Logical binary outputs alphabetically (page 568)

AL CoolantTemp Wrn

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1420		
Description			
The output is closed when there is the warning alarm from the COOLANT TEMP (PAGE 667) in the alarmlist or isn't confirmed. ***Note:*** *Binary output is also active if protection type is set to HistRecOnl and threshold level for history record is reach.*			

back to Logical binary outputs alphabetically

AL D+ Fail

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1260		
Description			
This output is active when the **Wrn Charging Alternator Fail (page 692)** alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Dual Master Fail

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	2098		
Description			
This LBO is active when there is alarm of 2nd level on Master controller.			

back to Logical binary outputs alphabetically

AL Dual Slave Fail

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	2099		
Description			
This LBO is active when there is alarm of 2nd level on Slave controller.			

back to Logical binary outputs alphabetically

AL Earth Fault

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1294		
Description			
This output is active when the **Sd Earth Fault Current (page 713)** alarm is present in alarm list or isn't confirm. ***Note:*** *It is strongly recommended to use this output only onetime.*			

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AL Fence 1

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1548		
Description			
This output is active when the **Wrn Fence 1 Alarm (page 693)** or **BOC Fence 1 Alarm (page 722)** or **Sd Fence 1 Alarm (page 714)** (depends on configuration of alarm type) alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Fence 2

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1549		
Description			
This output is active when the **Wrn Fence 2 Alarm (page 694)** or **BOC Fence 2 Alarm (page 723)** or **Sd Fence 2 Alarm (page 714)** (depends on configuration of alarm type) alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Fuel Level Sd

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1423		
Description			
The output is closed when there is the shutdown or BOC alarm from the **FUEL LEVEL (PAGE 668)** in the alarmlist or isn't confirmed.			

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AL Fuel Level Wrn

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1422		
Description			
The output is closed when there is the warning alarm from the **FUEL LEVEL (PAGE 668)** in the alarmlist or isn't confirmed. ***Note:*** *Binary output is also active if protection type is set to HistRecOnl and threshold level for history record is reach.*			

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AL Gen Freq Wrn

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1267		
Description			
This output is active generator frequency warning alarm is present in alarmlist or isn't confirm.			

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AL Gen Frequency

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1266		
Description			
This output is active when at least one generator frequency BOC or Sd alarm is present in alarmlist or isn't confirm.			

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AL Gen Overfrequency

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1264		
Description			
This output is active when at least one generator overfrequency alarm is present in alarmlist or isn't confirm.			

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AL Gen Overvoltage

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1261		
Description			
This output is active when at least one generator overvoltage alarm is present in alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Gen Underfrequency

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1265		
Description			
This output is active when at least one generator underfrequency alarm is present in alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Gen Undervoltage

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1262		
Description			
This output is active when at least one generator undervoltage alarm is present in alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Gen Voltage Wrn

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1289		
Description			
This output is active when at least one generator voltage warning alarm is present in alarmlist or isn't confirm.			

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AL Gen Voltage

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1263		
Description			
This output is active when at least one generator voltage BOC or Sd alarm is present in alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Mains Fail

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	197		
Description			
Output for signaling Mains Failure. This output is active when at least one mains frequency BOC or Sd alarm or at least one mains voltage BOC or Sd alarm is present in alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL Mains Frequency

Related FW	1.9.0	**Related applications**	AMF
Comm object	1271		
Description			
This output is active when at least one mains frequency BOC or Sd alarm is present in alarmlist or isn't confirm.			

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AL Mains Voltage

Related FW	1.9.0	**Related applications**	AMF
Comm object	1270		
Description			
This output is active when at least one mains voltage BOC or Sd alarm is present in the alarmlist or isn't confirm.			

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AL Maintenance 1

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1254		
Description			
This output is active when the Alarm Maintenance 1 is present in the alarmlist. It means that counter of maintenance is on zero or the Alarm Maintenance 1 isn't confirm.			

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AL Maintenance 2

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1255		
Description			
This output is active when the Alarm Maintenance 2 is present in the alarmlist. It means that counter of maintenance is on zero or the Alarm Maintenance 2 isn't confirm.			

back to Logical binary outputs alphabetically

AL Maintenance 3

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1256		
Description			
This output is active when the Alarm Maintenance 3 is present in the alarmlist. It means that counter of maintenance is on zero or the Alarm Maintenance 3 isn't confirm.			

back to Logical binary outputs alphabetically

AL Oil Press Sd

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1419		
Description			
The output is closed when there is the shutdown alarm from the **OIL PRESSURE (PAGE 670)** in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL Oil Press Wrn

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1418		
Description			
The output is closed when there is the warning alarm from the **OIL PRESSURE (PAGE 670)** in the alarmlist or isn't confirmed. ***Note:*** *Binary output is also active if protection type is set to HistRecOnl and threshold level for history record is reach.*			

back to Logical binary outputs alphabetically

AL Overcurrent

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	109		
Description			
This output is active when the **BOC Overcurrent IDMT (page 726)** or **BOC Short Circuit (page 727)** alarm is present in alarmlist or isn't confirm.			

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AL Overload BOC

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1268		
Description			
This output is active when the **Sd Overload (page 720)** alarm is present in the alarmlist or isn't confirm.			

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AL Overload Wrn

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1269		
Description			
This output is active when the **Wrn Overload (page 700)** alarm is present in alarmlist or isn't confirm.			

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AL Overspeed

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	779		
Description			
This output is active when the **Sd Overspeed (page 720)** alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Rental Timer 1

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1370		
Description			
The binary output closes when the **Rental Timer 1 (page 341)** elapsed.			

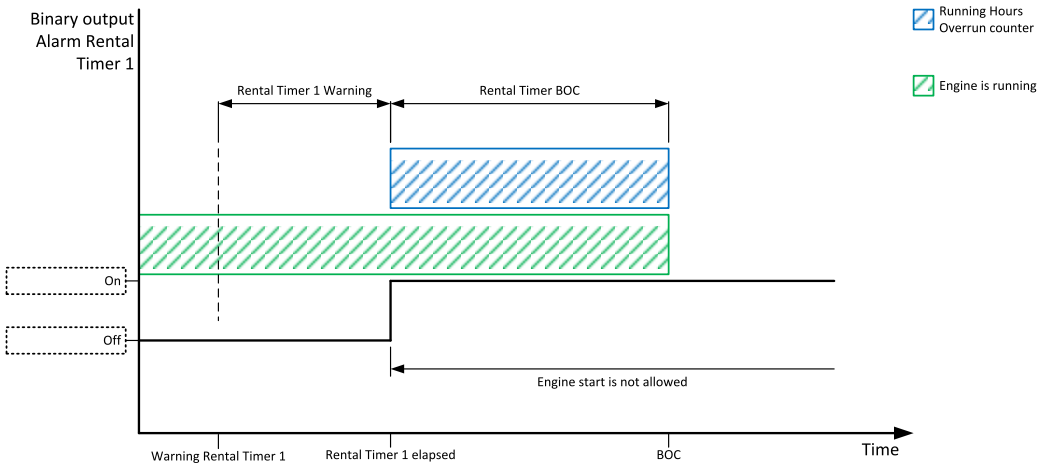


Image 8.139 Rental Timer 1

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AL Rental Timer 2

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1371		
Description			
The binary output closes when the **Rental Timer 2 (page 343)** elapsed.			

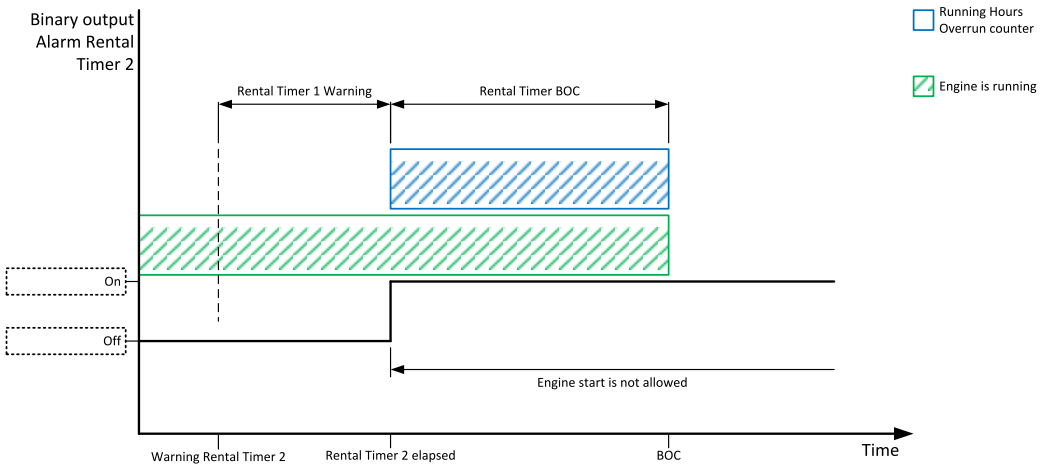


Image 8.140 Rental Timer 2

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AL Start Fail

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1291		
Description			
This output is active when the **Sd Start Fail (page 721)** alarm is present in the alarmlist or isn't confirm.			

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AL Stop Fail

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	339		
Description			
This output is active when the **Wrn Stop Fail (page 701)** alarm is present in the alarmlist or isn't confirm.			

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AL Underspeed

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1296		
Description			
This output is active when the **Sd Underspeed (page 721)** alarm is present in the alarmlist or isn't confirm.			

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Alarm

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2		
Description			
The output is designed to be used as external alarm indication such as a red bulb in the control room etc. The output is active when at least one unconfirmed alarm is present in the alarmlist and remains active until confirmation of alarm.			

back to Logical binary outputs alphabetically

AIN Switch01

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1400		
Description			
This is an output from the General Analog Input 1 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 1 On (page 267)** and **Analog Switch 1 Off (page 268)**. The value is measured from **AIN SWITCH 01 (PAGE 660)** analog input.			

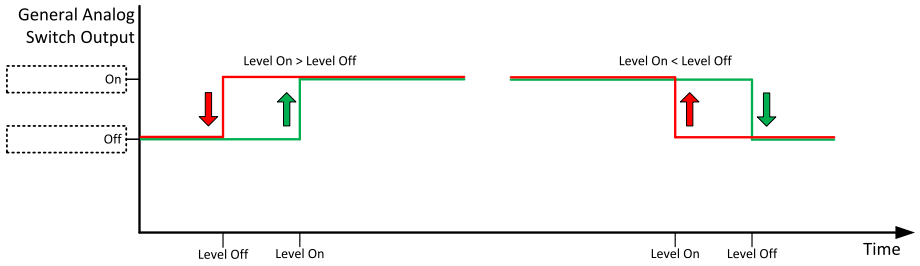


Image 8.141 General analog input 1 switch

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AIN Switch02

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1401		
Description			
This is an output from the General Analog Input 2 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 2 On (page 270)** and **Analog Switch 2 Off (page 271)**. The value is measured from **AIN SWITCH 02 (PAGE 660)** analog input.			

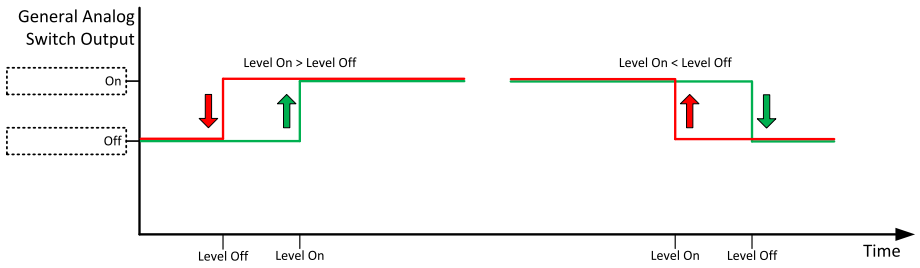


Image 8.142 General analog input 2 switch

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AIN Switch03

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1402		
Description			
This is an output from the General Analog Input 3 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 3 On (page 273)** and **Analog Switch 3 Off (page 274)**. The value is measured from **AIN SWITCH 03 (PAGE 660)** analog input.			

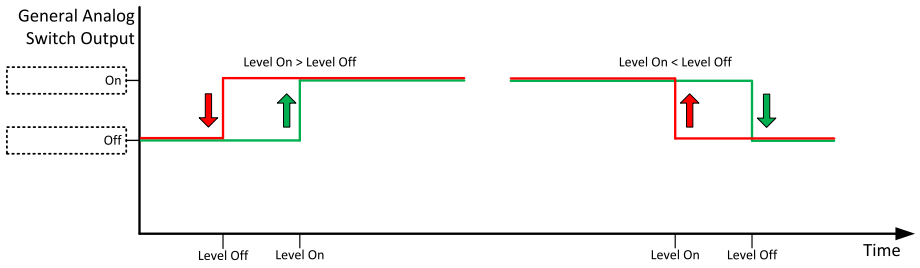


Image 8.143 General analog input 3 switch

back to Logical binary outputs alphabetically

AIN Switch04

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1403		
Description			
This is an output from the General Analog Input 4 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 4 On (page 276)** and **Analog Switch 4 Off (page 277)**. The value is measured from **AIN SWITCH 04 (PAGE 661)** analog input.			



Image 8.144 General analog input 4 switch

Logical binary outputs alphabetically (page 568)

AIN Switch05

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1787		
Description			
This is an output from the General Analog Input 5 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 5 On (page 279)** and **Analog Switch 5 Off (page 280)**. The value is measured from **AIN SWITCH 05 (PAGE 661)** analog input.			



Image 8.145 General analog input 5 switch

Logical binary outputs alphabetically (page 568)

AIN Switch06

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1788		
Description			
This is an output from the General Analog Input 6 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 6 On (page 282)** and **Analog Switch 6 Off (page 283)**. The value is measured from **AIN SWITCH 06 (PAGE 661)** analog input.			



Image 8.146 General analog input 6 switch

Logical binary outputs alphabetically (page 568)

AIN Switch07

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1789		
Description			
This is an output from the General Analog Input 7 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 7 On (page 285)** and **Analog Switch 7 Off (page 286)**. The value is measured from **AIN SWITCH 07 (PAGE 662)** analog input.			



Image 8.147 General analog input 7 switch

Logical binary outputs alphabetically (page 568)

AIN Switch08

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1790		
Description			
This is an output from the General Analog Input 8 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 8 On (page 288)** and **Analog Switch 8 Off (page 289)**. The value is measured from **AIN SWITCH 08 (PAGE 662)** analog input.			



Image 8.148 General analog input 8 switch

Logical binary outputs alphabetically (page 568)

AIN Switch09

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1791		
Description			
This is an output from the General Analog Input 9 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 9 On (page 291)** and **Analog Switch 9 Off (page 292)**. The value is measured from **AIN SWITCH 09 (PAGE 662)** analog input.			

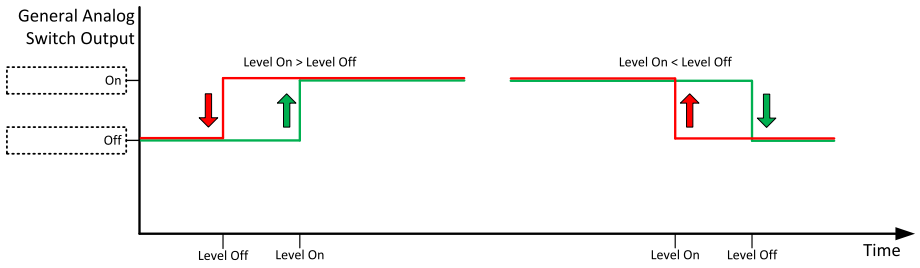


Image 8.149 General analog input 9 switch

Logical binary outputs alphabetically (page 568)

AIN Switch10

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1792		
Description			
This is an output from the General Analog Input 10 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 10 On (page 294)** and **Analog Switch 10 Off (page 295)**. The value is measured from **AIN SWITCH 10 (PAGE 663)** analog input.			

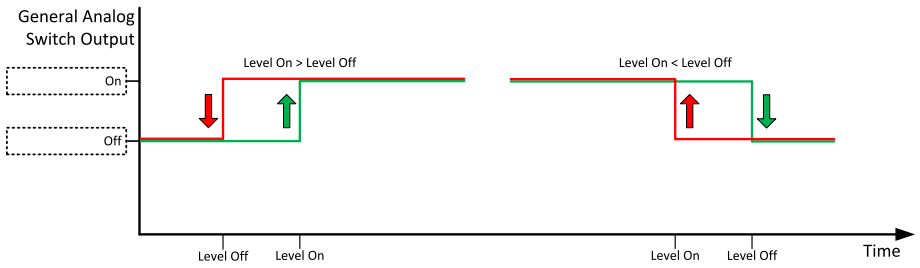


Image 8.150 General analog input 10 switch

Logical binary outputs alphabetically (page 568)

AIN Switch11

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1793		
Description			
This is an output from the General Analog Input 11 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 11 On (page 297)** and **Analog Switch 11 Off (page 298)**. The value is measured from **AIN SWITCH 11 (PAGE 663)** analog input.			

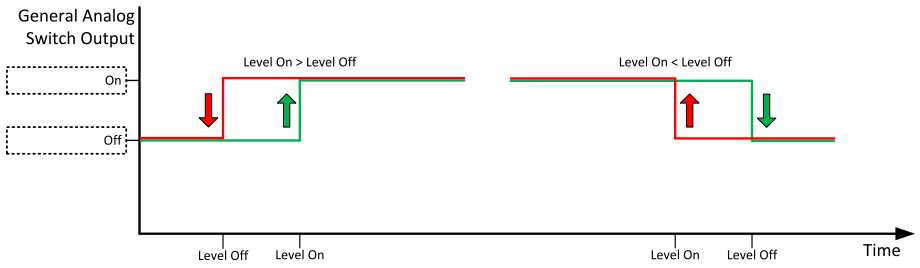


Image 8.151 General analog input 11 switch

Logical binary outputs alphabetically (page 568)

AIN Switch12

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1794		
Description			
This is an output from the General Analog Input 12 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 12 On (page 300)** and **Analog Switch 12 Off (page 301)**. The value is measured from **AIN SWITCH 12 (PAGE 663)** analog input.			



Image 8.152 General analog input 12 switch

Logical binary outputs alphabetically (page 568)

AIN Switch13

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1795		
Description			
This is an output from the General Analog Input 13 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 13 On (page 303)** and **Analog Switch 13 Off (page 304)**. The value is measured from **AIN SWITCH 13 (PAGE 664)** analog input.			



Image 8.153 General analog input 13 switch

Logical binary outputs alphabetically (page 568)

AIN Switch14

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1796		
Description			
This is an output from the General Analog Input 14 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 14 On (page 306)** and **Analog Switch 14 Off (page 307)**. The value is measured from **AIN SWITCH 14 (PAGE 664)** analog input.			



Image 8.154 General analog input 14 switch

Logical binary outputs alphabetically (page 568)

AIN Switch15

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1797		
Description			
This is an output from the General Analog Input 15 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 15 On (page 309)** and **Analog Switch 15 Off (page 310)**. The value is measured from **AIN SWITCH 15 (PAGE 664)** analog input.			



Image 8.155 General analog input 15 switch

Logical binary outputs alphabetically (page 568)

AIN Switch16

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1798		
Description			

This is an output from the General Analog Input 16 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 16 On (page 312)** and **Analog Switch 16 Off (page 313)**. The value is measured from **AIN SWITCH 16 (PAGE 665)** analog input.



Image 8.156 General analog input 16 switch

Logical binary outputs alphabetically (page 568)

AIN Switch17

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1799		
Description			

This is an output from the General Analog Input 17 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 17 On (page 315)** and **Analog Switch 17 Off (page 316)**. The value is measured from **AIN SWITCH 17 (PAGE 665)** analog input.



Image 8.157 General analog input 17 switch

Logical binary outputs alphabetically (page 568)

AIN Switch18

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1800		
Description			
This is an output from the General Analog Input 18 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 18 On (page 318)** and **Analog Switch 18 Off (page 319)**. The value is measured from **AIN SWITCH 18 (PAGE 665)** analog input.			

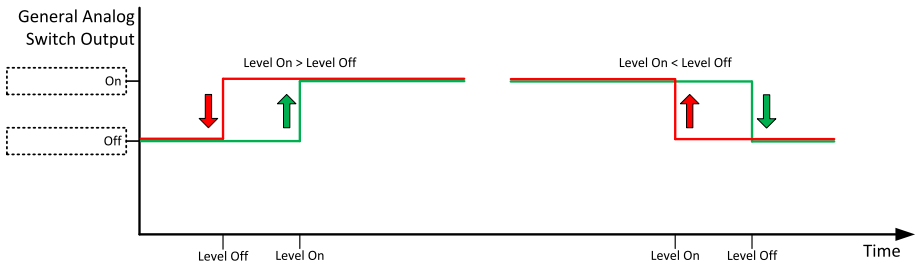


Image 8.158 General analog input 18 switch

Logical binary outputs alphabetically (page 568)

AIN Switch19

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1801		
Description			
This is an output from the General Analog Input 19 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 19 On (page 321)** and **Analog Switch 19 Off (page 322)**. The value is measured from **AIN SWITCH 19 (PAGE 666)** analog input.			

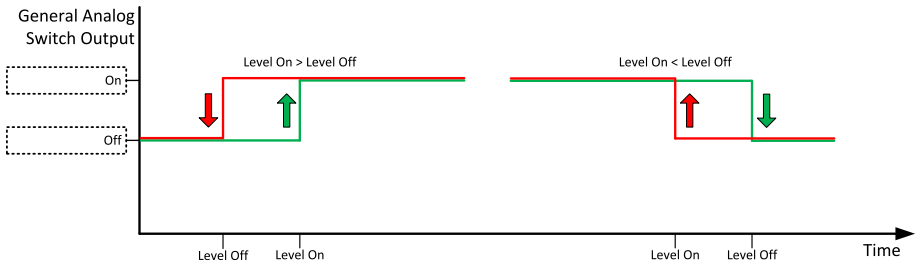


Image 8.159 General analog input 19 switch

Logical binary outputs alphabetically (page 568)

AIN Switch20

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1802		
Description			
This is an output from the General Analog Input 20 switch function. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 20 On (page 324)** and **Analog Switch 20 Off (page 325)**. The value is measured from **AIN SWITCH 20 (PAGE 666)** analog input.			

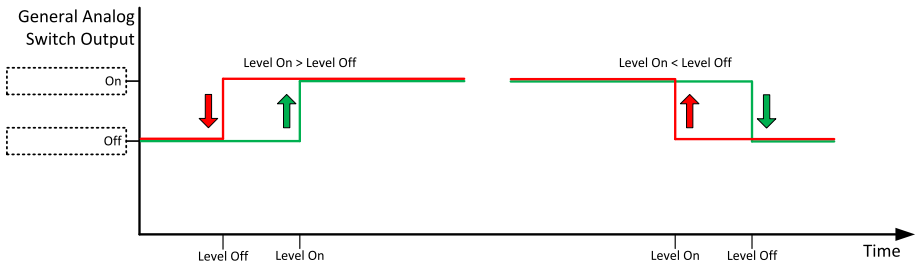


Image 8.160 General analog input 20 switch

Logical binary outputs alphabetically (page 568)

ATT DEF Level Lamp

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2154		
Description			
This output is active when ATT DEF Level Lamp is active.			

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ATT Filter Lamp

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2152		
Description			
This output is active when ATT Filter Lamp is active.			

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ATT HEST Lamp

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1373		
Description			
This output is closed if ECU send signal HEST Lamp. If ECU stop send HEST LAMP signal binary input will be opened without no matter if alarms in alarmlist are confirmed or not.			

back to Logical binary outputs alphabetically

ATT Inhibited Lamp

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	2155		
Description			
This output is active when ATT Inhibited Lamp is active.			

back to Logical binary outputs alphabetically

ATT SCR Error Lamp

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	2153		
Description			
This output is active when ATT SCR Error Lamp is active.			

back to Logical binary outputs alphabetically

LBO: B

BIN 1 Status

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1374		
Description			

This output is closed, when Binary Input 1 is active and open when Binary Input 1 is inactive. When Binary Input 1 is used for BIN protection function then this output is closed when BIN protection alarm is in Alarmlist.

> ***Note:*** *When LBI 1 is used like protection, then state of this LBO is connected with this protection e.g. when LBI is inactive but alarm of protection is not confirm in alarmlist, LBO is still active.*

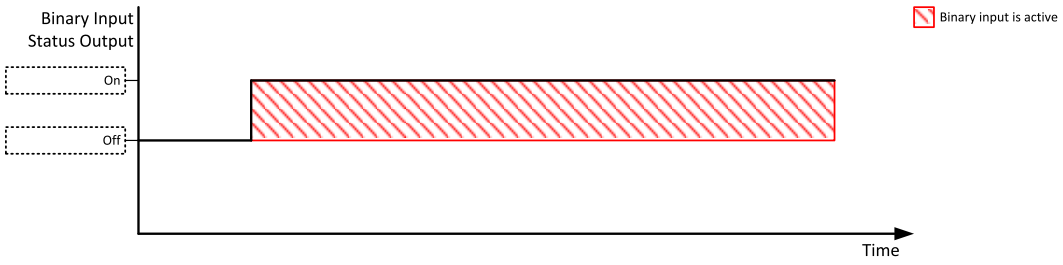


Image 8.161 Binary Input 1 Status

back to Logical binary outputs alphabetically

BIN 2 Status

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1375		
Description			

This output is closed, when Binary Input 2 is active and open when Binary Input 2 is inactive. When Binary Input 2 is used for BIN protection function then this output is closed when BIN protection alarm is in Alarmlist.

Note: *When LBI 2 is used like protection, then state of this LBO is connected with this protection e.g. when LBI is inactive but alarm of protection is not confirm in alarmlist, LBO is still active.*

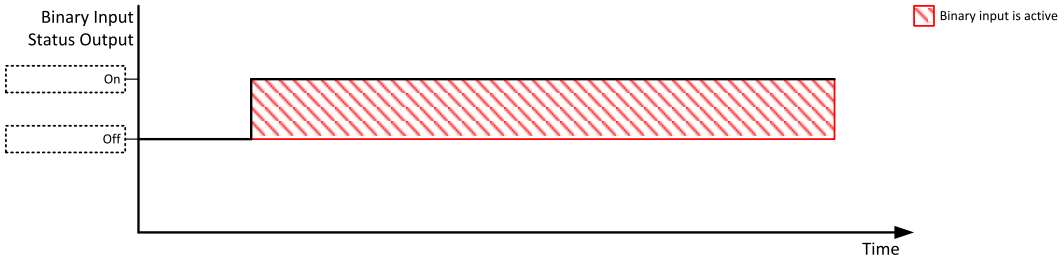


Image 8.162 Binary Input 2 Status

back to Logical binary outputs alphabetically

BIN 3 Status

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1376		
Description			

This output is closed, when Binary Input 3 is active and open when Binary Input 3 is inactive. When Binary Input 3 is used for BIN protection function then this output is closed when BIN protection alarm is in Alarmlist.

Note: *When LBI 3 is used like protection, then state of this LBO is connected with this protection e.g. when LBI is inactive but alarm of protection is not confirm in alarmlist, LBO is still active.*

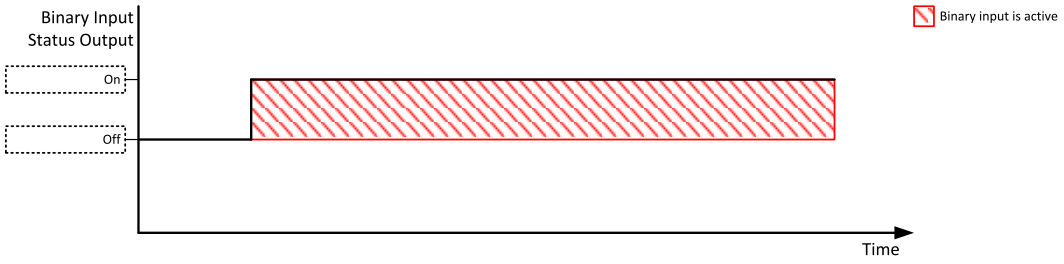


Image 8.163 Binary Input 3 Status

back to Logical binary outputs alphabetically

BIN 4 Status

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1377		
Description			

This output is closed, when Binary Input 4 is active and open when Binary Input 4 is inactive. When Binary Input 4 is used for BIN protection function then this output is closed when BIN protection alarm is in Alarmlist.

Note: *When LBI 4 is used like protection, then state of this LBO is connected with this protection e.g. when LBI is inactive but alarm of protection is not confirm in alarmlist, LBO is still active.*

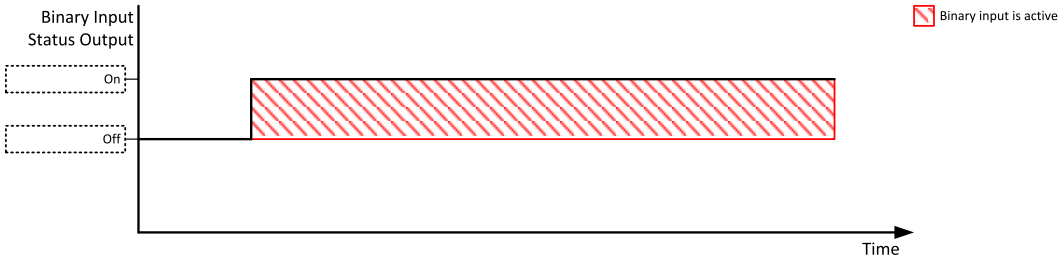


Image 8.164 Binary Input 4 Status

back to Logical binary outputs alphabetically

BIN 5 Status

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1378		
Description			

This output is closed, when Binary Input 5 is active and open when Binary Input 5 is inactive. When Binary Input 5 is used for BIN protection function then this output is closed when BIN protection alarm is in Alarmlist.

Note: *When LBI 5 is used like protection, then state of this LBO is connected with this protection e.g. when LBI is inactive but alarm of protection is not confirm in alarmlist, LBO is still active.*

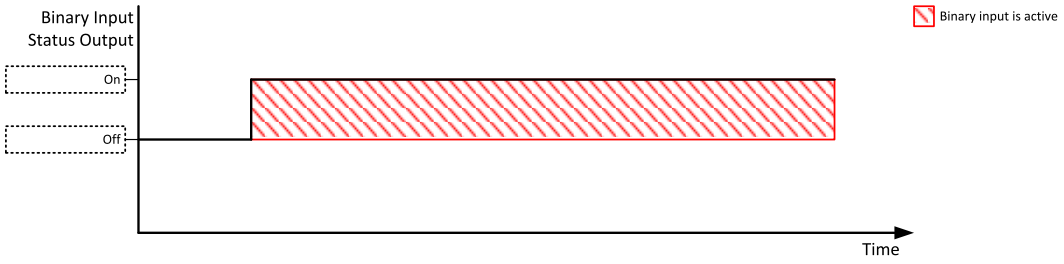


Image 8.165 Binary Input 5 Status

back to Logical binary outputs alphabetically

BIN 6 Status

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1379		
Description			

This output is closed, when Binary Input 6 is active and open when Binary Input 6 is inactive. When Binary Input 6 is used for BIN protection function then this output is closed when BIN protection alarm is in Alarmlist.

Note: *When LBI 6 is used like protection, then state of this LBO is connected with this protection e.g. when LBI is inactive but alarm of protection is not confirm in alarmlist, LBO is still active.*

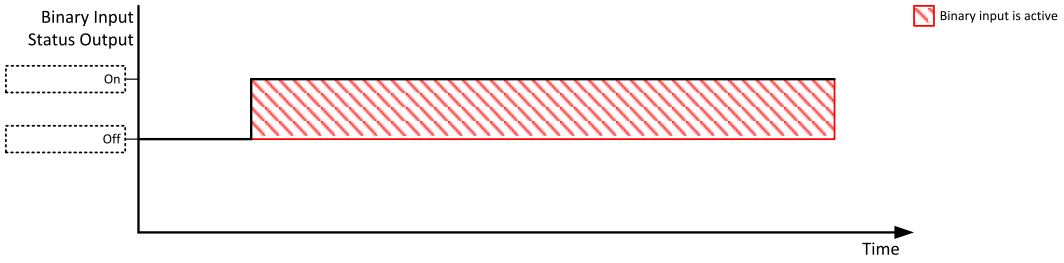


Image 8.166 Binary Input 6 Status

back to Logical binary outputs alphabetically

BIN 7 Status

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1380		
Description			

This output is closed, when Binary Input 7 is active and open when Binary Input 7 is inactive. When Binary Input 7 is used for BIN protection function then this output is closed when BIN protection alarm is in Alarmlist.

Note: *When LBI 7 is used like protection, then state of this LBO is connected with this protection e.g. when LBI is inactive but alarm of protection is not confirm in alarmlist, LBO is still active.*

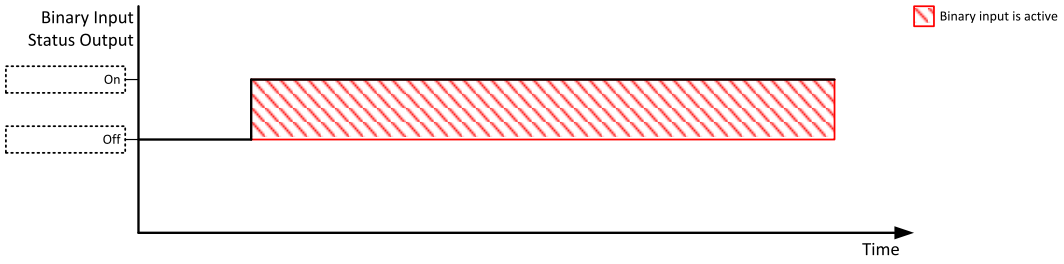


Image 8.167 Binary Input 7 Status

back to Logical binary outputs alphabetically

BIN 8 Status

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1381		
Description			

This output is closed, when Binary Input 8 is active and open when Binary Input 8 is inactive. When Binary Input 8 is used for BIN protection function then this output is closed when BIN protection alarm is in Alarmlist.

Note: *When LBI 8 is used like protection, then state of this LBO is connected with this protection e.g. when LBI is inactive but alarm of protection is not confirm in alarmlist, LBO is still active.*

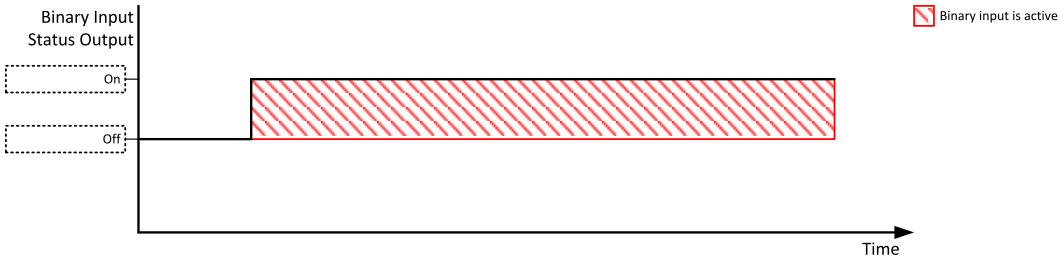


Image 8.168 Binary Input 8 Status

back to Logical binary outputs alphabetically

LBO: C

Choke

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2091		
Description			

Logical binary output for choke valve control. Output CHOKE is activated every time when logical binary output **STARTER (PAGE 633)** is activated. Output is deactivated when one of these conditions is fulfilled:

- Choke Time is elapsed
- Generator voltage is higher than Choke Voltage
- Logical binary input Choke Inhibit is activated

Or when some of these situations during start occurs:

- Any second level alarm
- Emergency stop
- Stop command
- Cranking pause

back to Logical binary outputs alphabetically

Cooling Pump

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	40		
Description			
This output is dedicated for coolant pump control. It is closed in the moment the gen-set is started and remains closed until the gen-set is stopped and **After Cooling Time (page 220)** elapses or the cranking pause or the Emergency Stop occurs or the controller is switched to OFF mode.			

