ComAp
The heart of smart control

InteliLite MRS11

Controller for single gen-set applications

SW version 1.9.0

Written by Michal Slavata
Prague, Czech Republic
ComAp a.s., U Uranie 1612/14a,
170 00 Prague 7, Czech Republic
Tel: +420 246 012 111
E-mail: info@comap-control.com, www.comap-control.com

Global Guide

Table of contents

1 Document information

back to Table of contents

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

This End User's Guide /Manual as part of the Documentation is an inseparable part of ComAp's Product and may be used exclusively according to the conditions defined in the "USER or Distributor LICENSE AGREEMENT CONDITIONS– COMAP CONTROL SYSTEMS SOFTWARE" (License Agreement) and in the "ComAp a.s. Standard Terms for sale of Products and provision of Services" (Standard Terms)

ComAp's License Agreement is governed by the Czech Authorship Act 121/2000 Col., by international treaties and by other relevant legal documents regulating protection of the intellectual properties (TRIPS).

The End User and/or ComAp's Distributor shall only be permitted to use this End User's Guide /Manual with ComAp Control System Registered Products. The Documentation is not intended and applicable for any other purpose.

ComAp reserves the right to update this End User's Guide /Manual at any time. ComAp does not assume any responsibility for its use outside of the scope of the Standard Terms and the License Agreement.

Licensed End User is entitled to make only necessary number of copies of the End User's Guide /Manual. Any translation of this End User's Guide /Manual without the prior written consent of ComAp is expressly prohibited!

Even if the prior written consent from ComAp is acquired, ComAp does not take any responsibility for the content and quality of any such translation. ComAp will deem a translation equal to this End User's Guide/Manual only if it agrees to verify such a translation. The terms and conditions of such verification must be included in the written consent.

For more details relating to the Ownership, Extent of Permitted Reproductions Term of Use of the Documentation and to the Confidentiality rules please review and comply with the ComAp's END USER or Distributor LICENSE AGREEMENT CONDITIONS– COMAP CONTROL SYSTEMS SOFTWARE and STANDARD TERMS FOR SALE OF PRODUCTS AND PROVISION OF SERVICES available on the www.comap-control.com.

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

Copyright (c) [2019] [Jason Fung]

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 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)

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

back to Document information

2 System overview

back to Table of contents

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
- 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

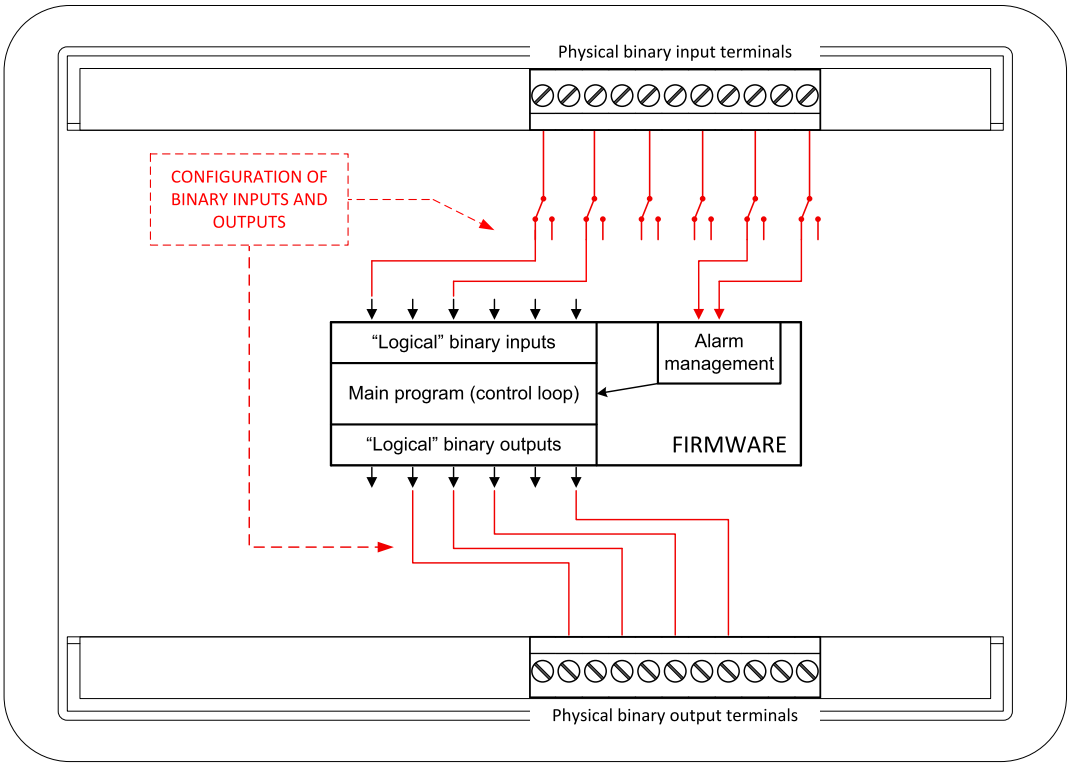


Image 2.1 Principle of binary inputs and outputs configuration

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.

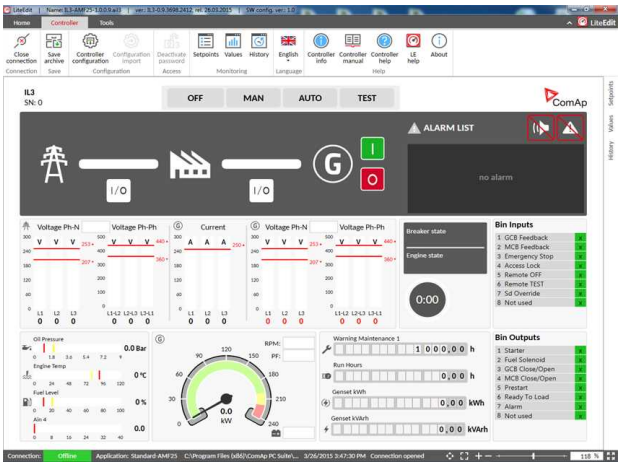
2.4 PC Tools

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

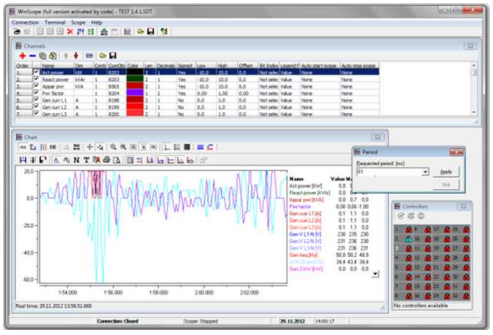


2.4.2 WinScope

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

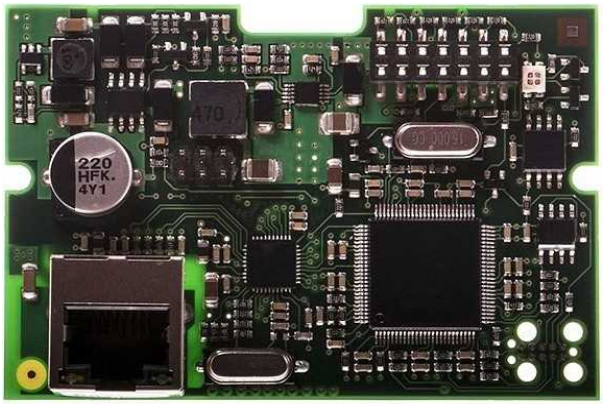


2.5 Plug-in Modules

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 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



2.5.2 CM-4G-GPS

GSM/4G module

- Wireless integrated solution
- Quick and easy installation
- 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

2.5.3 CM-GPRS

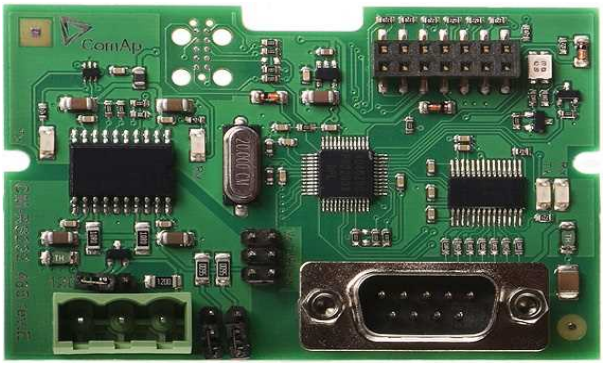
GSM/GPRS module

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

2.5.4 CM-RS232-485

Communication module with two communication ports.

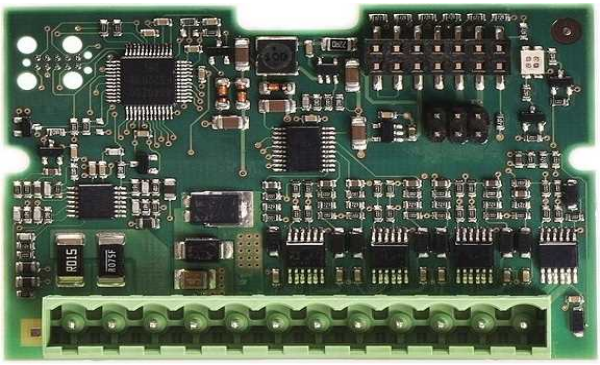
- RS232 and RS485 interface
- MODBUS
- Serial connection to InteliConfig



2.5.5 EM-BIO8-EFCP

Hybrid current input and binary input/output extension module.

- 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

back to System overview

3 Applications overview

back to Table of contents

3.1 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.

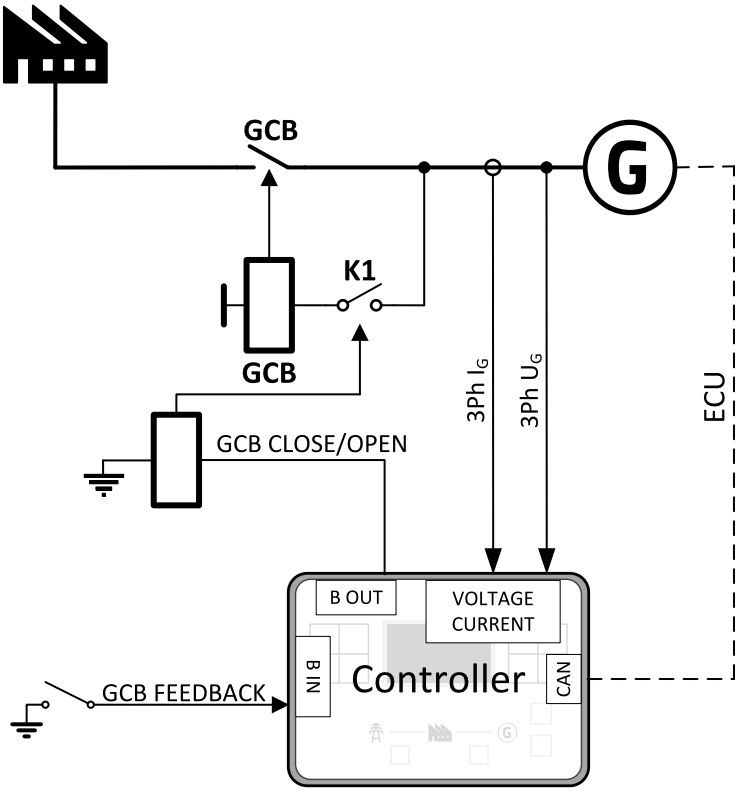


Image 3.1 MRS application overview

back to Applications overview

4 Installation and wiring

back to Table of contents

4.1 Package content

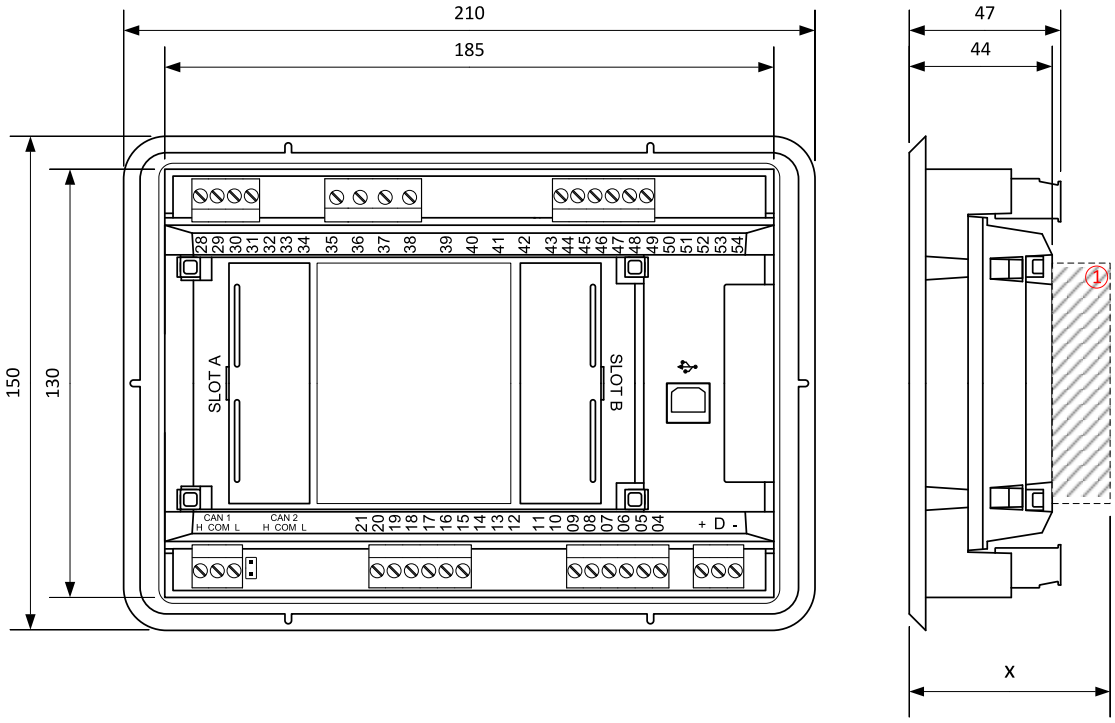
The package contains:

- 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

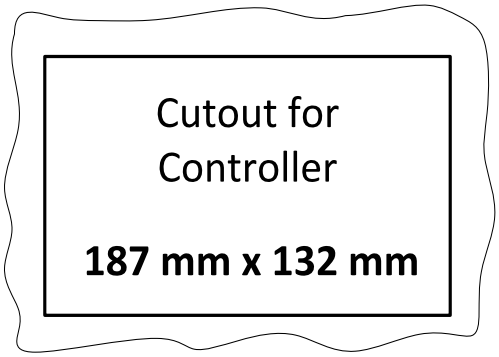
4.2.1 Dimensions



① Plug-in module

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

Note: *Dimensions are in millimeters and are the same for all versions of InteliLite.*

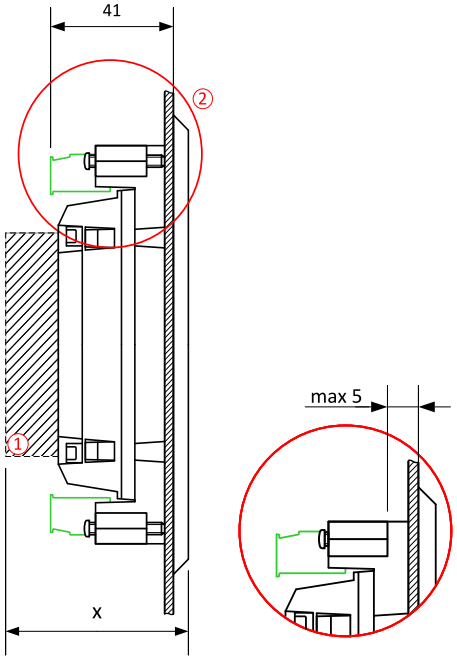


Note: *Cutout is in millimeters and is the same for all versions of InteliLite.*

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 BINARY INPUTS	
T28	COM	T35	N	T43	BIN1
T29	L1	T36	L1	T44	BIN2
T30	L2	T37	L2	T45	BIN3
T31	L3	T38	L3	T46	BIN4
				T47	BIN5
				T48	BIN6