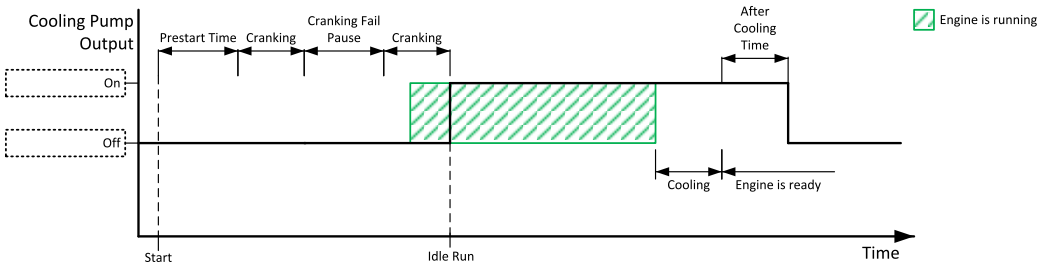


Image 8.169 Cooling Pump

back to Logical binary outputs alphabetically

Cooling

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	74		
Description			
The output closes when gen-set is in Cooling state.			

back to Logical binary outputs alphabetically

LBO: D

Dual Operation Error

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2097		
Description			
This LBO is active when there is Dual Operation Fail (page 703) alarm in alarmlist.			

back to Logical binary outputs alphabetically

Dual Operation OK

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2096		
Description			
This LBO is active when there is not Dual Operation Fail (page 703) alarm in alarmlist.			

back to Logical binary outputs alphabetically

LBO: E

ECU Communic Error

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	114		
Description			
This output is active when an ECU is configured, but the communication with the ECU is not established or has dropped out. ***Note:*** *When **ECU POWER RELAY (PAGE 600)** is not configured, output is evaluated all the time. If **ECU POWER RELAY (PAGE 600)** is configured, output is evaluated only when engine is not stop (**ECU POWER RELAY (PAGE 600)** is active).*			

back to Logical binary outputs alphabetically

ECU Communic OK

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	347		
Description			
This output is active when an ECU is configured, connected and the communication with the ECU is established. ***Note:*** *When **ECU POWER RELAY (PAGE 600)** is not configured, output is evaluated all the time. If **ECU POWER RELAY (PAGE 600)** is configured, output is evaluated only when engine is not stop (**ECU POWER RELAY (PAGE 600)** is active).*			

back to Logical binary outputs alphabetically

ECU Power Relay

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	116		
Description			

This output is to be used for control of “keyswitch” input of an ECU. If the particular ECU does not have keyswitch or a similar input, it can be used for control of DC power for the ECU.

The output closes together with **PRESTART (PAGE 621)** and remains closed for the entire duration that the engine is running. It is opened at the moment that the engine comes to a stop (i.e. together with the **FUEL SOLENOID (PAGE 602)**).

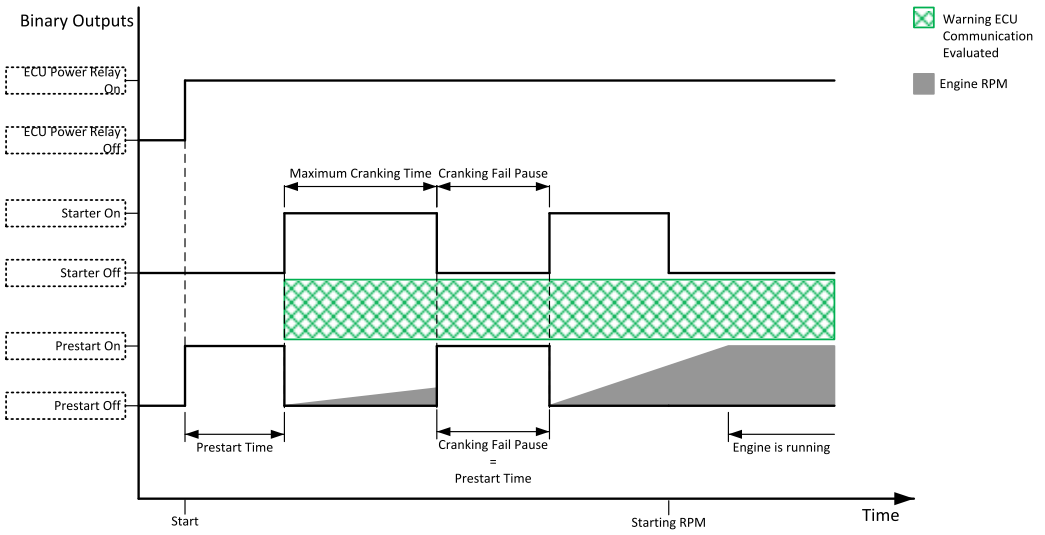


Image 8.170 ECU Power Relay

IMPORTANT: This LBO also affects evaluation of Sd ECU Communication Fail (page 714) or Wrn ECU Communication Fail (page 693) alarms. With configured LBO ECU Power Relay, these alarms are evaluated only when this LBO is active. Without configured LBO ECU Power Relay, these alarm are evaluated all the time.

back to Logical binary outputs alphabetically

ECU Red Lamp

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	350		
Description			

This output is active when the ECU sends an active “red lamp” flag, i.e. it has detected a critical malfunction and the engine should not be operated until a service check is performed. This flag is taken from the DM1 frame on standard J1939 ECUs. Some ECUs provide this flag in their own proprietary frames and some do not provide the flag at all.

back to Logical binary outputs alphabetically

ECU Run Stop

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	958		
Description			
Signal for starting and stopping of ECU.			

back to Logical binary outputs alphabetically

ECU Wait To Start

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	959		
Description			
This output is active when ECU Wait To Start Lamp is active.			

back to Logical binary outputs alphabetically

ECU Yellow Lamp

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	349		
Description			
This output is active when the ECU sends an active “yellow lamp” flag, i.e. it has detected a non-critical malfunction. This flag is taken from the DM1 frame on standard J1939 ECUs. Some ECUs provide this flag in their own proprietary frames and some do not provide the flag at all.			

back to Logical binary outputs alphabetically

Exercise Timer 1

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1250		
Description			
This is an output from the Exercise timer 1. This output makes it easy to make periodic tests of the gen-set and its activation depends on the setpoints in the **Subgroup: Timer 1 (page 327)** subgroup. This output is active when Timer 1 is active.			

back to Logical binary outputs alphabetically

Exercise Timer 2

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1251		
Description			
This is an output from the Exercise timer 2. This output makes it easy to make periodic tests of the gen-set and its activation depends on the setpoints in the **Subgroup: Timer 2 (page 334)** subgroup. This output is active when Timer 2 is active.			

back to Logical binary outputs alphabetically

LBO: F

Fault Reset

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	592		
Description			

This output provides 1s pulse when:

- Fault Reset button is pressed on the controller front facia or
- Fault Reset button is pressed on any of external local/remote terminals or
- Fault Reset command is received via communication line or
- the input FAULT RESET BUTTON is activated.

back to Logical binary outputs alphabetically

Frequency Select

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1815		
Description			

The Frequency select output is opened when Nominal Frequency (Frequency Settings) is equal to 50Hz and closed when Nominal Frequency (Frequency Settings) is equal to 60Hz.

back to Logical binary outputs alphabetically

Fuel Pump

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1253		
Description			

Output closes when the value of Fuel Level lies under the value of **Fuel Pump On (page 233)** setpoint and opens when value of **Fuel Pump Off (page 234)** is reached.

This output also can be closed by binary input **FUEL PUMP ON/OFF (PAGE 555)**. In this case the binary output **FUEL PUMP ON (PAGE 233)** is closed until the binary input **FUEL PUMP ON/OFF (PAGE 555)** is active or until the value of Fuel Level reaches 100%.

> ***Note:*** *Setpoints **Fuel Pump On (page 233)** and **Fuel Pump Off (page 234)** are invisible until configuration of this LBO.*

back to Logical binary outputs alphabetically

Fuel Solenoid

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	22		
Description			

This output controls the fuel solenoid valve. The Fuel Solenoid output has two different behaviors depending on engine type – gas or diesel. This setting is done by **Fuel Solenoid (page 205)** setpoint in Engine Settings group.

Diesel:

The output closes before binary output **STARTER (PAGE 633)**.The lead time is adjusted by setpoint **Fuel Solenoid Lead (page 214)**.

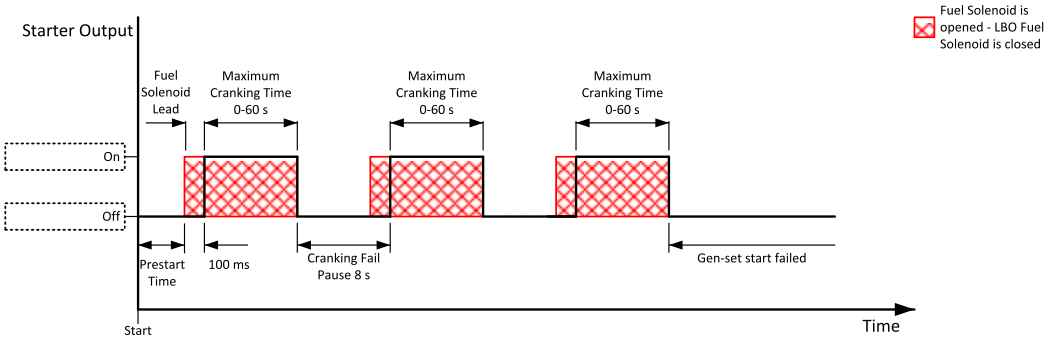


Image 8.171 Fuel Solenoid 1

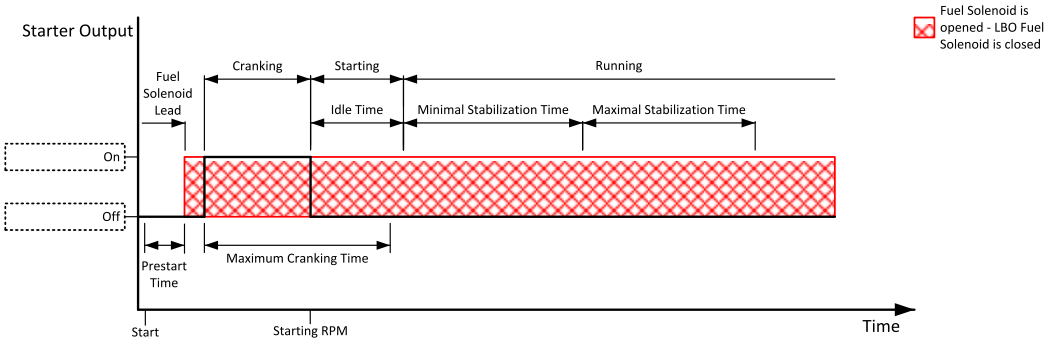


Image 8.172 Fuel Solenoid 2

The output opens when:

- Emergency Stop comes
- cooled gen-set is stopped
- in pause between repeated starts

Gas:

The output closes together with binary output **IGNITION (PAGE 612)** when engine RPM exceed 30 RPM (fix value).

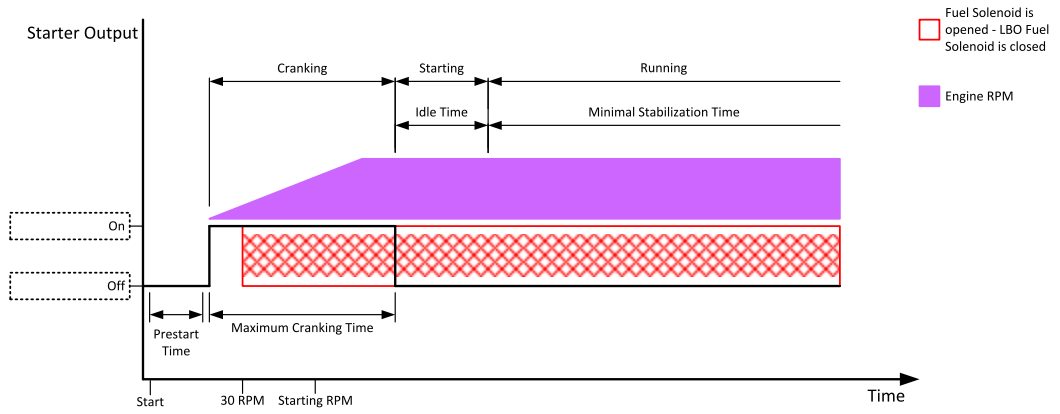


Image 8.173 Fuel Solenoid 3

The output opens when:

- Emergency Stop comes
- cooled gen-set is stopped
- in pause between repeated starts

back to Logical binary outputs alphabetically

LBO: G

GCB Close/Open

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	41		

Description

The output controls the generator circuit breaker. Its state represents the breaker position requested by the controller. The breaker must react within 5 seconds to a close or open command, otherwise an alarm is issued.

> ***Note:*** *InteliLite controllers can work even without breaker feedbacks, in this case do not configure the feedback to binary inputs.*

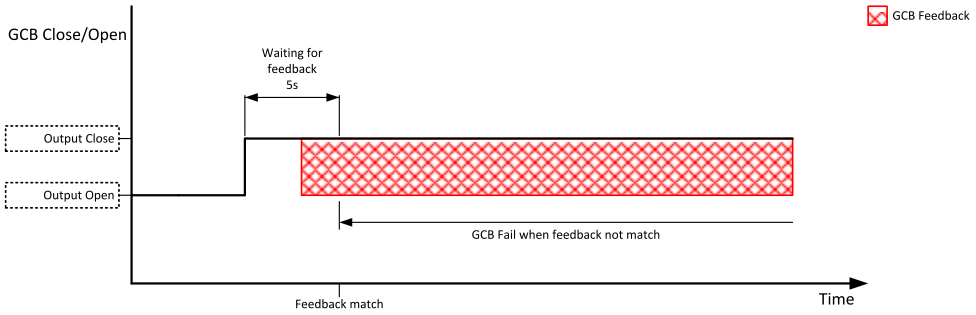


Image 8.174 GCB Close command

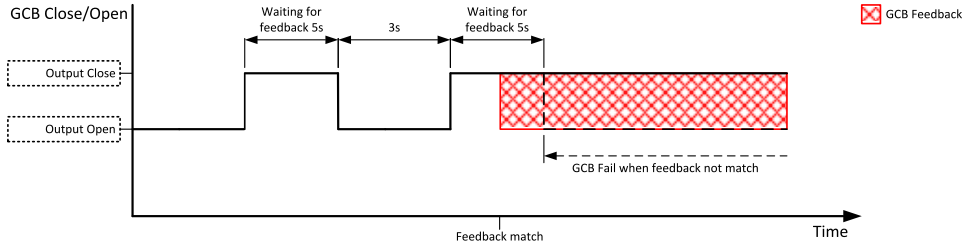


Image 8.175 Repeated GCB Close command

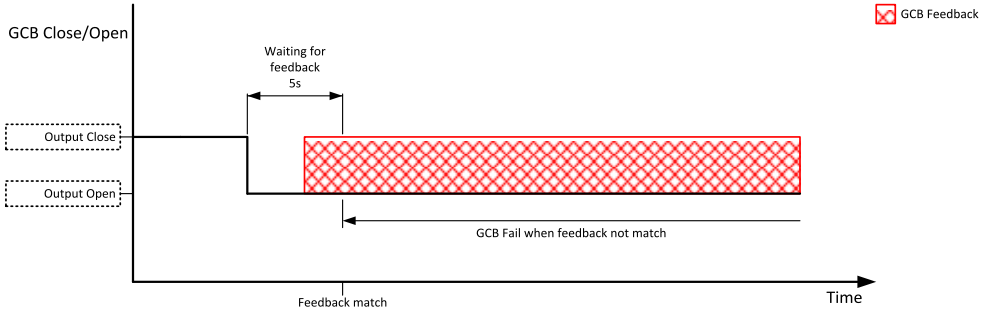


Image 8.176 GCB Open command

back to Logical binary outputs alphabetically

GCB OFF Coil

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	43		

Description

The output is intended for control of open coil of generator circuit breaker. The output gives a pulse in the moment the breaker has to be opened. The pulse lasts until the feedback deactivates, but at least for 5 seconds.

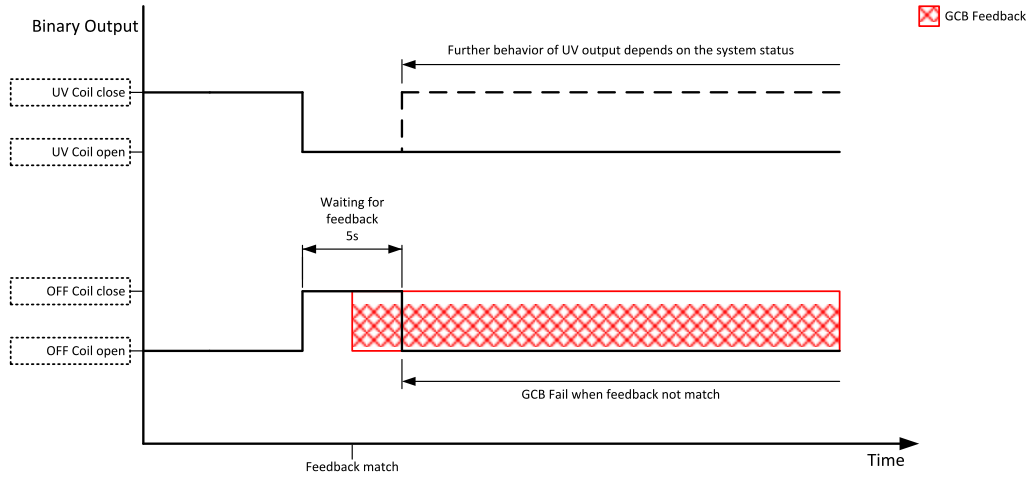


Image 8.177 GCB OFF Coil command

Image 8.178 GCB OFF Coil command

back to Logical binary outputs alphabetically

GCB ON Coil

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	42		
Description			
The output is intended for control of close coil of generator circuit breaker. The output gives at least 5 second pulse in the moment the breaker has to be closed.			

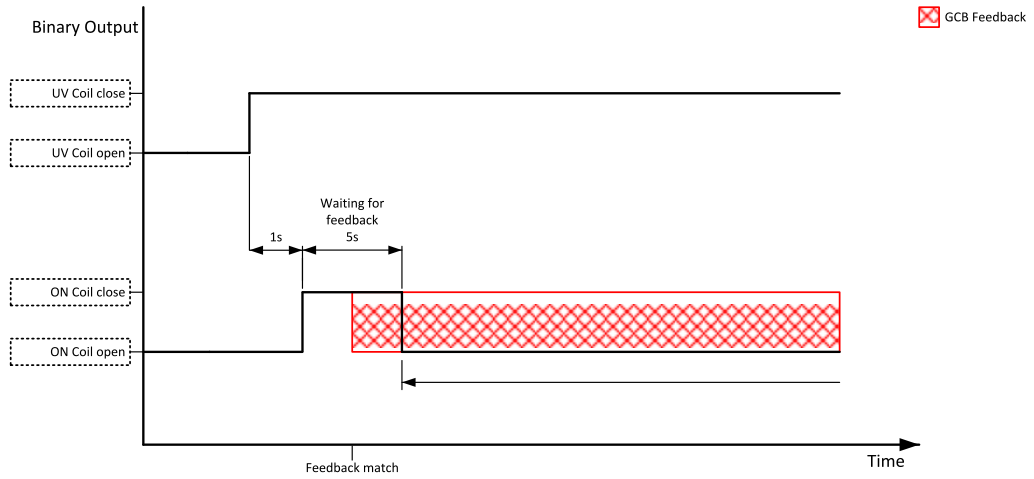


Image 8.179 GCB ON Coil close command

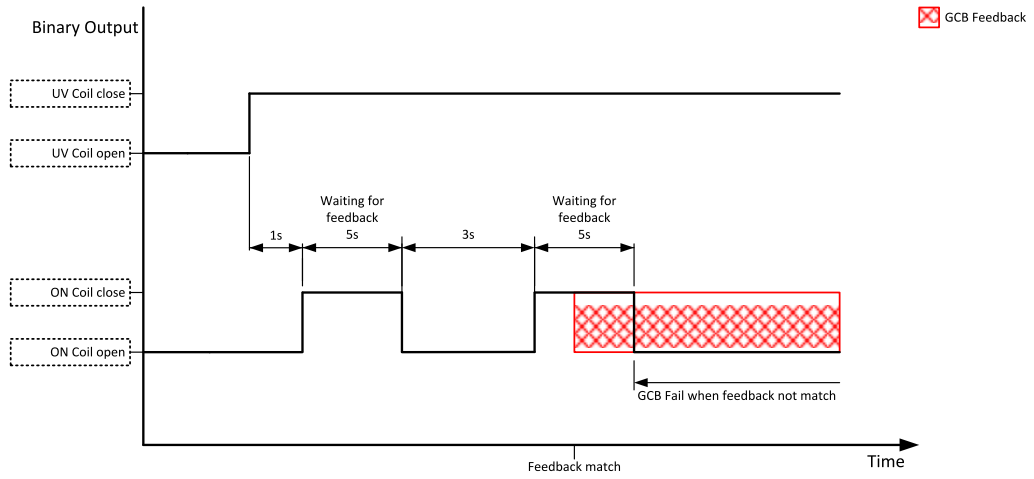


Image 8.180 Repeated GCB ON coil close command

back to Logical binary outputs alphabetically

GCB UV Coil

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	44		
Description			
The output is intended for control of undervoltage coil of generator circuit breaker. The output is active the			

whole time when the generator is running. The output is deactivated for at least 5 seconds in the moment the breaker has to be switched off.

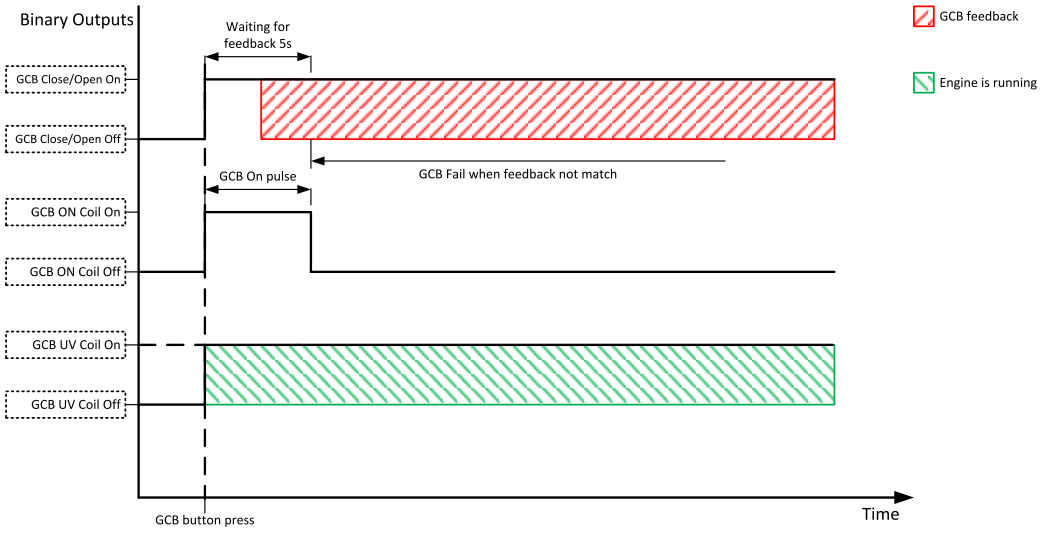


Image 8.181 GCB UV Coil close command

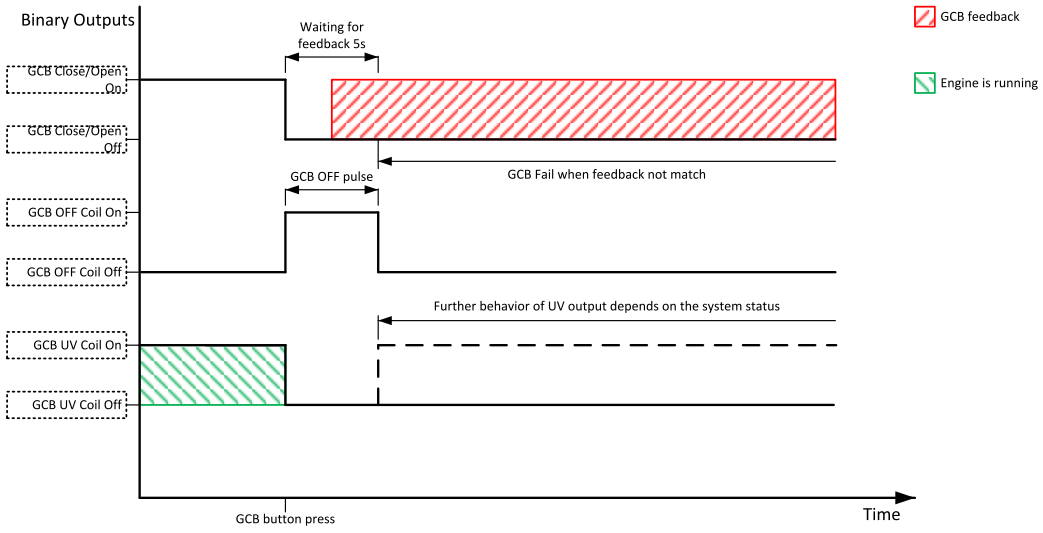


Image 8.182 GCB UV Coil open command

back to Logical binary outputs alphabetically

Generator Healthy

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	77		
Description			

This output is active when the generator voltage, frequency and voltage unbalance is within limits. It is deactivated:

- immediately when the voltage/frequency/voltage unbalance gets out of limits (when GCB is not closed)
  or
- with an appropriate delay after the voltage/frequency/voltage unbalance has got out of limits (when GCB is closed)

back to Logical binary outputs alphabetically

Glow Plugs

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1252		
Description			

This output is dedicated for diesel engine only. This output will close for exact time pre-set by setpoint **Glow Plugs Time (page 208)** before every starting attempt. The output opens in same time as the **STARTER (PAGE 633)** output closes (100 ms after **PRESTART (PAGE 621)** output opens).

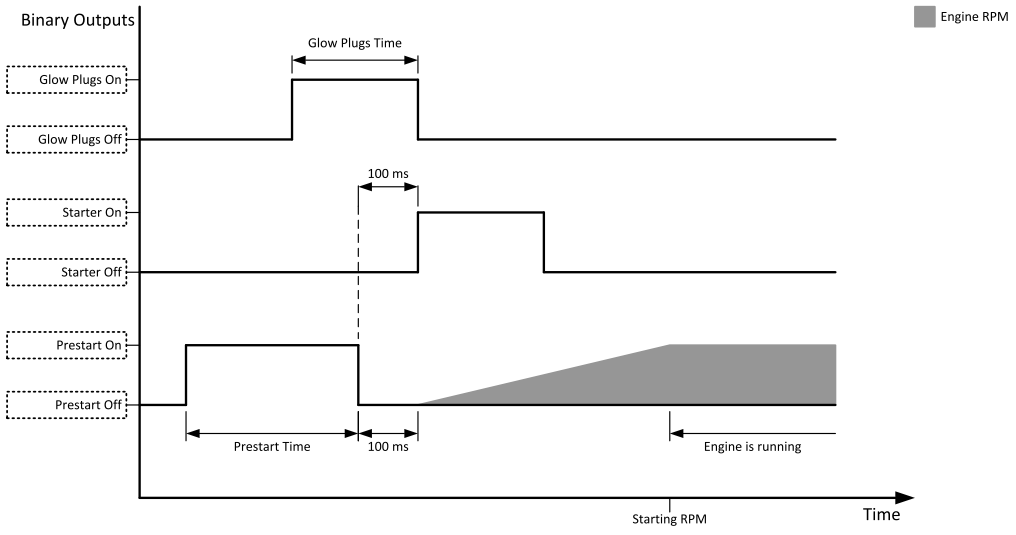


Image 8.183 Glow Plugs

When the **Glow Plugs Time (page 208)** is longer than **Cranking Fail Pause (page 206)** then the **Glow Plugs Time (page 208)** in **Cranking Fail Pause (page 206)** is long as **Cranking Fail Pause (page 206)**.

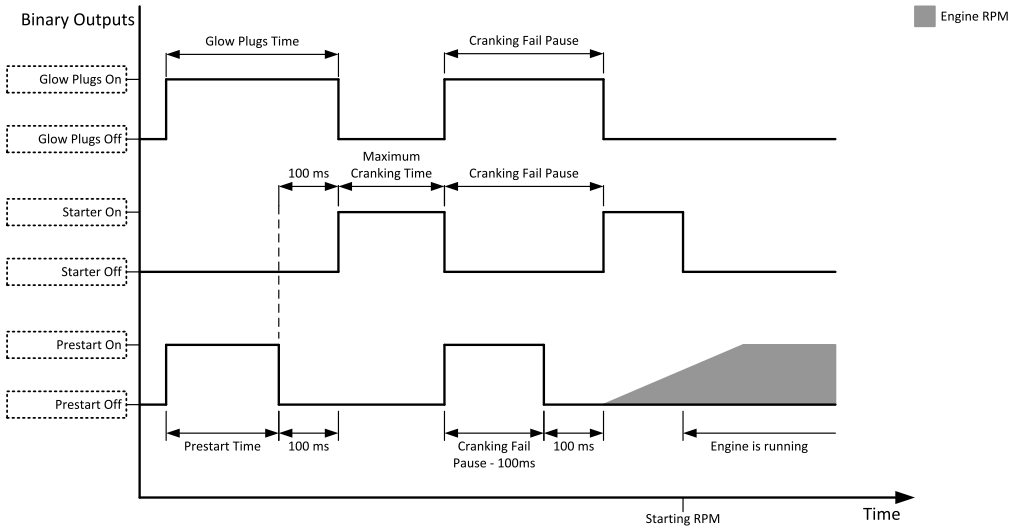


Image 8.184 Glow Plugs in Cranking Fail Pause 1

When the **Glow Plugs Time (page 208)** is shorter than **Cranking Fail Pause (page 206)** then the **Glow Plugs Time (page 208)** in **Cranking Fail Pause (page 206)** is long as normal **Glow Plugs Time (page 208)**.

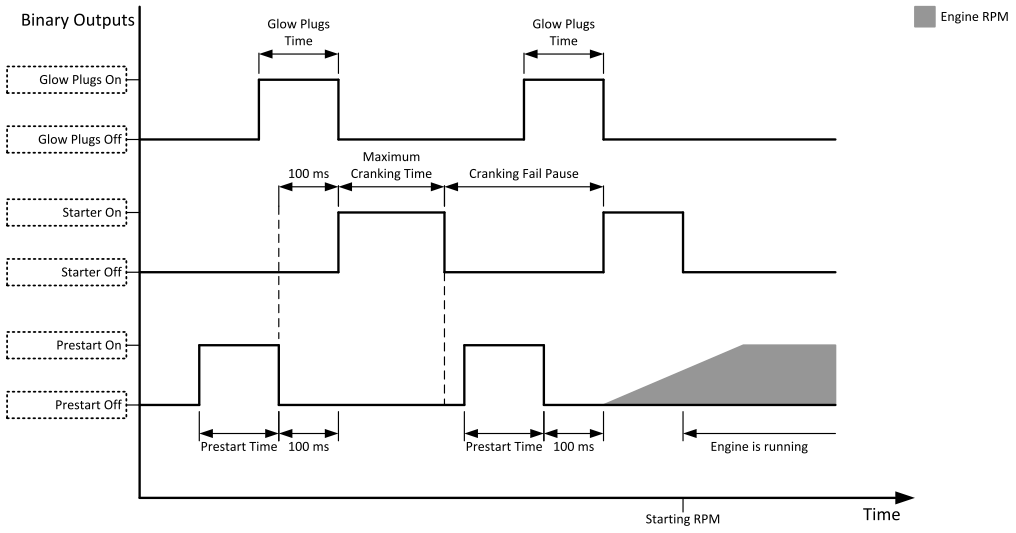


Image 8.185 Glow Plugs in Cranking Fail Pause 2

back to Logical binary outputs alphabetically

LBO: H

Heartbeat

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	81		
Description			
This output toggles on/off in a period of 500 ms whenever the controller is switched on and functional.			

back to Logical binary outputs alphabetically

Horn

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1		
Description			

The output designed to be used for acoustic indication of a newly appeared alarm. The output is activated each time a new alarm has appeared and remains active until one of the following events occurs:

- Fault reset is pressed
- Horn reset is pressed
- **Horn Timeout (page 201)** has elapsed

back to Logical binary outputs alphabetically

LBO: I

Idle/Nominal

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	39		
Description			

This output is used for switching between idle speed and nominal speed of the engine during the startup phase, if this feature (input) is available on the particular engine. In the case of some EFI engines, the idle/nominal switching is performed over the communication bus.

The output Idle/Nominal closes after the timer **Idle Time (page 214)** elapses. The **Idle Time (page 214)** starts to countdown when **Starting RPM (page 207)** reached. The underspeed protection is not evaluated during fixed 5 seconds period after reaching **Starting RPM (page 207)**. A Start Fail protection occurs if the RPM drop below 2RPM during idle.

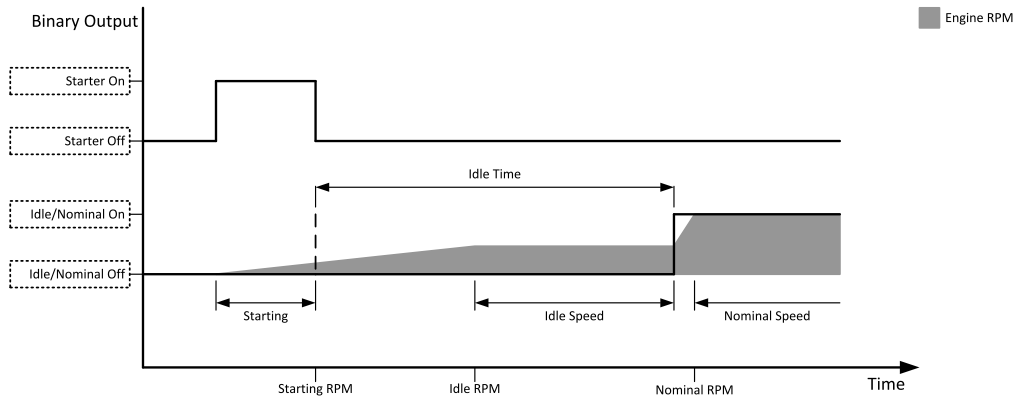


Image 8.186 Idle/Nominal

Note: *Connect binary output Idle/Nominal to speed governor to switch the speed:*
opened = Idle
closed = Nominal
(for normally open contact type)

back to Logical binary outputs alphabetically

Ignition

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	37		
Description			

This output is dedicated to controlling the ignition at a gas engine. The output is closed together with binary output **FUEL SOLENOID (PAGE 602)** in the moment when the timer **Sd Ventilation Time (page 218)** elapsed and the gen-set reaches at least 30 RPM during cranking. The timer **Sd Ventilation Time (page 218)** become active when the gen-set has been stopped for any Sd protection or the controller has been turned on only before first cranking attempt. The output is opened 500ms after all Additional running engine indication **Additional running engine indications (page 132)** will be inactive. The output is opened when the gen-set has to be stopped or in pause during repeated starts.

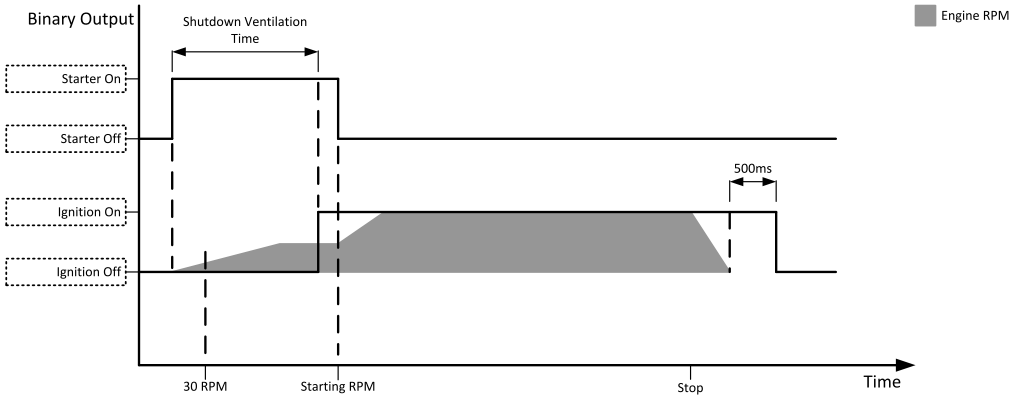


Image 8.187 Ignition 1

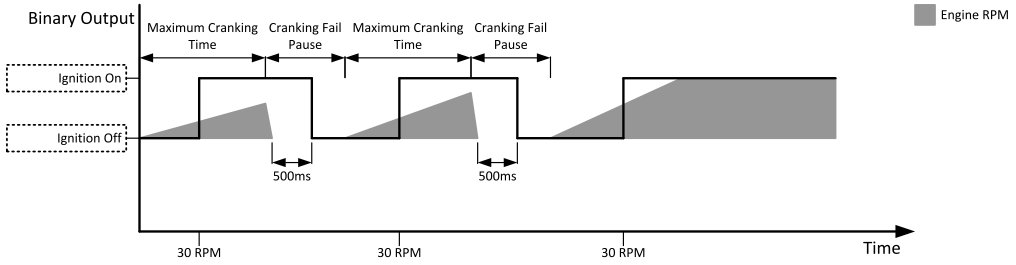


Image 8.188 Ignition 2

back to Logical binary outputs alphabetically

Ignition On

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1257		
Description			

This input is on since start button is pressed till the unit is completely stopped (or the engine doesn't start or Sd or E-Stop becomes active)

> ***Note:*** *This function is the same as* ***ECU POWER RELAY (PAGE 600)*** *. Ignition ON stays there from historical reasons.*

back to Logical binary outputs alphabetically

LBO: M

Mains Healthy

Related FW	1.9.0	Related applications	AMF
Comm object	78		
Description			
This output is active while mains failure is not detected and mains voltage and frequency is within limits. This output is active when the mains voltage and frequency are within limits. The limits for under/overvoltage and under/overfrequency are the same as for mains voltage/frequency and can be found in the Mains Settings setpoint group. It works only with Application Mode Select = SPTM, the output is always inactive with Application Mode Select = MINT.			

back to Logical binary outputs alphabetically

Manual Ready

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1258		
Description			
This output is active when controller is in MAN mode and the engine is stopped and it is possible to start it i.e. no red alarm is activated or **SD OVERRIDE (PAGE 565)** is active (Output **READY (PAGE 623)** is active).			

back to Logical binary outputs alphabetically

MCB Close/Open

Related FW	1.9.0	Related applications	AMF
Comm object	45		
Description			
The output controls the mains circuit breaker. Its state represents the breaker position requested by the controller. The breaker must react within 5 seconds to a close or open command, otherwise an alarm is issued. ***Note:*** *InteliLite controllers can work even without breaker feedbacks, in this case do not configure the feedback to binary inputs.*			

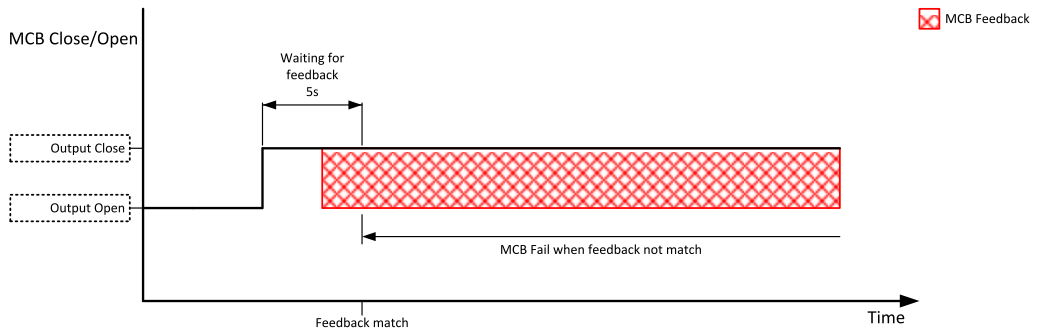


Image 8.189 MCB Close command

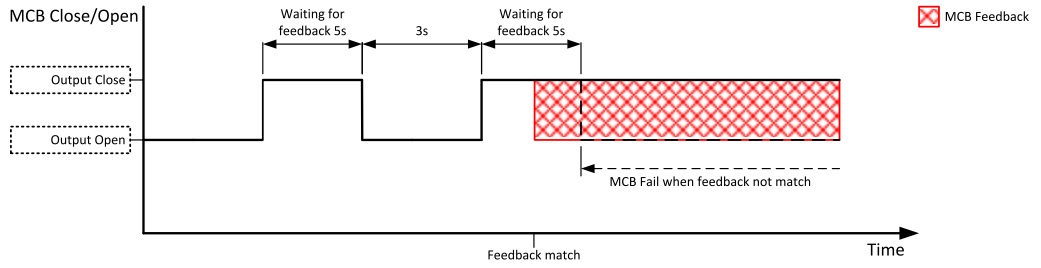


Image 8.190 Repeated MCB Close command

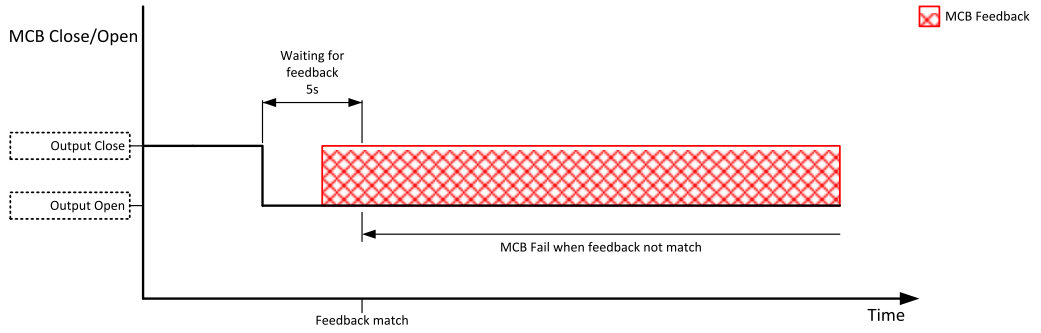


Image 8.191 MCB Open command

back to Logical binary outputs alphabetically

MCB OFF Coil

Related FW	1.9.0	Related applications	AMF
Comm object	47		

Description

The output is intended for control of open coil of mains circuit breaker. The output gives a pulse in the moment the breaker has to be opened. The pulse lasts until the feedback deactivates, but at least for 5 seconds.

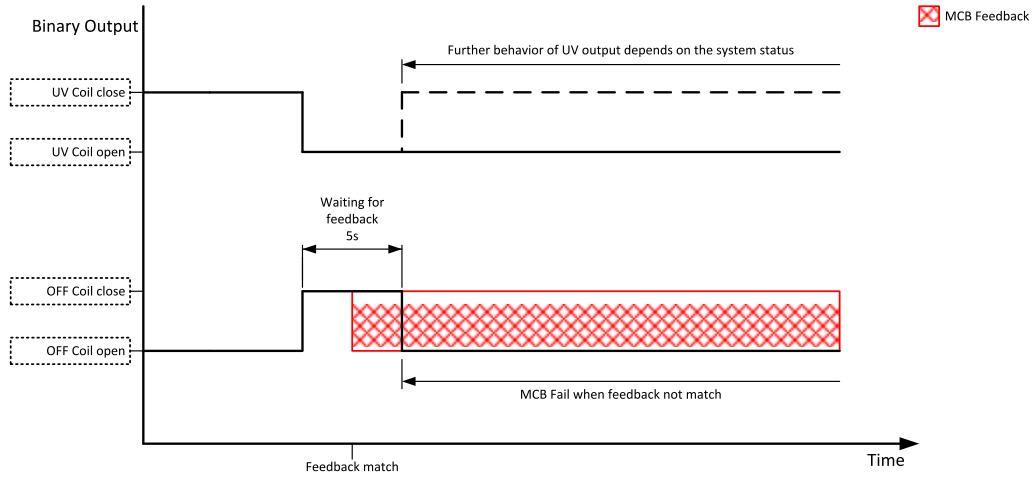


Image 8.192 MCB OFF Coil command

back to Logical binary outputs alphabetically

MCB ON Coil

Related FW	1.9.0	Related applications	AMF
Comm object	46		

Description

The output is intended for control of close coil of mains circuit breaker. The output gives at least 5 second pulse in the moment the breaker has to be closed.

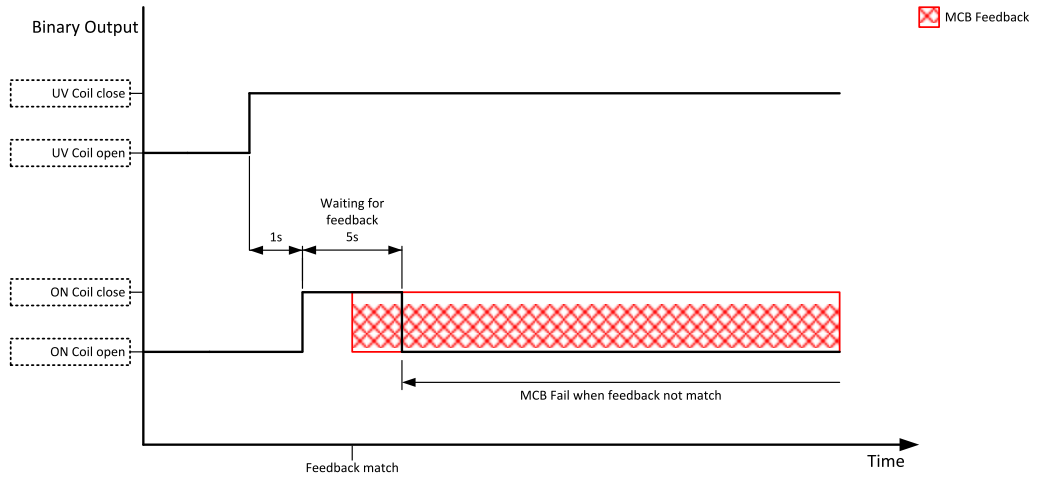


Image 8.193 MCB ON Coil close command

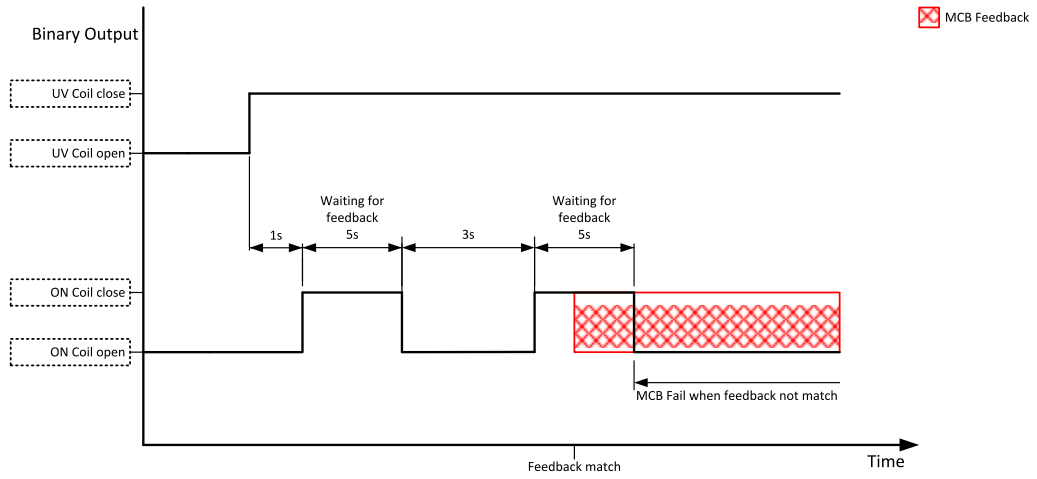


Image 8.194 Repeated MCB ON coil close command

back to Logical binary outputs alphabetically

MCB UV Coil

Related FW	1.9.0	Related applications	AMF
Comm object	48		

Description

The output is intended for control of undervoltage coil of mains circuit breaker. The output is active the whole time when the controller is switched on. The output is deactivated for at least 5 seconds in the moment the breaker has to be switched off.

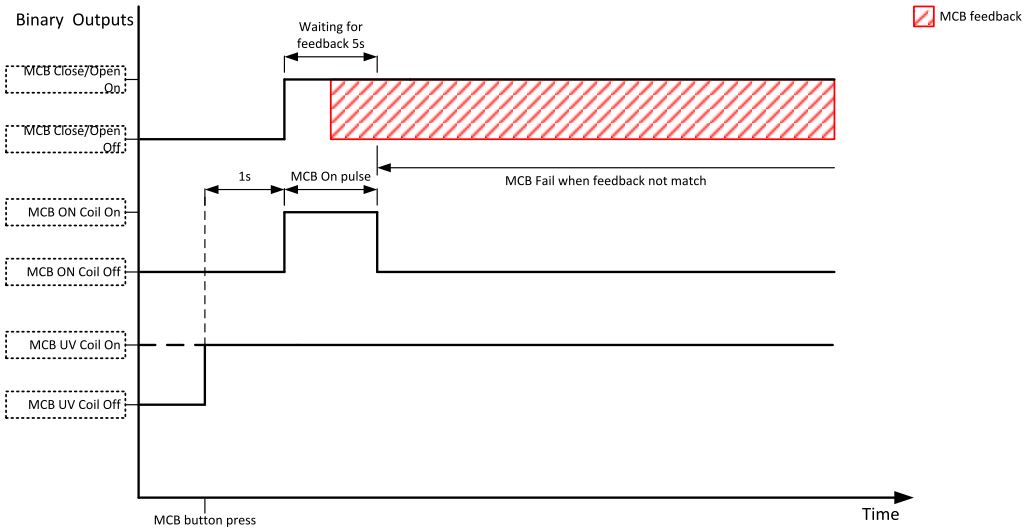


Image 8.195 MCB UV Coil close command

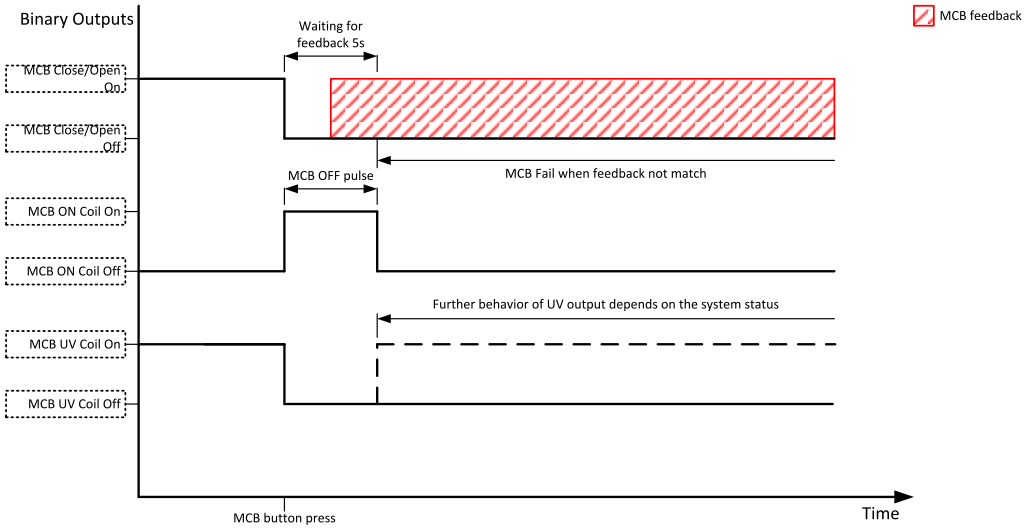


Image 8.196 MCb UV Coil open command

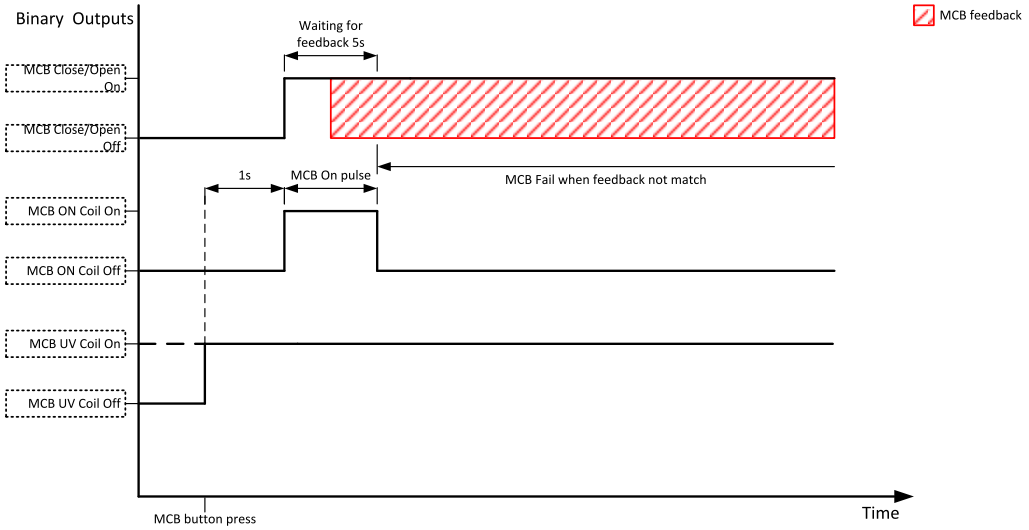


Image 8.197 MCB UV Coil close command

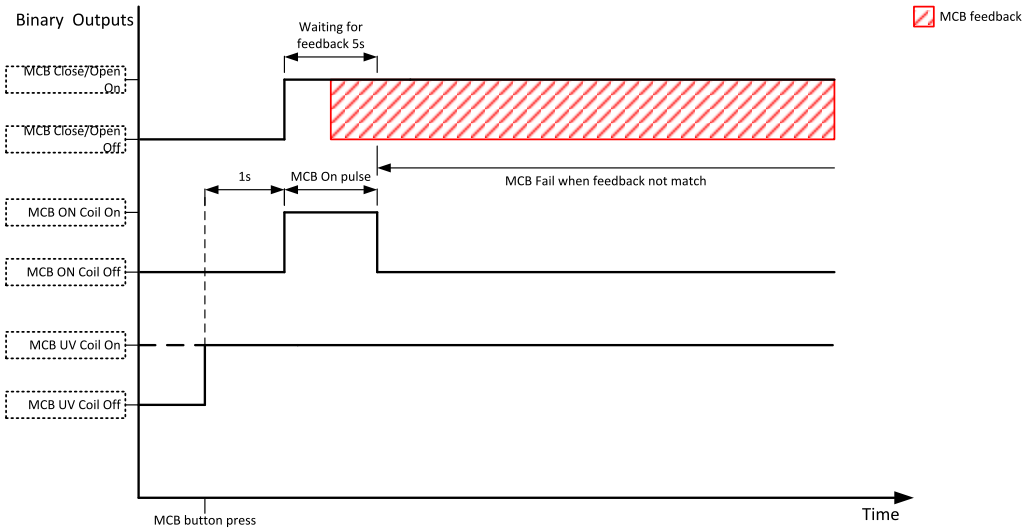


Image 8.198 MCB UV Coil close command

back to Logical binary outputs alphabetically

Mode AUTO

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	19		
Description			
This output is active whenever the controller is in AUTO mode.			

back to Logical binary outputs alphabetically

Mode MAN

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	18		
Description			
This output is active whenever the controller is in MAN mode.			

back to Logical binary outputs alphabetically

Mode OFF

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	17		
Description			
This output is active whenever the controller is in OFF mode.			

back to Logical binary outputs alphabetically

Mode TEST

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	20		
Description			
This output is active whenever the controller is in TEST mode.			

back to Logical binary outputs alphabetically

LBO: N

Not In AUTO

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1248		
Description			
This output is active when controller isn't in AUTO mode.			

back to Logical binary outputs alphabetically

Not Used

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	286		
Description			
Output has no function.			

back to Logical binary outputs alphabetically

LBO: P

Power Switch

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	290		
Description			

This is an output from the Power switch function. The behavior of the switch depends on the adjustment of the setpoints **Power Switch On (page 238)** and **Power Switch Off (page 239)**. When the dummy load function is used the switching ON of Power switch is block when the engine isn't running and is allowed 30 s after start of the engine.



Image 8.199 Power Switch

Note: *Setpoints **Power Switch On (page 238)** and **Power Switch Off (page 239)** are invisible until configuration of this LBO.*

back to Logical binary outputs alphabetically

Prestart

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	36		
Description			

This output can be used for control of any device, which has to be activated just before start. The output is closed for time period of **Prestart Time (page 207)**. The output opens 100 ms before the **STARTER (PAGE 633)** output closes.

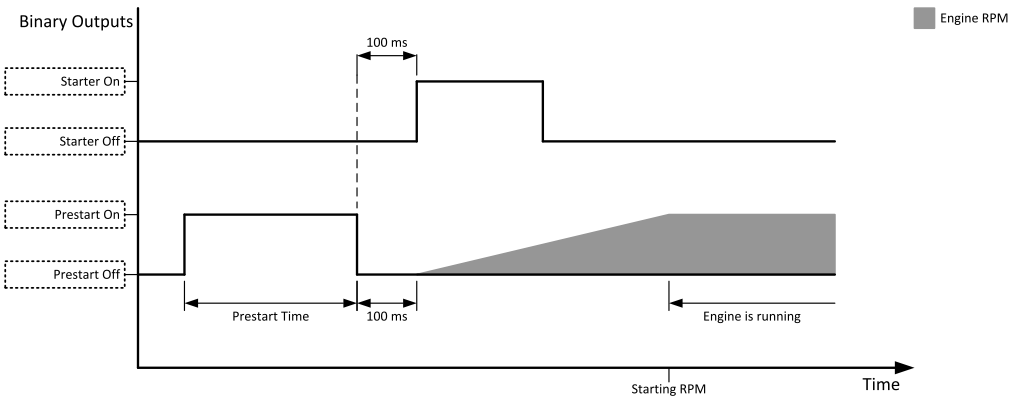


Image 8.200 Engine start

When the **Prestart Time (page 207)** is longer than **Cranking Fail Pause (page 206)** then the **Prestart Time (page 207)** in **Cranking Fail Pause (page 206)** is long as **Cranking Fail Pause (page 206)** minus 100ms.

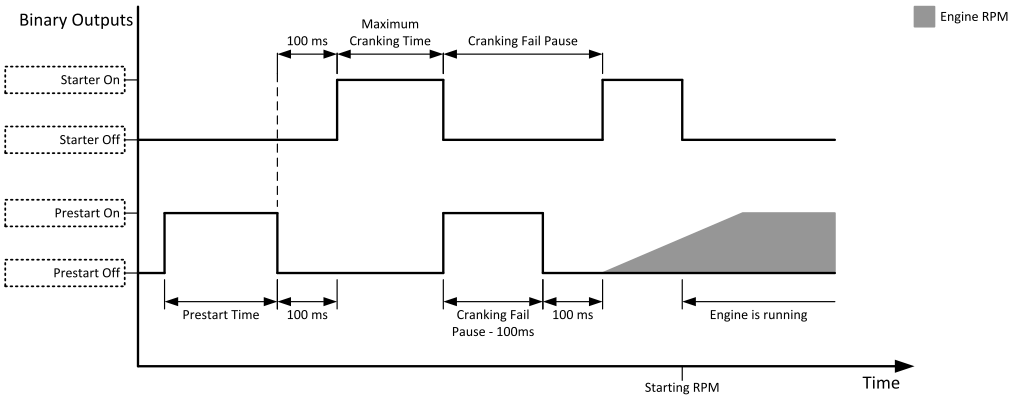


Image 8.201 Prestart in Cranking Fail Pause 1

When the **Prestart Time (page 207)** is shorter than **Cranking Fail Pause (page 206)** then the **Prestart Time (page 207)** in **Cranking Fail Pause (page 206)** is long as normal **Prestart Time (page 207)**.

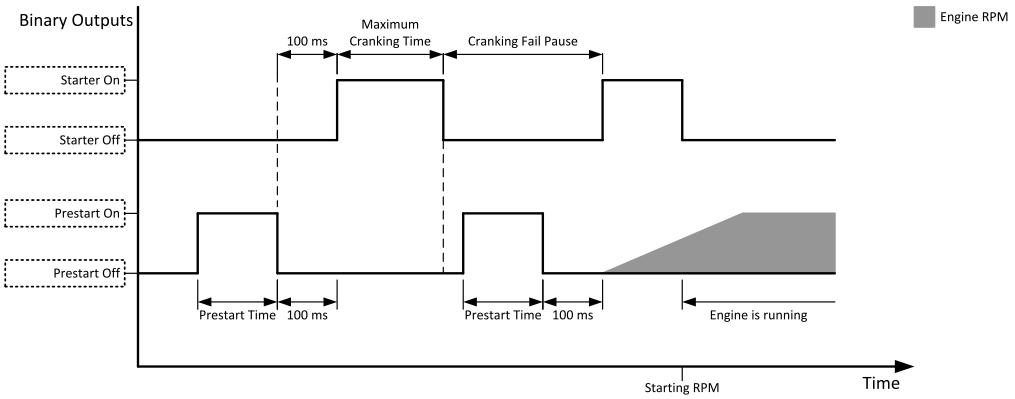


Image 8.202 Prestart in Cranking Fail Pause 2

back to Logical binary outputs alphabetically

LBO: R

Ready To AMF

Related FW	1.9.0	**Related applications**	AMF
Comm object	324		
Description			

The output is closed if the gen-set is ready to start automatically and take the load if the mains fails, i.e.:

- the controller is in AMF operating mode
- the controller is in AUTO controller mode and
- no red alarm is present in the alarmlist
- when the red alarm is confirmed during Stop Valve and other requirements are fulfilled then the LBO is still inactive until the state ready

back to Logical binary outputs alphabetically

Ready To Load

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	58		
Description			

The output is closed whenever the GCB is closed or can be closed i.e. the stabilization phase is finished, the gen-set is running and the **Minimal Stabilization Time (page 216)** timer has elapsed.
and the gen-set voltage and frequency are within limits.

If GCB is open then gen-set voltage and frequency must be in limits.

If GCB is close then gen-set voltage and frequency can be out of limits, but protection delay can't be count down. If gen-set voltage and frequency will return into limits until delay is count down then output is still closed.

back to Logical binary outputs alphabetically

Ready

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	62		
Description			

The binary output is closed, when the engine is stopped and it is possible to start it i.e. no red alarm is activated or **SD OVERRIDE (PAGE 565)** is active.

The binary output is switch on when the Ready state occurs.

The binary output is switch off when the Prestart or the Not Ready or the Stop state occurs i.e. always except Ready state.

back to Logical binary outputs alphabetically

Regen Needed

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1372		
Description			
This output is closed when DPF lamp from ECU is active.			

back to Logical binary outputs alphabetically

Remote Control 01

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2285		
Description			

Logical binary outputs which can be controlled remotely via MODBUS. There are fixed registers for MODBUS control.

- Holding register 5200 - this register can adjust all switches
  - supported function 6
  - value 0000 (all switches are 0) .. value FFFF (all switches are 1)
- Single register 5210
  - supported function 5
  - value 0000 (switch is 0) / value FF00 (switch is 1)

back to Logical binary outputs alphabetically

Remote Control 02

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2286		
Description			

Logical binary outputs which can be controlled remotely via MODBUS. There are fixed registers for MODBUS control.

- Holding register 5200 - this register can adjust all switches
  - supported function 6
  - value 0000 (all switches are 0) .. value FFFF (all switches are 1)
- Single register 5211
  - supported function 5
  - value 0000 (switch is 0) / value FF00 (switch is 1)

back to Logical binary outputs alphabetically

Remote Control 03

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2287		
Description			

Logical binary outputs which can be controlled remotely via MODBUS. There are fixed registers for MODBUS control.

- Holding register 5200 - this register can adjust all switches
  - supported function 6
  - value 0000 (all switches are 0) .. value FFFF (all switches are 1)
- Single register 5212
  - supported function 5
  - value 0000 (switch is 0) / value FF00 (switch is 1)

back to Logical binary outputs alphabetically

Remote Control 04

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2288		
Description			

Logical binary outputs which can be controlled remotely via MODBUS. There are fixed registers for MODBUS control.

- Holding register 5200 - this register can adjust all switches
  - supported function 6
  - value 0000 (all switches are 0) .. value FFFF (all switches are 1)
- Single register 5213
  - supported function 5
  - value 0000 (switch is 0) / value FF00 (switch is 1)

back to Logical binary outputs alphabetically

Remote Control 05

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2289		
Description			

Logical binary outputs which can be controlled remotely via MODBUS. There are fixed registers for MODBUS control.

- Holding register 5200 - this register can adjust all switches
  - supported function 6
  - value 0000 (all switches are 0) .. value FFFF (all switches are 1)
- Single register 5214
  - supported function 5
  - value 0000 (switch is 0) / value FF00 (switch is 1)

back to Logical binary outputs alphabetically

Remote Control 06

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2290		
Description			

Logical binary outputs which can be controlled remotely via MODBUS. There are fixed registers for MODBUS control.

- Holding register 5200 - this register can adjust all switches
  - supported function 6
  - value 0000 (all switches are 0) .. value FFFF (all switches are 1)
- Single register 5215
  - supported function 5
  - value 0000 (switch is 0) / value FF00 (switch is 1)

back to Logical binary outputs alphabetically

Remote Control 07

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2291		
Description			

Logical binary outputs which can be controlled remotely via MODBUS. There are fixed registers for MODBUS control.

- Holding register 5200 - this register can adjust all switches
  - supported function 6
  - value 0000 (all switches are 0) .. value FFFF (all switches are 1)
- Single register 5216
  - supported function 5
  - value 0000 (switch is 0) / value FF00 (switch is 1)

back to Logical binary outputs alphabetically

Remote Control 08

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2292		
Description			

Logical binary outputs which can be controlled remotely via MODBUS. There are fixed registers for MODBUS control.

- Holding register 5200 - this register can adjust all switches
  - supported function 6
  - value 0000 (all switches are 0) .. value FFFF (all switches are 1)
- Single register 5217
  - supported function 5
  - value 0000 (switch is 0) / value FF00 (switch is 1)

back to Logical binary outputs alphabetically

Remote Control 09

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2293		
Description			

Logical binary outputs which can be controlled remotely via MODBUS. There are fixed registers for MODBUS control.

- Holding register 5200 - this register can adjust all switches
  - supported function 6
  - value 0000 (all switches are 0) .. value FFFF (all switches are 1)
- Single register 5218
  - supported function 5
  - value 0000 (switch is 0) / value FF00 (switch is 1)

back to Logical binary outputs alphabetically

Remote Control 10

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2294		
Description			

Logical binary outputs which can be controlled remotely via MODBUS. There are fixed registers for MODBUS control.

- Holding register 5200 - this register can adjust all switches
  - supported function 6
  - value 0000 (all switches are 0) .. value FFFF (all switches are 1)
- Single register 5219
  - supported function 5
  - value 0000 (switch is 0) / value FF00 (switch is 1)

back to Logical binary outputs alphabetically

Remote Control 11

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2295		
Description			

Logical binary outputs which can be controlled remotely via MODBUS. There are fixed registers for MODBUS control.

- Holding register 5200 - this register can adjust all switches
  - supported function 6
  - value 0000 (all switches are 0) .. value FFFF (all switches are 1)
- Single register 5220
  - supported function 5
  - value 0000 (switch is 0) / value FF00 (switch is 1)

back to Logical binary outputs alphabetically

Remote Control 12

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2296		
Description			

Logical binary outputs which can be controlled remotely via MODBUS. There are fixed registers for MODBUS control.

- Holding register 5200 - this register can adjust all switches
  - supported function 6
  - value 0000 (all switches are 0) .. value FFFF (all switches are 1)
- Single register 5221
  - supported function 5
  - value 0000 (switch is 0) / value FF00 (switch is 1)

back to Logical binary outputs alphabetically

Remote Control 13

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2297		
Description			

Logical binary outputs which can be controlled remotely via MODBUS. There are fixed registers for MODBUS control.

- Holding register 5200 - this register can adjust all switches
  - supported function 6
  - value 0000 (all switches are 0) .. value FFFF (all switches are 1)
- Single register 5222
  - supported function 5
  - value 0000 (switch is 0) / value FF00 (switch is 1)

back to Logical binary outputs alphabetically

Remote Control 14

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2298		
Description			

Logical binary outputs which can be controlled remotely via MODBUS. There are fixed registers for MODBUS control.

- Holding register 5200 - this register can adjust all switches
  - supported function 6
  - value 0000 (all switches are 0) .. value FFFF (all switches are 1)
- Single register 5223
  - supported function 5
  - value 0000 (switch is 0) / value FF00 (switch is 1)

back to Logical binary outputs alphabetically

Remote Control 15

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2299		
Description			

Logical binary outputs which can be controlled remotely via MODBUS. There are fixed registers for MODBUS control.

- Holding register 5200 - this register can adjust all switches
  - supported function 6
  - value 0000 (all switches are 0) .. value FFFF (all switches are 1)
- Single register 5224
  - supported function 5
  - value 0000 (switch is 0) / value FF00 (switch is 1)

back to Logical binary outputs alphabetically

Remote Control 16

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	2300		
Description			

Logical binary outputs which can be controlled remotely via MODBUS. There are fixed registers for MODBUS control.

- Holding register 5200 - this register can adjust all switches
  - supported function 6
  - value 0000 (all switches are 0) .. value FFFF (all switches are 1)
- Single register 5225
  - supported function 5
  - value 0000 (switch is 0) / value FF00 (switch is 1)

back to Logical binary outputs alphabetically

Running

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	67		
Description			
The output is designed to be used as an indication that the gen-set is running. The output closes if FUEL SOLENOID (PAGE 602) is closed and STARTER (PAGE 633) and PRESTART (PAGE 621) are open. The out remains close until engine stop and cooling period elapses.			

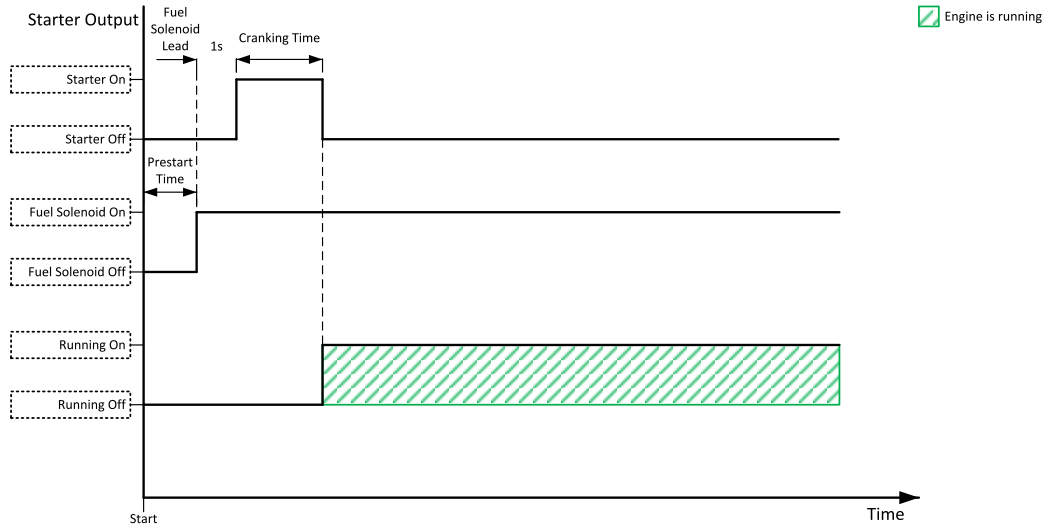


Image 8.203 Running

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LBO: S

Sd Override

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	962		
Description			
The output is closed if SD OVERRIDE (PAGE 565) input is active and open if SD OVERRIDE (PAGE 565) input is inactive. This output is usually used to send information about SD OVERRIDE (PAGE 565) input into ECU.			

back to Logical binary outputs alphabetically

Starter

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	24		
Description			

This output is dedicated for starter motor control. The number of cranking attempts is adjusted by setpoint **Cranking Attempts (page 205)** in Engine Settings group. Cranking fail pause is adjusted by setpoint **Cranking Fail Pause (page 206)**.

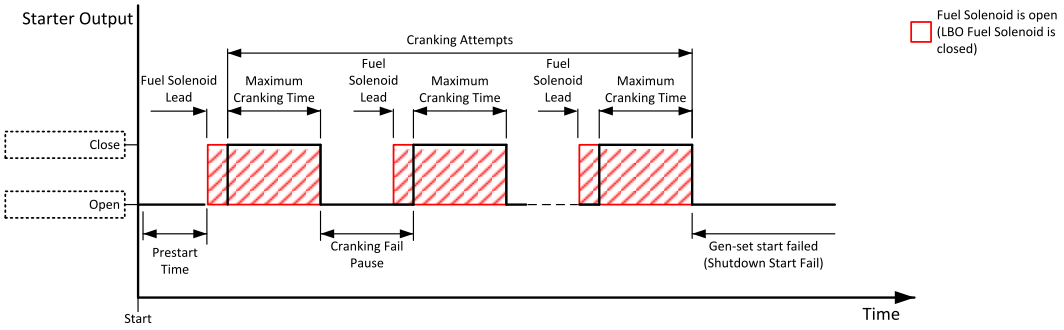


Image 8.204 Starter

The starter output opens when:

- the “firing” speed is reached
- maximum time of cranking is exceeded
- request to stop comes up
- D+ value is higher than **D+ Treshold (page 222)**
- Oil pressure value is higher than **Starting Oil Pressure (page 208)**
- Generator voltage > 25% of **Nominal Voltage Ph-N (page 195)** or **Nominal Voltage Ph-Ph (page 195)** (any phase)

back to Logical binary outputs alphabetically

Still Log 0

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	26		
Description			

Logical binary output which is still in logical 0.