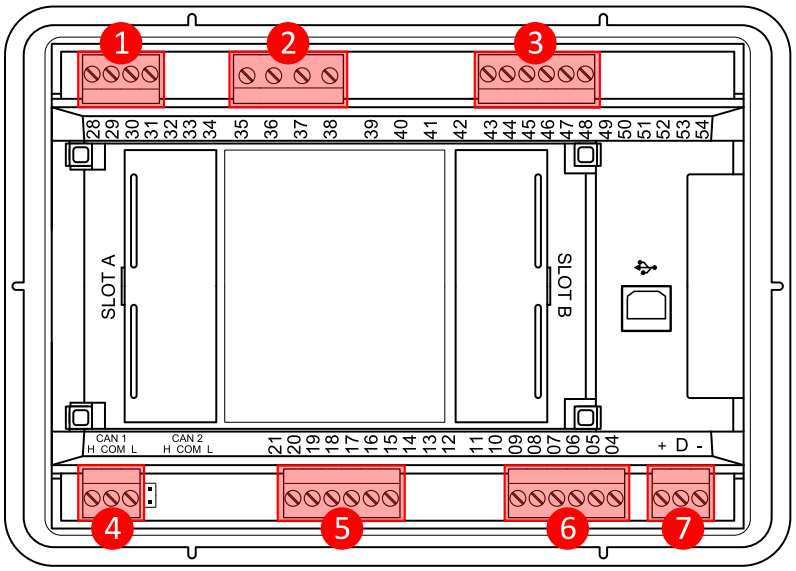
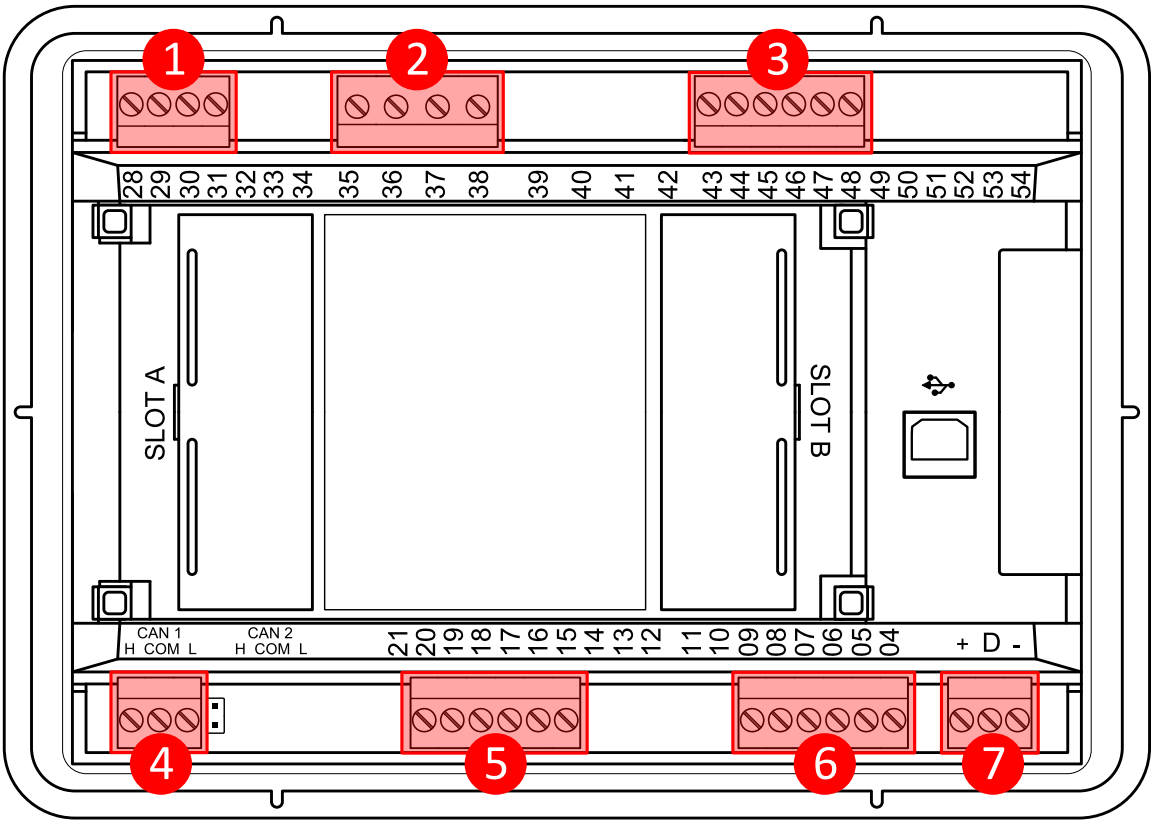


Image 4.1 Terminal diagram for InteliLite MRS11

④ CAN1		⑤ ANALOG INPUTS		⑥ BINARY OUTPUTS		⑦ 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		

4.4 Recommended wiring



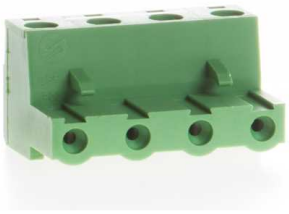
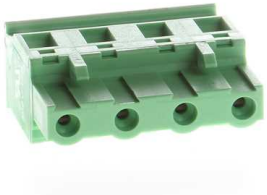
1	Current inputs	28 - 31	**Current measurement wiring (page 26)**
2	Voltage inputs	35 - 38	**Voltage measurement MRS wiring (page 29)**
3	Binary inputs	43 - 48	**Binary inputs (page 37)**
4	CAN bus	H, COM, L	**CAN bus and RS485 wiring (page 43)**
5	Analog inputs	15 - 20	**Analog inputs (page 39)**
6	Binary outputs	04 - 09	**Binary Outputs (page 38)**
7	Power supply	"+", D, "-"	**Power supply (page 24)**
8	USB		

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.

<table>
<tr><th colspan="2">Tightening torque, allowable wire size and type, for the Field-Wiring Terminals:</th></tr>
<tr><td colspan="2">For Mains(Bus) Voltage, Generator Voltage and Current terminals</td></tr>
<tr><td rowspan="2">  </td><td>Specified tightening torque is 0,56 Nm (5,0 In-lbs)</td></tr>
<tr><td>use only diameter 2,0 - 0,5 mm (12 - 26 AWG) conductor, rated for 90°C minimum.</td></tr>
<tr><td colspan="2">For other controller field wiring terminals</td></tr>
<tr><td rowspan="3"> 
  </td><td>Specified tightening torque 0,79 nm (7,0 In-lb)</td></tr>
<tr><td>Use only diameter 2,0 - 0,5 mm (12 - 26 AWG) conductor, rated for 75°C minimum.</td></tr>
<tr><td>use copper conductors only</td></tr>
</table>

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:

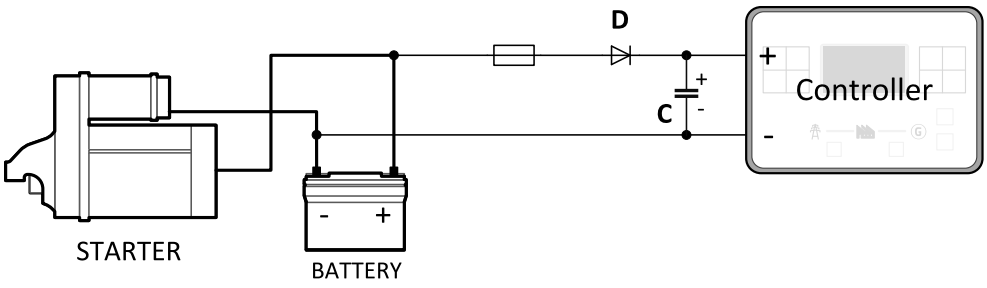
- Use power supply cable min. 1.5 mm^2

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.

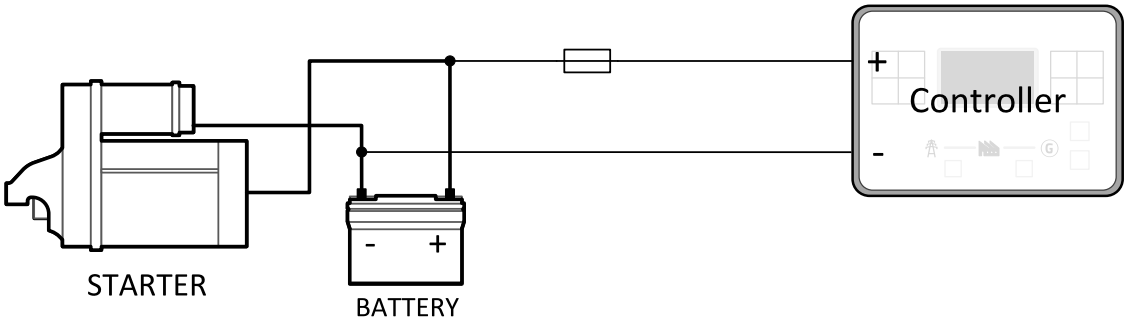
Note: *Suitable conductor protection shall be provided in accordance with NFPA 70, Article 240.*

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 162)**, **Nominal Voltage Ph-N (page 164)**, **Nominal Voltage Ph-Ph (page 164)**, **Nominal Current (page 161)**, **PT Ratio (page 165)** and **CT Ratio (page 162)** 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.

Current measurement wiring

The number of CT's is automatically selected based on selected value of setpoint **Connection type (page 162)** [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:

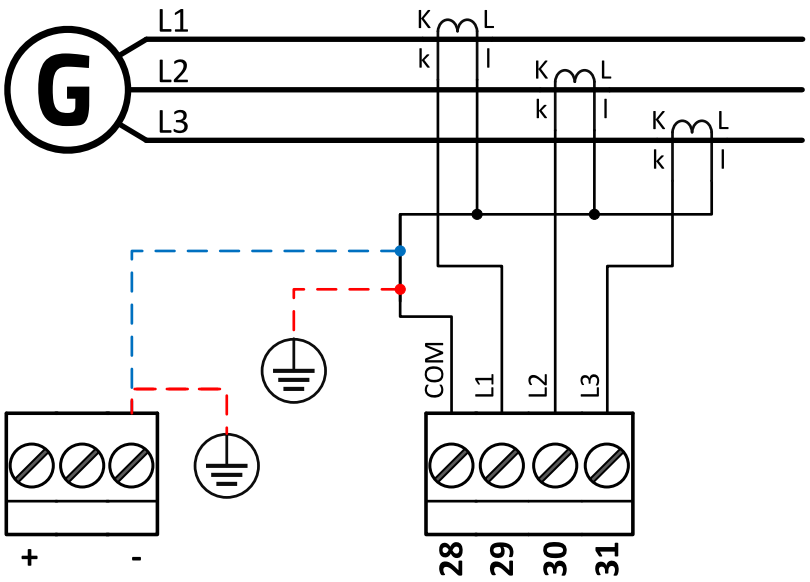


Image 4.2 3 phase application

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:

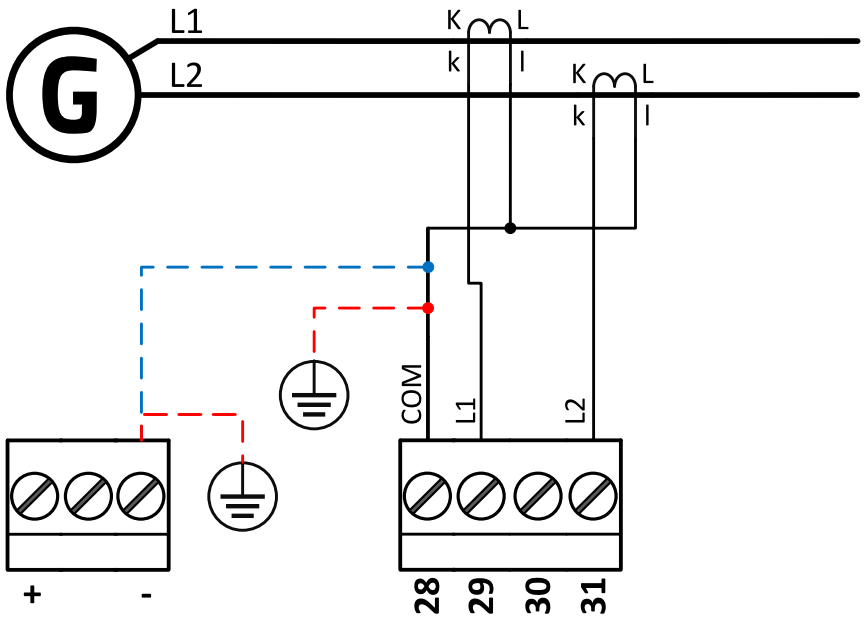


Image 4.3 Split phase application

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.

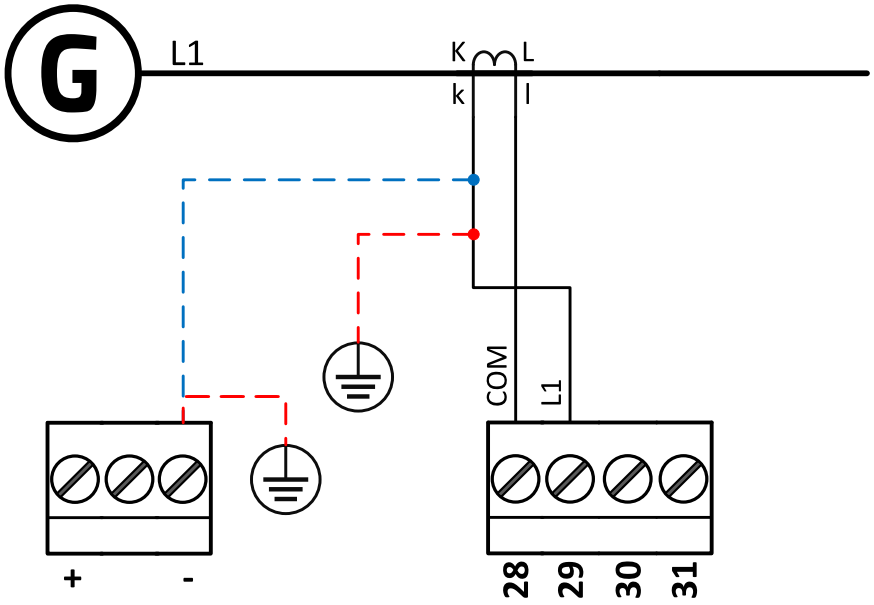


Image 4.4 Mono phase application

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 MRS wiring

There are 4 voltage measurement Connection Type (setpoint **Connection type (page 162)** [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 162)** 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