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Still Log 1

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	27		
Description			

Logical binary output which is still in logical 1.

back to Logical binary outputs alphabetically

Stop Pulse

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	25		
Description			
Output is active for 1 second after **STOP SOLENOID (PAGE 634)** output activation. This signal is sent to ECU in case of engine stop request.			

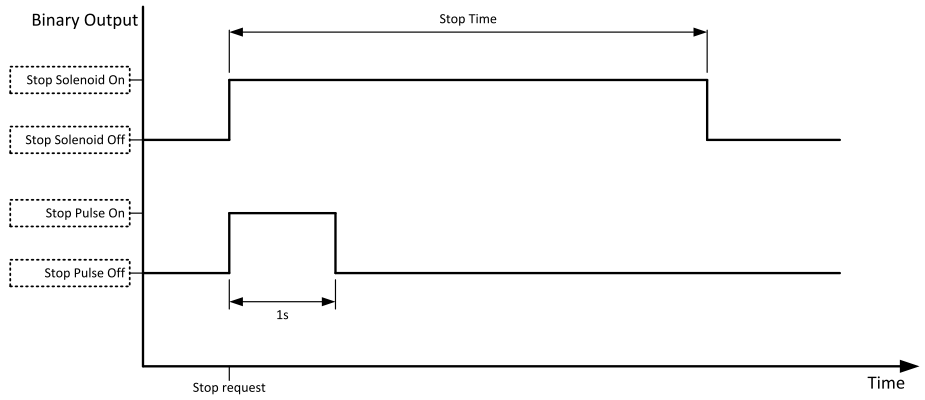


Image 8.205 Stop Pulse

back to Logical binary outputs alphabetically

Stop Solenoid

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	23		
Description			
This output is dedicated to control the stop solenoid (valve). The output closes when an engine stop command is received and is deactivated 12 s after last running engine indication went off, i.e. engine is stopped.			

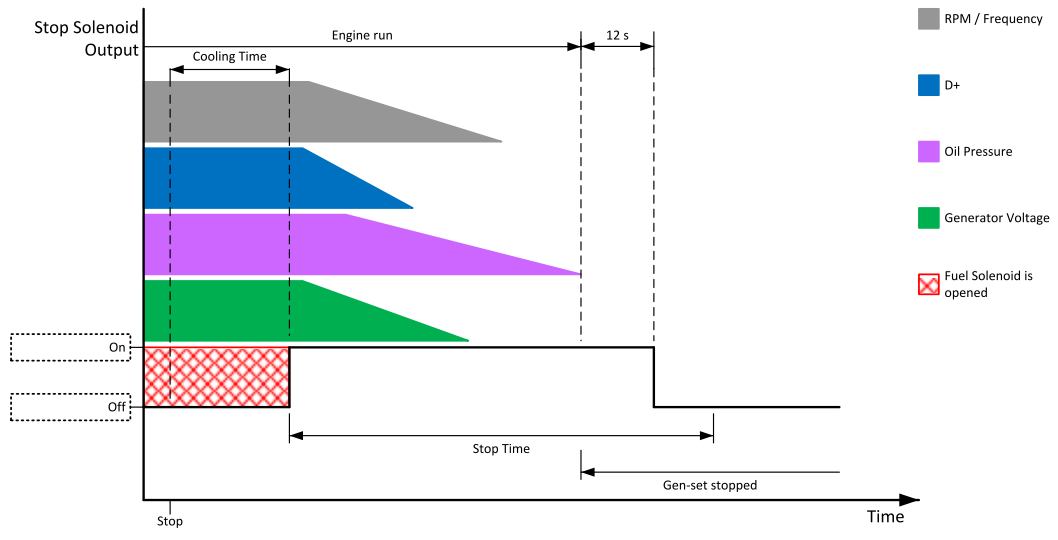


Image 8.206 Stop Solenoid 1

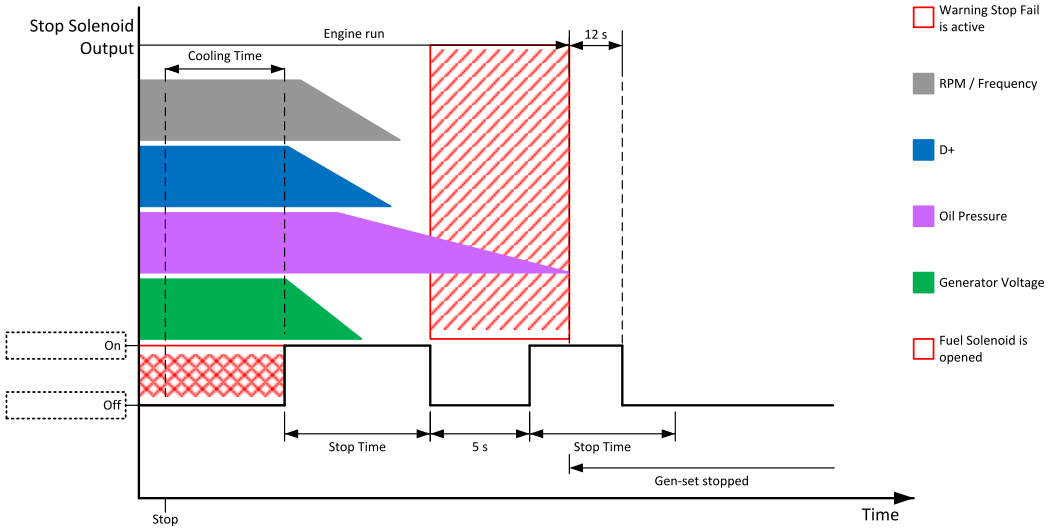


Image 8.207 Stop Solenoid 2

Note: *If **Additional running engine indications (page 132)** went off during 5 s pause than Stop Solenoid is not activated again otherwise stop solenoid is activated again.*

Logical binary outputs alphabetically (page 568)

Supplying Load

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1249		
Description			
The binary output depends on measured generator active power. Power is compared with generator nominal active power with use of hysteresis and with delay of switch 1 s. When the measured active power is equal to or bigger than 5 % of **Nominal Power (page 191)** for 1 s then the binary output is closed. When the measured active power is equal to or lower than 3 % of **Nominal Power (page 191)** for 1 s then the binary output is opened.			

back to Logical binary outputs alphabetically

Swap Start

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1997		
Description			
This logical binary output is result of internal comparator which compares statistic values **Running Hours (page 497)** and **Pulse Counter 2 (page 496)**. Binary output is active when **Running Hours (page 497)** are equal or higher than the **Pulse Counter 2 (page 496)**.			

back to Logical binary outputs alphabetically

LBO: T

Temperature Switch

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	563		
Description			

This is an output from the Temperature switch function. The behavior of the switch depends on the adjustment of the setpoints **Temperature Switch On (page 228)** and **Temperature Switch Off (page 229)**.

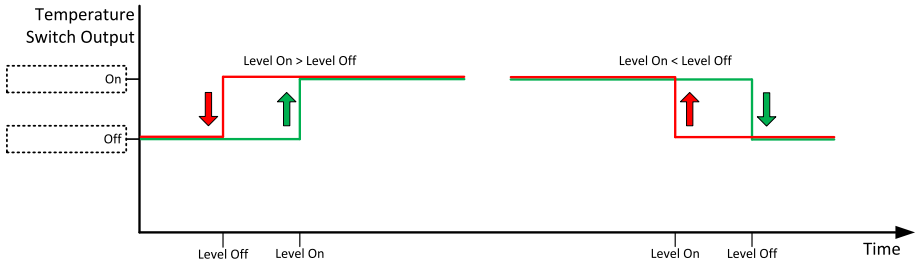


Image 8.208 Temperature Switch

Note: *Setpoints **Temperature Switch On (page 228)** and **Temperature Switch Off (page 229)** are invisible until configuration of this LBO.*

back to Logical binary outputs alphabetically

LBO: V

Ventilation

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	38		
Description			

This logical binary output is activated at the beginning of start procedure together with **PRESTART (PAGE 621)** LBO. Ventilation output is deactivated when engine stops revolving.

Ventilation LBO is also deactivated immediately when **EMERGENCY STOP (PAGE 554)** (or E-Stop) is activated or when controller is switched to OFF mode.

Note: *The output is intended for control of an engine room ventilation fan, engine container ventilation fan, container louvres or similar running gen-set technology.*

back to Logical binary outputs alphabetically

Ventilation Off Pulse

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	2090		
Description			

This logical binary output is activated on falling edge of **VENTILATION (PAGE 636)** LBO (when engine stops). The pulse duration is adjusted by **Ventilation Pulse Time (page 241)** setpoint.

Note: *The output is intended for control of an engine room ventilation fan, engine container ventilation fan, container louvres or similar running gen-set technology.*

back to Logical binary outputs alphabetically

Ventilation On Pulse

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	2089		
Description			

This logical binary output is activated on rising edge of **VENTILATION (PAGE 636)** LBO (at the begining of prestart period). The pulse duration is adjusted by **Ventilation Pulse Time (page 241)** setpoint.

Note: *The output is intended for control of an engine room ventilation fan, engine container ventilation fan, container louvres or similar running gen-set technology.*

back to Logical binary outputs alphabetically

8.1.5 Logical analog inputs

What Logical analog inputs are:

Logical analog inputs are inputs for analog values.

Alphabetical groups of Logical analog inputs

LAI: A 640
LAI: C 667
LAI: F 668
LAI: N 669
LAI: O 670

For full list of Logical analog inputs go to the chapter **Logical analog inputs alphabetically (page 639)**.

Logical analog inputs alphabetically

AIN Prot01 640
AIN Prot02 641
AIN Prot03 642
AIN Prot04 643
AIN Prot05 644
AIN Prot06 645
AIN Prot07 646
AIN Prot08 647
AIN Prot09 648
AIN Prot10 649
AIN Prot11 650
AIN Prot12 651
AIN Prot13 652
AIN Prot14 653
AIN Prot15 654
AIN Prot16 655
AIN Prot17 656
AIN Prot18 657
AIN Prot19 658
AIN Prot20 659
AIN Switch 01 660
AIN Switch 02 660
AIN Switch 03 660
AIN Switch 04 661
AIN Switch 05 661
AIN Switch 06 661
AIN Switch 07 662
AIN Switch 08 662
AIN Switch 09 662
AIN Switch 10 663
AIN Switch 11 663
AIN Switch 12 663
AIN Switch 13 664
AIN Switch 14 664
AIN Switch 15 664
AIN Switch 16 665
AIN Switch 17 665
AIN Switch 18 665
AIN Switch 19 666
AIN Switch 20 666
Coolant Temp 667
Fuel Level 668
Not Used 669
Oil Pressure 670

LAI: A

AIN Prot01

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	9999		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 1 Wrn (page 266)** and **Analog Protection 1 Sd (page 266)**. Delay is adjusted by setpoint **Analog Protection 1 Delay (page 267)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot02

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9998		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 2 Wrn (page 268)** and **Analog Protection 2 Sd (page 269)**. Delay is adjusted by setpoint **Analog Protection 2 Delay (page 269)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot03

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9997		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 3 Wrn (page 271)** and **Analog Protection 3 Sd (page 272)**. Delay is adjusted by setpoint **Analog Protection 3 Delay (page 272)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot04

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	9996		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 4 Wrn (page 274)** and **Analog Protection 4 Sd (page 275)**. Delay is adjusted by setpoint **Analog Protection 4 Delay (page 275)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot05

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9995		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 5 Wrn (page 277)** and **Analog Protection 5 Sd (page 278)**. Delay is adjusted by setpoint **Analog Protection 5 Delay (page 278)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot06

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	9994		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 6 Wrn (page 280)** and **Analog Protection 6 Sd (page 281)**. Delay is adjusted by setpoint **Analog Protection 6 Delay (page 281)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot07

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	9993		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 7 Wrn (page 283)** and **Analog Protection 7 Sd (page 284)**. Delay is adjusted by setpoint **Analog Protection 7 Delay (page 284)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot08

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9992		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 8 Wrn (page 286)** and **Analog Protection 8 Sd (page 287)**. Delay is adjusted by setpoint **Analog Protection 8 Delay (page 287)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot09

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	9991		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 9 Wrn (page 289)** and **Analog Protection 9 Sd (page 290)**. Delay is adjusted by setpoint **Analog Protection 9 Delay (page 290)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot10

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	9990		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 10 Wrn (page 292)** and **Analog Protection 10 Sd (page 293)**. Delay is adjusted by setpoint **Analog Protection 10 Delay (page 293)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot11

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9989		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 11 Wrn (page 295)** and **Analog Protection 11 Sd (page 296)**. Delay is adjusted by setpoint **Analog Protection 11 Delay (page 296)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot12

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	9988		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 12 Wrn (page 298)** and **Analog Protection 12 Sd (page 299)**. Delay is adjusted by setpoint **Analog Protection 12 Delay (page 299)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot13

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	9987		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 13 Wrn (page 301)** and **Analog Protection 13 Sd (page 302)**. Delay is adjusted by setpoint **Analog Protection 13 Delay (page 302)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot14

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9986		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 14 Wrn (page 304)** and **Analog Protection 14 Sd (page 305)**. Delay is adjusted by setpoint **Analog Protection 14 Delay (page 305)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

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AIN Prot15

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	9985		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 15 Wrn (page 307)** and **Analog Protection 15 Sd (page 308)**. Delay is adjusted by setpoint **Analog Protection 15 Delay (page 308)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

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AIN Prot16

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9984		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 16 Wrn (page 310)** and **Analog Protection 16 Sd (page 311)**. Delay is adjusted by setpoint **Analog Protection 16 Delay (page 311)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

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AIN Prot17

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	9983		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 17 Wrn (page 313)** and **Analog Protection 17 Sd (page 314)**. Delay is adjusted by setpoint **Analog Protection 17 Delay (page 314)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

back to Logical analog inputs alphabetically

AIN Prot18

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	9982		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 18 Wrn (page 316)** and **Analog Protection 18 Sd (page 317)**. Delay is adjusted by setpoint **Analog Protection 18 Delay (page 317)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

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AIN Prot19

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	9981		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 19 Wrn (page 319)** and **Analog Protection 19 Sd (page 320)**. Delay is adjusted by setpoint **Analog Protection 19 Delay (page 320)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

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AIN Prot20

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	9980		

Description

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Analog Protection 20 Wrn (page 322)** and **Analog Protection 20 Sd (page 323)**. Delay is adjusted by setpoint **Analog Protection 20 Delay (page 323)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
AL Indic	Analog value is not used for protection. Only alarmlist record is made if analog value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

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AIN Switch 01

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	209		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH01 (PAGE 582)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 1 On (page 267)** and **Analog Switch 1 Off (page 268)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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AIN Switch 02

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	210		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH02 (PAGE 583)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 2 On (page 270)** and **Analog Switch 2 Off (page 271)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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AIN Switch 03

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	211		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH03 (PAGE 583)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 3 On (page 273)** and **Analog Switch 3 Off (page 274)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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AIN Switch 04

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	212		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH04 (PAGE 584)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 4 On (page 276)** and **Analog Switch 4 Off (page 277)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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AIN Switch 05

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	278		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH05 (PAGE 584)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 5 On (page 279)** and **Analog Switch 5 Off (page 280)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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AIN Switch 06

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	279		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH06 (PAGE 585)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 6 On (page 282)** and **Analog Switch 6 Off (page 283)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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AIN Switch 07

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	280		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH07 (PAGE 585)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 7 On (page 285)** and **Analog Switch 7 Off (page 286)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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AIN Switch 08

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	281		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH08 (PAGE 586)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 8 On (page 288)** and **Analog Switch 8 Off (page 289)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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AIN Switch 09

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	282		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH09 (PAGE 586)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 9 On (page 291)** and **Analog Switch 9 Off (page 292)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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AIN Switch 10

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	283		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH10 (PAGE 587)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 10 On (page 294)** and **Analog Switch 10 Off (page 295)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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AIN Switch 11

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	284		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH11 (PAGE 587)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 11 On (page 297)** and **Analog Switch 11 Off (page 298)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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AIN Switch 12

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	285		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH12 (PAGE 588)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 12 On (page 300)** and **Analog Switch 12 Off (page 301)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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AIN Switch 13

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	286		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH13 (PAGE 588)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 13 On (page 303)** and **Analog Switch 13 Off (page 304)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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AIN Switch 14

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	287		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH14 (PAGE 589)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 14 On (page 306)** and **Analog Switch 14 Off (page 307)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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AIN Switch 15

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	288		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH15 (PAGE 589)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 15 On (page 309)** and **Analog Switch 15 Off (page 310)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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AIN Switch 16

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	289		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH16 (PAGE 590)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 16 On (page 312)** and **Analog Switch 16 Off (page 313)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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AIN Switch 17

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	290		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH17 (PAGE 590)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 17 On (page 315)** and **Analog Switch 17 Off (page 316)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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AIN Switch 18

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	291		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH18 (PAGE 591)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 18 On (page 318)** and **Analog Switch 18 Off (page 319)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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AIN Switch 19

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	292		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH19 (PAGE 591)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 19 On (page 321)** and **Analog Switch 19 Off (page 322)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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AIN Switch 20

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	293		
Description			

Logical analog input designed for general value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. This analog input controls logical binary output **AIN SWITCH20 (PAGE 592)**. The behavior of the switch depends on the adjustment of the setpoints **Analog Switch 20 On (page 324)** and **Analog Switch 20 Off (page 325)**.

Note: *This function is not suitable for tristate or binary analog sensors.*

> **IMPORTANT: This analog input has no protection. Input is designed only to control appropriate logical binary output.**

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LAI: C

Coolant Temp

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	67		

Description

Logical analog input designed for coolant temperature value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Coolant Temperature Wrn (page 226)** and **Coolant Temperature Sd (page 226)**. Delay is adjusted by setpoint **Coolant Temperature Delay (page 227)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

Note: *This analog function can by also configured on binary input as binary function. In this case chose* ***COOLANT TEMP (PAGE 551)*** *binary input in the list of binary inputs. Delay of this binary input is adjusted via the same setpoint like for analog function.*

IMPORTANT: Value from analog input has higher priority than value from ECU.

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LAI: F

Fuel Level

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	78		

Description

Logical analog input designed for fuel level value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Fuel Level Wrn (page 230)** and **Fuel Level Sd (page 230)**. Delay is adjusted by setpoint **Fuel Level Delay (page 231)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + BOC	Analog value is used for warning and BOC (Breaker Open and Cooling) protection.
BOC	Analog value is used for BOC (Breaker Open and Cooling) protection.
Wrn + Sd	Analog value is used for warning and shutdown protection.
Sd	Analog value is used for shutdown protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

IMPORTANT: For right behavior of this function, curve for analog input has to be in percentage and setpoint Fuel Tank Volume (page 232) has to be adjusted correctly.

Note: *This analog function can by also configured on binary input as binary function. In this case chose FUEL LEVEL (PAGE 555) binary input in the list of binary inputs. Delay of this binary input is adjusted via the same setpoint like for analog function.*

IMPORTANT: Value from analog input has higher priority than value from ECU.

back to Logical analog inputs alphabetically

LAI: N

Not Used

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	230		
Description			
Input has no function.			

back to Logical analog inputs alphabetically

LAI: O

Oil Pressure

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	9		
Description			

Logical analog input designed for oil pressure value received from analog sensor. For more information about wiring of analog inputs **see Analog inputs on page 49**. Limits for this protection are adjusted by setpoints **Oil Pressure Wrn (page 224)** and **Oil Pressure Sd (page 224)**. Delay is adjusted by setpoint **Oil Pressure Delay (page 225)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
Wrn	Analog value is used for warning protection only.
Wrn + Sd	Analog value is used for warning and Sd protection.
Sd	Analog value is used for Sd protection.

Note: *This parameter has to be adjusted via InteliConfig.*

Alarm

Under limit	Alarm is activated when value of analog input is under adjusted limits
Over limit	Alarm is activated when value of analog input is over adjusted limits
Under limit + fls	Alarm is activated when value of analog input is under adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.
Over limit + fls	Alarm is activated when value of analog input is over adjusted limits. If sensor fail is detected then the alarm with higher level is activate as well.

Example: Protection type is Wrn + Sd. When sensor fail is detected then Sd alarm will be activated + Sensor fail alarm will be activated.

Note: *This parameter has to be adjusted via InteliConfig.*

Note: *This analog function can by also configured on binary input as binary function. In this case chose* ***OIL PRESSURE (PAGE 561)*** *binary input in the list of binary inputs. Delay of this binary input is adjusted via the same setpoint like for analog function.*

IMPORTANT: Value from analog input has higher priority than value from ECU.

back to Logical analog inputs alphabetically

8.1.6 PLC

List of PLC groups

Group: Basic Logical functions 673

Group: Comparison of analog inputs 676
Group: Time functions 678
Group: Other functions 682

For full list of PLC blocks go to the chapter **List of PLC blocks (page 672)**.

List of PLC blocks

Group: Basic logical functions

OR/AND 673
XOR/RS 675

Group: Comparison of analog inputs

Comparator With Hysteresis 676
Comparator With Delay ...677

Group: Time functions

Timer 678
Delay 680

Group: Other functions

Force History Record 682
Force Protection 682

Group: Basic Logical functions

OR/AND

PLC group	Basic logical functions
Related FW	1.9.0
Related applications	AMF, MRS
Comm object	1



Inputs

Input	Type	Negation	Range	Function
Input 1..8	Binary	Yes	0/1	Inputs 1..8

Outputs

Output	Type	Negation	Range	Function
Output	Binary	Yes	0/1	Result of the logical operation

Description

The block performs logical operation OR / AND of 2 - 8 binary operands. The inputs as well as the output can be inverted.

Function OR

Input 1	Input 2	Output
0	0	0
0	1	1
1	0	1
1	1	1

Function AND

Input 1	Input 2	Output
0	0	0
0	1	0
1	0	0
1	1	1

There have to be at least 2 inputs every time. There may be up to 8 inputs configured.

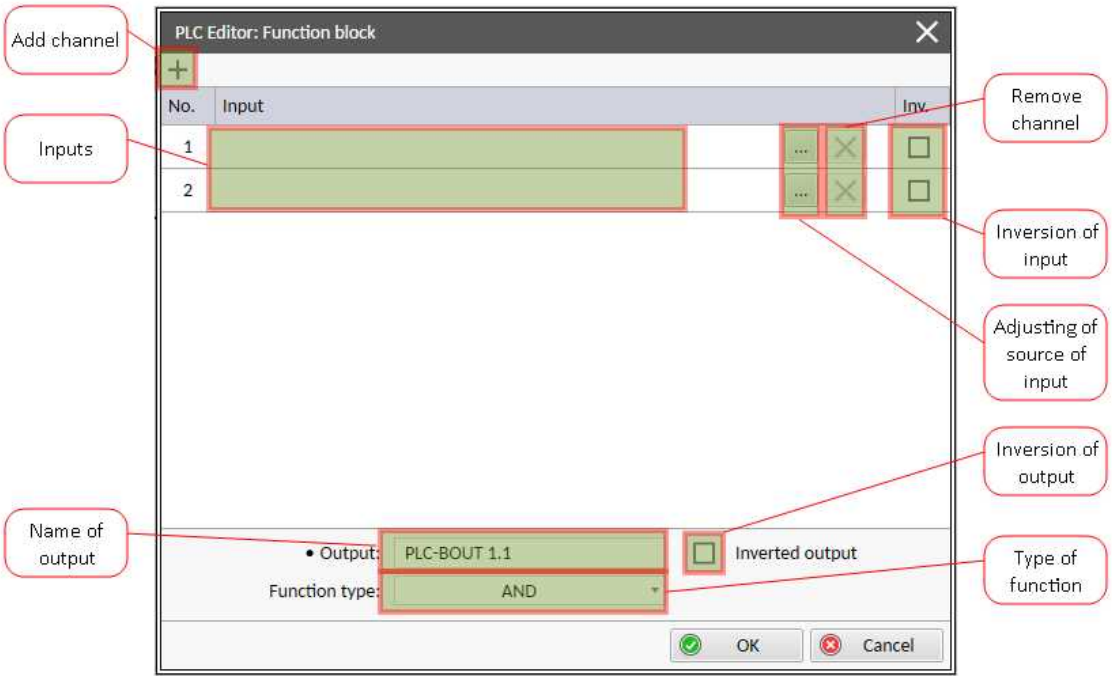


Image 9.1 Configuration of OR/AND block

back to List of PLC blocks

XOR/RS

PLC group	Basic logical functions
Related FW	1.9.0
Related applications	AMF, MRS
Comm object	2



Inputs

Input	Type	Negation	Range	Function
Input 1..2	Binary	Yes	0/1	Inputs 1..2

Outputs

Output	Type	Negation	Range	Function
Output	Binary	Yes	0/1	Result of the logical operation

Description

The block provides logical function of two values - XOR or RS flip-flop. Both inputs and output can be inverted.

Function XOR

Input 1	Input 2	Output
0	0	0
0	1	1
1	0	1
1	1	0

Function RS

R	S	Q_{n+1}
0	0	Q_n
0	1	1
1	0	0
1	1	0

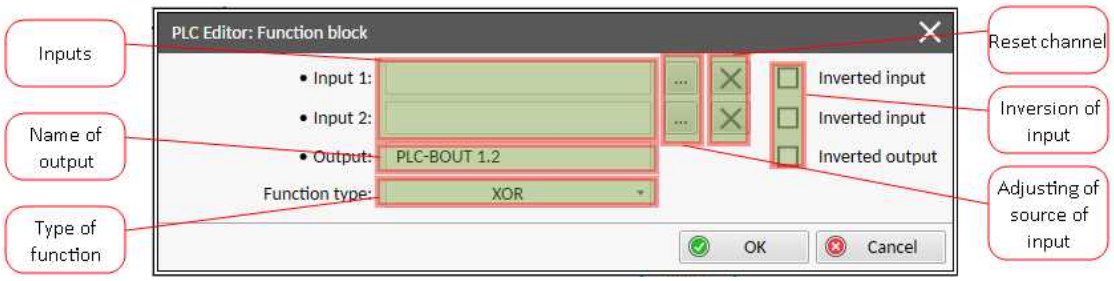


Image 9.2 Configuration of XOR/RS block

back to List of PLC blocks

Group: Comparison of analog inputs

Comparator With Hysteresis

PLC group	Comparison of analog inputs
Related FW	1.9.0
Related applications	AMF, MRS
Comm object	3



Inputs

Input	Type	Negation	Range	Function
Input	Analog	No	Any	Compared value
Input ON	Analog	No	Same as Input	Comparative level for switching on
Input OFF	Analog	No	Same as Input	Comparative level for switching off

Outputs

Output	Type	Negation	Range	Function
Output	Binary	No	0/1	Comparator output

Description

The block compares the input value with the comparative levels. The behavior depends on whether the ON level is higher than OFF level or vice versa.

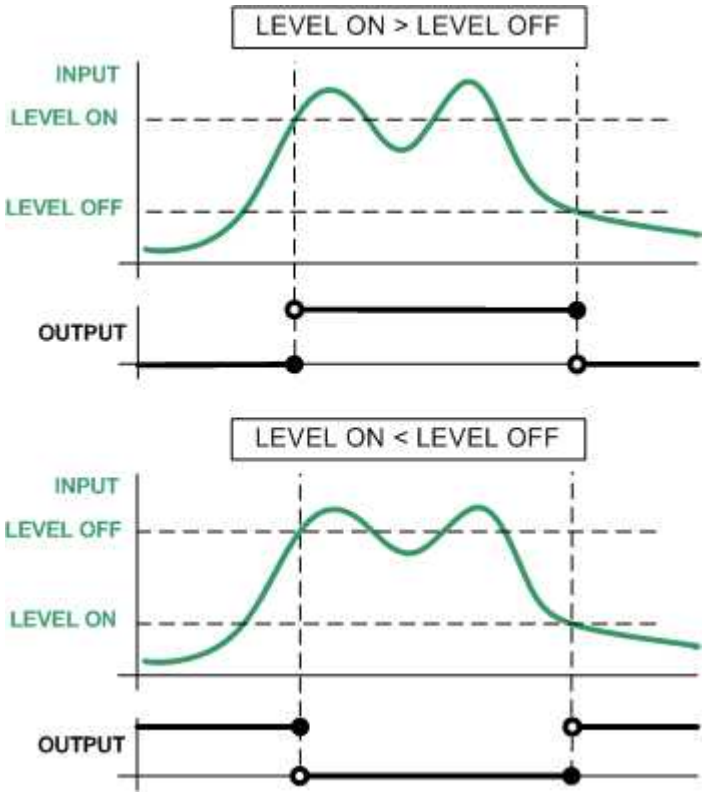


Image 9.3 Different On and Off levels

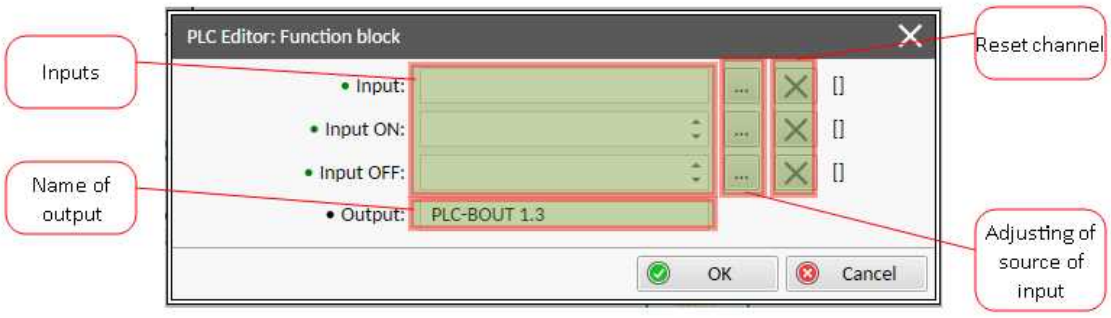


Image 9.4 Configuration of Comp Hyst block

Note: *Level On and Level Off can be constants or values from controller.*

> **IMPORTANT: In case that values on inputs have different decimal numbers than the values are converted and the name of block is red. It is strongly recommended to use values with the same decimal numbers.**

back to List of PLC blocks

Comparator With Delay

PLC group	Comparison of analog inputs
Related FW	1.9.0
Related applications	AMF, MRS
Comm object	4



Inputs

Input	Type	Negation	Range	Function
Input 1	Analog	No	Any	Compared value
Input 2	Analog	No	Same as Input 1	Comparative level
Delay	Analog	No	0.0..3000,0 [s]	Comparative delay

Outputs

Output	Type	Negation	Range	Function
Output	Binary	No	0/1	Comparator output

Description

The block works as an analog switch. It compares the input value with the comparative level. The output will switch on if the input is equal or higher than the comparative level for time longer than the delay.

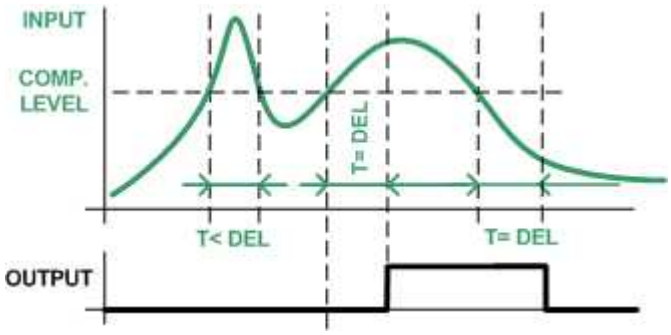


Image 9.5 Principle of delay

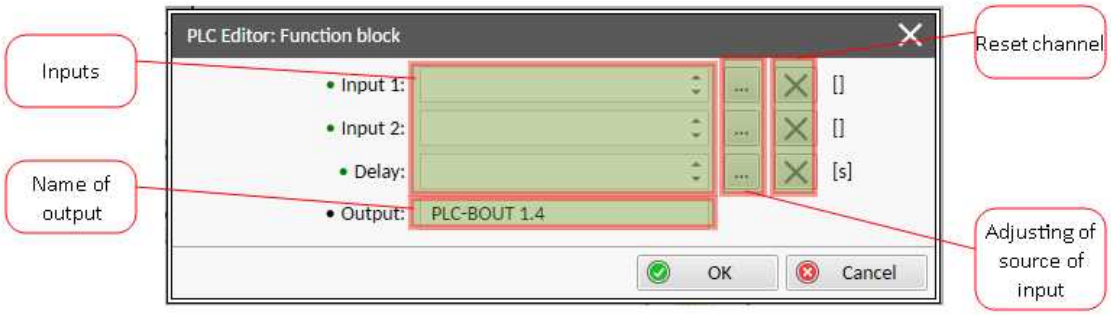


Image 9.6 Configuration of Comp Time block

Note: *Input 2 and Delay can be constants or values from controller.*

back to List of PLC blocks

Group: Time functions

Timer

PLC group	Time functions
Related FW	1.9.0
Related applications	AMF, MRS
Comm object	14



Inputs

Input	Type	Negation	Range	Function
Run	Binary	No	0/1	The timer runs only if this input is active or not connected
Reload	Binary	No	0/1	This input reloads the timer to the initial value
Reload value	Analog	No	0,0..3276,7 [s]	Initial value of the timer

Outputs

Output	Type	Negation	Range	Function
Output	Binary	No	0/1	Timer output

Description

The block works as a countdown timer which is decreased by 1 every PLC cycle. The timer initial value is adjustable by the "Reload value" input. The timer is automatically reloaded with the initial value when it reaches zero or it can be reloaded in any other moment using the "reload" input. The timer is held at reload value until the reload input is deactivated. The timer output is inverted always when the timer is reloaded.

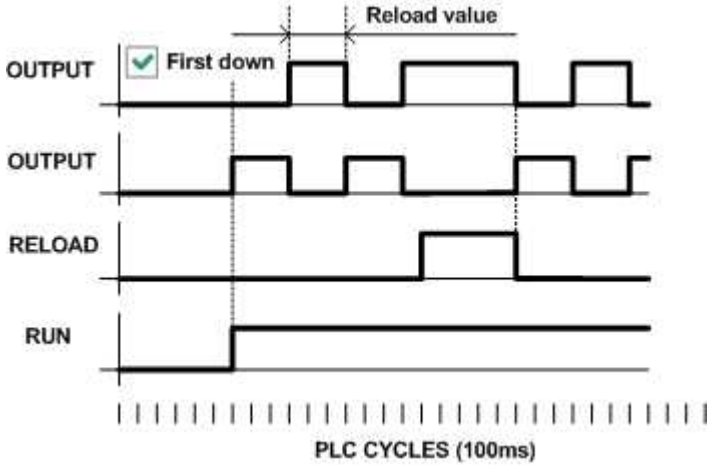


Image 9.7 Principle of timer

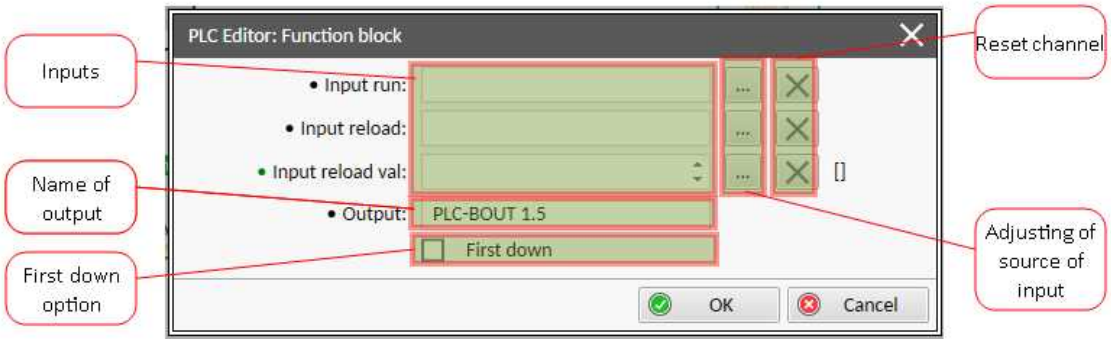


Image 9.8 Configuration of Timer block

Note: *Input reload value can be constant or value from controller.*

Note: *If you want the output to start at logical 0, tick First down option. Otherwise the output will start at logical 1.*

> **IMPORTANT: In case that inputs are not connected and First down option isn´t tick, than output is active.**

back to List of PLC blocks

Delay

PLC group	Time functions
Related FW	1.9.0
Related applications	AMF, MRS
Comm object	33



Inputs

Input	Type	Negation	Range	Function
Input	Binary	No	0/1	Input signal to be delayed
Input time up	Analog	No	-3200,0..3200,0 [s, m, h]	Delay of the rising edge resp. pulse length generated by rising edge of the input
Input time down	Analog	No	-3200,0..3200,0 [s, m, h]	Delay of the falling edge resp. pulse length generated by falling edge of the input
Input reset	Binary	No	0/1	Resets the output to logical 0. The output remains in logical 0 until new rising edge appears on Input (when Input reset is deactivated already)

Outputs

Output	Type	Negation	Range	Function
Output	Binary	No	0/1	Output signal

Description

This block can work in two modes of operation:

- Delay mode - the rising edge at the output is generated with delay of "input time up" when a rising edge at the input is detected. The falling edge at the output is generated with delay of "input time down" when a falling edge at the input is detected. If the delayed falling edge at the output came earlier than the delayed rising edge, then no pulse would be generated at the output.
- Pulse mode - a pulse of "input time up" length is generated at the output when a rising edge is detected, a pulse of "input time down" length is generated at the output when a falling edge is detected.