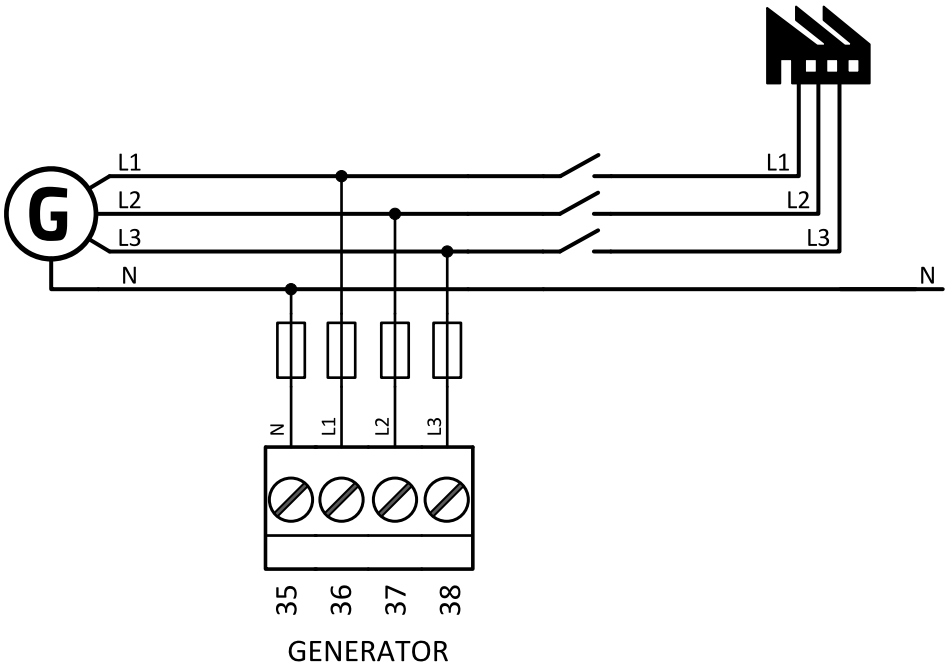


Image 4.5 3 phase application with neutral

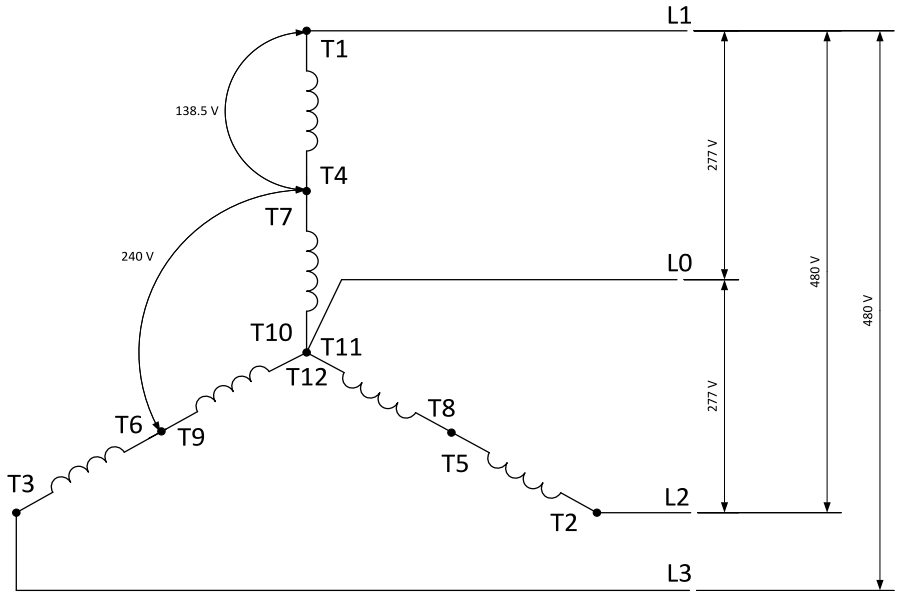


Image 4.6 Typical 3 Phase 4 Wires generator wiring

ConnectionType: High Leg D

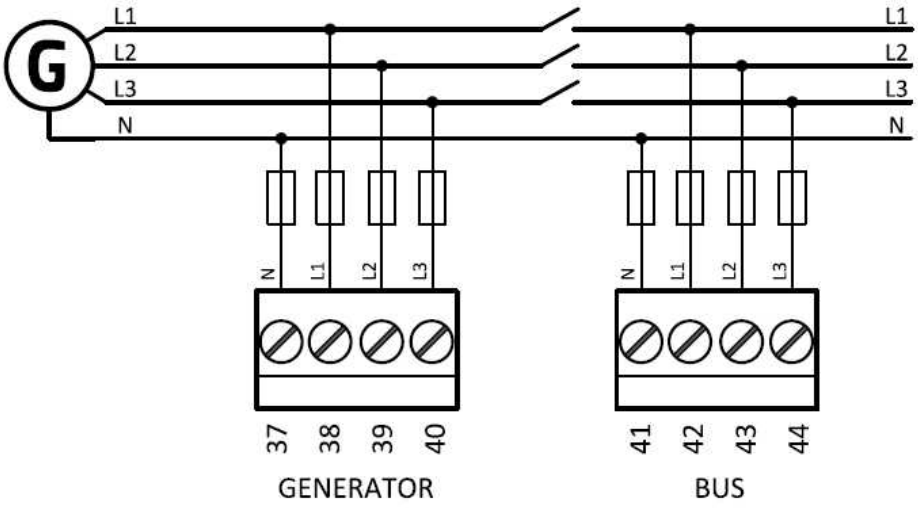


Image 4.7 High Leg Delta application

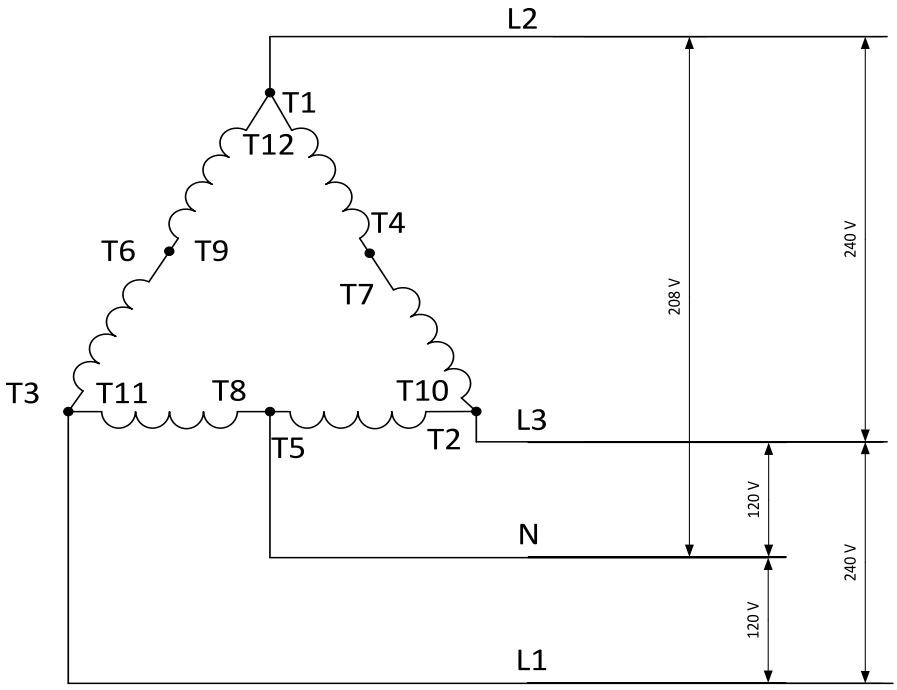


Image 4.8 Typical High Leg D generator wiring

ConnectionType: 3 Phase 3 Wires

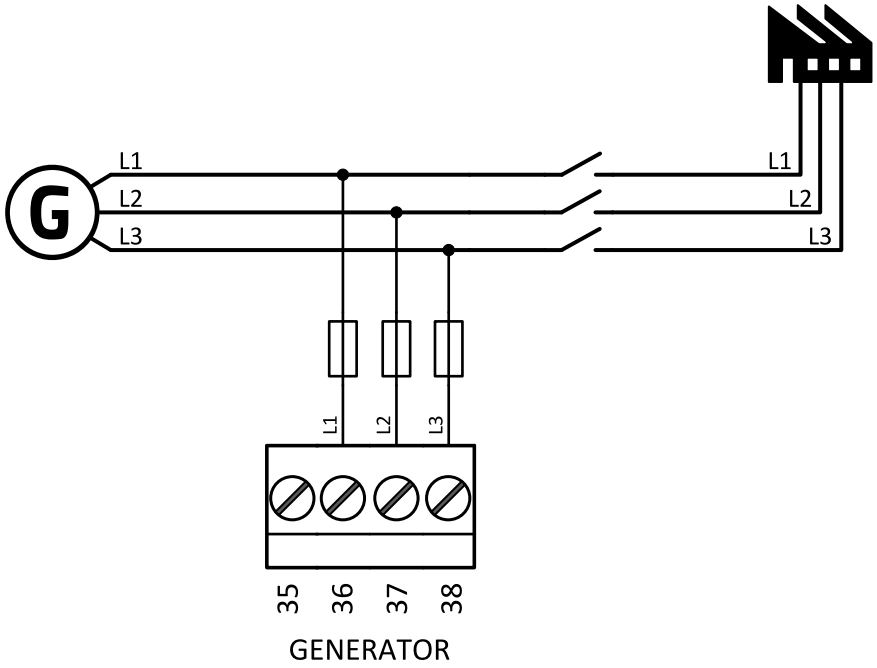


Image 4.9 3 phase application without neutral

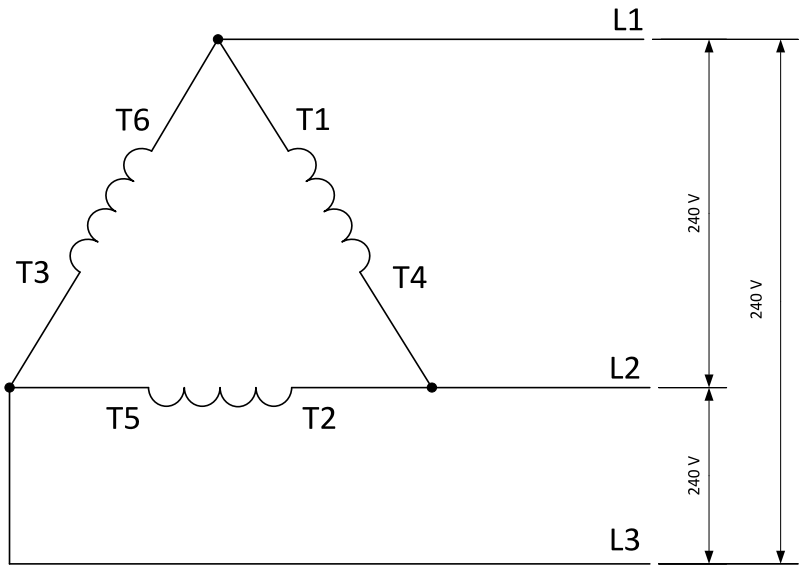


Image 4.10 Typical 3 Phase 3 Wires generator wiring

ConnectionType: SplPhL1L2

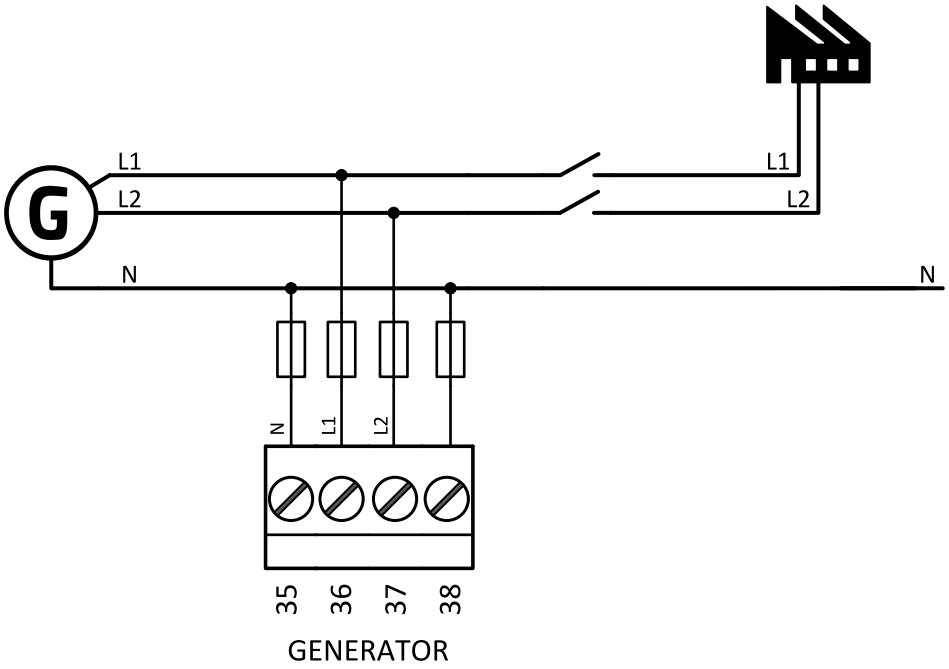
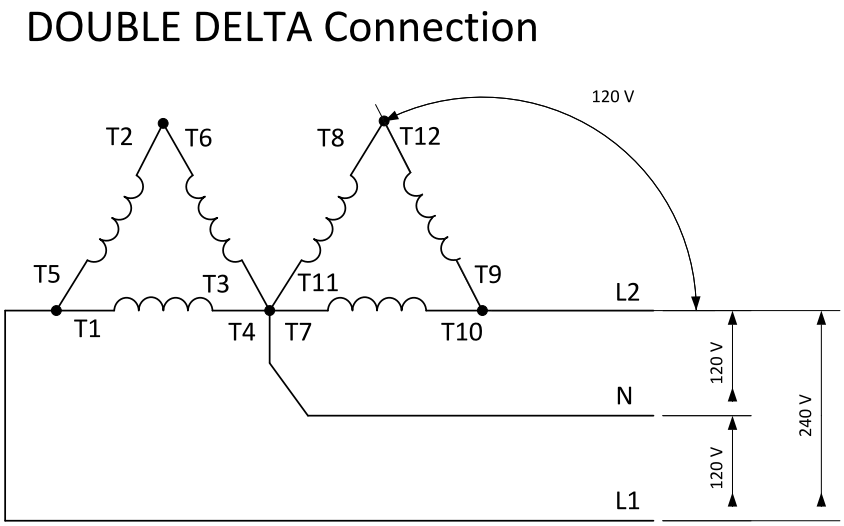


Image 4.11 Split phase L1L2 application



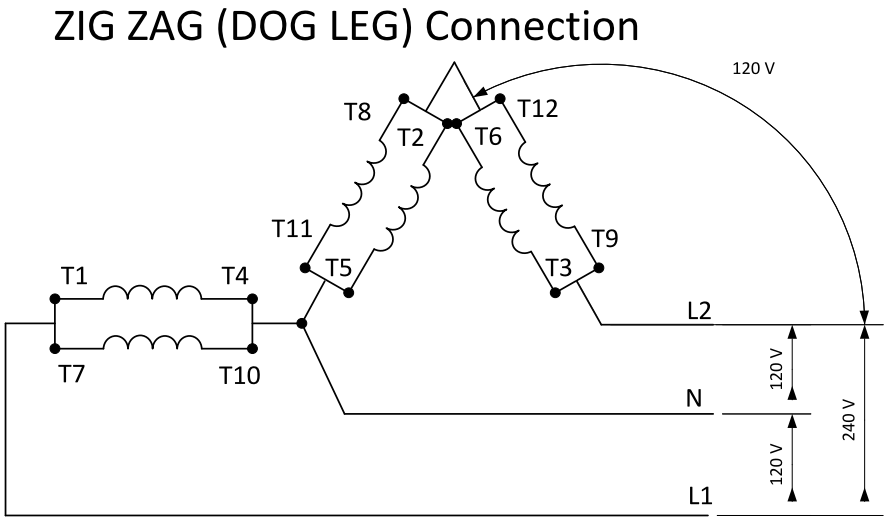


Image 4.12 Typical Split Phase generator wiring

ConnectionType: SplPhL1L3

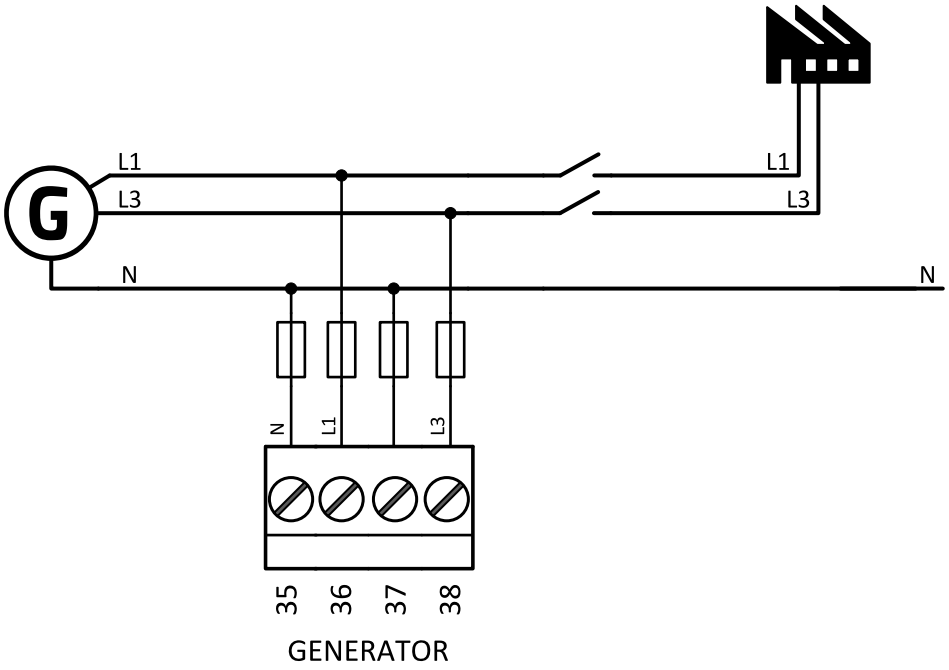
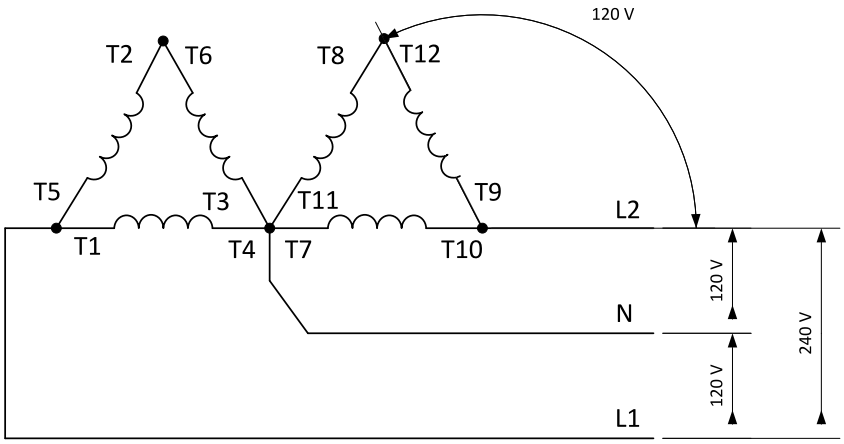