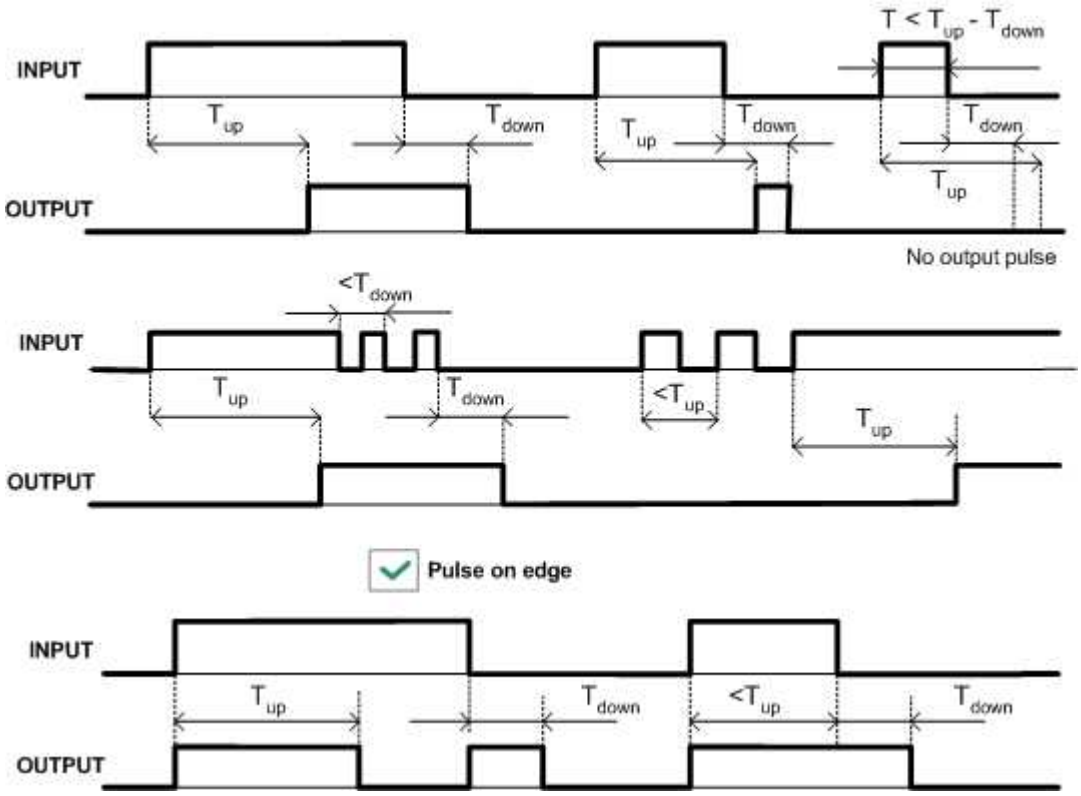


Image 9.9 Delay modes principles

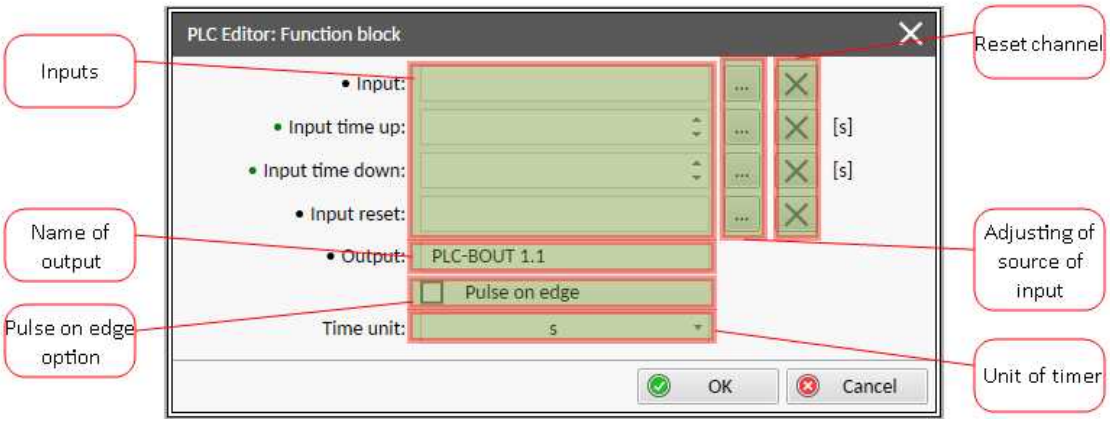


Image 9.10 Configuration of Delay block

Note: *If Input time up or Input time down value is <0, this input is internally set to zero.*

Note: *Input time up and Input time down values can be constants or values from controller.*

Note: *Use Pulse on edge option to choose between delay and pulse mode.*

back to List of PLC blocks

Group: Other functions

Force History Record

PLC group	Other functions
Related FW	1.9.0
Related applications	AMF, MRS
Comm object	9



Inputs

Input	Type	Negation	Range	Function
Input	Binary	No	0/1	A record with configured text is recorded into the controller history when the input is activated.

Outputs

No outputs.

Description

This block writes a record with defined text into the history when the input is activated.



Image 9.11 Configuration of Force Hist block

Note: *Maximal number of characters for history message is 15.*

back to List of PLC blocks

Force Protection

PLC group	Other functions
Related FW	1.9.0
Related applications	AMF, MRS
Comm object	10



Inputs

Input	Type	Negation	Range	Function
Lvl 1	Binary	No	0/1	The input activates yellow level of the configured protection if it is configured
Lvl 2	Binary	No	0/1	The input activates red level of the configured protection if a red level protection is configured
Fls	Binary	No	0/1	The input activates sensor fail if a fls protection is configured

Outputs
No outputs.
Description
This block issues alarms of configured type and text when appropriate binary input is activated.

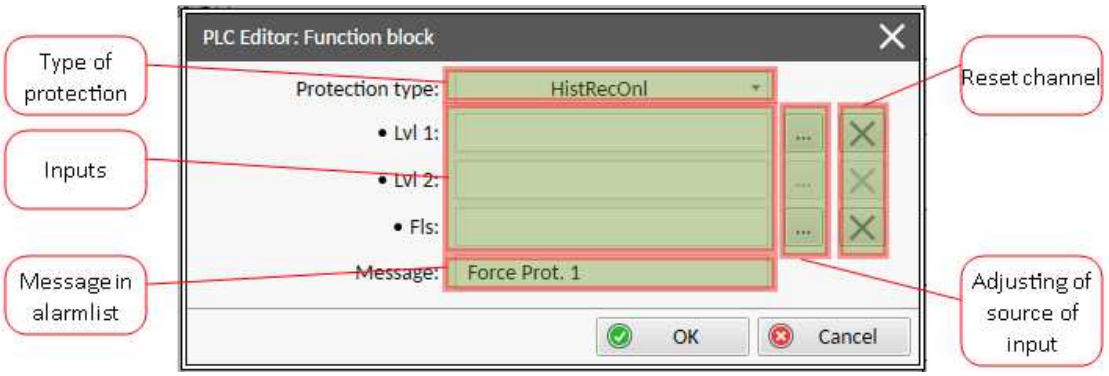


Image 9.12 Configuration of Force Prot block

Available protections are:

- Monitoring
- HistRecOnl
- AL Indic
- Wrn
- Wrn+BOC
- BOC
- Wrn+Sd
- Sd

Note: *Maximal number of characters for alarmlist message is 15.*

Note: *Prefix of protection (e.g. Wrn, Sd, BOC) is added automatically into alarmlist message.*

back to List of PLC blocks

8.2 Alarms

8.2.1 Alarms level 1 683
8.2.2 Alarms level 2 709
8.2.3 Fail sensor and other types 728

What alarms are:

The controller evaluates two levels of alarms. For more information **see Alarm management on page 112**.

8.2.1 Alarms level 1

Warnings 687
Other type 702

For full list of Alarms level 1 go to **List of alarms level 1 (page 685)**.

What alarms level 1 are:

The level 1 alarm indicates that a value or parameter is out of normal limits, but has still not reached critical level. For more information **see Alarm types - Level 1 on page 114**.

List of alarms level 1

Alarm Email 1 Fail 687
Alarm Email 2 Fail 687
Alarm Email 3 Fail 687
Alarm Email 4 Fail 687
Alarm SMS 1 Fail 688
Alarm SMS 2 Fail 688
Alarm SMS 3 Fail 688
Alarm SMS 4 Fail 688
Battery Charger Fail 689
Event Email 1 Fail 689
Event Email 2 Fail 689
Event Email 3 Fail 689
Event Email 4 Fail 690
Event SMS 1 Fail 690
Event SMS 2 Fail 690
Event SMS 3 Fail 690
Event SMS 4 Fail 691
Rental Timer 1 Elapsed ...691
Rental Timer 2 Elapsed ...691
Rental Timer Block Start . 691
Wrn AIN Prot 691
Wrn Battery > Voltage 692
Wrn Battery < Voltage 692
Wrn BIN Protection 692
Wrn Charging Alternator Fail 692
Wrn Coolant Temperature Low 693
Wrn Coolant Temp 693
Wrn ECU Communication Fail 693
Wrn Fence 1 Alarm 693
Wrn Fence 2 Alarm 694
Wrn Fuel Level 694
Wrn Fuel Theft 694
Wrn Generator L1 > Voltage 694
Wrn Generator L1 < 695
Voltage .....
Wrn Generator L1L2 > Voltage 695
Wrn Generator L1L2 < Voltage 695
Wrn Generator L2 > Voltage 695
Wrn Generator L2 < Voltage 696
Wrn Generator L2L3 > Voltage 696
Wrn Generator L2L3 < Voltage 696
Wrn Generator L3 > Voltage 696
Wrn Generator L3 < Voltage 697
Wrn Generator L3L1 > Voltage 697
Wrn Generator L3L1 < Voltage 697
Wrn Generator > Frequency 698
Wrn Generator < Frequency 698
Wrn Check DPF Status .. 698
Wrn Mains Voltage Detected 698
Wrn Maintenance 1 699
Wrn Maintenance 2 699
Wrn Maintenance 3 699
Wrn MCB Fail 699
Wrn Oil Pressure 700
Wrn Overload 700
Wrn Override All Sd 700
Wrn Rental Timer 1 701
Wrn Rental Timer 2 701
Wrn Stop Fail 701
After-Treatment 702
Dual Operation Different FW Version 702
Dual Operation Different Mains 702
Dual Operation Fail 703
Dual Operation Master Fail703
Dual Operation Slave Fail 703
ECU Wait To Start 704
ECU Yellow Lamp 704
EM(A) - a message lost ...704
EM(A) - configuration mistake 704
EM(A) - insufficient 705
EM(A) - missing or damaged 705
EM(B) - a message lost ...705
EM(B) - configuration mistake 705
EM(B) - insufficient 705
EM(B) - missing or damaged 706
Generator CCW Rotation .706
Mains CCW Rotation 706
Manual Restore 706
Module(slotA) - comm. outage 707
Module(slotA) - false module 707
Module(slotA) - unattended 707
Module(slotA) - unexpected 707
Module(slotA) - unknown module 708
Module(slotB) - comm. outage 708
Module(slotB) - false module 708
Module(slotB) - unattended 708

Module(slotB) - unexpected 709
Module(slotB) - unknown module 709

Warnings

Alarm Email 1 Fail

Alarm Type	Other
Alarmlist message	Alarm Email 1 Fail
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm indicates that there was a request to send an alarm email to email address which is adjusted in setpoint **Email Address 1 (page 395)** and email wasn't send.

back to List of alarms level 1

Alarm Email 2 Fail

Alarm Type	Other
Alarmlist message	Alarm Email 2 Fail
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm indicates that there was a request to send an alarm email to email address which is adjusted in setpoint **Email Address 2 (page 396)** and email wasn't send.

back to List of alarms level 1

Alarm Email 3 Fail

Alarm Type	Other
Alarmlist message	Alarm Email 3 Fail
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm indicates that there was a request to send an alarm email to email address which is adjusted in setpoint **Email Address 3 (page 396)** and email wasn't send.

back to List of alarms level 1

Alarm Email 4 Fail

Alarm Type	Other
Alarmlist message	Alarm Email 4 Fail
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm indicates that there was a request to send an alarm email to email address which is adjusted in setpoint **Email Address 4 (page 397)** and email wasn't send.

back to List of alarms level 1

Alarm SMS 1 Fail

Alarm Type	Other
Alarmlist message	Alarm SMS 1 Fail
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm indicates that there was a request to send an alarm SMS to telephone number which is adjusted in setpoint **Telephone Number 1 (page 392)** and SMS wasn't send.

back to List of alarms level 1

Alarm SMS 2 Fail

Alarm Type	Other
Alarmlist message	Alarm SMS 2 Fail
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm indicates that there was a request to send an alarm SMS to telephone number which is adjusted in setpoint **Telephone Number 2 (page 392)** and SMS wasn't send.

back to List of alarms level 1

Alarm SMS 3 Fail

Alarm Type	Other
Alarmlist message	Alarm SMS 3 Fail
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm indicates that there was a request to send an alarm SMS to telephone number which is adjusted in setpoint **Telephone Number 3 (page 393)** and SMS wasn't send.

back to List of alarms level 1

Alarm SMS 4 Fail

Alarm Type	Other
Alarmlist message	Alarm SMS 4 Fail
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm indicates that there was a request to send an alarm SMS to telephone number which is adjusted in setpoint **Telephone Number 4 (page 393)** and SMS wasn't send.

back to List of alarms level 1

Battery Charger Fail

Alarm Type	Warning
Alarmlist message	Battery Charge Fail
Alarm evaluated	Mains is OK
Related applications	AMF, MRS
Description	This alarm is activated when logical binary input **BATTERY CHARGER (PAGE 526)** is active.

back to List of alarms level 1

Event Email 1 Fail

Alarm Type	Other
Alarmlist message	Event Email 1 Fail
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm indicates that there was a request to send an event email to email address which is adjusted in setpoint **Email Address 1 (page 395)** and email wasn't send.

back to List of alarms level 1

Event Email 2 Fail

Alarm Type	Other
Alarmlist message	Event Email 2 Fail
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm indicates that there was a request to send an event email to email address which is adjusted in setpoint **Email Address 2 (page 396)** and email wasn't send.

back to List of alarms level 1

Event Email 3 Fail

Alarm Type	Other
Alarmlist message	Event Email 2 Fail
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm indicates that there was a request to send an event email to email address which is adjusted in setpoint **Email Address 3 (page 396)** and email wasn't send.

back to List of alarms level 1

Event Email 4 Fail

Alarm Type	Other
Alarmlist message	Event Email 4 Fail
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm indicates that there was a request to send an event email to email address which is adjusted in setpoint **Email Address 4 (page 397)** and email wasn't send.

back to List of alarms level 1

Event SMS 1 Fail

Alarm Type	Other
Alarmlist message	Event SMS 1 Fail
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm indicates that there was a request to send an event SMS to telephone number which is adjusted in setpoint **Telephone Number 1 (page 392)** and SMS wasn't send.

back to List of alarms level 1

Event SMS 2 Fail

Alarm Type	Other
Alarmlist message	Event SMS 2 Fail
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm indicates that there was a request to send an event SMS to telephone number which is adjusted in setpoint **Telephone Number 2 (page 392)** and SMS wasn't send.

back to List of alarms level 1

Event SMS 3 Fail

Alarm Type	Other
Alarmlist message	Event SMS 3 Fail
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm indicates that there was a request to send an event SMS to telephone number which is adjusted in setpoint **Telephone Number 3 (page 393)** and SMS wasn't send.

back to List of alarms level 1

Event SMS 4 Fail

Alarm Type	Other
Alarmlist message	Event SMS 4 Fail
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm indicates that there was a request to send an event SMS to telephone number which is adjusted in setpoint **Telephone Number 4 (page 393)** and SMS wasn't send.

back to List of alarms level 1

Rental Timer 1 Elapsed

Alarm Type	Warning
Alarmlist message	Rental Timer 1 Elapsed
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is activated when **Rental Timer 1 (page 341)** elapses.

back to List of alarms level 1

Rental Timer 2 Elapsed

Alarm Type	Warning
Alarmlist message	Rental Timer 2 Elapsed
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is activated when **Rental Timer 2 (page 343)** elapses.

back to List of alarms level 1

Rental Timer Block Start

Alarm Type	Other
Alarmlist message	Rental Timer Block Start
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	Alarm is active when there is start command and **Rental Timer 1 (page 341)** or **Rental Timer 2 (page 343)** elapsed.

back to List of alarms level 1

Wrn AIN Prot

Alarm Type	Warning
Alarmlist message	Wrn + Name of analog input
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that value the general analog protection is out of warning protection limit.

back to List of alarms level 1

Wrn Battery > Voltage

Alarm Type	Warning
Alarmlist message	All the time
Alarm evaluated	Wrn Battery > Voltage
Related applications	AMF, MRS
Description	This alarm informs the operator that the controller supply voltage is too high. The following setpoints are related to it: ▶ **Battery Overvoltage (page 237)** ▶ **Battery <> Voltage Delay (page 237)**

back to List of alarms level 1

Wrn Battery < Voltage

Alarm Type	Warning
Alarmlist message	Wrn Battery < Voltage
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm informs the operator that the controller supply voltage is too low. The following setpoints are related to it: ▶ **Battery Undervoltage (page 236)** ▶ **Battery <> Voltage Delay (page 237)**

back to List of alarms level 1

Wrn BIN Protection

Alarm Type	Warning
Alarmlist message	Wrn + Name of binary input
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	Binary input also can be adjusted like alarm. In this case message in alarmlist contains prefix - Wrn and binary input name. This alarm occurs, when appropriate binary input is active.

back to List of alarms level 1

Wrn Charging Alternator Fail

Alarm Type	Warning
Alarmlist message	Wrn Charging Alternator Fail
Alarm evaluated	Engine running only
Related applications	AMF, MRS
Description	This alarm is issued if the engine is running and the voltage on the D+ terminal is lower than **D+ Treshold (page 222)** of the controller supply voltage. This alarm works similar to the red “battery” alarm indicator on a vehicle dashboard. The setpoint has to be in Charge Fail or Enabled position to enable this alarm.

back to List of alarms level 1

Wrn Coolant Temperature Low

Alarm Type	Warning
Alarmlist message	Wrn Coolant Temperature Low
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that the coolant temperature is lower than the temperature set in **Coolant Temperature Low Wrn (page 229)** setpoint.

back to List of alarms level 1

Wrn Coolant Temp

Alarm Type	Warning
Alarmlist message	Wrn Coolant Temp
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that the coolant temperature is higher than the temperature set in **Coolant Temperature Wrn (page 226)** setpoint.

back to List of alarms level 1

Wrn ECU Communication Fail

Alarm Type	Warning
Alarmlist message	Wrn ECU Communication Fail
Alarm evaluated	With configured LBO **ECU Power Relay (page 600)** - only when this LBO is active Without configured LBO **ECU Power Relay (page 600)** - all the time
Related applications	AMF, MRS
Description	This alarm occurs when an ECU is configured, but the communication with the ECU is not established or has dropped out.

back to List of alarms level 1

Wrn Fence 1 Alarm

Alarm Type	Warning
Alarmlist message	Wrn Fence 1 Alarm
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm evaluates the GPS position of gen-set. The following setpoint are related to it: ▶ **Geo-Fencing (page 348)** ▶ **Fence 1 Protection (page 349)** ▶ **Fence Radius 1 (page 347)**

back to List of alarms level 1

Wrn Fence 2 Alarm

Alarm Type	Warning
Alarmlist message	Wrn Fence 2 Alarm
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm evaluates the GPS position of gen-set. The following setpoint are related to it: ▶ **Geo-Fencing (page 348)** ▶ **Fence 2 Protection (page 350)** ▶ **Fence Radius 2 (page 347)**

back to List of alarms level 1

Wrn Fuel Level

Alarm Type	Warning
Alarmlist message	Wrn Fuel Level
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that the fuel level is lower than the level set in **Fuel Level Wrn (page 230)** setpoint.

back to List of alarms level 1

Wrn Fuel Theft

Alarm Type	Warning
Alarmlist message	Wrn Fuel Theft
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm occurs when the fuel level value measured at relevant AI (Fuel Level) drops faster than is the limit adjusted by setpoint **Maximal Fuel Drop (page 232)**.

back to List of alarms level 1

Wrn Generator L1 > Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L1 > Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase voltage in phase 1. The following setpoints are related to it: ▶ **Generator Overvoltage Wrn (page 246)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 1

Wrn Generator L1 < Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L1 < Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase voltage in phase 1. The following setpoints are related to it: ▶ **Generator Undervoltage Wrn (page 247)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 1

Wrn Generator L1L2 > Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L1L2 > Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase to phase voltage between phases 1 and 2. The following setpoints are related to it: ▶ **Generator Overvoltage Wrn (page 246)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 1

Wrn Generator L1L2 < Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L1L2 < Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase to phase voltage between phases 1 and 2. The following setpoints are related to it: ▶ **Generator Undervoltage Wrn (page 247)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 1

Wrn Generator L2 > Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L2 > Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase voltage in phase 2. The following setpoints are related to it: ▶ **Generator Overvoltage Wrn (page 246)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 1

Wrn Generator L2 < Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L2 < Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase voltage in phase 2. The following setpoints are related to it: ▶ **Generator Undervoltage Wrn (page 247)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 1

Wrn Generator L2L3 > Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L2L3 > Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase to phase voltage between phases 2 and 3. The following setpoints are related to it: ▶ **Generator Overvoltage Wrn (page 246)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 1

Wrn Generator L2L3 < Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L2L3 < Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase to phase voltage between phases 2 and 3. The following setpoints are related to it: ▶ **Generator Undervoltage Wrn (page 247)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 1

Wrn Generator L3 > Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L3 > Voltage
Alarm evaluated	Generator excited only

Related applications	AMF, MRS
Description	This alarm evaluates the generator phase voltage in phase 3. The following setpoints are related to it: ▶ **Generator Overvoltage Wrn (page 246)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 1

Wrn Generator L3 < Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L3 < Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase voltage in phase 3. The following setpoints are related to it: ▶ **Generator Undervoltage Wrn (page 247)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 1

Wrn Generator L3L1 > Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L3L1 > Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase to phase voltage between phases 3 and 1. The following setpoints are related to it: ▶ **Generator Overvoltage Wrn (page 246)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 1

Wrn Generator L3L1 < Voltage

Alarm Type	Warning
Alarmlist message	Wrn Generator L3L1 < Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase to phase voltage between phases 3 and 1. The following setpoints are related to it: ▶ **Generator Undervoltage Wrn (page 247)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 1

Wrn Generator > Frequency

Alarm Type	Warning
Alarmlist message	Wrn Generator > Frequency
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator frequency in the phase L1. The following setpoints are related to it: ▶ **Generator Overfrequency Wrn (page 248)** ▶ **Generator <> Frequency Delay (page 249)**

back to List of alarms level 1

Wrn Generator < Frequency

Alarm Type	Warning
Alarmlist message	Wrn Generator < Frequency
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator frequency in the phase L1. The following setpoints are related to it: ▶ **Generator Underfrequency Wrn (page 249)** ▶ **Generator <> Frequency Delay (page 249)**

back to List of alarms level 1

Wrn Check DPF Status

Alarm Type	Warning
Alarmlist message	Wrn Check DPF Status
Alarm evaluated	When ECU is configured
Related applications	AMF, MRS
Description	This alarm occurs when ECU send alarm message about Tier IV protection. ***Note:*** *Tier IV protection have to be supported by ECU.*

back to List of alarms level 1

Wrn Mains Voltage Detected

Alarm Type	Warning
Alarmlist message	Wrn Mains Voltage Detected
Alarm evaluated	Gen-set is running
Related applications	AMF
Description	This alarm occurs when setpoint **Operation Mode (page 199)** is adjusted to MRS and voltage is detected on mains.

back to List of alarms level 1

Wrn Maintenance 1

Alarm Type	Warning
Alarmlist message	Wrn Maintenance 1
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	Adjust the setpoint **Maintenance Timer 1 (page 235)** to the interval of the next maintenance check. The value of the setpoint will count down while the engine is running and if reaches zero, this alarm will be issued. The alarm message will remain in the alarm list (even if the controller is switched off and on again) until the setpoint is re-adjusted to a positive value.

back to List of alarms level 1

Wrn Maintenance 2

Alarm Type	Warning
Alarmlist message	Wrn Maintenance 2
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	Adjust the setpoint **Maintenance Timer 2 (page 236)** to the interval of the next maintenance check. The value of the setpoint will count down while the engine is running and if reaches zero, this alarm will be issued. The alarm message will remain in the alarm list (even if the controller is switched off and on again) until the setpoint is re-adjusted to a positive value.

back to List of alarms level 1

Wrn Maintenance 3

Alarm Type	Warning
Alarmlist message	Wrn Maintenance 3
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	Adjust the setpoint **Maintenance Timer 3 (page 236)** to the interval of the next maintenance check. The value of the setpoint will count down while the engine is running and if reaches zero, this alarm will be issued. The alarm message will remain in the alarm list (even if the controller is switched off and on again) until the setpoint is re-adjusted to a positive value.

back to List of alarms level 1

Wrn MCB Fail

Alarm Type	Warning
Alarmlist message	Wrn MCB Fail
Alarm evaluated	All the time

Related applications	AMF
Description	This alarm will occur when the **MCB Feedback (page 560)** input does not match the expected position given by the **MCB Close/Open (page 614)** output. It stays active until the mismatch between the output and feedback disappears. ▶ If there was no command issued by the controller and the breaker (feedback) changes suddenly the position itself, the alarm will be issued immediately. ▶ Self-opening of the breaker is not considered a fault and if all mains values are within limits, the command to reclose the breaker is issued after delay given by the setpoint **Mains Return Delay (page 255)** has elapsed. ▶ The alarm will be also issued, if the breaker does not respond to the close command within 2 seconds. After this period has elapsed the output MCB Close/Open is deactivated again and the next attempt to close the breaker will occur first after the alarm is reset. ▶ The alarm will be also issued if the breaker does not respond to the open command within 2 seconds. The output MCB Close/Open will stay deactivated. Closing of GCB is blocked until this alarm becomes inactive.

back to List of alarms level 1

Wrn Oil Pressure

Alarm Type	Warning
Alarmlist message	Wrn Oil Pressure
Alarm evaluated	Gen-set is running
Related applications	AMF, MRS
Description	This alarm indicates that the oil pressure is lower than the pressure set in **Oil Pressure Wrn (page 224)** setpoint.

back to List of alarms level 1

Wrn Overload

Alarm Type	Warning
Alarmlist message	Wrn Overload
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm is issued when the gen-set power is over the limit for time period longer than the delay. The following setpoints are related to it: ▶ **Overload Wrn (page 242)** adjusts the overload limit. ▶ **Overload Delay (page 242)** Overload Del adjusts the delay.

back to List of alarms level 1

Wrn Override All Sd

Alarm Type	Warning
Alarmlist message	Override All Sd
Alarm evaluated	All the time

Related applications	AMF, MRS
Description	This alarm occurs when binary input **SD OVERRIDE (PAGE 565)** is activated.

back to List of alarms level 1

Wrn Rental Timer 1

Alarm Type	Warning
Alarmlist message	Wrn Rental Timer 1
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm occurs xx hours before **Rental Timer 1 (page 341)** elapsed. Hours are adjusted by setpoint **Rental Timer 1 Wrn (page 343)**.

back to List of alarms level 1

Wrn Rental Timer 2

Alarm Type	Warning
Alarmlist message	Wrn Rental Timer 2
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm occurs xx hours before **Rental Timer 2 (page 343)** elapsed. Hours are adjusted by setpoint **Rental Timer 2 Wrn (page 345)**.

back to List of alarms level 1

Wrn Stop Fail

Alarm Type	Warning
Alarmlist message	Wrn Stop Fail
Alarm evaluated	While the engine shall be stopped
Related applications	AMF, MRS
Description	This alarm occurs if the gen-set shall be stopped, but some symptom indicates that it is not stopped. The period when the gen-set shall be stopped begins after the **FUEL SOLENOID (PAGE 602)** has been switched off and time delay **Stop Time (page 219)** has elapsed and lasts for the entire time the **FUEL SOLENOID (PAGE 602)** or **STARTER (PAGE 633)** are off.

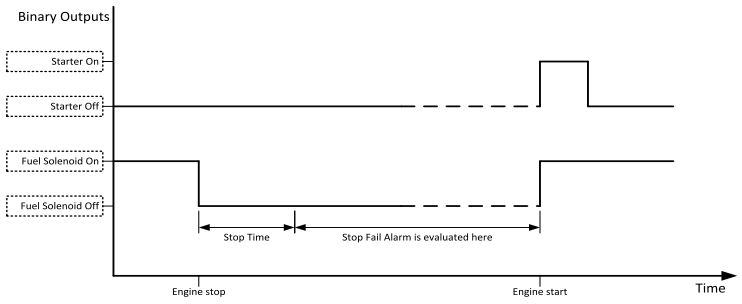


Image 9.13 Stop Fail

Note: *Gen-set cannot be started until this alarm is inactive and reset.*

back to List of alarms level 1

Other type

After-Treatment

Alarm Type	Alarm indication
Alarmlist message	After-Treatment
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm occurs when appropriate after-treatment lamp is active.

back to List of alarms level 1

Dual Operation Different FW Version

Alarm Type	Alarm indication
Alarmlist message	Dual Operation Different FW Version
Alarm evaluated	Only during dual operation
Related applications	AMF, MRS
Description	This alarm is active when FW version (all numbers are checked) or Branch of Master and Slave is different.

back to List of alarms level 1

Dual Operation Different Mains

Alarm Type	Alarm indication
Alarmlist message	Dual Operation Different Mains
Alarm evaluated	Only during dual operation
Related applications	AMF, MRS
Description	This alarm is active when there are different states of mains on controllers. For example Master see healthy mains and slave see mains fail. ***Note:*** *This alarm is also written to history.*

back to List of alarms level 1

Dual Operation Fail

Alarm Type	Alarm indication
Alarmlist message	Dual Operation Fail
Alarm evaluated	Only during dual operation
Related applications	AMF, MRS
Description	This alarm is active when there is fail between controllers in dual operation function. Exapmles: ▶ No connection - disconnection of cable ▶ No connection - incorrect settings of COM Modes ▶ Controllers not in AUTO mode ▶ Different Operation Modes (AMF controllers only) ▶ Different FW versions in controllers ▶ Different mains statuses in controllers (AMF controllers only) ***Note:*** *This alarm is also written to history.*

back to List of alarms level 1

Dual Operation Master Fail

Alarm Type	Alarm indication
Alarmlist message	Dual Operation Master Fail
Alarm evaluated	Only during dual operation
Related applications	AMF, MRS
Description	This alarm is active when Master is not able to take the load e.g. there is alarm of 2nd level on Master. Logical binary input **AL DUAL MASTER FAIL (PAGE 575)** is activated. ***Note:*** *This alarm is also written to history.*

back to List of alarms level 1

Dual Operation Slave Fail

Alarm Type	Alarm indication
Alarmlist message	Dual Operation Slave Fail
Alarm evaluated	Only during dual operation
Related applications	AMF, MRS
Description	This alarm is active when Slave is not able to take the load e.g. there is alarm of 2nd level on Slave. Logical binary input **AL DUAL SLAVE FAIL (PAGE 575)** is activated. ***Note:*** *This alarm is also written to history.*

back to List of alarms level 1

ECU Wait To Start

Alarm Type	Warning
Alarmlist message	ECU Wait To Start
Alarm evaluated	Only when ECU is connected
Related applications	AMF, MRS
Description	This alarm is activated when ECU send information that ECU Wait To Start lamp is activated. LBO **ALARM (PAGE 582)**is not activated, after deactivation of lamp, alarm automatically disappear.

back to List of alarms level 1

ECU Yellow Lamp

Alarm Type	Alarm indication + history record
Alarmlist message	ECU Yellow Lamp
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is activated when ECU send information that ECU Yellow lamp is activated. LBO **ALARM (PAGE 582)**is not activated, after deactivation of lamp, alarm automatically disappear.

back to List of alarms level 1

EM(A) - a message lost

Alarm Type	Other
Alarmlist message	EM(A) - a message lost
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that there is a problem with communication between controller and module in slot.

back to List of alarms level 1

EM(A) - configuration mistake

Alarm Type	Other
Alarmlist message	EM(A) - configuration mistake
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that there is a problem with configuration of binary input or output of module in slot.

back to List of alarms level 1

EM(A) - insufficient

Alarm Type	Other
Alarmlist message	EM(A) - insufficient
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that module does not support all required features.

back to List of alarms level 1

EM(A) - missing or damaged

Alarm Type	Other
Alarmlist message	EM(A) - missing or damaged
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that there is a problem with communication with module in slot (in first 5 second there was no communication and module is configured in slot).

back to List of alarms level 1

EM(B) - a message lost

Alarm Type	Other
Alarmlist message	EM(B) - a message lost
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that there is a problem with communication between controller and module in slot.

back to List of alarms level 1

EM(B) - configuration mistake

Alarm Type	Other
Alarmlist message	EM(B) - configuration mistake
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that there is a problem with configuration of binary input or output of module in slot.

back to List of alarms level 1

EM(B) - insufficient

Alarm Type	Other
Alarmlist message	EM(B) - insufficient
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that module does not support all required features.

back to List of alarms level 1

EM(B) - missing or damaged

Alarm Type	Other
Alarmlist message	EM(B) - missing or damaged
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that there is a problem with communication with module in slot (in first 5 second there was no communication and module is configured in slot).

back to List of alarms level 1

Generator CCW Rotation

Alarm Type	Warning
Alarmlist message	Generator CCW Rotation
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The controller detects phase sequence on generator voltage terminals. This protection is important after controller installation to avoid wrong voltage phase connection. There is a fixed defined phase sequence in InteliLite controller: T35 = N, T36 = L1, T37 = L2 and T38 = L3. When the phases are connected in a different order, alarms are detected. This alarm prevent circuit breaker closing.

back to List of alarms level 1

Mains CCW Rotation

Alarm Type	Alarm indication
Alarmlist message	Mains CCW Rotation
Alarm evaluated	All the time
Related applications	AMF
Description	The controller detects phase sequence on mains voltage terminals. This protection is important after controller installation to avoid wrong voltage phase connection. There is a fixed defined phase sequence in InteliLite controller: T39 = N, T40 = L1, T41 = L2 and T42 = L3. When the phases are connected in a different order, alarms are detected. This alarm prevent circuit breaker closing.

back to List of alarms level 1

Manual Restore

Alarm Type	Warning
Alarmlist message	Manual Restore
Alarm evaluated	All the time
Related applications	AMF
Description	Alarm is activated when controller is in AUTO mode, **Return From Island (page 261)** setpoint is set to manual, load is on gen-set a mains has returned.

back to List of alarms level 1

Module(slotA) - comm. outage

Alarm Type	Other
Alarmlist message	Module(slotA) - comm. outage
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that there is a problem with communication between controller and module in slot.

back to List of alarms level 1

Module(slotA) - false module

Alarm Type	Other
Alarmlist message	Module(slotA) - fake module
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that false module is inserted in slot.

back to List of alarms level 1

Module(slotA) - unattended

Alarm Type	Other
Alarmlist message	Module(slotA) - unattended
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that two same communication modules are inserted in slots and one of them will be inactive.

back to List of alarms level 1

Module(slotA) - unexpected

Alarm Type	Other
Alarmlist message	Module(slotA) - unexpected
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that in slot is inserted different module than which is configured or the module is unconfigured and has to be configured for proper function.

back to List of alarms level 1

Module(slotA) - unknown module

Alarm Type	Other
Alarmlist message	Module(slotA) - unknown module
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that unknown module is inserted in slot.

back to List of alarms level 1

Module(slotB) - comm. outage

Alarm Type	Other
Alarmlist message	Module(slotB) - comm. outage
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that there is a problem with communication between controller and module in slot.

back to List of alarms level 1

Module(slotB) - false module

Alarm Type	Other
Alarmlist message	Module(slotB) - fake module
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that false module is inserted in slot.

back to List of alarms level 1

Module(slotB) - unattended

Alarm Type	Other
Alarmlist message	Module(slotB) - unattended
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that two same communication modules are inserted in slots and one of them will be inactive.

back to List of alarms level 1

Module(slotB) - unexpected

Alarm Type	Other
Alarmlist message	Module(slotB) - unexpected
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that in slot is inserted different module than which is configured or the module is unconfigured and has to be configured for proper function.

back to List of alarms level 1

Module(slotB) - unknown module

Alarm Type	Other
Alarmlist message	Module(slotB) - unknown module
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that unknown module is inserted in slot.

back to List of alarms level 1

Wrn Fuel Transfer Failed

Alarm Type	Warning
Alarmlist message	Wrn Fuel Transfer Failed
Alarm evaluated	When **FUEL PUMP (PAGE 602)** is active
Related applications	AMF, MRS
Description	This alarm will occur when there is no increase of fuel level when **FUEL PUMP (PAGE 602)** is active.

back to List of alarms level 1

Wrn Transferring Fuel

Alarm Type	Warning
Alarmlist message	Transferring Fuel
Alarm evaluated	When **FUEL PUMP (PAGE 602)** is active
Related applications	AMF, MRS
Description	This alarm will occur when **FUEL PUMP (PAGE 602)** is active.

back to List of alarms level 1

8.2.2 Alarms level 2

Shutdown 712
Other type 721

For full list of Alarms level 2 go to **List of alarms level 2 (page 711)**.

What alarms level 2 are:

The level 2 level alarm indicates that a critical level of the respective value or parameter has been reached. For

more information **see Alarm types - Level 2 on page 114**.

List of alarms level 2

Emergency Stop 712
Sd AIN Protec 712
Sd Battery Flat 712
Sd BIN Protection 712
Sd Coolant Temp 713
Sd Current Unbalance 713
Sd Earth Fault Current 713
Sd ECU Communication Fail 714
Sd Fence 1 Alarm 714
Sd Fence 2 Alarm 714
Sd Fuel Level 714
Sd GCB Fail 715
Sd Generator L1 > Voltage 715
Sd Generator L1 < Voltage 715
Sd Generator L1L2 > Voltage 716
Sd Generator L1L2 < Voltage 716
Sd Generator L2 > Voltage 716
Sd Generator L2 < Voltage 716
Sd Generator L2L3 > Voltage 717
Sd Generator L2L3 < Voltage 717
Sd Generator L3 > Voltage 717
Sd Generator L3 < Voltage 717
Sd Generator L3L1 > Voltage 718
Sd Generator L3L1 < Voltage 718
Sd Generator > Frequency 718
Sd Generator < Frequency 719
Sd Generator Voltage Unbalance Ph-Ph 719
Sd Generator Voltage Unbalance Ph-N 719
Sd Oil Pressure 719
Sd Overload 720
Sd Overspeed 720
Sd RPM Measurement Fail 720
Sd Short Circuit 721
Sd Start Fail 721
Sd Underspeed 721
BOC AIN Prot 721
BOC BIN Protection 722
BOC Coolant Temp 722
BOC Current Unbalance .. 722
BOC Fence 1 Alarm 722
BOC Fence 2 Alarm 723
BOC Fuel Level 723
BOC Generator L1 < Voltage 723
BOC Generator L1L2 < Voltage 723
BOC Generator L2 < Voltage 724
BOC Generator L2L3 < Voltage 724
BOC Generator L3 < Voltage 724
BOC Generator L3L1 < Voltage 725
BOC Generator > Frequency 725
BOC Generator < Frequency 725
BOC Gen Voltage Unbalance Ph-Ph 725
BOC Gen Voltage Unbalance Ph-N 726
BOC Overcurrent IDMT .. 726
BOC Overload 727
BOC Rental Timer 727
BOC Short Circuit 727
ECU Red Lamp 727

Shutdown

Emergency Stop

Alarm Type	Shutdown
Alarmlist message	Emergency Stop
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	Alarm is activated when binary input **EMERGENCY STOP (PAGE 554)** is activated. The gen-set shuts down in the moment the input is activated and starting is blocked until the input is deactivated and fault reset is pressed. ***Note:*** *Use red emergency button placed on the switchboard door and connect it to a binary input of the controller. Then configure the function Emergency Stop to this binary input. It is recommended to use NC contact of the button.* ***Note:*** *The MCB control is not affected by this alarm.*

back to List of alarms level 2

Sd AIN Protec

Alarm Type	Sd
Alarmlist message	Sd + Name of analog input
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that value the general analog protection is out of shutdown protection limit.

back to List of alarms level 2

Sd Battery Flat

Alarm Type	Shutdown
Alarmlist message	Sd Battery Flat
Alarm evaluated	During cranking
Related applications	AMF, MRS
Description	This alarm will be issued if the controller was reset during cranking of the gen-set. If this situation occurs, the controller supposes the starting battery is so exhausted that its voltage drops so low when starter motor is energized that it causes controller reset.

back to List of alarms level 2

Sd BIN Protection

Alarm Type	Shutdown
Alarmlist message	Sd + Name of binary input
Alarm evaluated	All the time

Related applications	AMF, MRS
Description	Binary input also can be adjusted like alarm. In this case message in alarmlist contains prefix - Sd and binary input name. This alarm occurs, when appropriate binary input is active.

back to List of alarms level 2

Sd Coolant Temp

Alarm Type	Shutdown
Alarmlist message	Sd Coolant Temp
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that the coolant temperature is higher than the temperature set in **Coolant Temperature Sd (page 226)** setpoint.

back to List of alarms level 2

Sd Current Unbalance

Alarm Type	Shutdown
Alarmlist message	Sd Current Unbalance
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm evaluates the unbalance of the phase currents, i.e. the difference between highest and lowest phase current at any given time. The following setpoints are related to it: ▶ **Current Unbalance BOC (page 245)** adjusts the maximum allowed difference between the highest and lowest phase current at any given time. ▶ **Current Unbalance BOC Delay (page 245)** adjusts the alarm delay.

back to List of alarms level 2

Sd Earth Fault Current

Alarm Type	Shutdown
Alarmlist message	Sd Earth Fault Current
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that the value of earth fault current is higher than adjusted limit. The following setpoints are related to it: ▶ **Earth Fault Sd (page 411)** adjusts the maximum allowed earth fault current. ▶ **Earth Fault Delay (page 410)** adjusts the alarm delay.

back to List of alarms level 2

Sd ECU Communication Fail

Alarm Type	Shutdown
Alarmlist message	Sd ECU Communication Fail
Alarm evaluated	With configured LBO **ECU Power Relay (page 600)** - only when this LBO is active Without configured LBO **ECU Power Relay (page 600)** - all the time
Related applications	AMF, MRS
Description	This alarm occurs when an ECU is configured, but the communication with the ECU is not established or has dropped out.

back to List of alarms level 2

Sd Fence 1 Alarm

Alarm Type	Shutdown
Alarmlist message	Sd Fence 1 Alarm
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm evaluates the GPS position of gen-set. The following setpoint are related to it: ▶ **Geo-Fencing (page 348)** ▶ **Fence 1 Protection (page 349)** ▶ **Fence Radius 1 (page 347)**

back to List of alarms level 2

Sd Fence 2 Alarm

Alarm Type	Shutdown
Alarmlist message	Sd Fence 2 Alarm
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm evaluates the GPS position of gen-set. The following setpoint are related to it: ▶ **Geo-Fencing (page 348)** ▶ **Fence 1 Protection (page 349)** ▶ **Fence Radius 1 (page 347)**

back to List of alarms level 2

Sd Fuel Level

Alarm Type	Shutdown
Alarmlist message	Sd Fuel Level
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that the fuel level is lower than the level set in **Fuel Level Sd (page 230)** setpoint.

back to List of alarms level 2

Sd GCB Fail

Alarm Type	Shutdown
Alarmlist message	Sd GCB Fail
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm will occur when the **GCB FEEDBACK (PAGE 556)** input does not match the expected position given by the **GCB CLOSE/OPEN (PAGE 604)** output. It stays active until the mismatch between the output and feedback persists. ▶ If there was no command issued by the controller and the breaker (feedback) changes suddenly the position itself, the alarm will be issued immediately. ▶ The alarm will be also issued if the breaker does not respond to an open or close command within 2 seconds.

back to List of alarms level 2

Sd Generator L1 > Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L1 > Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase voltage in phase 1. The following setpoints are related to it: ▶ **Generator Overvoltage Sd (page 245)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 2

Sd Generator L1 < Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L1 < Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase voltage in phases 1. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 246)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 2

Sd Generator L1L2 > Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L1L2 > Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase to phase voltage between phases 1 and 2. The following setpoints are related to it: ▶ **Generator Overvoltage Sd (page 245)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 2

Sd Generator L1L2 < Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L1L2 < Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase to phase voltage between phases 1 and 2. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 246)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 2

Sd Generator L2 > Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L2 > Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase voltage in phase 2. The following setpoints are related to it: ▶ **Generator Overvoltage Sd (page 245)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 2

Sd Generator L2 < Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L2 < Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase voltage in phases 2. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 246)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 2

Sd Generator L2L3 > Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L2L3 > Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase to phase voltage between phases 2 and 3. The following setpoints are related to it: ▶ **Generator Overvoltage Sd (page 245)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 2

Sd Generator L2L3 < Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L2L3 < Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase to phase voltage between phases 2 and 3. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 246)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 2

Sd Generator L3 > Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L3 > Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase voltage in phase 3. The following setpoints are related to it: ▶ **Generator Overvoltage Sd (page 245)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 2

Sd Generator L3 < Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L3 < Voltage
Alarm evaluated	Generator excited only

Related applications	AMF, MRS
Description	This alarm evaluates the generator phase voltage in phases 3. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 246)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 2

Sd Generator L3L1 > Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L3L1 > Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase to phase voltage between phases 3 and 1. The following setpoints are related to it: ▶ **Generator Overvoltage Sd (page 245)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 2

Sd Generator L3L1 < Voltage

Alarm Type	Shutdown
Alarmlist message	Sd Generator L3L1 < Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase to phase voltage between phases 3 and 1. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 246)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 2

Sd Generator > Frequency

Alarm Type	Shutdown
Alarmlist message	Sd Generator > Frequency
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator frequency in the phase L1. The following setpoints are related to it: ▶ **Generator Overfrequency BOC (page 248)** ▶ **Generator <> Frequency Delay (page 249)**

back to List of alarms level 2

Sd Generator < Frequency

Alarm Type	Shutdown
Alarmlist message	Sd Generator < Frequency
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator frequency in the phase L1. The following setpoints are related to it: ▶ **Generator Underfrequency BOC (page 249)** ▶ **Generator <> Frequency Delay (page 249)**

back to List of alarms level 2

Sd Generator Voltage Unbalance Ph-Ph

Alarm Type	Shutdown
Alarmlist message	Sd Generator Voltage Unbalance Ph-Ph
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the unbalance of the phase to phase voltage, i.e. the difference between highest and lowest phase to phase voltage at any given time. The following setpoints are related to it: ▶ **Voltage Unbalance BOC (page 247)** adjusts the maximum allowed difference between the highest and lowest phase voltage at any given time. ▶ **Voltage Unbalance BOC Delay (page 248)** adjusts the alarm delay.

back to List of alarms level 2

Sd Generator Voltage Unbalance Ph-N

Alarm Type	Shutdown
Alarmlist message	Sd Generator Voltage Unbalance Ph-N
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the unbalance of the phase voltage, i.e. the difference between highest and lowest phase voltage at any given time. The following setpoints are related to it: ▶ **Voltage Unbalance BOC (page 247)** adjusts the maximum allowed difference between the highest and lowest phase voltage at any given time. ▶ **Voltage Unbalance BOC Delay (page 248)** adjusts the alarm delay.

back to List of alarms level 2

Sd Oil Pressure

Alarm Type	Shutdown
Alarmlist message	Sd Oil Pressure
Alarm evaluated	Gen-set is running

Related applications	AMF, MRS
Description	This alarm indicates that the oil pressure is lover than the pressure set in **Oil Pressure Sd (page 224)** setpoint.

back to List of alarms level 2

Sd Overload

Alarm Type	Shutdown
Alarmlist message	Sd Overload
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm is issued when the gen-set power is over the limit for time period longer than the delay. The behavior of the overload alarm is adjusted by the following setpoints: ▶ **Overload BOC (page 242)** adjusts the overload limit. ▶ **Overload Delay (page 242)** adjusts the delay

back to List of alarms level 2

Sd Overspeed

Alarm Type	Shutdown
Alarmlist message	Sd Overspeed
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm occurs immediately when the engine speed has exceeded the limit. The behavior of the overspeed alarm is adjusted by the following setpoints: ▶ **Overspeed Sd (page 223)** adjust the overspeed limit ▶ **Overspeed Overshot (page 223)** adjust the additional overspeed limit ▶ **Overspeed Overshot Period (page 224)** adjust the time period of additional overspeed limit

back to List of alarms level 2

Sd RPM Measurement Fail

Alarm Type	Shutdown
Alarmlist message	Sd RPM Measurement Fail
Alarm evaluated	During cranking
Related applications	AMF, MRS
Description	The alarm is issued if the engine speed has not exceeded the **Starting RPM (page 207)** within the **Maximum Cranking Time (page 206)**, although some of additional running engine indication sources indicate that the engine has started.

back to List of alarms level 2

Sd Short Circuit

Alarm Type	Shutdown
Alarmlist message	Sd Short Circuit
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This is a fast overcurrent protection. The following setpoints are related to this alarm: ▶ **Short Circuit BOC (page 243)** adjusts the short current limit ▶ **Short Circuit BOC Delay (page 243)** adjusts the delay in fine steps

back to List of alarms level 2

Sd Start Fail

Alarm Type	Shutdown
Alarmlist message	Sd Start Fail
Alarm evaluated	When the gen-set is being started
Related applications	AMF, MRS
Description	This alarm will be issued after all attempts to start the gen-set have run out but the gen-set did not start. The following setpoints are related to this alarm: ▶ **Cranking Attempts (page 205)** adjust the number of attempts

back to List of alarms level 2

Sd Underspeed

Alarm Type	Shutdown
Alarmlist message	Sd Underspeed
Alarm evaluated	Engine running only
Related applications	AMF, MRS
Description	This alarm will be issued when the gen-set is running and then stops by itself, i.e. the RPM drops under the value of setpoint **Underspeed Sd (page 223)**. The underspeed alarm starts to be evaluated after successful gen-set start and is being evaluated for the entire time that the fuel solenoid is on.

back to List of alarms level 2

Other type

BOC AIN Prot

Alarm Type	BOC
Alarmlist message	BOC + Name of analog input
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that the value of general analog protection is out of BOC protection limit.

back to List of alarms level 2

BOC BIN Protection

Alarm Type	BOC
Alarmlist message	BOC + Name of binary input
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	Binary input also can be adjusted like alarm. In this case message in alarmlist contains prefix - BOC and binary input name. This alarm occurs, when appropriate binary input is active.

back to List of alarms level 2

BOC Coolant Temp

Alarm Type	BOC
Alarmlist message	BOC Coolant Temperature
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that the coolant temperature is higher than the temperature set in **Coolant Temperature Sd (page 226)** setpoint.

back to List of alarms level 2

BOC Current Unbalance

Alarm Type	BOC
Alarmlist message	BOC Current Unbalance
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm evaluates the unbalance of the phase currents, i.e. the difference between highest and lowest phase current at any given time. The following setpoints are related to it: ▶ **Current Unbalance BOC (page 245)** adjusts the maximum allowed difference between the highest and lowest phase current at any given time. ▶ **Current Unbalance BOC Delay (page 245)** adjusts the alarm delay.

back to List of alarms level 2

BOC Fence 1 Alarm

Alarm Type	BOC
Alarmlist message	BOC Fence 1 Alarm
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm evaluates the GPS position of gen-set. The following setpoint are related to it: ▶ **Geo-Fencing (page 348)** ▶ **Fence 1 Protection (page 349)** ▶ **Fence Radius 1 (page 347)**

back to List of alarms level 2

BOC Fence 2 Alarm

Alarm Type	BOC
Alarmlist message	BOC Fence 2 Alarm
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm evaluates the GPS position of gen-set. The following setpoint are related to it: ▶ **Geo-Fencing (page 348)** ▶ **Fence 1 Protection (page 349)** ▶ **Fence Radius 1 (page 347)**

back to List of alarms level 2

BOC Fuel Level

Alarm Type	BOC
Alarmlist message	BOC Fuel Level
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that the fuel level is lower than the level set level in **Fuel Level Sd (page 230)** setpoint.

back to List of alarms level 2

BOC Generator L1 < Voltage

Alarm Type	BOC
Alarmlist message	BOC Generator L1 < Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase voltage in phases 1. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 246)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 2

BOC Generator L1L2 < Voltage

Alarm Type	BOC
Alarmlist message	BOC Generator L1L2 < Voltage
Alarm evaluated	Generator excited only

Related applications	AMF, MRS
Description	This alarm evaluates the generator phase to phase voltage between phases 1 and 2. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 246)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 2

BOC Generator L2 < Voltage

Alarm Type	BOC
Alarmlist message	BOC Generator L2 < Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase voltage in phases 2. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 246)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 2

BOC Generator L2L3 < Voltage

Alarm Type	BOC
Alarmlist message	BOC Generator L2L3 < Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase to phase voltage between phases 2 and 3. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 246)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 2

BOC Generator L3 < Voltage

Alarm Type	BOC
Alarmlist message	BOC Generator L3 < Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase voltage in phases 3. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 246)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 2

BOC Generator L3L1 < Voltage

Alarm Type	BOC
Alarmlist message	BOC Generator L3L1 < Voltage
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator phase to phase voltage between phases 3 and 1. The following setpoints are related to it: ▶ **Generator Undervoltage BOC (page 246)** ▶ **Generator <> Voltage Delay (page 247)**

back to List of alarms level 2

BOC Generator > Frequency

Alarm Type	BOC
Alarmlist message	BOC Generator > Frequency
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator frequency in the phase L1. The following setpoints are related to it: ▶ **Generator Overfrequency BOC (page 248)** ▶ **Generator <> Frequency Delay (page 249)**

back to List of alarms level 2

BOC Generator < Frequency

Alarm Type	BOC
Alarmlist message	BOC Generator < Frequency
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator frequency in the phase L1. The following setpoints are related to it: ▶ **Generator Underfrequency BOC (page 249)** ▶ **Generator <> Frequency Delay (page 249)**

back to List of alarms level 2

BOC Gen Voltage Unbalance Ph-Ph

Alarm Type	BOC
Alarmlist message	BOC Gen Voltage Unbalance ph-ph
Alarm evaluated	Generator excited only

Related applications	AMF, MRS
Description	This alarm evaluates the unbalance of the phase to phase voltages, i.e. the difference between highest and lowest phase to phase voltage at any given time. The following setpoints are related to it: ▶ **Voltage Unbalance BOC (page 247)** adjusts the maximum allowed difference between the highest and lowest phase voltage at any given time. ▶ **Voltage Unbalance BOC Delay (page 248)** adjusts the alarm delay.

back to List of alarms level 2

BOC Gen Voltage Unbalance Ph-N

Alarm Type	BOC
Alarmlist message	BOC Gen Voltage Unbalance ph-n
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the unbalance of the phase voltages, i.e. the difference between highest and lowest phase voltage at any given time. The following setpoints are related to it: ▶ **Voltage Unbalance BOC (page 247)** adjusts the maximum allowed difference between the highest and lowest phase voltage at any given time. ▶ **Voltage Unbalance BOC Delay (page 248)** adjusts the alarm delay.

back to List of alarms level 2

BOC Overcurrent IDMT

Alarm Type	Shutdown
Alarmlist message	Sd + Name of binary input
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	The overcurrent alarm is based on IDMT principle. The reaction time of an IDMT alarm is not fixed, but depends on how much is the protected value (generator current in this case) above the limit (**Nominal Current (page 191)**). The higher is the overcurrent, the shorter the reaction time will be. All generator phases are evaluated. The behaviour of the overcurrent alarm is adjusted by the following setpoints: ▶ **IDMT Overcurrent Delay (page 244)** defines the reaction time of the protection when the current is twice the amount of nominal value. ▶ **Nominal Current (page 191)** set the nominal current level, where the alarm starts to be evaluated. The reaction time is infinite at this point.

back to List of alarms level 2

BOC Overload

Alarm Type	BOC
Alarmlist message	BOC Overload
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm is issued when the gen-set power is over the limit for time period longer than the delay. The behavior of the overload alarm is adjusted by the following setpoints: ▶ **Overload BOC (page 242)** adjusts the overload limit. ▶ **Overload Delay (page 242)** adjusts the delay

back to List of alarms level 2

BOC Rental Timer

Alarm Type	Shutdown
Alarmlist message	BOC Rental Timer
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm occurs when **Rental Timer BOC (page 345)** elapses.

back to List of alarms level 2

BOC Short Circuit

Alarm Type	BOC
Alarmlist message	BOC Short Circuit
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This is a fast overcurrent protection. The following setpoints are related to this alarm: ▶ **Short Circuit BOC (page 243)** adjusts the short current limit ▶ **Short Circuit BOC Delay (page 243)** adjusts the delay in fine steps

back to List of alarms level 2

ECU Red Lamp

Alarm Type	Alarm indication + history record
Alarmlist message	ECU Red Lamp
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is activated when ECU send information that ECU Red lamp is activated. LBO **ALARM (PAGE 582)**is not activated, after deactivation of lamp, alarm automatically disappear. ***Note:*** *This alarm doesn't stop the engine.*

back to List of alarms level 2

8.2.3 Fail sensor and other types

Fls AIN Prot 1 730
Fls Coolant Temp 730
Fls Fuel Level 730
Fls Oil Pressure 730

For full list of Fails sensor and other types of alarms go to **List of fail sensor alarms (page 729)**.

What Fail sensor and other types of alarms are

If the measured resistance on an analog input exceeds the valid range, a sensor fail will be detected and a sensor fail message will appear in the Alarmlist. For more information **see Sensor fail detection (FLS) on page 115**.

List of fail sensor alarms

Fls AIN Prot 1 730
Fls Coolant Temp 730
Fls Fuel Level 730
Fls Oil Pressure 730

Fail sensor

FIs AIN Prot 1

Alarm Type	FIs
Alarmlist message	FIs + name of analog input 1
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that the value of general analog protection is out of range or is missing.

back to List of fail sensor alarms

FIs Coolant Temp

Alarm Type	FIs
Alarmlist message	FIs Coolant Temperature
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm occurs when measurement value of coolant temperature is out of range or is missing.

back to List of fail sensor alarms

FIs Fuel Level

Alarm Type	FIs
Alarmlist message	FIs Fuel Level
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm occurs when measurement value of fuel level is out of range or is missing.

List of fail sensor alarms (page 729)

FIs Oil Pressure

Alarm Type	FIs
Alarmlist message	FIs Oil Pressure
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm occurs when measurement value of oil pressure is out of range or is missing.

back to List of fail sensor alarms

8.3 Modules

8.3.1 Plug-In modules 731
8.3.2 CAN modules 746

8.3.1 Plug-In modules

Communication modules 731
Extension modules 743

IMPORTANT: 2nd generation of InteliLite controllers does not support new modules and 3rd generation does not support all old modules.

The available communication plug-in modules are:

- CM-RS232-485 - communication module for connection via RS232 or RS485 line
- CM-4G-GPS - communication module for connection via 4G
- CM-GPRS - communication module for connection via GPRS
- CM-Ethernet - communication module for internet connection via Ethernet

The available extension plug-in modules are:

- EM-BIO8-EFCP - extension module with 8 binary inputs/outputs and with earth fault current protection

Note: *Controller has 2 plug-in module slots.*

Supported combinations of plug-in modules

Module	CM-Ethernet	CM-4G-GPS	CM-GPRS	CM-RS232-485	EM-BIO8-EFCP
CM-Ethernet	✗	✓	✓	✓	✓
CM-4G-GPS	✓	✗	✗	✓	✓
CM-GPRS	✓	✗	✗	✓	✓
CM-RS232-485	✓	✓	✓	✗	✓
EM-BIO8-EFCP	✓	✓	✓	✓	✓

Communication modules

CM-RS232-485 731
CM-Ethernet 733
CM-GPRS 735
CM-4G-GPS 739

CM-RS232-485

CM-RS232-485 is optional plug-in card to enable InteliLite the RS232 and RS485 communication. This is required for computer or MODBUS connection. The CM-RS232-485 is a dual port module with RS232 and RS485 interfaces at independent COM channels. The RS232 is connected to COM1 and RS485 to COM2.



Image 9.14 CM-RS232-485 interface

IMPORTANT: Any manipulation with plug-in module shall be done with disconnected power supply to controller.

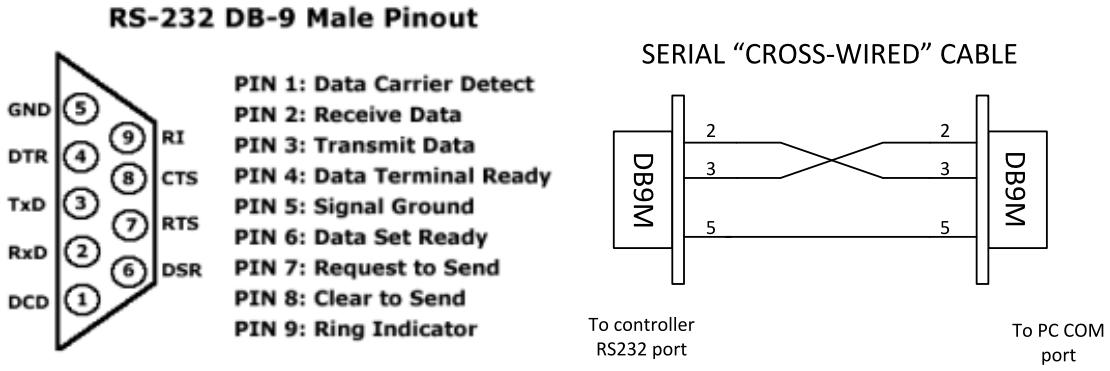


Image 9.15 Pinout of RS-232 line

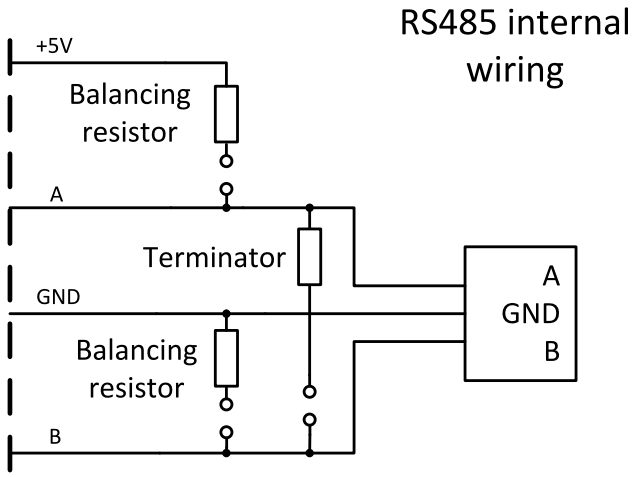


Image 9.16 Pinout of RS-485 line



Image 9.17 Jumpers description

Note: *Balancing resistors shall be both closed at only one device in whole RS485 network.*

Maximal distance of line is 10m for RS232 line and 1200m for RS485 line.

Terminator 120Ω

Balancing resistor +5V

Technical data

Power consumption	40 mA / 8 VDC 26 mA / 12 VDC 14 mA / 24 VDC 10 mA / 36 VDC
Isolation	Galvanic separation

Firmware upgrade

- Download the newest FW of module from ComAp website (in form of PSI file or installation package)
- Instal package to computer or open PSI to instal it into InteliConfig
- Plug the module into the controller and power the controller on.
- Open a connection with controller via InteliConfig
- Go the menu Tools -> Firmware upgrade, select the Plug-in modules tab and select the appropriate firmware you want to program into the module (in InteliConfig).
- Press the OK button to start upgrade of firmware.

The firmware update process may be performed via any kind of connection including connection via the same module in which the firmware is to be updated. The connection is reestablished again automatically when the update process is finished.

CM-Ethernet

CM-Ethernet is a plug-in card with Ethernet 10/100 Mbit interface in RJ45 connector. It provides an interface for connecting a PC with through ethernet/internet network, for sending active e-mails and for integration of the controller into a building management (MODBUS TCP and SNMP protocols). This card also enables to monitor and control the gen-set over web browser from any location with internet access using appropriate security measures.

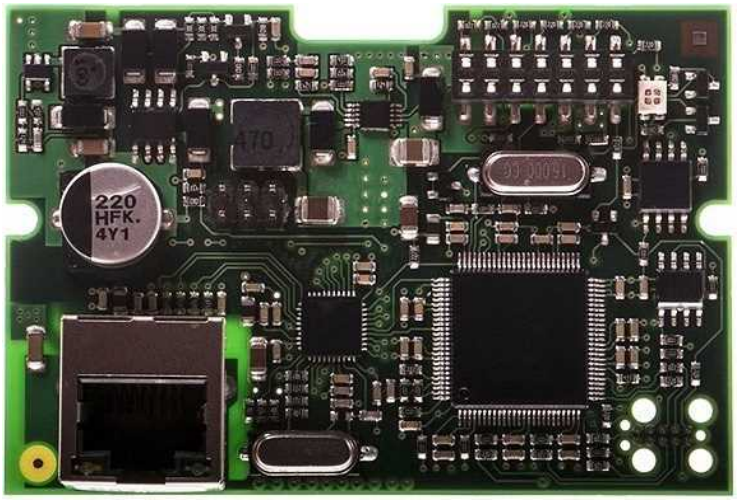


Image 9.18 CM-Ethernet interface

IMPORTANT: Any manipulation with plug-in module shall be done with disconnected power supply to controller.

Use an Ethernet UTP cable with a RJ45 connector for linking the module with your Ethernet network. The module can also be connected directly to a PC using cross-wired UTP cable.

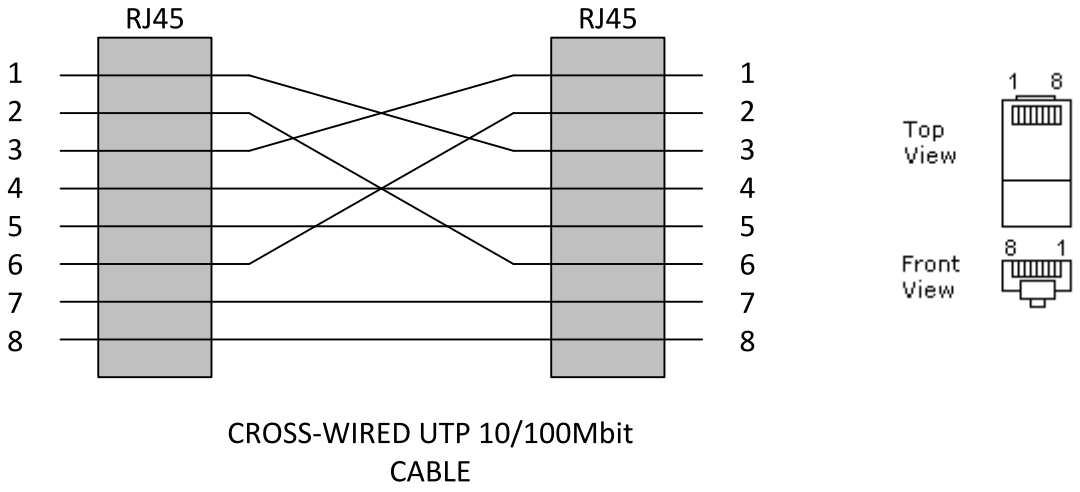


Image 9.19 Cross-wired cable

Technical data

Power consumption	120 mA / 8 VDC 82 mA / 12 VDC 35 mA / 24 VDC 25 mA / 36 VDC

Module setup

All settings related to the module are to be adjusted via the controller setpoints. The respective setpoints are located in the setpoint **Group: CM-Ethernet (page 395)**.

All actual operational values like actual IP address etc. are available in controller values in a specific group as well.

Status LED

Blinking frequency	Color
1 Hz	Green - everything is OK Red - some of following errors occurred: ▶ unplugged ethernet cable ▶ module cannot connect to AirGate ▶ module can not obtain IP address from DHCP
10 Hz	Green - firmware is currently being programmed Red - no firmware present in the module

Firmware upgrade

- Download the newest FW of module from ComAp website (in form of PSI file or installation package)
- Instal package to computer or open PSI to instal it into InteliConfig
- Plug the module into the controller and power the controller on.
- Open a connection with controller via InteliConfig
- Go the menu Tools -> Firmware upgrade, select the Plug-in modules tab and select the appropriate firmware you want to program into the module (in InteliConfig).
- Press the OK button to start upgrade of firmware.

The firmware update process may be performed via any kind of connection including connection via the same module in which the firmware is to be updated. The connection is reestablished again automatically when the update process is finished.

CM-GPRS

CM-GPRS plug-in module is a GSM/GPRS modem which can works in two modes of operation based on the settings in the setpoint **Internet Connection (page 383)**.

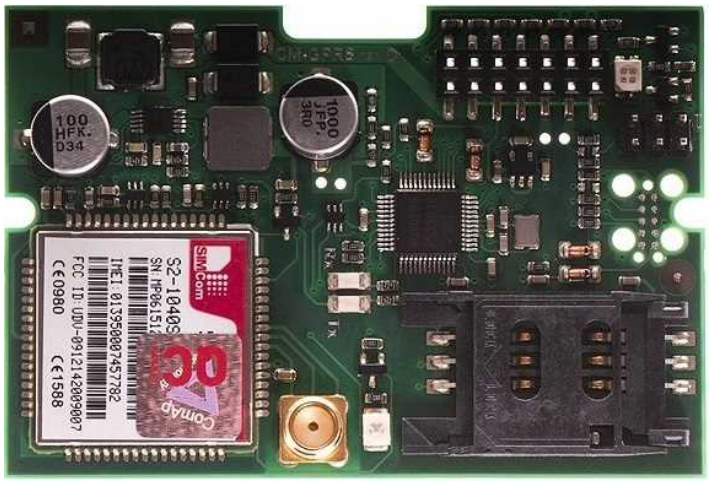


Image 9.20 CM-GPRS module

IMPORTANT: Any manipulation with plug-in module shall be done with disconnected power supply to controller.

IMPORTANT: CM-4G-GPS and CM-GPRS modules can't be used in one controller in the same time.

Note: *GPRS and CSD services must be provided by your GSM/GPRS operator for successful operation.*

Note: *The GPRS and CSD connection should not be used for the firmware update process.*

CM-GPRS module works with:

- WebSupervisor – internet-based remote monitoring solution
- AirGate – powerful connection technology to make internet access as simple as possible

Technical data

Power consumption	32 mA / 8 VDC 18 mA / 12 VDC 10 mA / 24 VDC 12 mA / 36 VDC

SIM card settings

SIM card to be used in CM-4G-GPS or CM-GPRS modules must be adjusted as follows:

- SMS service enabled
- Packet data (Internet access) enabled (when required for the selected mode of operation)
- PIN code security disabled

How to start using CM-GPRS module

- You will need a controller, CM-GPRS module, antenna and SIM card with SMS and packet data service.