Image 4.13 Split phase L1L3 application

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

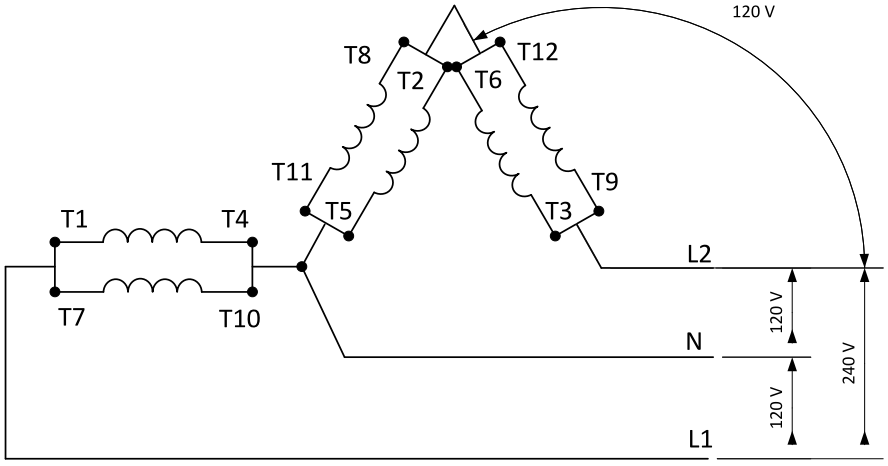


Image 4.14 Typical Split Phase generator wiring

ConnectionType: Mono Phase

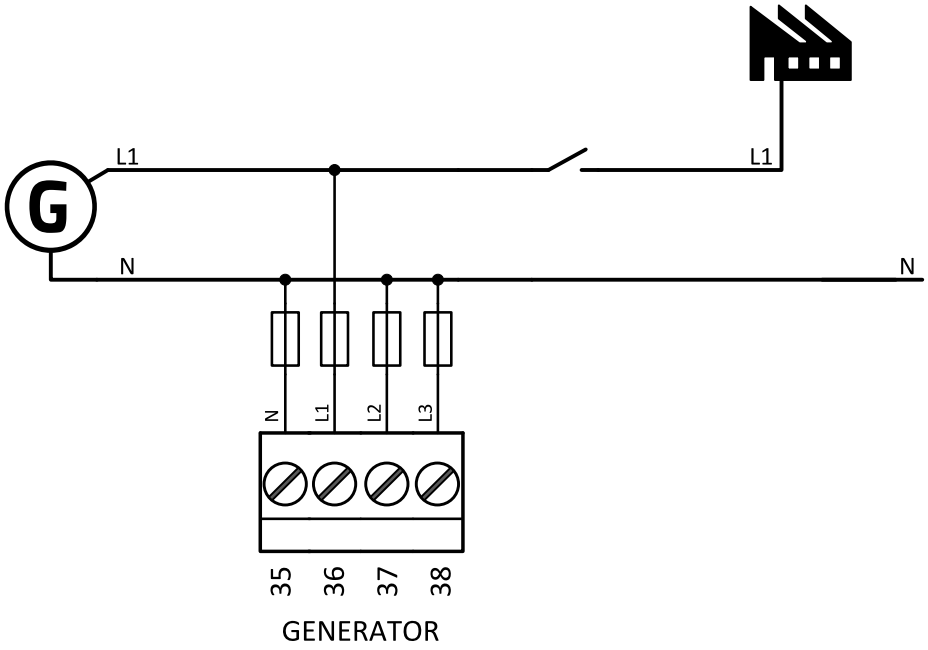


Image 4.15 Mono phase application

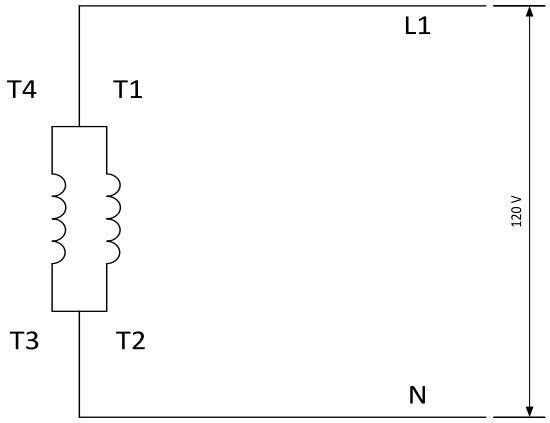


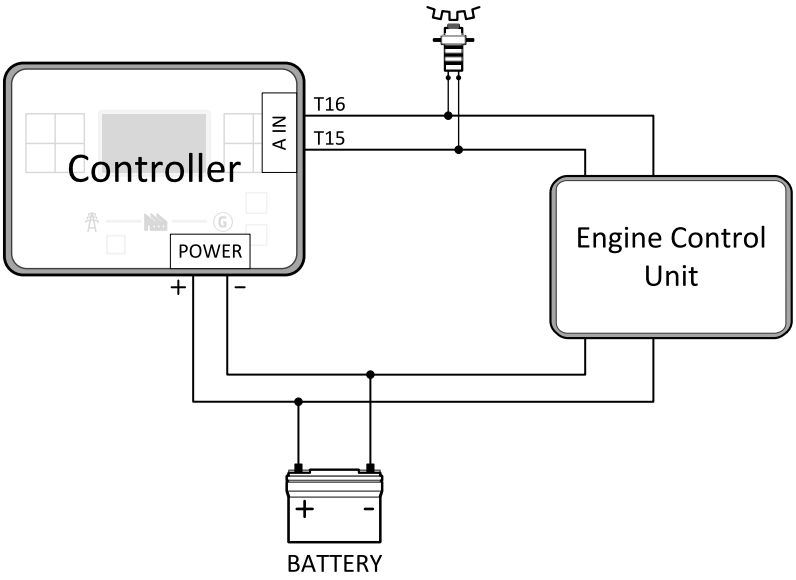
Image 4.16 Typical Mono Phase generator wiring

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 166)** according to the number of teeth on the flywheel.

For the details about the pick-up input parameters **see Technical data on page 152**

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.

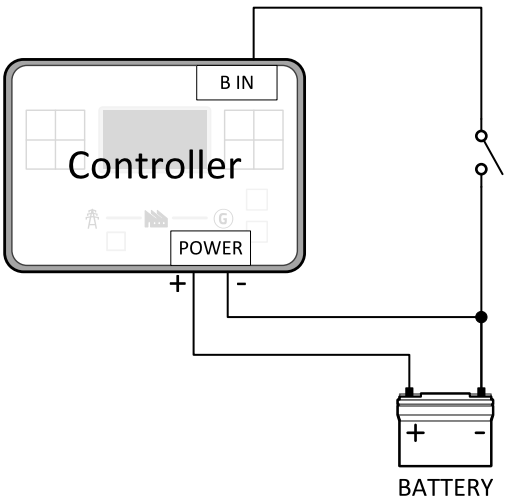


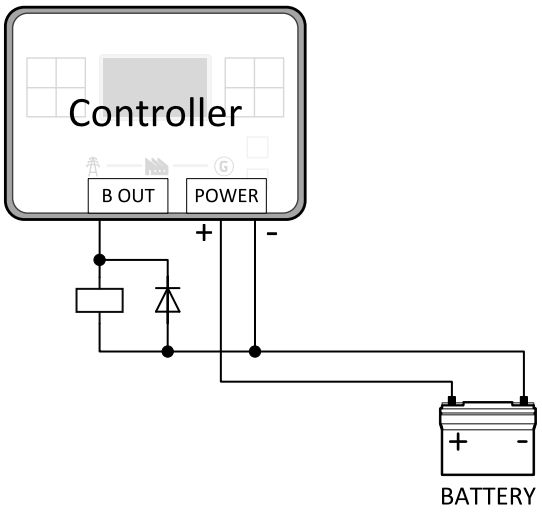
Image 4.17 Wiring binary inputs

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...).

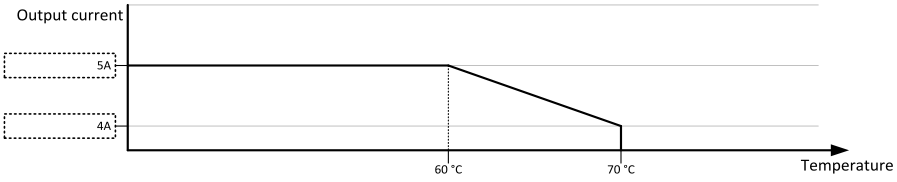
IMPORTANT: Use suppression diodes on all relays and other inductive loads!



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.

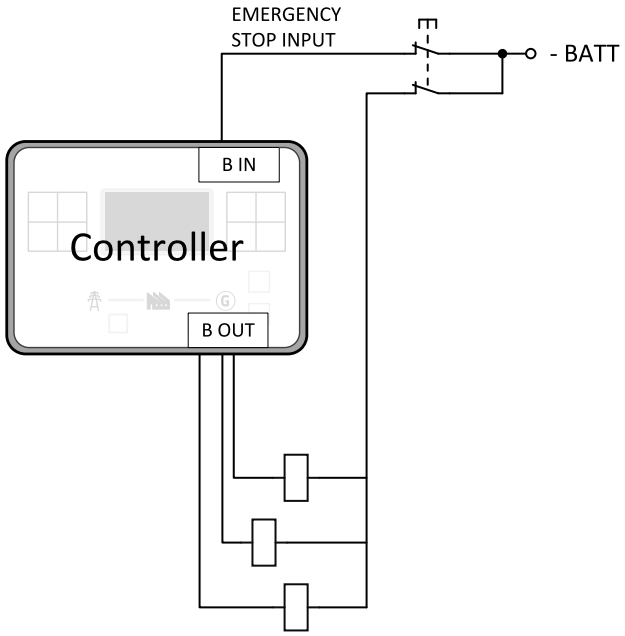


Image 4.18 Hard-wired emergency stop

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.

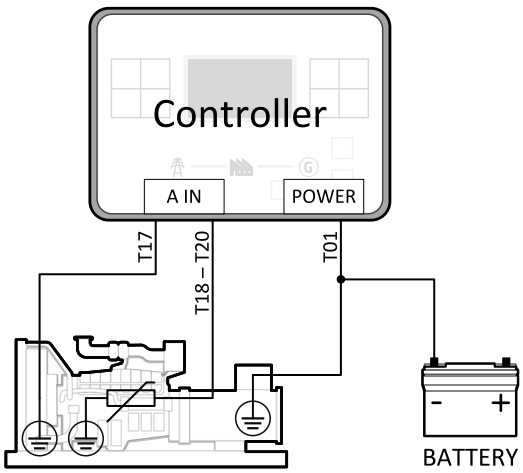


Image 4.19 Grounded sensors

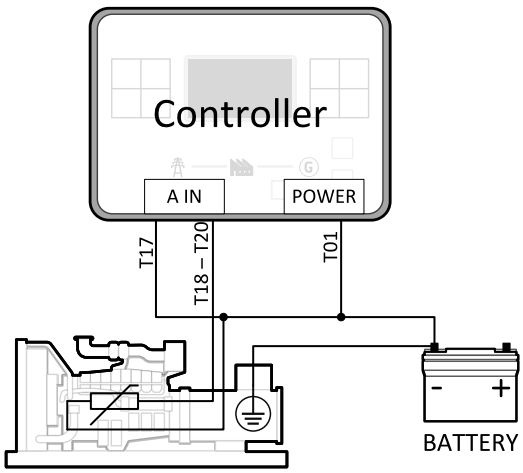


Image 4.20 Isolated sensors

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

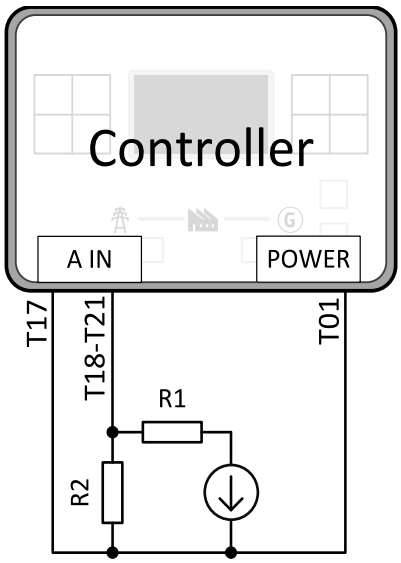


Image 4.21 Wiring of analog input with voltage sensor

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

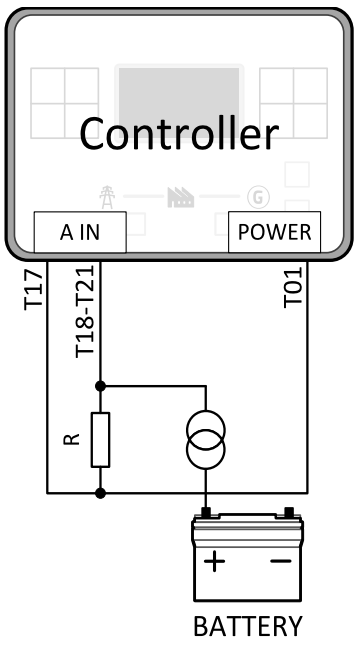


Image 4.22 Wiring of analog input with current sensor

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.*

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.*

[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)

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.*

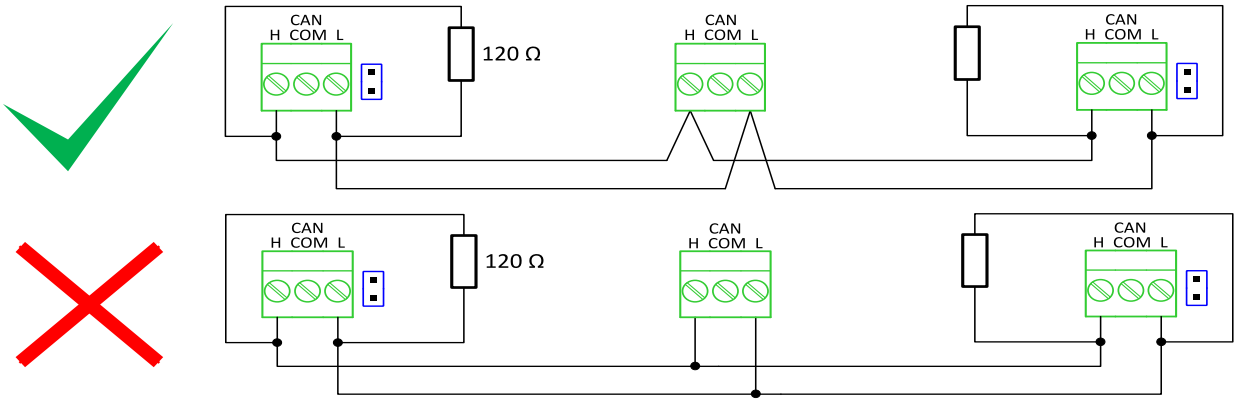


Image 4.23 CAN bus topology

- For shorter distances (connection within one building)

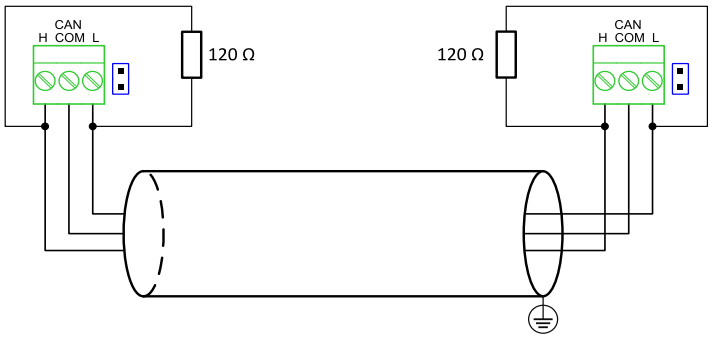


Image 4.24 CAN bus wiring for shorter distances

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.)

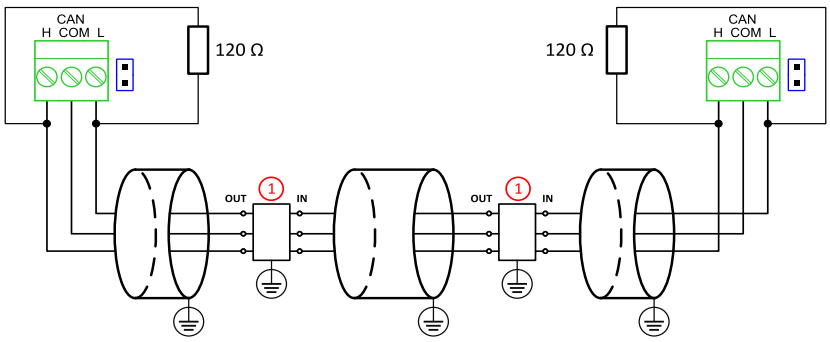


Image 4.25 CAN bus wiring for longer distances

① Recommended PT5-HF-12DC-ST[1]

[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

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[1] 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.
- For shorter distances (connection within one building)

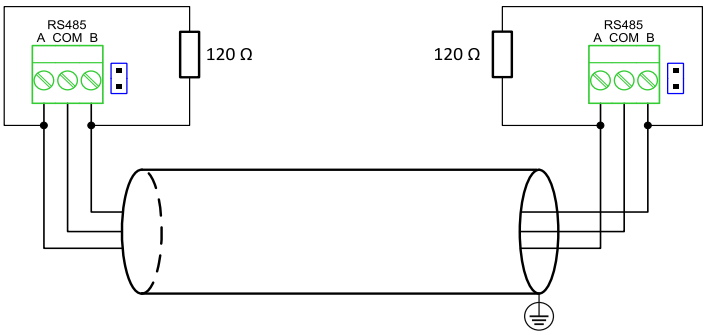


Image 4.26 RS485 wiring for shorter distances

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

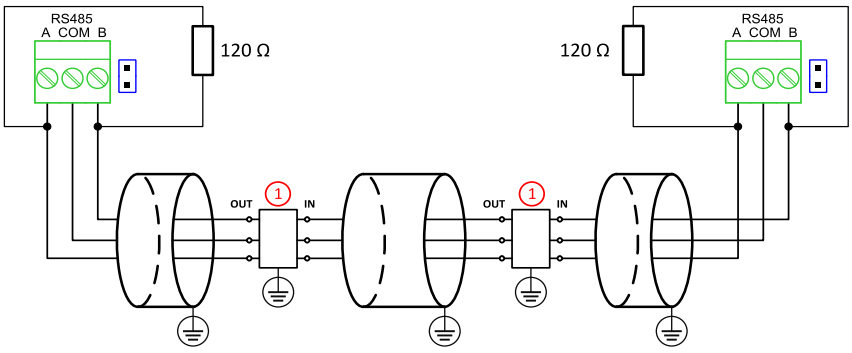


Image 4.27 RS485 wiring for longer distances

① Recommended PT5HF-5DC-ST[2]

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

---

[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)

[2]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.

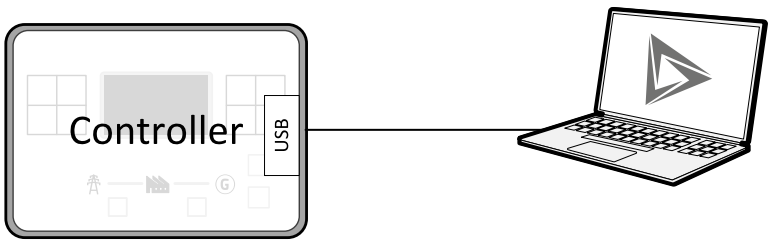
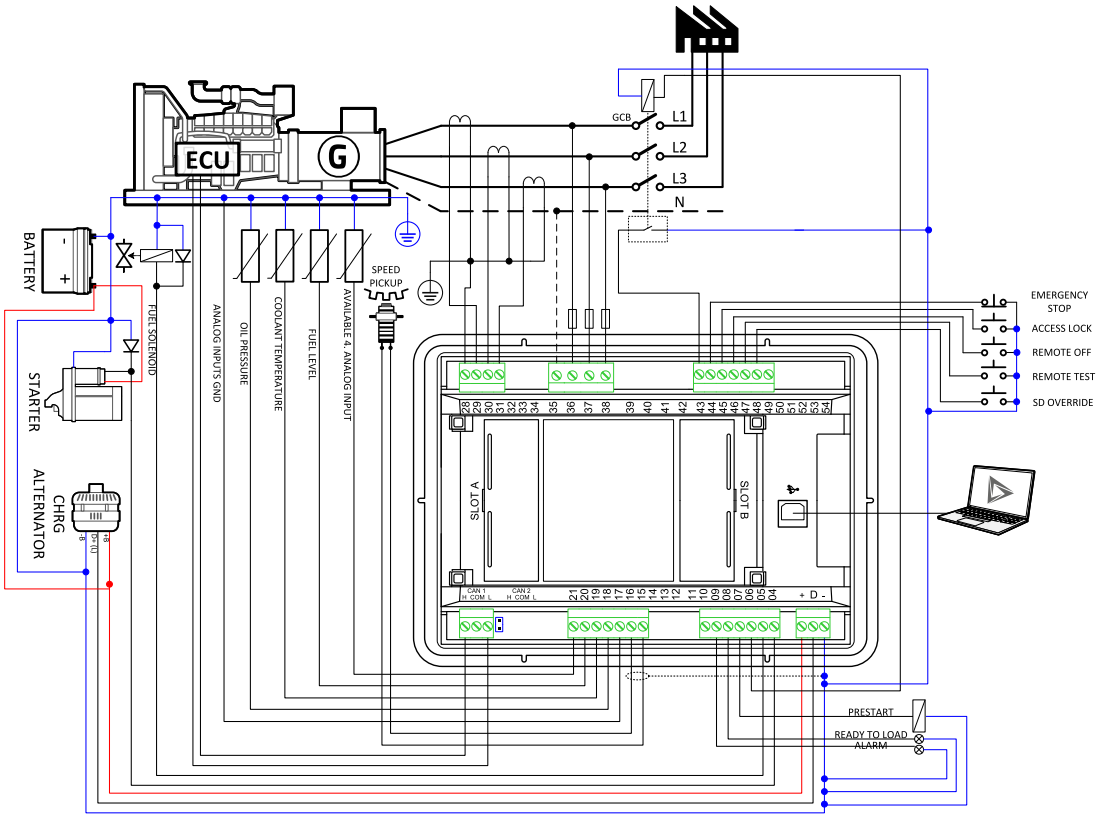


Image 4.28 USB connection

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 MRS Wiring



4.4.13 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).

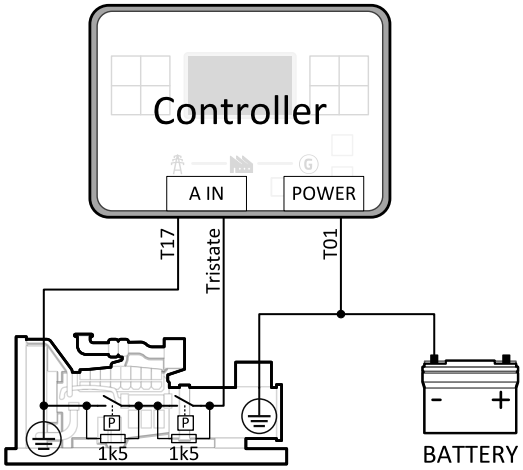


Image 4.29 Analog inputs as tristate

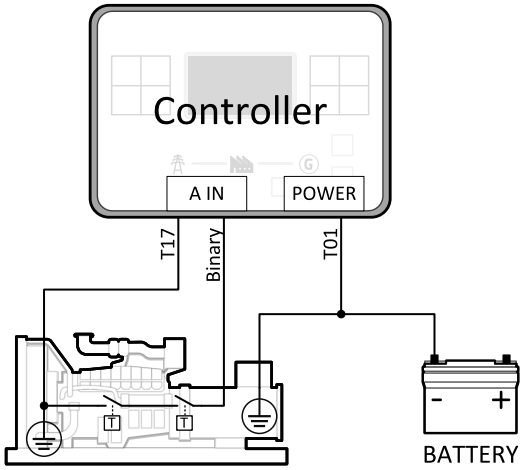


Image 4.30 Analog inputs as binary

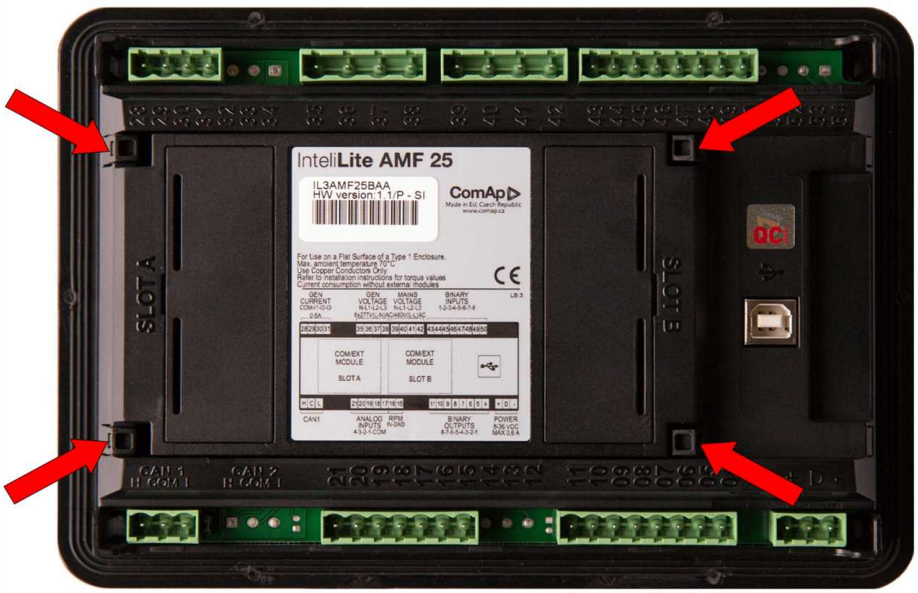
Note: *The name, sensor characteristic and alarm types for each analog input have to be assigned during configuration.*

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

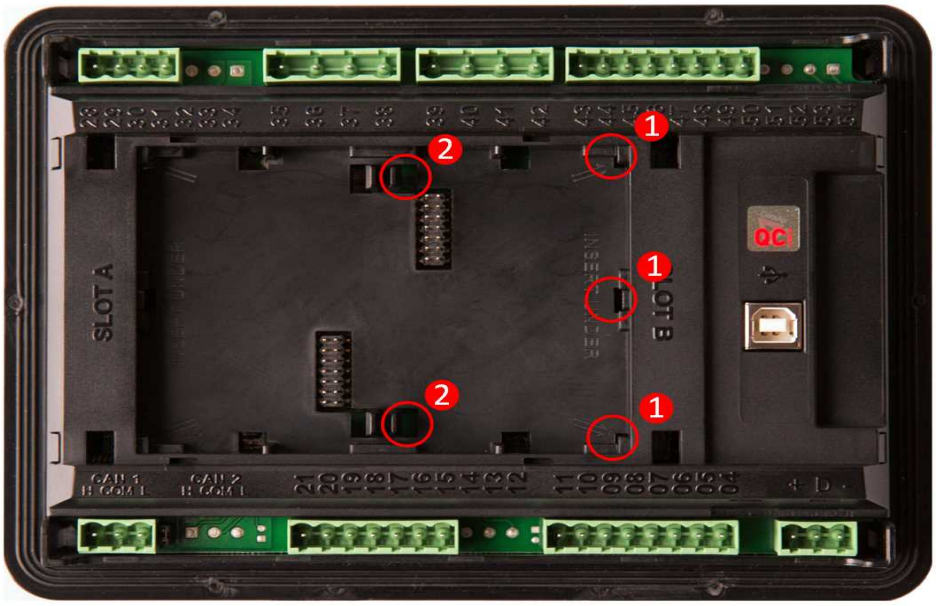
4.5 Plug-in module installation

4.5.1 Installation

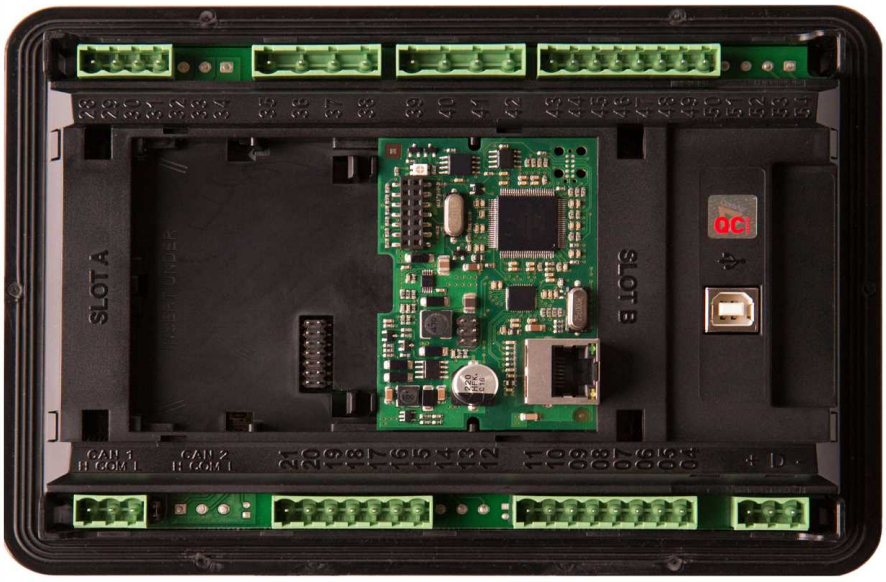
Remove the back cover. To do this, press four holders which are located in corners.



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.

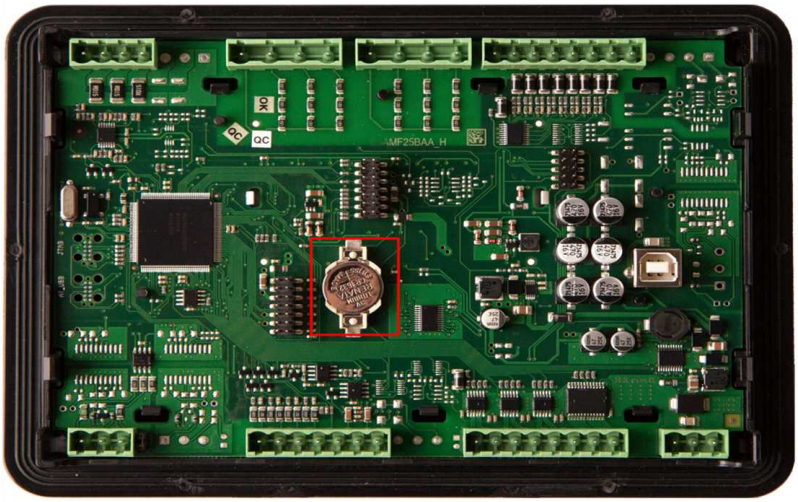
4.6 Maintenance

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

back to Table of contents

5.1 Default configuration

5.1.1 Binary inputs

Number	Description	Configured function
BIN1	Remote start/stop command	**REMOTE START/STOP (PAGE 415)**
BIN2	Free slot	**NOT USED (PAGE 413)**
BIN3	Emergency stop button	**EMERGENCY STOP (PAGE 408)**
BIN4	Switch controller to OFF mode	**REMOTE OFF (PAGE 415)**
BIN5	Suppression of alarms	**SD OVERRIDE (PAGE 416)**
BIN6	Control lock keyswitch	**REMOTE CTRL LOCK (PAGE 414)**

5.1.2 Binary outputs

Number	Description	Function
BOUT1	Starter motor control	**STARTER (PAGE 451)**
BOUT2	Fuel solenoid valve	**FUEL SOLENOID (PAGE 436)**
BOUT3	Indication of breaker state	**GCB CLOSE/OPEN (PAGE 437)**
BOUT4	Activation of any devices before start	**PRESTART (PAGE 447)**
BOUT5	Gen-set can be connected to load	**READY TO LOAD (PAGE 449)**
BOUT6	Indication of unconfirmed alarm	**ALARM (PAGE 427)**

5.1.3 Analog inputs

Number	Configured sensor	Function
AIN1	VDO 10 Bar	**OIL PRESSURE (PAGE 480)**
AIN2	VDO40-120°C	**COOLANT TEMP (PAGE 477)**
AIN3	VDOLevel %	**FUEL LEVEL (PAGE 478)**