Make sure that your SIM supports the packet data network type you want to use. I.e. if you want to use the module in GPRS (2,5G) network you have to confirm with the operator that the particular SIM card does support 2,5G network.

- Contact your mobile operator for getting packet data APN (APN = Access Point Name), username and password.

Example: APN Name = "internet", UserName = [blank], Password = [blank].

- Make sure SIM card does not require PIN code. Use any mobile phone to switch the SIM PIN security off.
- Place the SIM card into slot on CM-GPRS card
- Connect the antenna to Cellular module antenna connector.
- Switch off the controller.
- Insert CM-GPRS module into controller
- Power up the controller.
- Select the mode of CM-GPRS module by adjusting setpoint Mode.
- Enter correct APN Name, APN User Name and APN User Password in controller's setpoint group CM-GPRS which is accessible by PAGE button from any measurement screen on controller. Setpoints can be set on controller's front panel keyboard or by InteliConfig.
- Switch the controller off and on.
- Wait for approx 2 - 4 minutes for first connection of the system to AirGate. AirGate will generate automatically the AirGate ID value. Then navigate to measurement screens where you will find signal strength bar and AirGate ID identifier.



Image 9.21 Main screen of CM-GPRS module



Image 9.22 Screen of AirGate

GSM Diag Code – Diagnostic code for CM-GPRS modem

GSM Diag Code – Common list of diagnostic codes for cellular modules

Code	Description
0	OK. No error.
1	Not possible to hang up.
2	Modul is switched off
3	Module is switched on
4	Module – error in initialization
5	Module – not possible to set the APN
6	Module – not possible to connect to GPRS network
7	Module – not possible to retrieve IP address
8	Module – not accepted DNS IP address
9	Error in modem detection
10	Error in initialization of analog modem
11	SIM card is locked (Possibly PIN code required, PIN needs to be deactivated) or unknown status of SIM locking
12	No GSM signal
13	Not possible to read the SIM card parameters

14	GSM modem did not accepted particular initialization command, possibly caused by locked SIM card
15	Unknown modem
16	Bad answer to complement initialization string
17	Not possible to read GSM signal strength
18	CDMA modem not detected
19	No CDMA network
20	Unsuccessful registration to CDMA network
21	SIMCom/ME909s: can´t read FW version
22	SIMCom: GSM signal not found
23	SIMCom: can´t detect module speed
24	SIMCom: HW reset issued
25	PUK is required
26	Error of SIM card detected
27	ME909s: can't set module bps
28	ME909s: can't set link configuration
29	ME909s: can't do power-off
30	ME909s: can't do power-on
31	ME909s: can't do hardware reset
32	ME909s: ME909s not started
33	ME909s: switch off issued
34	ME909s: switch on issued
35	ME909s: HW reset issued
36	ME909s: can't switch echo off
37	ME909s: can't find out state of registration
38	ME909s: GSM signal not found
39	ME909s: no SIM memory for SMS
40	ME909s: waiting for registration
41	Can't read operator name
42	ME909s: can't set flow control
43	APN not typed
255	Only running communication is needed to indicate

AirGate Diag – Diagnostic Code for AirGate connection

Code	Description
0	Waiting for connection to AirGate Server
1	Controller registered, waiting for authorization
2	Not possible to register, controller blacklisted
3	Not possible to register, server has no more capacity
4	Not possible to register, other reason
5	Controller registered and authorized

Firmware upgrade

- Download the newest FW of module from ComAp website (in form of PSI file or installation package)
- Instal package to computer or open PSI to instal it into InteliConfig
- Plug the module into the controller and power the controller on.
- Open a connection with controller via InteliConfig
- Go the menu Tools -> Firmware upgrade, select the Plug-in modules tab and select the appropriate firmware you want to program into the module (in InteliConfig).
- Press the OK button to start upgrade of firmware.

The firmware update process may be performed via any kind of connection including connection via the same module in which the firmware is to be updated. The connection is reestablished again automatically when the update process is finished.

CM-4G-GPS

CM-4G-GPS plug-in module containing a GPS receiver and GSM/WCDMA/LTE modem which can works in two modes of operation based on the settings in the setpoint **Internet Connection (page 383)**.



Image 9.23 CM-4G-GPS module

IMPORTANT: Any manipulation with plug-in module shall be done with disconnected power supply to controller.

IMPORTANT: CM-4G-GPS and CM-GPRS modules cant be used in one controller in the same time.

IMPORTANT: Operating temperature of module is from -30°C to +75°C.

Note: *Cellular data service must be enabled in your SIM card by your mobile operator for successful operation.*

CM-4G-GPS module works with:

- WebSupervisor – internet-based remote monitoring solution
- AirGate – powerful connection technology to make internet access as simple as possible

CM-4G-GPS module also works like GPS locator. Geo-fencing function can be used with this module.

Supported 4G bands are as follows:

- FDD LTE: Band 1, Band 2, Band 3, Band 4, Band 5, Band 7, Band 8, Band 20, all bands with diversity
- WCDMA/HSDPA/HSUPA/HSPA+: Band 1, Band 2, Band 5, Band 8, all bands with diversity
- GSM/GPRS/EDGE: 850 MHz/900 MHz/1800 MHz/1900 MHz

Technical data

Power consumption	55 mA / 8 VDC 35 mA / 12 VDC 8 mA / 24 VDC 5 mA / 36 VDC

SIM card settings

SIM card to be used in CM-4G-GPS or CM-GPRS modules must be adjusted as follows:

- SMS service enabled
- Packet data (Internet access) enabled (when required for the selected mode of operation)
- PIN code security disabled

How to start using CM-4G-GPS module

- You will need a controller, CM-4G-GPS module, antenna and SIM card with SMS and packet data service.

Note: *Make sure that your SIM supports the packet data network type you want to use. - i.e. if you want to use the module in LTE (4G) network you have to confirm with the operator that the particular SIM card supports 4G network.*

- Contact your mobile operator for getting packet data APN (APN = Access Point Name), username and password.

Example: APN Name = "internet", UserName = [blank], Password = [blank].

- Make sure SIM card does not require PIN code. Use any mobile phone to switch the SIM PIN security off.
- Place the SIM card into slot on CM-4G-GPS card
- Connect the antenna to Cellular module antenna connector.
- If you want to use the built-in GPS receiver connect also an **active** GPS antenna to the GPS antenna connector.
- Switch off the controller.
- Insert CM-4G-GPS module into controller
- Power up the controller.
- Select the mode of CM-4G-GPS module by adjusting setpoint Mode.
- Enter correct APN Name, APN User Name and APN User Password in controller's setpoint group CM-4G-GPS which is accessible by PAGE button from any measurement screen on controller. Setpoints can be set on controller's front panel keyboard or by InteliConfig.
- Switch the controller off and on.
- Wait for approx 2 - 4 minutes for first connection of the system to AirGate. AirGate will generate automatically the AirGate ID value. Then navigate to measurement screens where you will find signal strength bar and AirGate ID identifier.



Image 9.24 Main screen of CM-4G-GPS module



Image 9.25 Screen of AirGate

GSM Diag Code – Common list of diagnostic codes for cellular modules

GSM Diag Code – Common list of diagnostic codes for cellular modules

Code	Description
0	OK. No error.
1	Not possible to hang up.
2	Modul is switched off
3	Module is switched on
4	Module – error in initialization
5	Module – not possible to set the APN
6	Module – not possible to connect to GPRS network
7	Module – not possible to retrieve IP address
8	Module – not accepted DNS IP address
9	Error in modem detection
10	Error in initialization of analog modem
11	SIM card is locked (Possibly PIN code required, PIN needs to be deactivated) or unknown status of SIM locking
12	No GSM signal
13	Not possible to read the SIM card parameters

14	GSM modem did not accepted particular initialization command, possibly caused by locked SIM card
15	Unknown modem
16	Bad answer to complement initialization string
17	Not possible to read GSM signal strength
18	CDMA modem not detected
19	No CDMA network
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22	SIMCom: GSM signal not found
23	SIMCom: can´t detect module speed
24	SIMCom: HW reset issued
25	PUK is required
26	Error of SIM card detected
27	ME909s: can't set module bps
28	ME909s: can't set link configuration
29	ME909s: can't do power-off
30	ME909s: can't do power-on
31	ME909s: can't do hardware reset
32	ME909s: ME909s not started
33	ME909s: switch off issued
34	ME909s: switch on issued
35	ME909s: HW reset issued
36	ME909s: can't switch echo off
37	ME909s: can't find out state of registration
38	ME909s: GSM signal not found
39	ME909s: no SIM memory for SMS
40	ME909s: waiting for registration
41	Can't read operator name
42	ME909s: can't set flow control
43	APN not typed
255	Only running communication is needed to indicate

AirGate Diag – Diagnostic Code for AirGate connection

Code	Description
0	Waiting for connection to AirGate Server
1	Controller registered, waiting for authorization
2	Not possible to register, controller blacklisted
3	Not possible to register, server has no more capacity
4	Not possible to register, other reason
5	Controller registered and authorized

Firmware upgrade

- Download the newest FW of module from ComAp website (in form of PSI file or installation package)
- Instal package to computer or open PSI to instal it into InteliConfig
- Plug the module into the controller and power the controller on.
- Open a connection with controller via InteliConfig
- Go the menu Tools -> Firmware upgrade, select the Plug-in modules tab and select the appropriate firmware you want to program into the module (in InteliConfig).
- Press the OK button to start upgrade of firmware.

The firmware update process may be performed via any kind of connection including connection via the same module in which the firmware is to be updated. The connection is reestablished again automatically when the update process is finished.

Extension modules

EM-BIO8-EFCP 743

EM-BIO8-EFCP

EM-BIO8-EFCP is optional plug-in card. Through this card controller can accommodate one AC current (CT) measuring input (1A or 5A input) and up to 8 binary inputs or outputs. In InteliConfig PC configuration tool it is possible to easily choose if particular I/O will be binary input or output.



Image 9.26 EM-BIO8-EFCP interface

IMPORTANT: Any manipulation with plug-in module shall be done with disconnected power supply to controller.

IMPORTANT: Earth fault current measurement is supported by controller only in slot A.

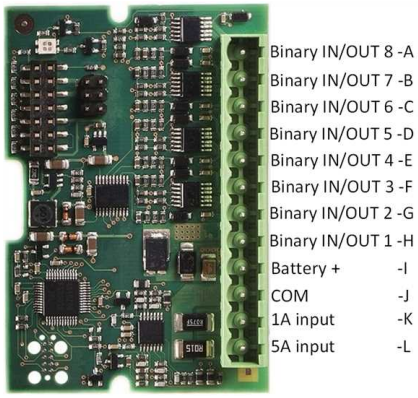


Image 9.27 Overview of EM-BIO8-EFCP

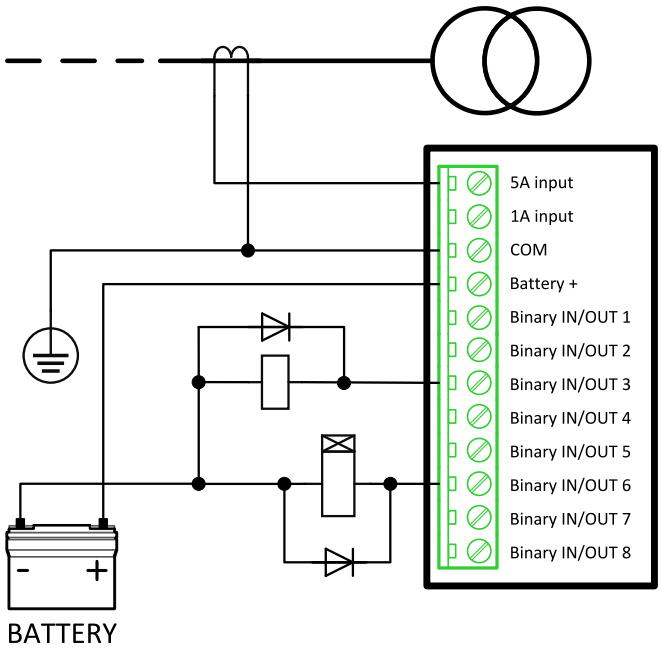


Image 9.28 EM-BIO8-EFCP wiring

EM-BIO8-EFCP technical data

Power supply

Power supply range	8-36 VDC
Power consumption	40 mA / 8 VDC 27 mA / 12 VDC 22 mA / 24 VDC 19 mA / 36 VDC

Binary inputs

Number	Up to 8, non-isolated
Close/Open indication	0-2 VDC close contact >6 VDC open contact

Binary outputs

Number	Up to 8 , non-isolated
Max. current	0,5A
Switching to	positive supply terminal

Current measuring input

Number of inputs	2
Nominal input current	1A/5A
Load (CT output impedance)	< 0,1
Max measured current from CT	10 A
Current measurement tolerance	2% from Nominal current
Max peak current from CT	150 A / 1 s
Max continuous current	10 A

Earth fault current measurement

The Earth Fault protection is done by the extension module EM-BIO8-EFCP.

When the measured current exceeds the set value, which indicates that part of the current is dispersed to earth, and when the set **Earth Fault Delay (page 410)** time elapses, the **Earth Fault Current Protection (page 409)**, **Sd Earth Fault Current (page 713)** alarm and **AL EARTH FAULT (PAGE 575)** output are activated. Earth Fault protection is not active when gen-set does not run and when the **Earth Fault Current Protection (page 409)** is disabled.

> **IMPORTANT: Earth fault current measurement is not intended to protect human health, but the machines!**

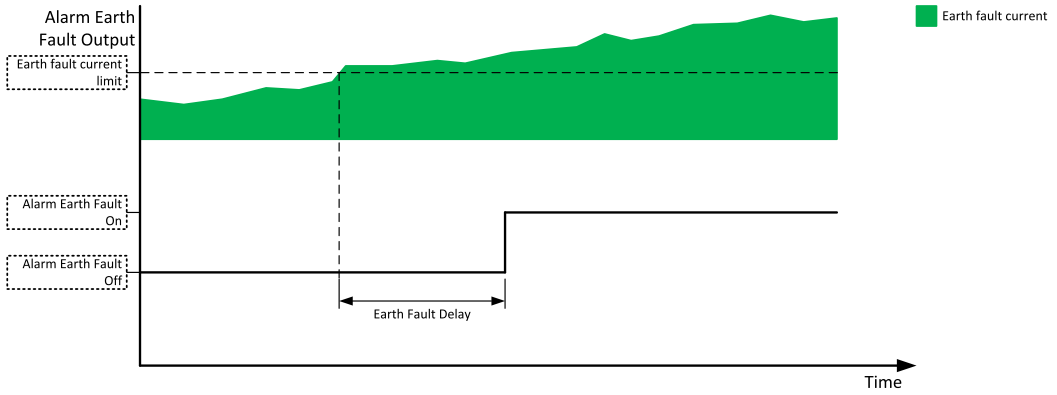


Image 9.29 Earth fault current protection

Firmware upgrade

- Download the newest FW of module from ComAp website (in form of PSI file or installation package)
- Instal package to computer or open PSI to instal it into InteliConfig
- Plug the module into the controller and power the controller on.
- Open a connection with controller via InteliConfig
- Go the menu Tools -> Firmware upgrade, select the Plug-in modules tab and select the appropriate firmware

you want to program into the module (in InteliConfig).

- Press the OK button to start upgrade of firmware.

The firmware update process may be performed via any kind of connection including connection via the same module in which the firmware is to be updated. The connection is reestablished again automatically when the update process is finished.

8.3.2 CAN modules

Extension modules 746

The available extension CAN modules are:

- Inteli AIN8 - extension CAN module with 8 analog inputs
- Inteli IO8/8 - extension CAN module with 8 binary inputs, 8 binary outputs and 2 analog outputs
  - this CAN module can be switched to Inteli IO 16/0 - extension CAN module with 16 binary inputs and 2 analog outputs

Supported combinations of modules

Slot	Inteli AIN8	Inteli AIN8TC	Inteli IO8/8	Inteli IO 16/0	IGL-RA15	IGS-PTM	Inteli AIO9/1
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✗	✗
4	✓	✓	✓	✓	✓	✗	✗
5	✗	✗	✓	✓	✗	✗	✗

IMPORTANT: In slot 3, 4 and 5 CAN modules Inteli IO8/8 and Inteli IO 16/0 are supported without analog outputs. Analog outputs of these CAN modules are supported only in slot 1 and 2.

It is possible to add up to 80 binary inputs or up to 68 binary outputs or up to 32 analog inputs on CAN modules.

Extension modules

Inteli AIN8 746
Inteli IO8/8 752
IGS-PTM 759
Inteli AIN8TC 765
Inteli AIO9/1 769

Inteli AIN8

Inteli AIN8 module is extension module equipped with analog inputs. Inteli AIN8 module is connected to controller by CAN1 bus.



Image 9.30 Inteli AIN8

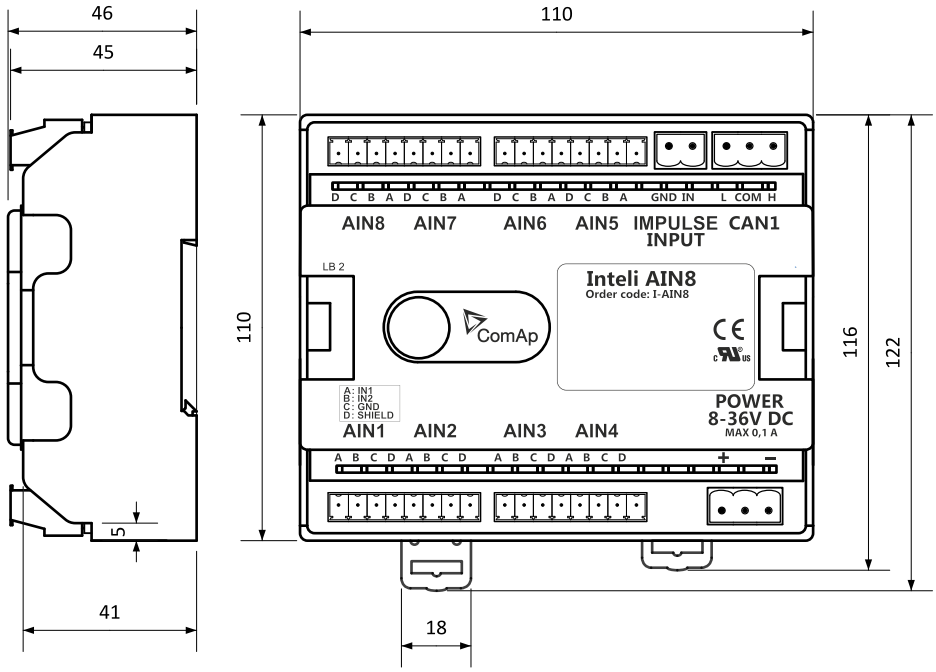
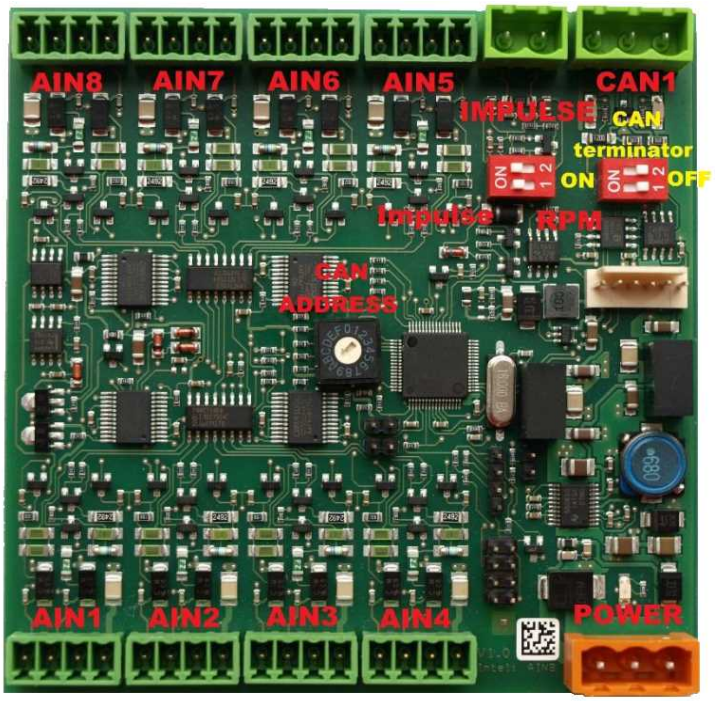


Image 9.31 Inteli AIN8 dimensions

Note: *All dimensions are in mm.*

Terminals



Analog input	8 analog Inputs
CAN	CAN1 line
Power	Power supply
CAN LED Tx, Rx	Indication transmitted or received data
Status LED	LED indication of correct function
CAN terminator	Terminating CAN resistor (active in position “ON” - switch both switches)

Note: *Impulse input is not supported.*

Analog inputs

- 8 channels
- can be configured as:
  - resistor three wire input
  - current input
  - voltage input

All inputs can be configured to any logical function or protection.

IMPORTANT: Impulse input is not supported in controller.

Supported sensors

Sensors		
User curves	NI100 [°F] (fix)	0-5V
PT100 [°C] (fix)	NI1000 [°F] (fix)	0-10V
PT1000 [°C] (fix)		4-20mA passive

Sensors		
NI100 [°C] (fix)	0-2400ohm	4-20mA active
NI1000 [°C] (fix)	0-10k ohm	0-20mA passive
PT100 [°F] (fix)	+-1V	+-20mA active
PT1000 [°F] (fix)	0-2.4V	

CAN address

DIP switch determinates CAN address for analog inputs.

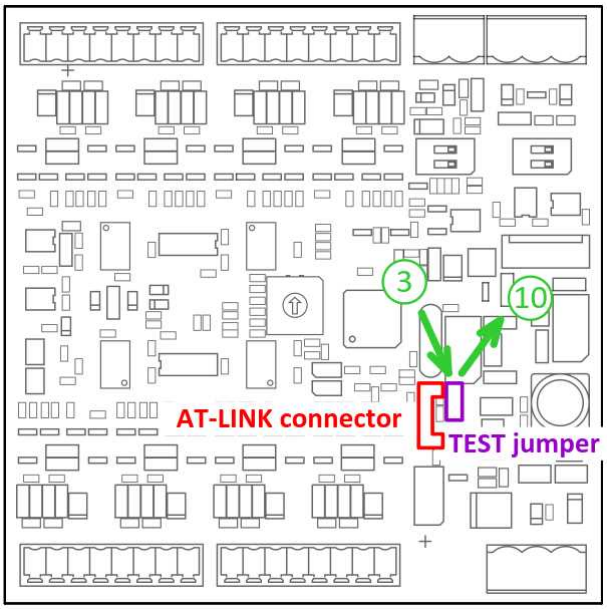


Note: *In case of setting the CAN address to zero, the appropriate group of signals is deactivated.*

Programming firmware

Firmware upgrade process:

1. Disconnect all terminals from the unit.
2. Separate the top cover of module
3. Put the TEST jumper on a pins
4. Connect the unit with PC via RS232-null modem cable and AT-Link conv



5. Connect power supply of the module (status LED lights continuously)
6. Launch FlashPgr.exe PC software (version 4.2 or higher)
7. In FlashPrg program choose card Inteli AIN8 and load FW for the module
8. Set the proper COM port (connected with the unit) and press Start button

9. Wait till process is done (If the process doesn't start – after 60 second the "Timeout" will be evaluated. In this case please check:
   - You have proper connection with the unit
   - COM port selection is correct
   - Module has power supply, (no CAN bus connection, status LED lights continuously)
10. After successful programming disconnect AT-Link conv , remove TEST jumper and disconnect power supply
11. Connect power supply again (status LED should blinking)
12. Module FW is upgraded

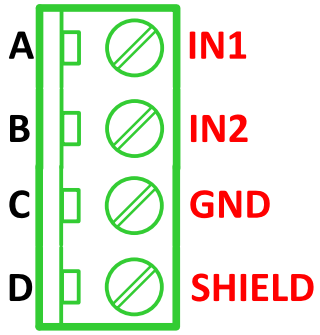
LED indication

LED status	Description
Dark	Fw in module does not work correctly.
Flashing	Module does not communicate with controller (in case non-zero CAN address).
Lights	Power supply is in the range and the communication between Inteli AIN8 and controller works properly. Or power supply is in range and zero CAN address is set. (in case zero CAN address module doesn't communicate with the controller).

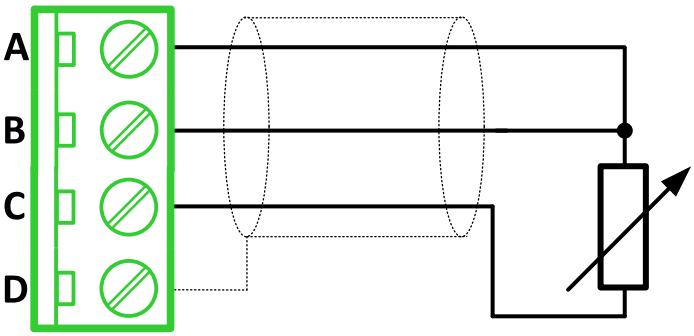
Wiring

The following diagrams show the correct connection of sensors.

Terminator

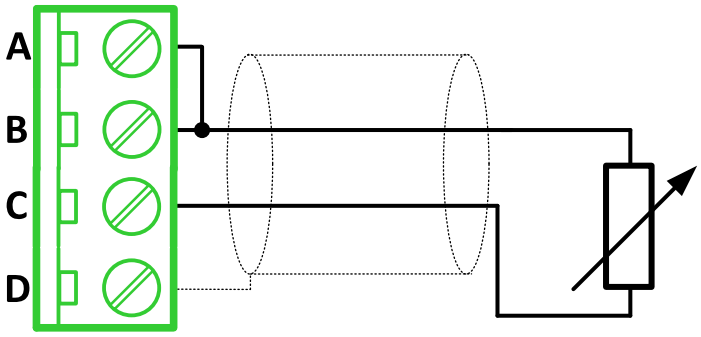


Resistance sensor - 3 wires



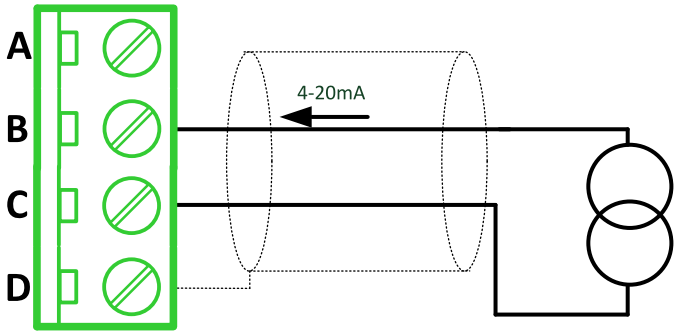
Note: *Ranges: Pt100, Pt1000, Ni100, Ni1000, 0 – 2400 Ω, 0 – 10 kΩ*

Resistance sensor - 2 wires



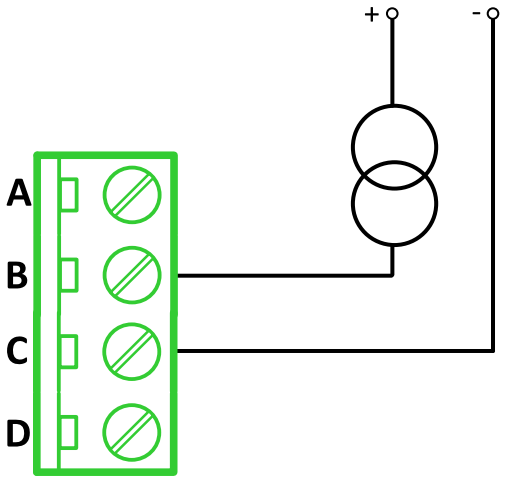
Note: *Ranges: Pt100, Pt1000, Ni100, Ni1000, 0 – 2400 Ω, 0 – 10 kΩ*

Current sensor - active



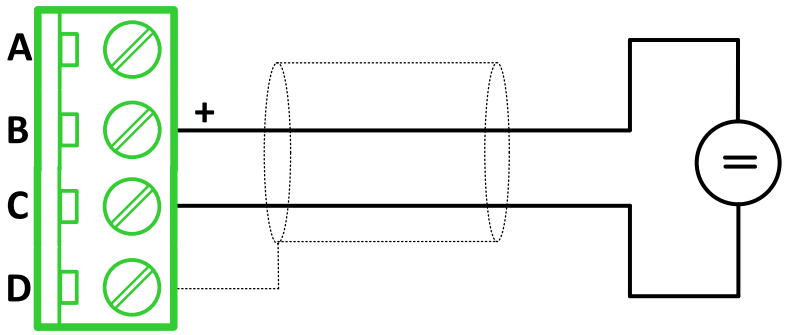
Note: *Ranges: ±20 mA, 4 – 20 mA*

Current sensor - passive



Note: *Ranges: 0 – 20 mA, 4 – 20 mA*

Voltage sensor



Note: *Ranges: ±1 V, 0 – 2,5 V, 0 – 5 V, 0 – 10 V*

Technical data

General data

Power supply	8 to 36 V DC
Current consumption	35 mA at 24 V ÷ 100 mA at 8 V
Interface to controller	CAN1
Protection	IP20
Storage temperature	- 40 °C to + 80 °C
Operating temperature	- 30 °C to + 70 °C
Dimensions (WxHxD)	110x110x46 mm (4,3”x4,3”x1,8”)
Weight	221,5 grams

Analog inputs

Number of channels	8
Voltage	Range 0-10 V Accuracy: ± 0,25 % of actual value + ± 25 mV
Current	Range: ±20 mA Accuracy: ± 0,25 % of actual value + ± 50 µA
Resistive	Range: 0- 10 kΩ Accuracy: ± 0,5 % of actual value + ± 2 Ω

Inteli IO8/8

Inteli IO8/8 module is an extension module equipped with binary inputs, binary outputs and analog outputs.

Inteli IO8/8 is the name of the module, but it is possible to configure the module (by internal switch) to two configurations:

- Inteli IO8/8 - 8 binary inputs, 8 binary outputs and 2 analog outputs
- Inteli IO 16/0 - 16 binary inputs, 0 binary outputs and 2 analog outputs

The detection of communication speed is indicated by fast flashing of status LED. Once the speed is detected the module remains set for the speed even when the communication is lost. Renewal of communication speed detection is done by reset of the module.



Image 9.32 Inteli IO8/8

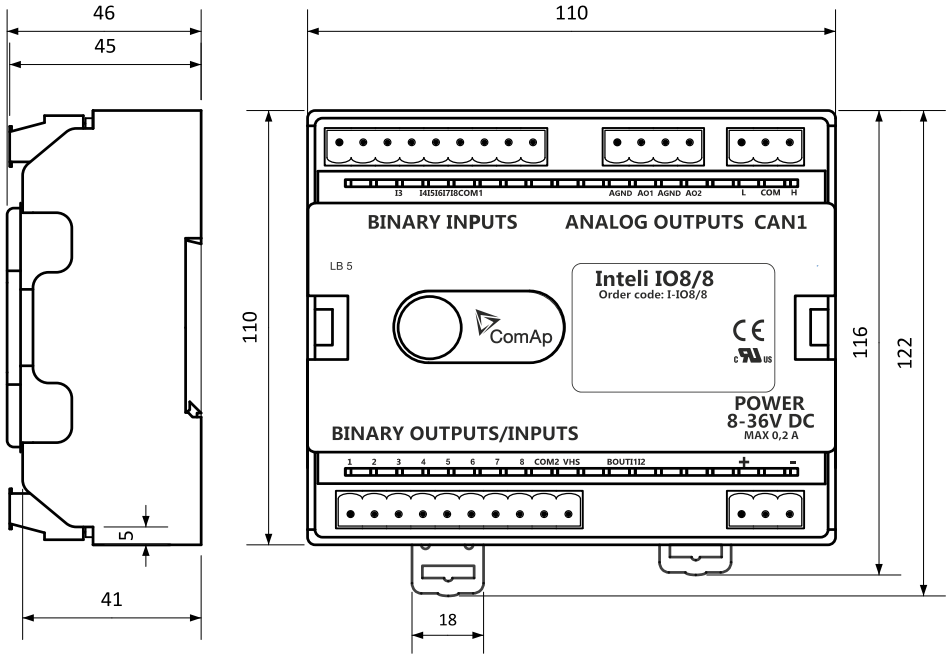
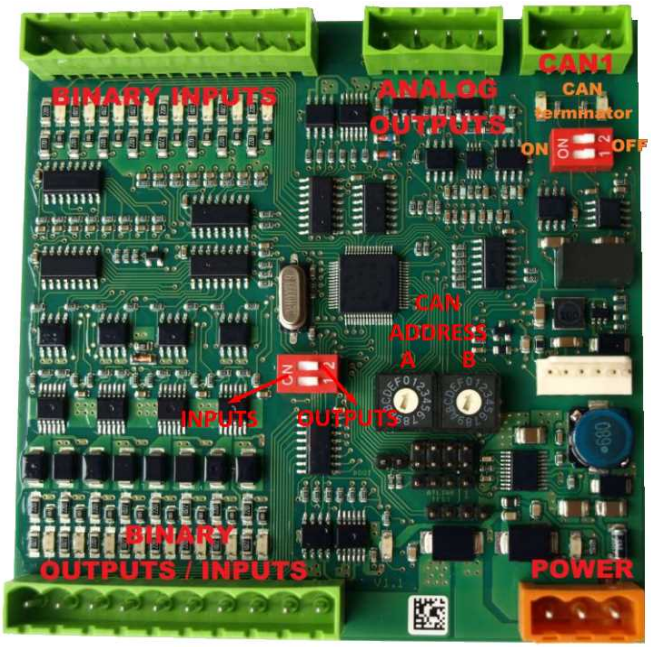


Image 9.33 Inteli IO8/8 dimensions

Note: *All dimensions are in mm.*

Terminals



Binary inputs	8 binary inputs
Binary outputs	8 binary outputs (8 binary inputs)
Analog outputs	2 analog outputs
CAN	CAN1 line
Power	Power supply
Binary inputs LEDs	8 LEDs for binary input indication
Binary outputs LEDs	8 LEDs for binary output indication
CAN LED	Indication transmitted or received data
Status	LED indication of correct function
CAN terminator	Terminating CAN resistor (active in position “ON” - switch both switches)

Inputs and outputs

Binary inputs

- 8 channels
- can be configured as:
  - pull up
  - pull down

All 8 inputs are configured to one type together.

All inputs can be configured to any logical function or protection.

Binary outputs

- 8 channels
- can be configured as:
  - High side switch
  - Low side switch

Always all 8 inputs are configured to one type (HSS/LSS) together. All 8 outputs can be modified to inputs by switch on the PCB (Inteli IO8/8 to Inteli IO 16/0).

Analog outputs

- 2 channels
- can be configured as:
  - voltage 0-10V
  - current 0-20mA
  - PWM (level 5V, with adjustable frequency from 200Hz to 2400Hz, with step 1Hz)

All inputs/outputs can be configured to any logical function or protection.

Output state check

Output state check function evaluates in real time the state of binary outputs and adjusted (required) state. In case of failure (different state of required state and real state) history record and alarm are issued (type of the alarm is set by “Protection upon module failure” - (No protection / Warning / Shutdown)).

This function is designed for short-circuit or other failure, which causes change of set state of binary output.

CAN address

In Inteli IO8/8 mode CAN address for binary inputs is determined by DIP switch A, CAN address for binary output and analog outputs is determined by DIP switch B.

In Inteli IO 16/0 mode CAN address for binary inputs is determined by DIP switch A, first group of 8 input has address A, second group of 8 inputs has address A+1. CAN address of analog outputs is set by DIP switch B.