5.2 Controller configuration and PC tools connection

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

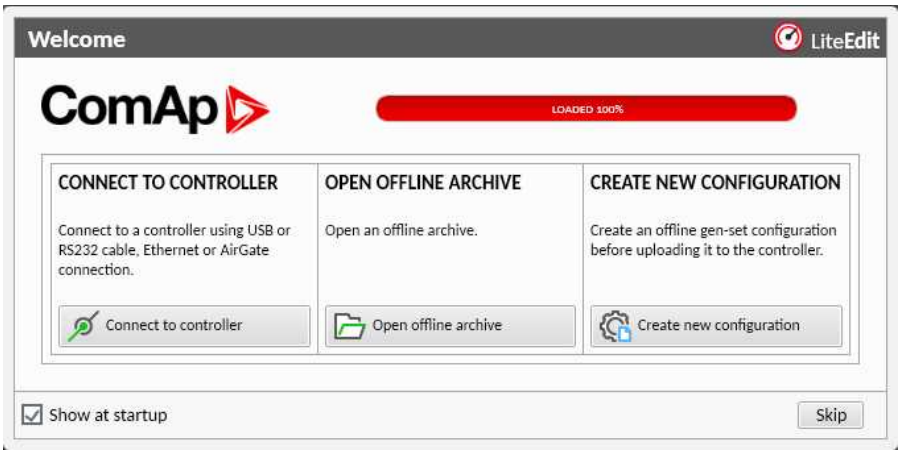


Image 5.1 First screen of InteliConfig - select connect to controller

Image 5.2 Second screen of InteliConfig - select detected controllers

Connection using WinScope

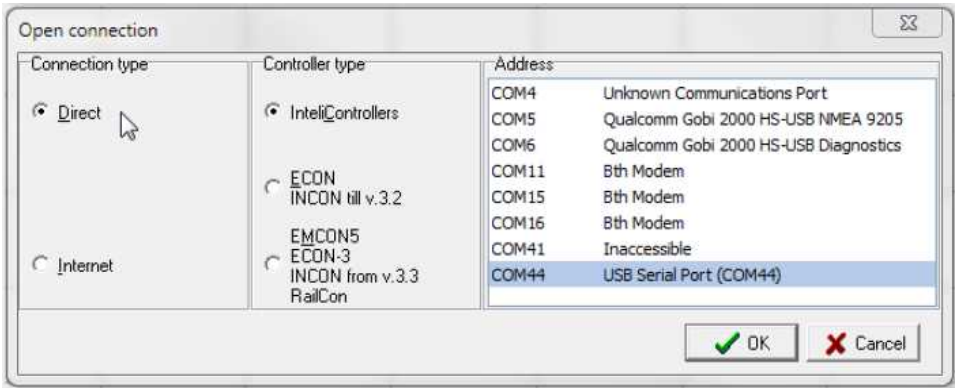


Image 5.3 WinScope screen - select direct connection

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 261)** = Direct
- has to be set to the same value as in the PC tool

Connection using InteliConfig

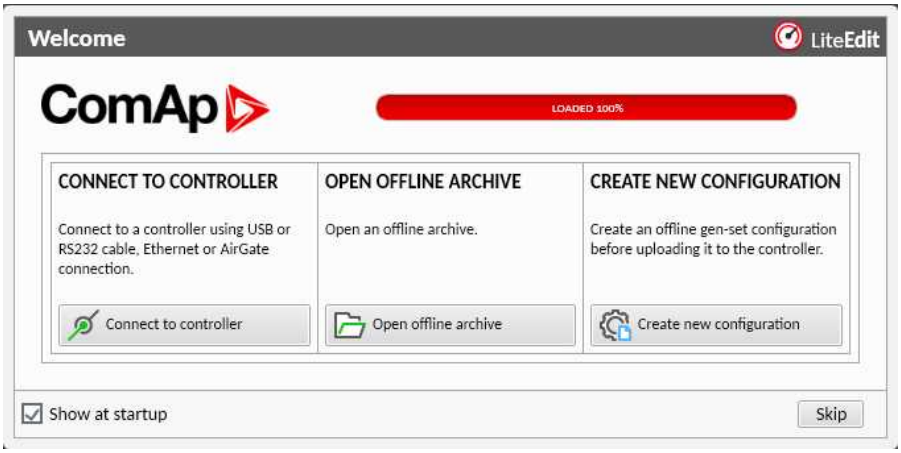


Image 5.4 First screen of InteliConfig - select connect to controller

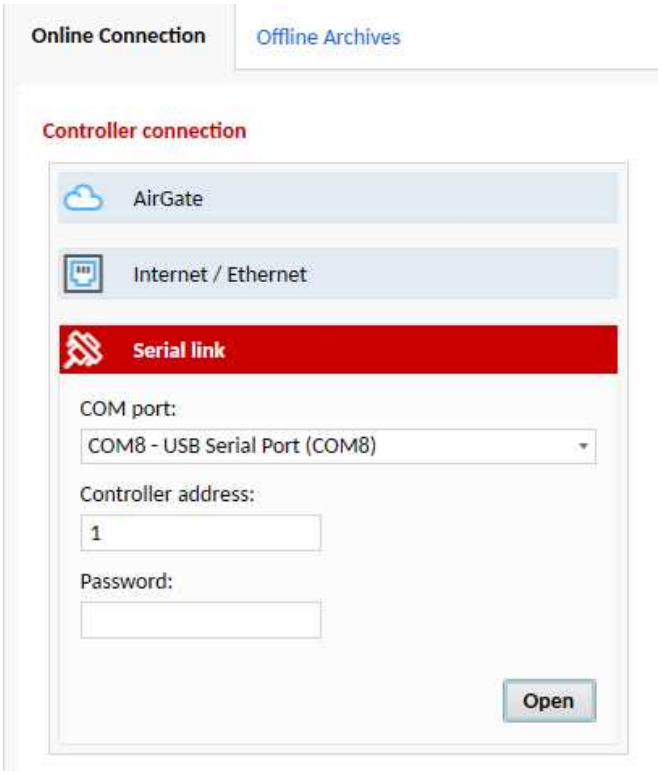


Image 5.5 Second screen of InteliConfig - select Serial link

Connection using WinScope

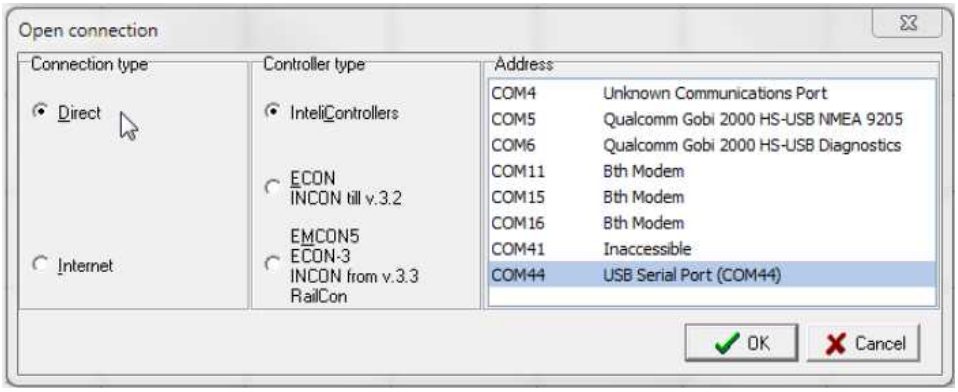


Image 5.6 WinScope screen - select direct connection

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

5.2.3 Ethernet

It is possible to connect to the controller using ethernet port.

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 168)** has to be set to the same value as in the PC tool
- **IP Address Mode (page 275)** can be set to AUTOMATIC when there is DHCP service is available. Otherwise it needs to be set to FIXED
- **IP Address (page 275)** is either set automatically or it can be adjusted to a specific requested value
- **Subnet Mask (page 276)** is either set automatically or it can be adjusted to a specific requested
- **Gateway IP (page 276)** can be set here when it is used

Connection using InteliConfig

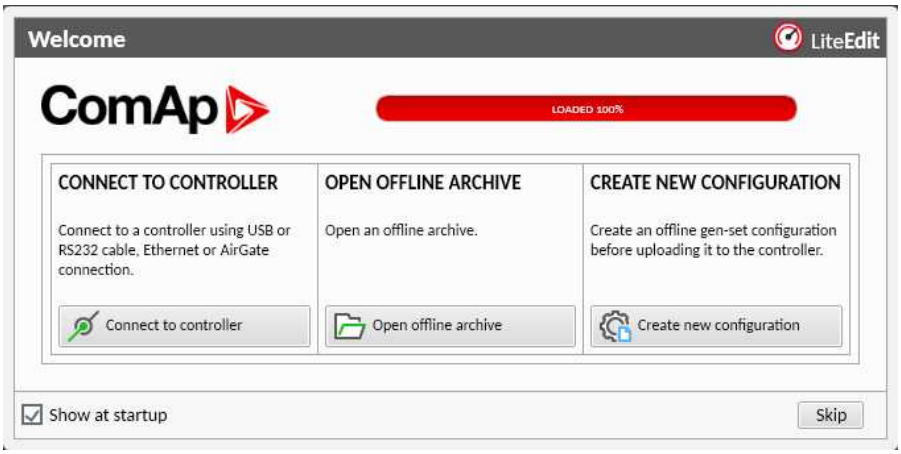


Image 5.7 First screen of InteliConfig - select connect to controller

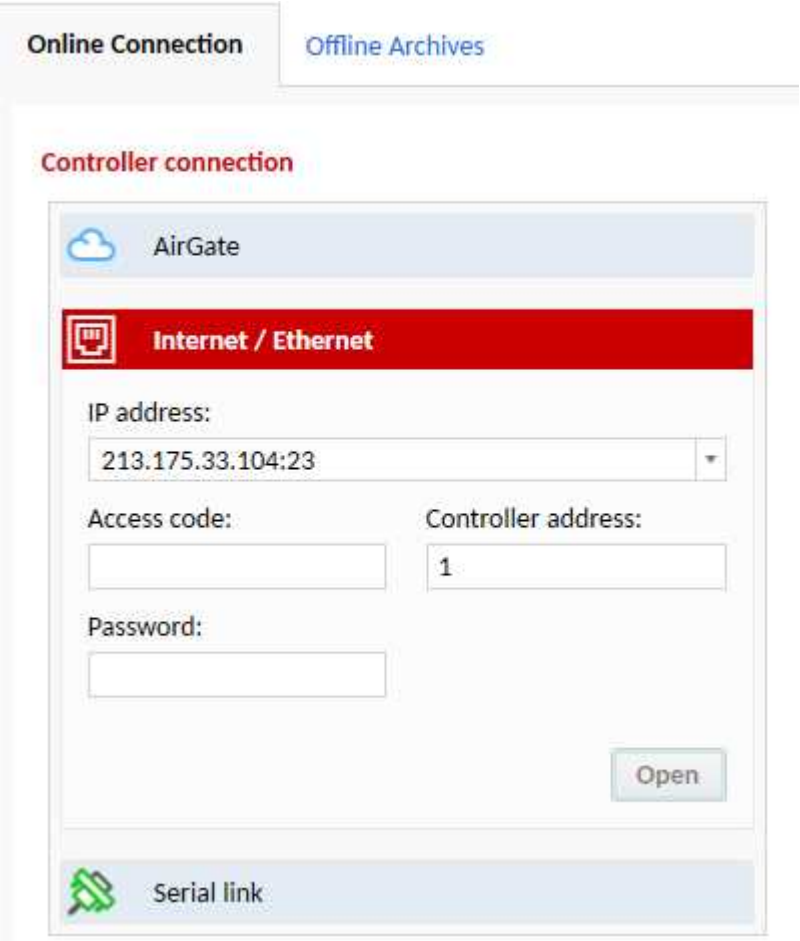


Image 5.8 Second screen of InteliConfig - select Internet/Ethernet

Connection using WinScope

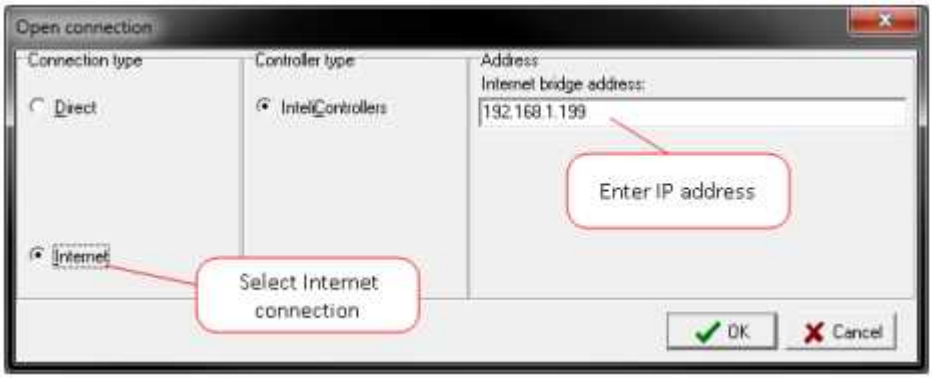


Image 5.9 WinScope screen

5.3 Operator Guide

5.3.1 Front panel elements

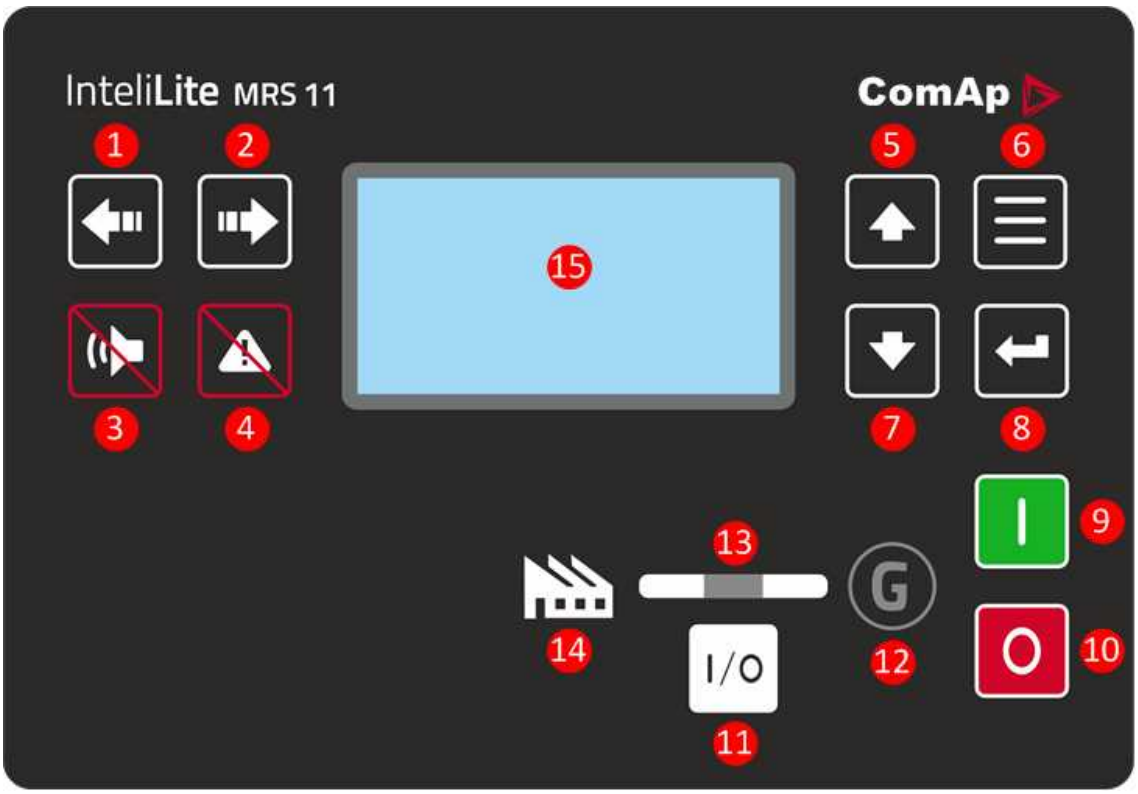


Image 5.10 Operator interface of MRS11

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.

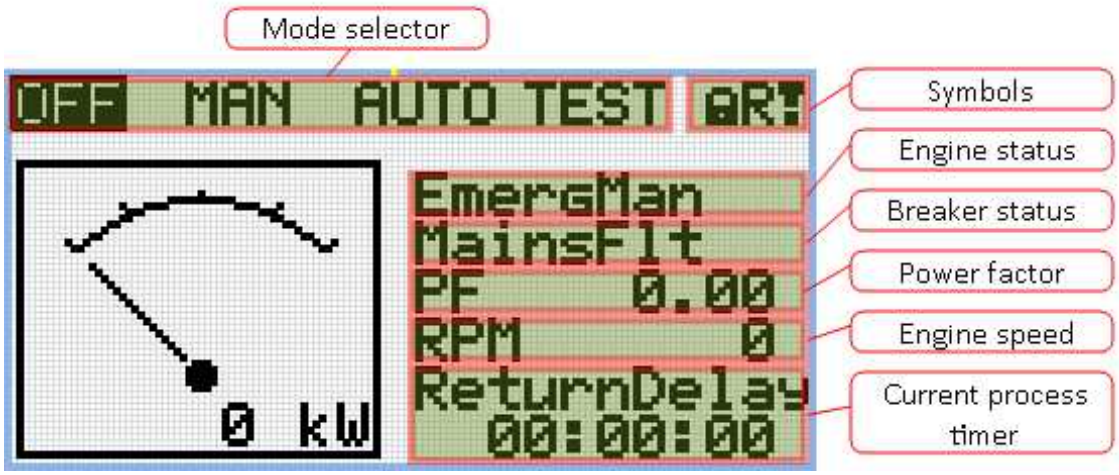
4		**FAULT RESET** button. Use this button to acknowledge alarms and deactivate the horn output. Inactive alarms will disappear immediately and status of active alarms will be changed to "confirmed" so they will disappear as soon as their reasons dismiss.
5		**UP** button. Use this button to move up 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.
Indicators and others		
Position		**Description**
12		**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).
13		**GCB ON**. Green LED is on if GCB is closed. It is driven by GCB CLOSE/OPEN output or by GCB feedback signal.
14		**LOAD**. Green LED is ON if load is supplied by generator. It means, that Gen-set is OK and circuit breaker is closed.
15		Graphic B/W display, 132x64 pixels.

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.

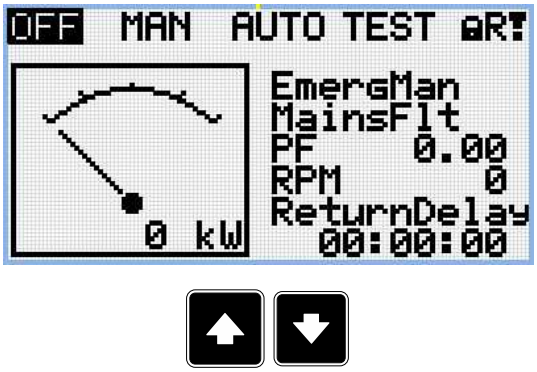
Main Screen



Symbols

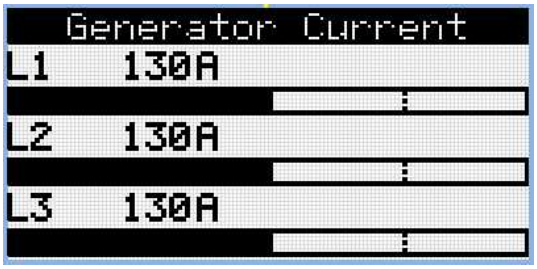
- Padlock - active when LBI ACCESS LOCK is active
- R - active when there is active remote connection to controller
- Exclamation mark - active when there is any alarm in alarmlist

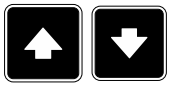
Measurement Screens



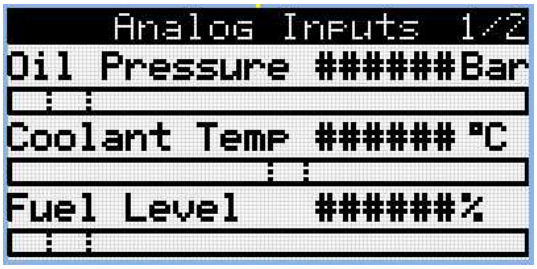
Note: *Use Up and Down button to move between measurement pages.*

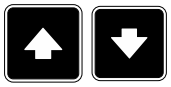
Note: *Use Up and Down button to move between measurement pages.*



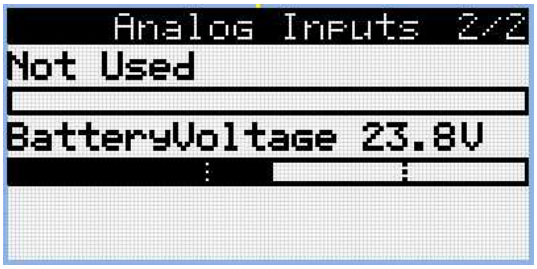


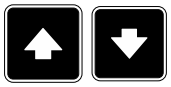
Note: *Use Up and Down button to move between measurement pages.*



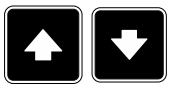


Note: *Use Up and Down button to move between measurement pages.*

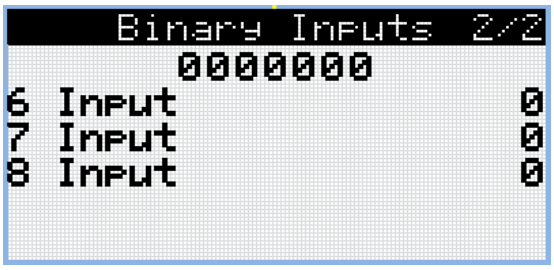


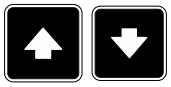


Note: *Use Up and Down button to move between measurement pages.*

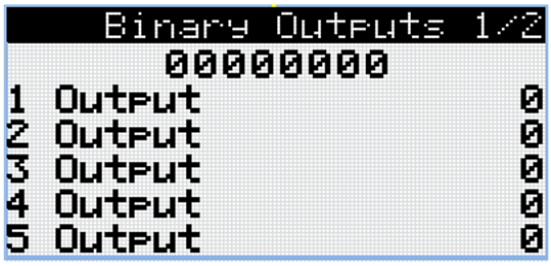


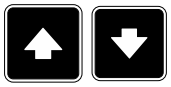
Note: *Use Up and Down button to move between measurement pages.*



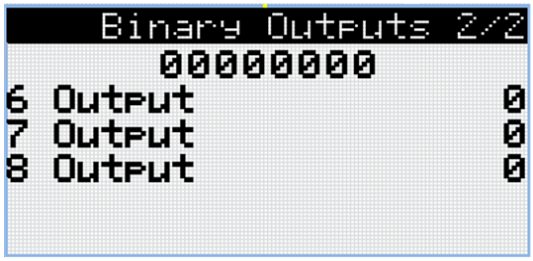


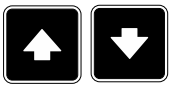
Note: *Use Up and Down button to move between measurement pages.*



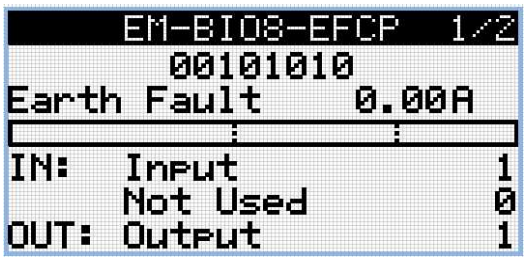


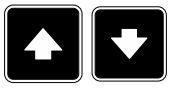
Note: *Use Up and Down button to move between measurement pages.*



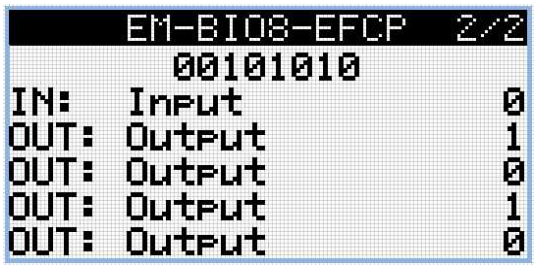


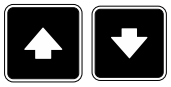
Note: *Use Up and Down button to move between measurement pages.*



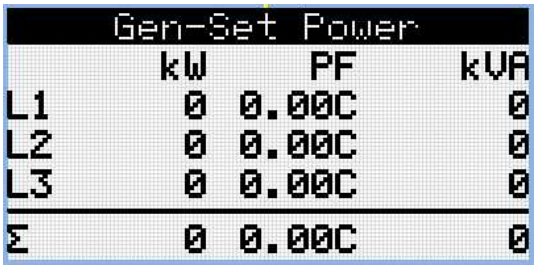


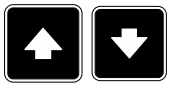
Note: *Use Up and Down button to move between measurement pages.*



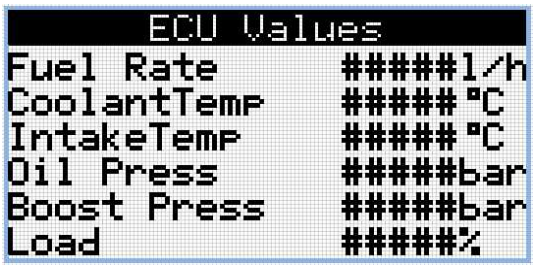


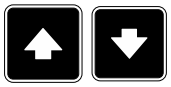
Note: *Use Up and Down button to move between measurement pages.*



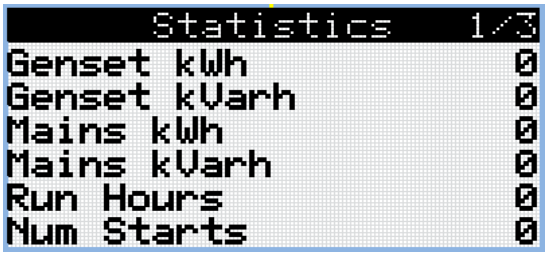


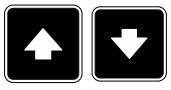
Note: *Use Up and Down button to move between measurement pages.*



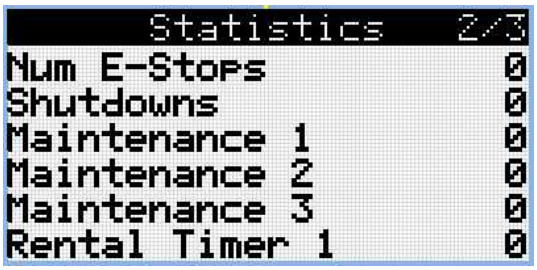


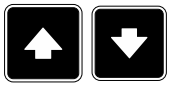
Note: *Use Up and Down button to move between measurement pages.*



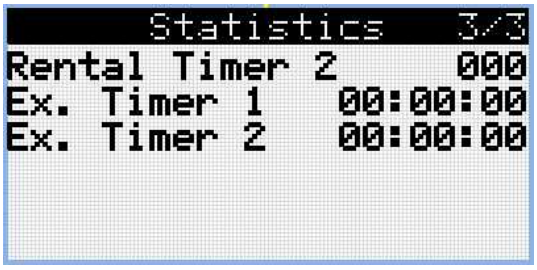


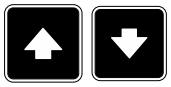
Note: *Use Up and Down button to move between measurement pages.*



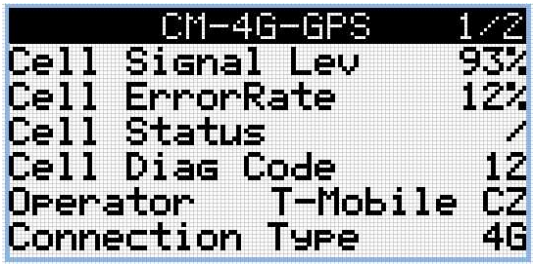


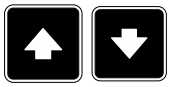
Note: *Use Up and Down button to move between measurement pages.*



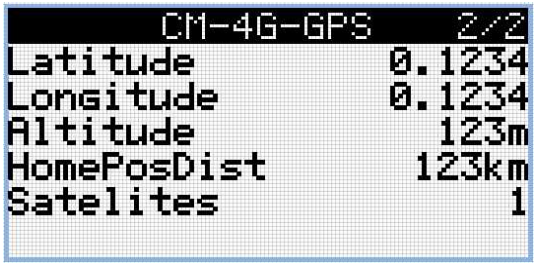


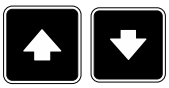
Note: *Use Up and Down button to move between measurement pages.*



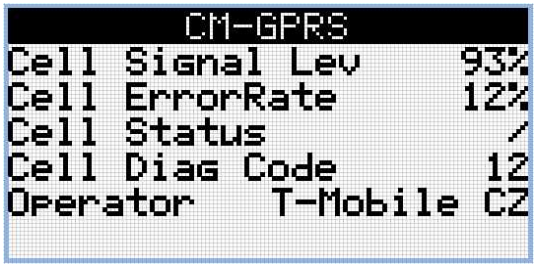


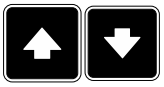
Note: *Use Up and Down button to move between measurement pages.*



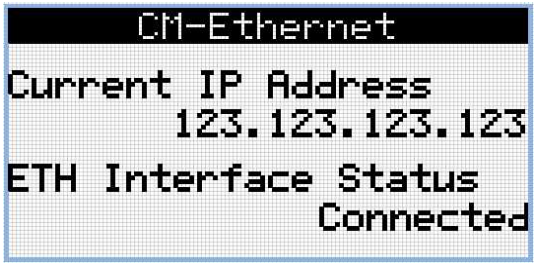


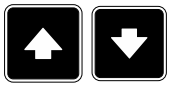
Note: *Use Up and Down button to move between measurement pages.*



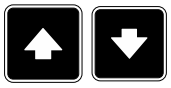


Note: *Use Up and Down button to move between measurement pages.*

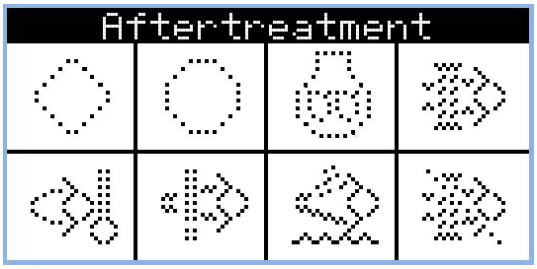


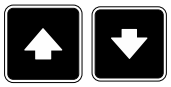


Note: *Use Up and Down button to move between measurement pages.*

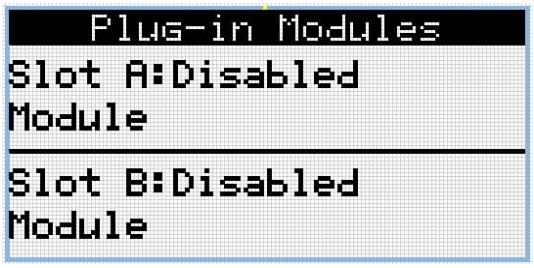


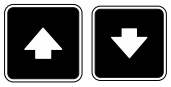
Note: *Use Up and Down button to move between measurement pages.*



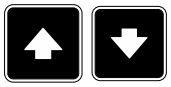


Note: *Use Up and Down button to move between measurement pages.*





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

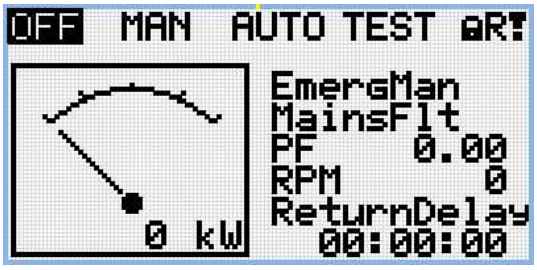


Note: *Use Up and Down button to move between measurement pages.*

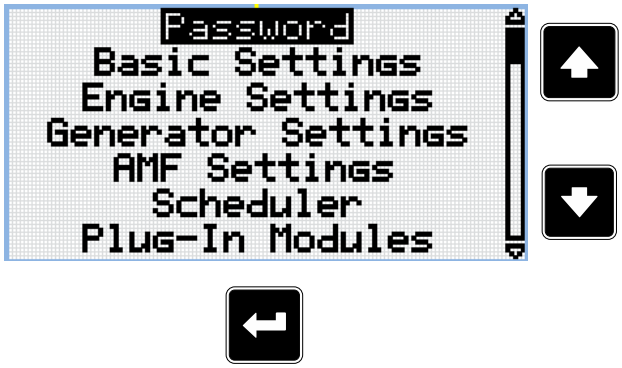
Note: *From all of these pages it is possible to switch seamlessly to the setpoint group page by pressing Page button.*

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

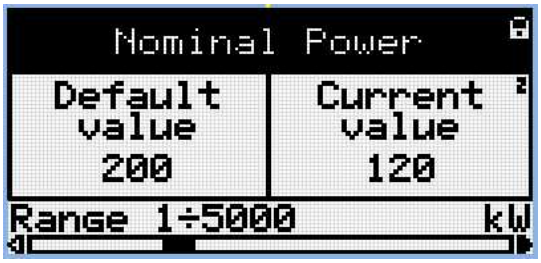


Note: *From all measurement pages we can fluently go to the setpoint group page by pressing Page button.*



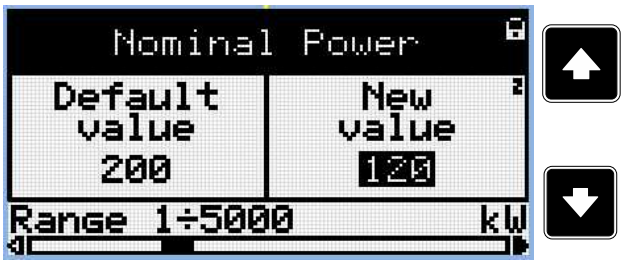
Note: *Use Up and Down button to select required setpoint group.*

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.*



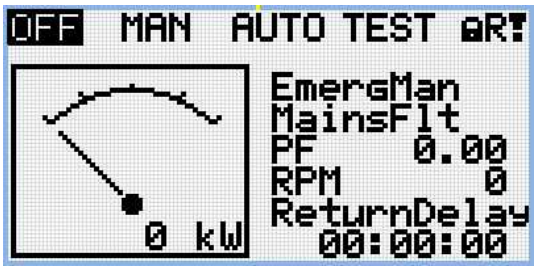
Note: *Use Up and Down button to set required value of selected setpoint.*

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

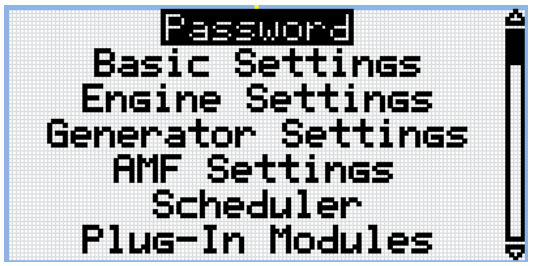
Note: *Use Page button to discard changes, to set setpoint to previous value and to return to the list of setpoints of selected group.*

IMPORTANT: Cannot change setpoint? Setpoints marked with an padlock are password protected. Enter password as described in the chapter Password (page 71).