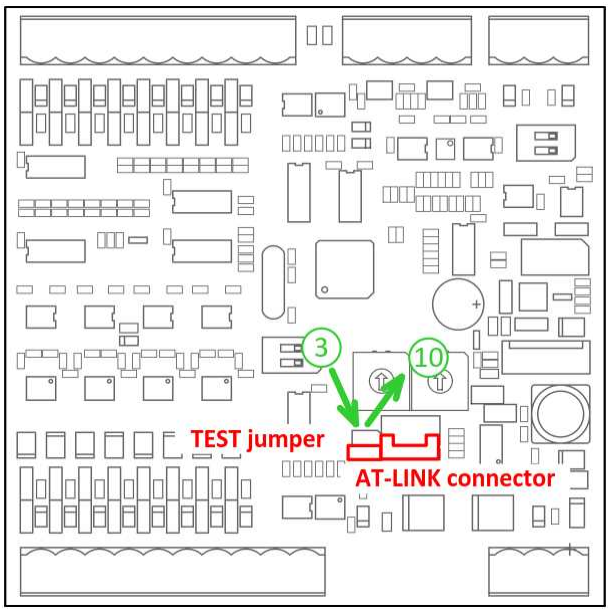
Note: *In case of setting the CAN address to zero, the appropriate group of signals is deactivated.*

Programming firmware

Firmware upgrade process:

1. Disconnect all terminals from the unit.
2. Separate the top cover of module
3. Put the TEST jumper on a pins

4. Connect the unit with PC via RS232-null modem cable and AT-Link conv



5. Connect power supply of the module (status LED lights continuously)
6. Launch FlashPgr.exe PC software (version 4.2 or higher)
7. In FlashPrg program choose card Inteli IO8/8 and load FW for the module
8. Set the proper COM port (connected with the unit) and press Start button
9. Wait till process is done (If the process doesn't start – after 60 second the "Timeout" will be evaluated. In this case please check:
   - You have proper connection with the unit
   - COM port selection is correct
   - Module has power supply, (no CAN bus connection, status LED lights continuously)
10. After successful programming disconnect AT-Link conv , remove TEST jumper and disconnect power supply
11. Connect power supply again (status LED should blinking)
12. Module FW is upgraded

LED indication

Binary input

Each binary input has LED which indicates input signal. LED is shining when input signal is set, and LED is dark while input signal has other state.

Binary output

Each binary output has LED which indicates output signal. Binary output LED is shining when binary output is set. When this LED is shining, then module is configured as 8 binary inputs and 8 binary outputs. When this LED is dark, then the module is configured as 16 binary inputs.

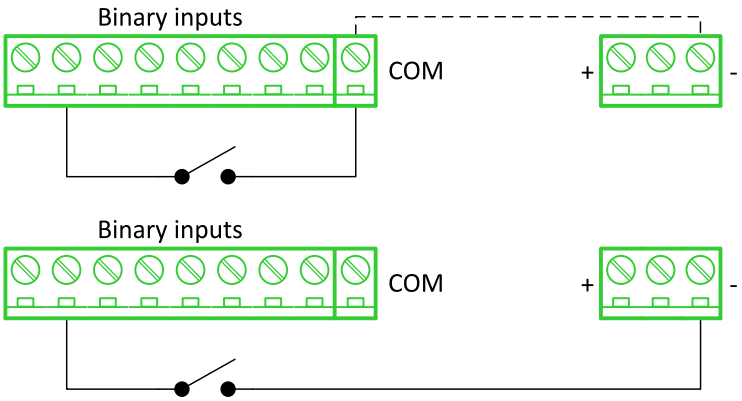
LED at power connector - status LED

LED status	Description
Dark	Fw in module does not work correctly.
Flashing	Module does not communicate with controller (in case non-zero CAN address).
Lights	Power supply is in the range and the communication between Inteli IO8/8 and controller works properly. Or power supply is in range and zero CAN address is set. (in case zero CAN address module doesn't communicate with the controller).

Wiring

The following diagrams show the correct connection of inputs and outputs.

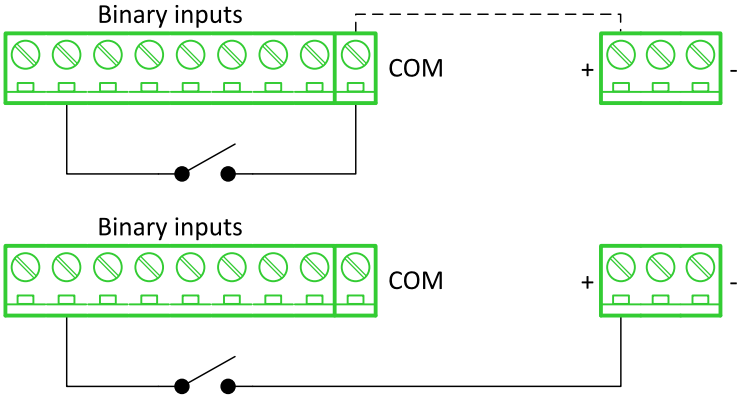
Binary inputs - pull up



There are two options of wiring. On upper picture you can see case when binary input is connected between BIN2 and COM (COM is connected internally to the GND (-) - dashed line).

On lower picture is case of wiring between BIN2 and GND (-). Both ways are correct.

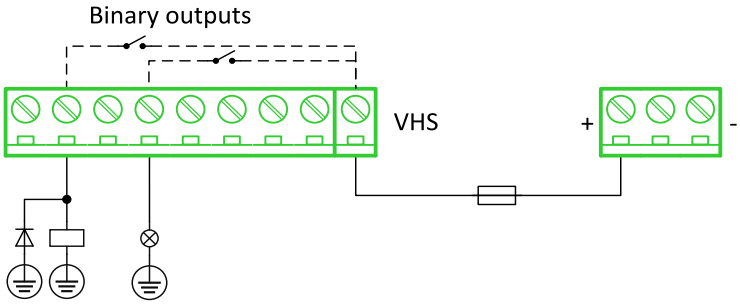
Binary inputs - pull down



There are two options of wiring. On upper picture you can see case when binary input is connected between BIN2 and COM (COM is connected internally to the Ucc (+) - dashed line).

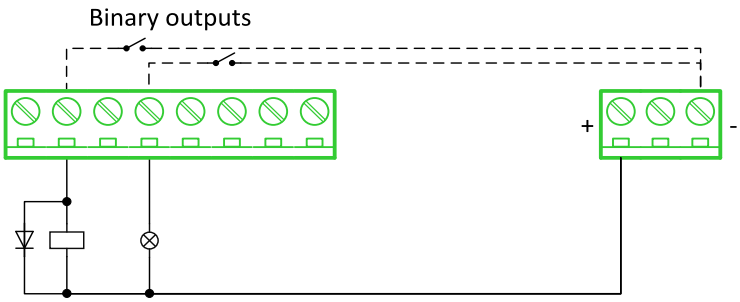
On lower picture is case of wiring between BIN2 and Ucc (+). Both ways are correct.

Binary outputs - high side



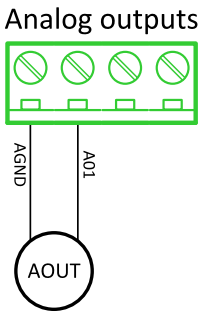
When high side setting of outputs is chosen - binary output must be connected to the minus potential directly Terminal VHS (voltage High side) has to be connected to positive potential directly. Maximal current of each binary output is 500 mA. Size of fuse depends on load.

Binary outputs - low side



When low side setting of outputs is chosen - binary output must be connected to the plus potential of power supply directly. Minus potential is connected internally - dashed line.

Analog outputs



Note: *Limit of analog ground (AGND) is 100mA.*

IMPORTANT: Terminator for analog output has special analog ground (AGND), which must not be connected to the GND.

Technical data

General data

Power supply	8 to 36 V DC
Current consumption	35 mA at 24 V ÷ 100 mA at 8 V
Interface to controller	CAN1
Protection	IP20
Storage temperature	- 40 °C to + 80 °C

Operating temperature	- 30 °C to + 70 °C
Dimensions (WxHxD)	110x110x46 mm (4,3”x4,3”x1,8”)
Weight	240 grams

Analog outputs

Number of channels	2
Voltage	Range 0-10 V Accuracy: ± 20 mV + ±0,5 % of actual value Imax 5 mA
Current	Range: 0-20 mA Accuracy: ± 100 µA + ±0,5 % of actual value Rmax 500 Ω
PWM	Level 5 V Frequency - adjustable 200÷2400 Hz Imax 20 mA

Binary inputs

Number of channels	8 for Inteli IO8/8, 16 for Inteli IO 16/0
Input resistance	4400 Ω
Input range	0 to 36 V DC
Switching voltage level for open contact indication	0 to 2 V DC
Max voltage level for close contact indication	6 to 36 V DC

Binary outputs

Number of channels	8 for Inteli IO8/8, 0 for Inteli IO 16/0
Max current	500 mA
Max switching voltage	36 V DC

IGS-PTM

IGS-PTM module is extension module equipped with binary inputs, binary outputs, analog inputs and analog output. IGS-PTM module is connected to controller by CAN1 bus.



Image 9.34 IGS-PTM

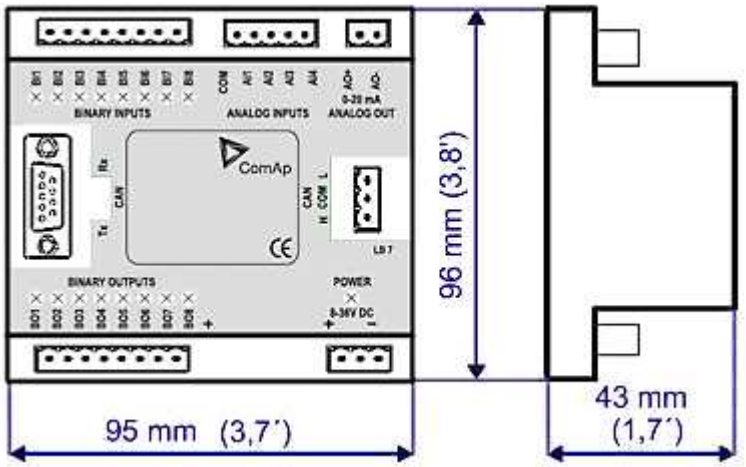
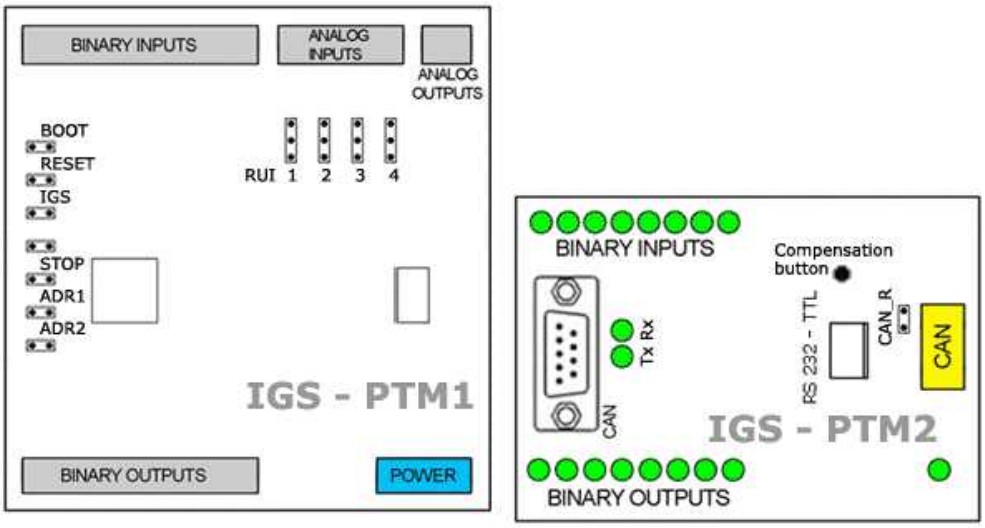


Image 9.35 IGS-PTM dimensions

Terminals



Binary inputs	8 binary inputs
Analog inputs	4 analog inputs
Analog outputs	1 analog output
Binary outputs	8 binary outputs
CAN	CAN1 line
RS232-TTL	Interface for programming
Power	Power supply

Analog inputs

Analog inputs can be configured for:

- Resistance measurement
- Current measurement
- Voltage measurement

The type of analog inputs is configured via jumpers RUI located on lower PCB.

RUI	Analog input configuration
1 - 2	Resistance measuring
2 - 3	Current measuring
no jumper	Voltage measuring

Supported sensors

Sensors	
PT100 [°C] (fix)	User curves
NI100 [°C] (fix)	0-100 mV
PT100 [°F] (fix)	0-2400 ohm
NI100 [°F] (fix)	±20 mA

CAN address

Controller type selection

The type of controller to be used with IGS-PTM must be selected via jumper labeled IGS accessible at the lower PCB.

IGS jumper	Controller type
OPEN	IL-NT, IC-NT
CLOSE	IG-NT, IS-NT, InteliLite

Address configuration

If InteliLite controller type is selected (by IGS jumper), address of IGS-PTM could be modified via jumpers labeled ADR1 and ADR2.

ADR1	ADR2	ADR offset	BIN module	BOUT module	AIN module
Open	Open	0 (default)	1	1	1
Close	Open	1	2	2	2
Open	Close	2	3	3	3
Close	Close	3	4	4	4

Programing firmware

Firmware upgrade is via AT-link (TTL). For programming is necessary to close jumper BOOT. RESET jumper is used to reset the device. Close jumper to reset the device. For programming is used FlashProg PC tool.

LED indication

Binary input

Each binary input has LED which indicates input signal. LED is shining when input signal is set, and LED is dark while input signal has other state.

Binary output

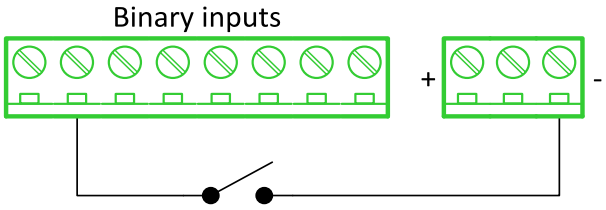
Each binary output has LED which indicates output signal. Binary output LED is shining when binary output is set.

LED at power connector - status LED

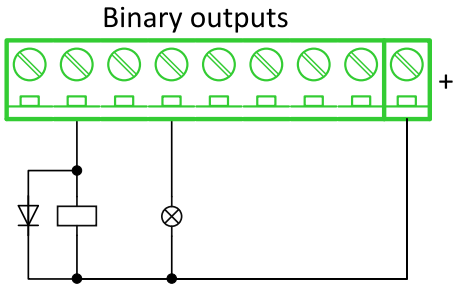
LED status	Description
Dark	No required power connected.
Quick flashing	Program check failure.
One flash and pause	Compensation fail.
Three flashes and pause	Compensation successful.
Flashes	There is no communication between IGS-PTM and the controller.
Lights	Power supply is in the range and communication between IGS-PTM and controller properly works.

Wiring

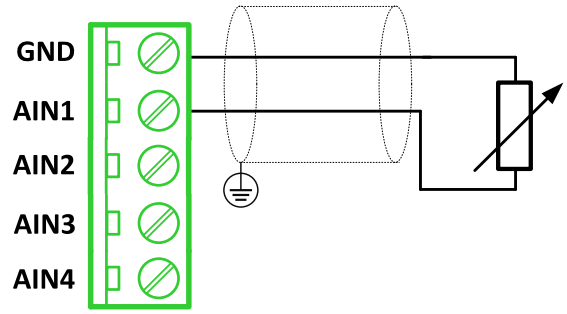
Binary inputs



Binary outputs



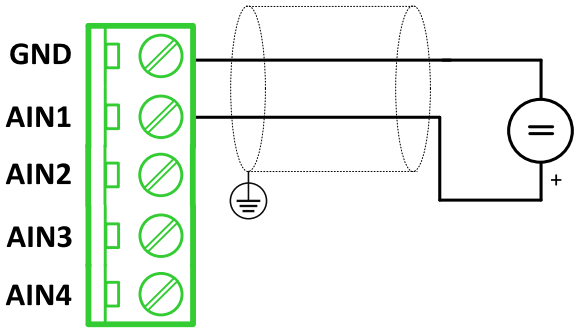
Resistance sensor



Note: *Range: 0- 2400 Ω*

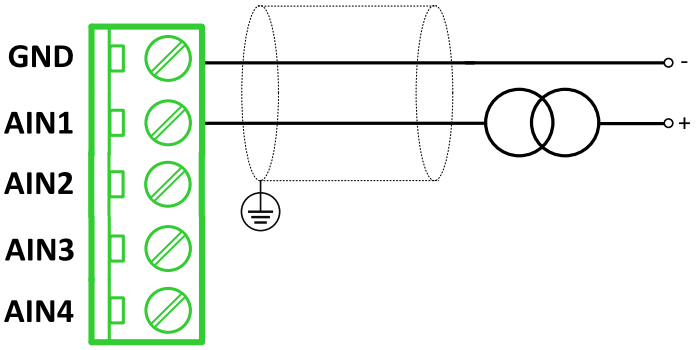
IMPORTANT: Physical analog input range is 0-250 Ω. In sensor configuration in PC tool it is necessary to chose 0-2400 Ω sensor HW type to ensure proper function of analog input.

Voltage sensor



Note: *Range 0-100 mV*

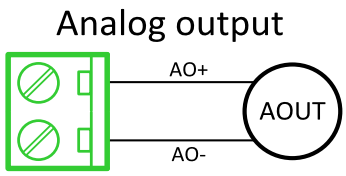
Current sensor - passive



Note: *Range: ± 0-20 mA*

IMPORTANT: Physical analog input range is 0-20mA. In sensor configuration in PC tool it is necessary to chose +- 20mA active sensor HW type to ensure proper function of analog input.

Analog outputs



Note: *Range: 0 to 20 mA ± 0,33 mA*

Technical data

General data

Power supply	8 to 36 V DC
Current consumption	100 mA at 24V ÷ 500 mA
Interface to controller	CAN1
Protection	IP20
Storage temperature	- 40 °C to + 80 °C
Operating temperature	- 30 °C to + 70 °C
Dimensions (WxHxD)	95×96×43 mm (3.7'×3.8'×1.7')

Analog inputs

Number of channels	8
Voltage	Range 0-100 mV Accuracy: 1,5 % ± 1 mV out of measured value
Current	Range: 0-20 mA Accuracy: 2.5 % ± 0,5 ohm out of measured value
Resistive	Range: 0- 250 Ω Accuracy: 1 % ± 2 ohm out of measured value

Analog outputs

Number of channels	1
Current	Range: 0 to 20 mA ± 0,33 mA Resolution 10 bit

Binary inputs

Number of channels	8
Input resistance	4700 Ω
Input range	0 to 36 V DC
Switching voltage level for open contact indication	0 to 2 V DC
Max voltage level for close contact indication	8 to 36 V DC

Binary outputs

Number of channels	8
Max current	500 mA
Max switching voltage	36 V DC
Number of channels	8
Voltage	Range 0-100 mV Accuracy: 1,5 % ± 1 mV out of measured value
Current	Range: 0-20 mA Accuracy: 2.5 % ± 0,5 ohm out of measured value
Resistive	Range: 0- 250 Ω Accuracy: 1 % ± 2 ohm out of measured value

Inteli AIN8TC

Inteli AIN8TC module is extension module equipped with 8 analog inputs dedicated for thermocouple sensors only.

The detection of communication speed is indicated by fast flashing of status LED. Once the speed is detected the module remains set for the speed even when the communication is lost. Renewal of communication speed detection is done by reset of the module.



Image 9.36 Inteli AIN8TC

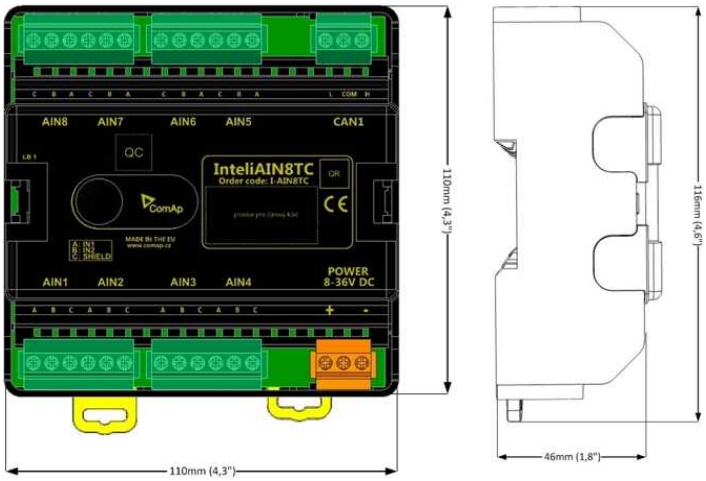
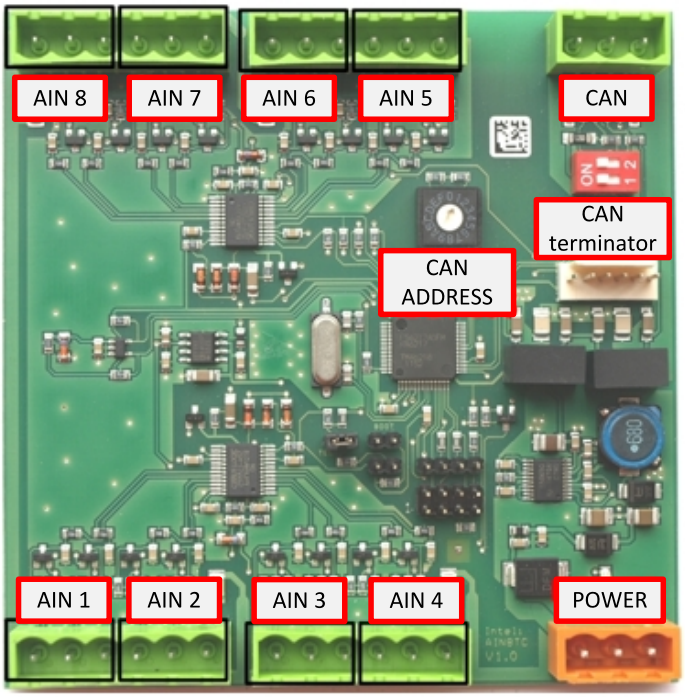


Image 9.37 Inteli AIN8TC dimensions

Terminals



ANALOG INPUT	8 analog Inputs
CAN	CAN1 line
POWER	Power supply
CAN LED Tx, Rx	Indication transmitted or received data
Status LED	LED indication of correct function
CAN terminator	Terminating CAN resistor (active in position “ON”)
TEST jumper	Upgrade of sw
AT-LINK	Connector for AT-LINK

Analog inputs

- 8 channels
- can be configured as thermocouple sensors only

Supported sensors

Sensors
Thermocpl J [°C] (fix)
Thermocpl K [°C] (fix)
Thermocpl L [°C] (fix)
Thermocpl J [°F] (fix)
Thermocpl K [°F] (fix)
Thermocpl L [°F] (fix)
Thermocpl (nc) J [°C] (fix)

Thermocpl (nc) K [°C] (fix)
Thermocpl (nc) L [°C] (fix)
Thermocpl (nc) J [°F] (fix)
Thermocpl (nc) K [°F] (fix)
Thermocpl (nc) L [°F] (fix)

***Note:** "nc" means not cold junction compensation (by external sensor).In this case is used internal temperature sensor on the PCB*

Address and DIP switch setting

Address configuration

DIP switch determinates CAN address for analog inputs.

Programming firmware

Firmware is upgraded via AT-link (TTL). For programming it is necessary to close jumper TEST.

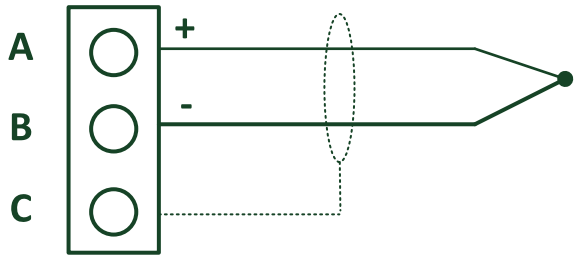
For programming FlashProg PC tool version 4.2 or higher must be used.

LED indication

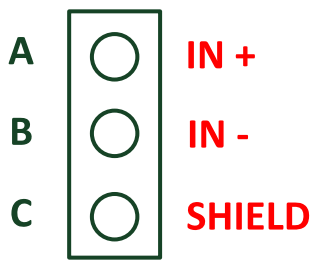
LED status	Description
Dark	Fw in module does not work correctly.
Flashing	Module does not communicate with controller (in case non-zero CAN address)
Fast flashing	Detection of CAN communication speed
Lights	Power supply is in the range and the communication between Inteli AIN8TC and controller works properly. Or power supply is in range and zero CAN address is set. (in case zero CAN address module doesn't communicate with the controller)

Wiring

Analog inputs



Terminaor



Technical data

Dimension (W × H × D)	110 × 110 × 46 mm (4.3” × 4.3” × 1.8”)
Weight	237.5 grams
Interface to controller	CAN1

Analog inputs (not electric separated)	8, no galvanic separated
Measuring	±100 mV
Accuracy	± 0.1 % of actual value + ± 100 µV (± 3 °C)
Internal sensor for measuring cold junction - Accuracy	±1 °C in temperature range -20 °C ÷ +70 °C
Galvanic separation	CANbus is galvanic separated from the measurement and power supply. All analog inputs are galvanic separated from power supply. Analog inputs are not galvanic separated between channels

Power supply	8 to 36 V DC
Protection	IP20
Current consumption	35 mA at 24 V ÷ 100 mA at 8 V
Storage temperature	- 40 °C to + 80 °C
Operating temperature	- 30 °C to + 70 °C
Heat radiation	2 W

Thermocouples galvanically separated and galvanically non-separated are supported.

Inteli AIO9/1

Inteli AIO9/1 module is extension module equipped with analog inputs and outputs – designed for DC measurement.

The detection of communication speed is indicated by fast flashing of status LED. Once the speed is detected the module remains set for the speed even when the communication is lost. Renewal of communication speed detection is done by reset of the module.



Image 9.38 Inteli AIO9/1

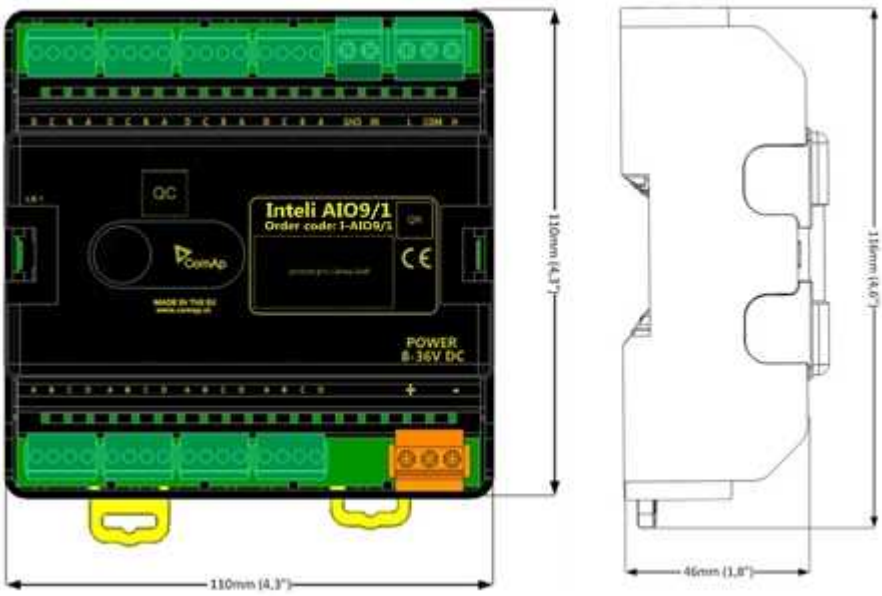
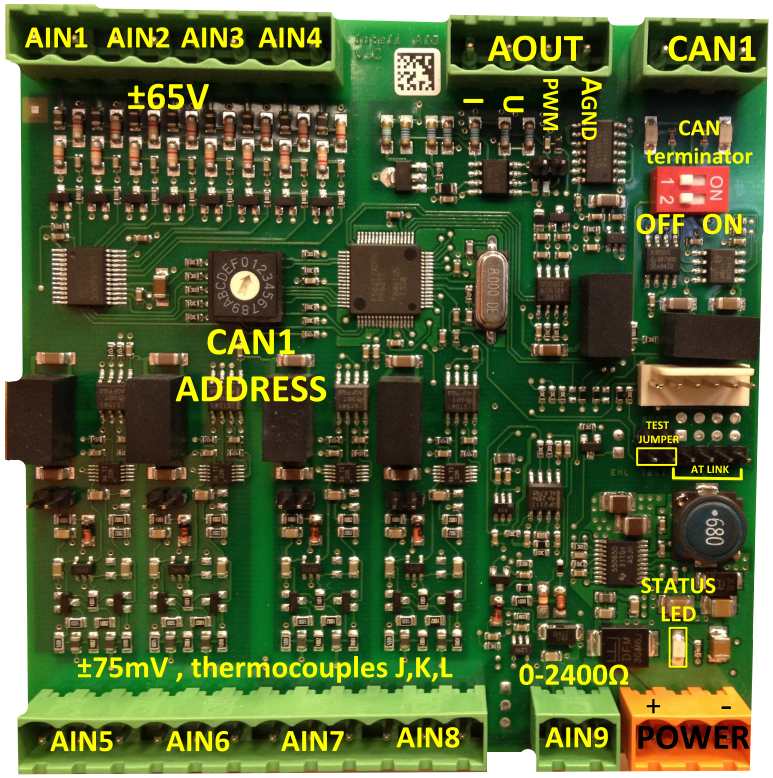


Image 9.39 Inteli AIO9/1 dimensions

Terminals



ANALOG INPUT	9 channels
ANALOG OUTPUTS	1 channel
CAN	CAN1 line
POWER	Power supply
CAN LED Tx, Rx	Indication transmitted or received data
Status LED	LED indication of correct function
CAN terminator	Terminating CAN resistor (active in position “ON”)
TEST jumper	Upgrade of sw
AT-LINK	Connector for AT-LINK (Upgrade of sw)

Analog inputs

- 4 channels AIN1 – AIN4 can be configured as:
  - Sensor ±65V (it is determinated for measurement of battery voltage)
- 4 channels AIN5 – AIN8 can be configured as:
  - Thermocouples – type J,K or L (in °C or °F)
  - Sensor ±75mV DC – (for connecting current shunts)
- 1 channel AIN9 can be configured as:
  - RTD (Pt1000, Ni1000)
  - Common resistance 0-2400Ω

Analog outputs

- 1 channel AOUT1. Type of output:
  - 0-10V DC
  - 0-20mA
  - PWM (5V, freq 2,4Hz ÷2,4kHz)
- Analog output has 4-pins connector – GND and one pin for each type of output.

All analog inputs can be configured to any logical function or protection.

Supported sensors

Sensors
User curves
PT1000 [°C] (fix)
NI1000 [°C] (fix)
0-2400Ω (fix linear)
± 65 V DC (fix linear)
+-75mV (fix linear)
Thermocpl J [°C] (fix)
Thermocpl K [°C] (fix)
Thermocpl L [°C] (fix)
Thermocpl (nc) J [°C] (fix)
Thermocpl (nc) K [°C] (fix)
Thermocpl (nc) L [°C] (fix)
Thermocpl (nc) J [°F] (fix)
Thermocpl (nc) K [°F] (fix)
Thermocpl (nc) L [°F] (fix)

Address and DIP switch setting

Address configuration

DIP switch determinates CAN address for analog inputs and outputs.

Programming Firmware

Firmware upgrade is via AT-link (TTL). For programming it is necessary to close jumper TEST and switch OFF and switch ON the power supply.

For programming use FlashProg PC tool version 4.4 or higher.

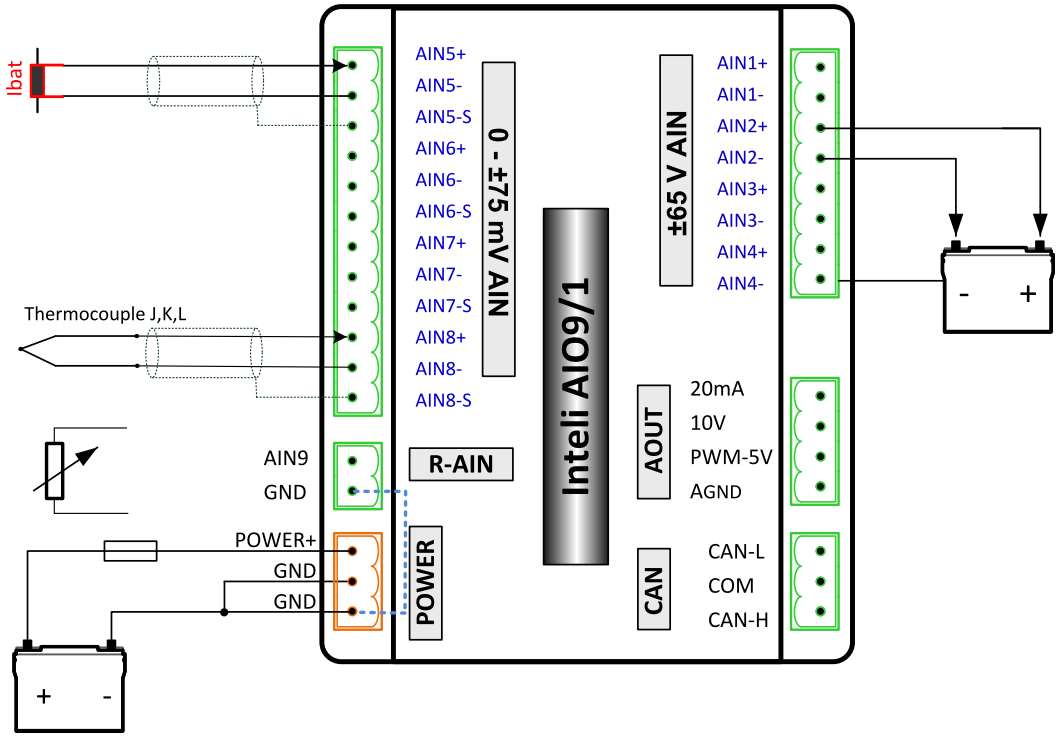
LED indication

LED status	Description
Dark	Fw in module does not work correctly.
Flashing	Module does not communicate with controller (in case non-zero CAN address)

Fast flashing	Detection of CAN communication speed
Lights	Power supply is in the range and the communication between Inteli AIN8TC and controller works properly. Or power supply is in range and zero CAN address is set. (in case zero CAN address module doesn't communicate with the controller)

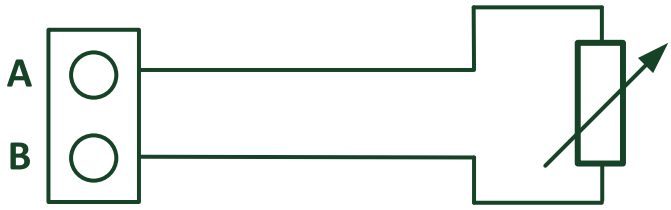
Wiring

The following diagrams show the correct connection of sensors.



Measuring resistance – AIN9

- 2 – wire measurement



Ranges: Pt1000, Ni1000, 0 – 2400 Ω.

Analog input 9 is determined for measuring resistance only.

Technical data

Dimension (W × H × D)	110 × 110 × 46 mm (4.3” × 4.3” × 1.8”)
Weight	248 grams
Interface to controller	CAN1 – galvanic separated from power supply and measurement,

Analog inputs (not electric separated)		9 channels
AIN1-AIN4 – Voltage inputs	**Range**	0-65 V ± 0.25 % of actual value + ± 120 mV Measurement is not galvanic separated from power supply, but IN- is not interconnected with GND – there is floating measurement.
	Accuracy of measurement	± 0,1 % of actual value + ± 100 µV (± 3 °C)
AIN5-AIN8 – Voltage inputs	**Range**	± 75 mV (nominal) (measurement up to ±80 mV)
	Accuracy of measurement	± 0.1 % of actual value + ± 75 µV Galvanic separated from power supply
AIN9 resistance input	**Range**	0- 2400 Ω
	Accuracy of measurement	± 0.5 % of actual value + ± 4 Ω Pt1000, Ni1000 ± 2,5 °C It is not galvanic separated from power supply.

Analog output
I 0-20mA /500Rmax. ± 1 % of actual value + ± 200 uA U 0-10V ± 0.5 % of actual value + ± 50 mV PWM – 5 V, 200 Hz-2.4kHz 15 mA max. Galvanic separated from power supply

Galvanic separation	CAN bus is galvanic separated from the measurement and power supply

Power supply	8 to 36 V DC
Protection	IP20
Current consumption	150 mA at 24 V ÷ 400 mA at 8 V
Storage temperature	- 40 °C to + 80 °C
Operating temperature	- 30 °C to + 80 °C

The product is fully supported in fw IGS-NT 3.1.1 or higher.

Information about support this module in IGS-NT fw branches and ID-DCU – please read New Feature Lists.