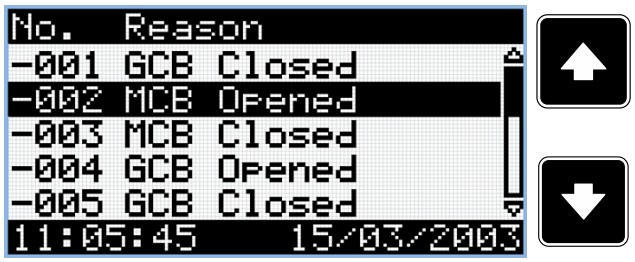
History Log



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

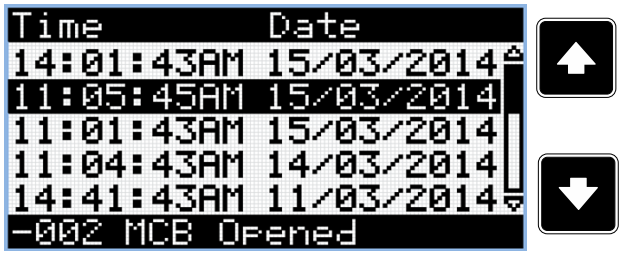


Note: *From setpoint group page we can fluently go to the history log pages by pressing Page button.*



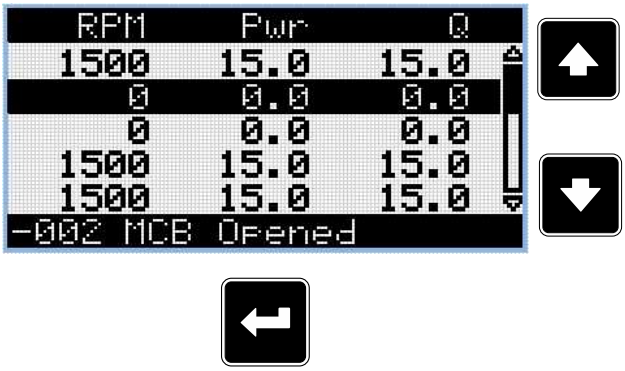
Note: *Use Up and Down button to select required alarm reason.*

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.*

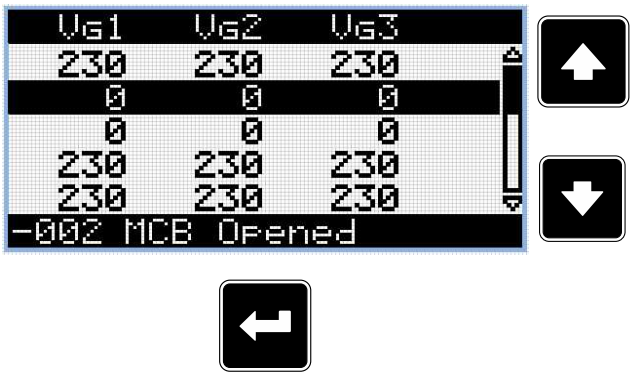


Note: *Use Up and Down button to select required alarm reason.*

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

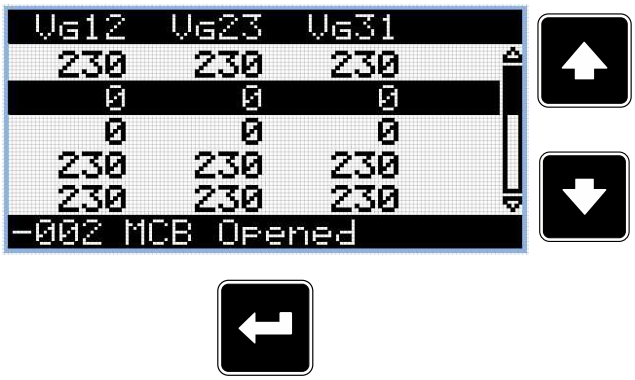
Note: *Use Up and Down button to select required alarm reason.*

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



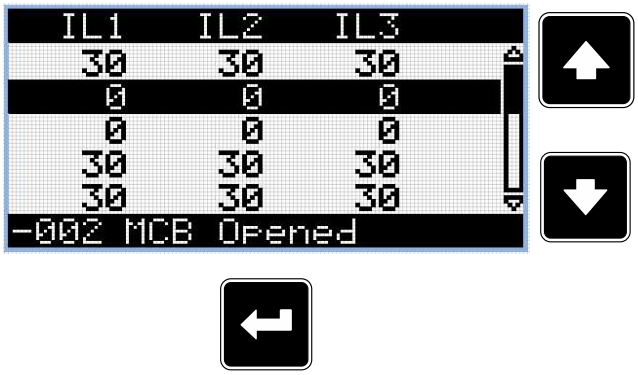
Note: *Use Up and Down button to select required alarm reason.*

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



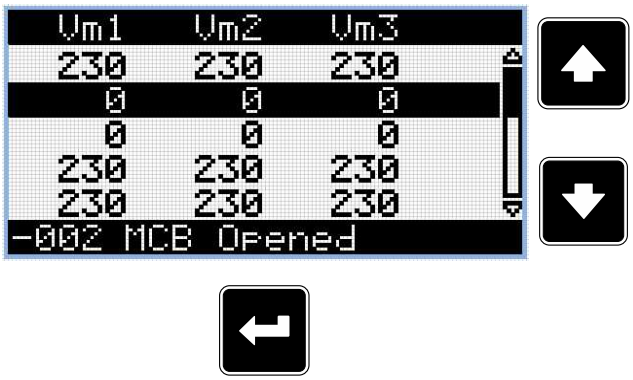
Note: *Use Up and Down button to select required alarm reason.*

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



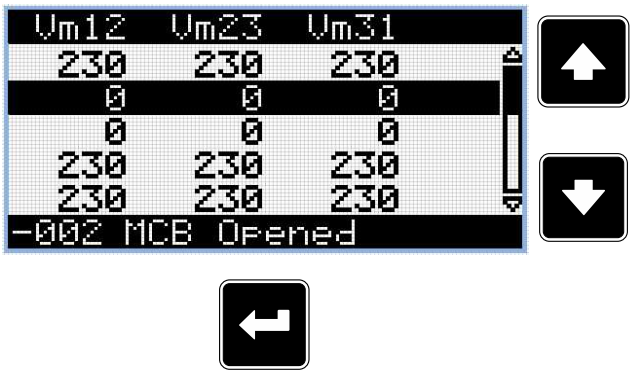
Note: *Use Up and Down button to select required alarm reason.*

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



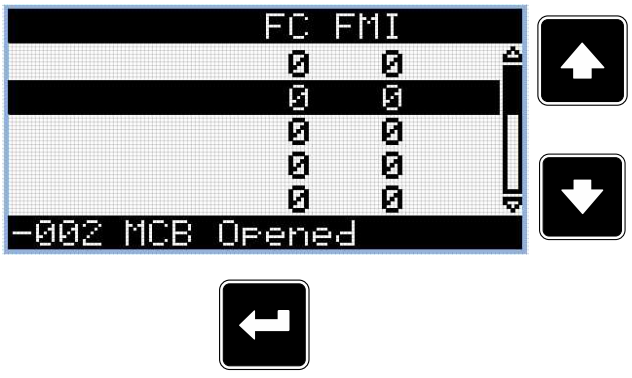
Note: *Use Up and Down button to select required alarm reason.*

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



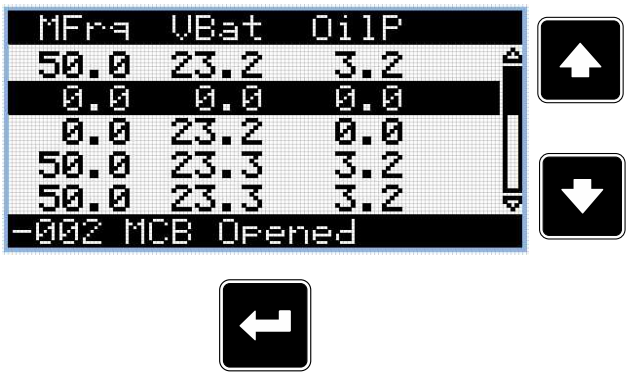
Note: *Use Up and Down button to select required alarm reason.*

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



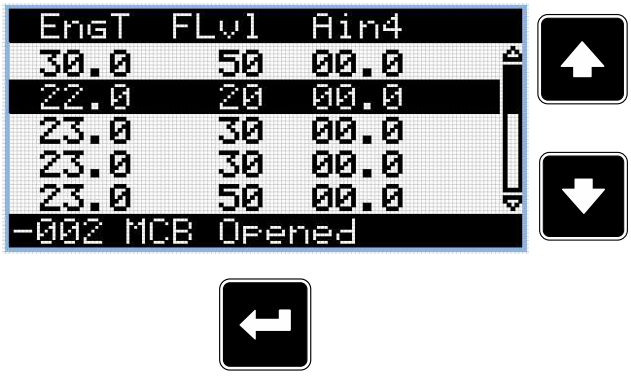
Note: *Use Up and Down button to select required alarm reason.*

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



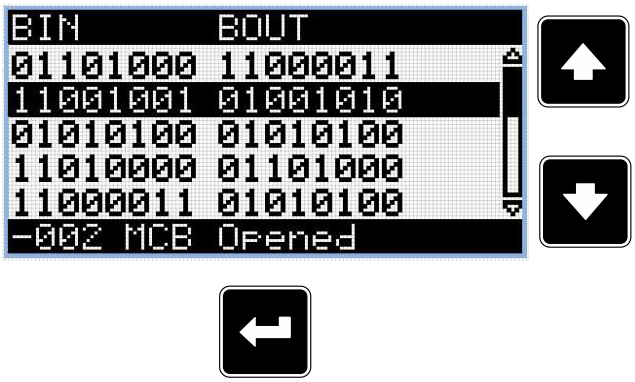
Note: *Use Up and Down button to select required alarm reason.*

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.*

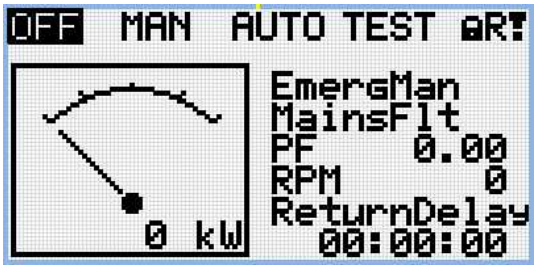
Note: *Use Up and Down button to select required alarm reason.*

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

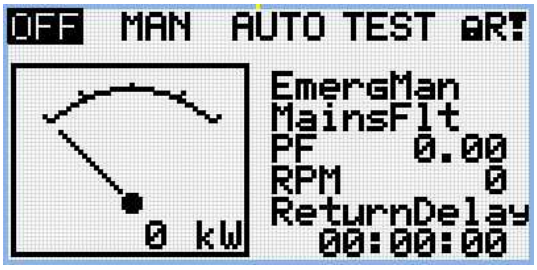


Note: *Use Up button to move to alarmlist from main measurement screen.*

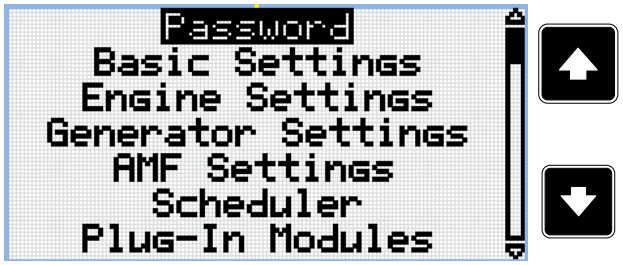
- Active alarms are displayed as white text on black background. It means the alarm is still active, i.e. the appropriate alarm conditions are still present.
- Inactive alarms are displayed as black text on white background. It means the alarm is no more active, i.e. the appropriate alarm conditions 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

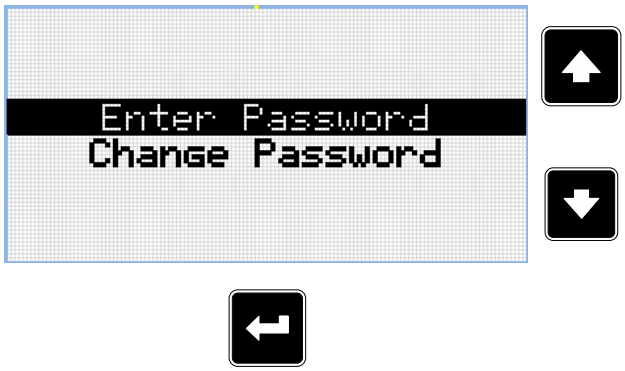


Note: *From all measurement pages we can fluently go to the setpoint group page by pressing Page button.*



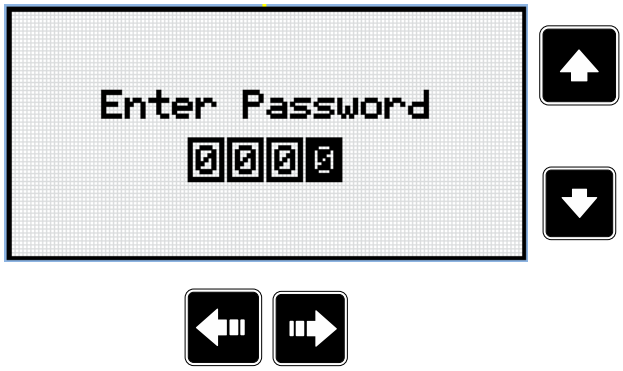
Note: *Use Up and Down button to select setpoint group Password.*

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.*



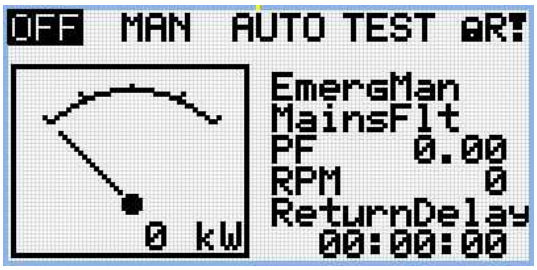
Note: *Use Up and Down button to set required value of selected setpoint.*

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

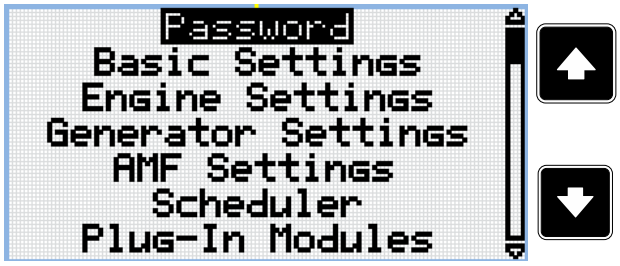
Note: *Use Enter button to confirm the password or Page button to cancel entering the password.*

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.*

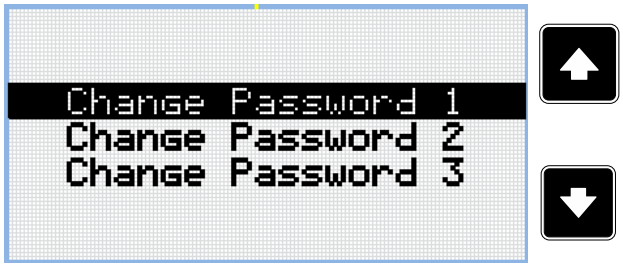


Note: *Use Up and Down button to select setpoint group Password.*

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.*

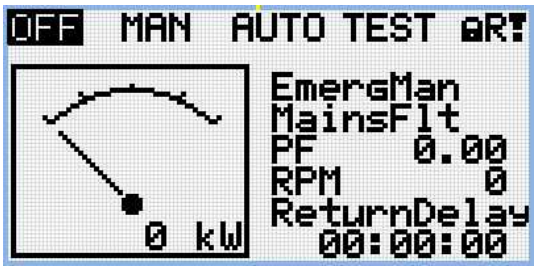
Note: *Use Up and Down button to set required value of password again.*

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

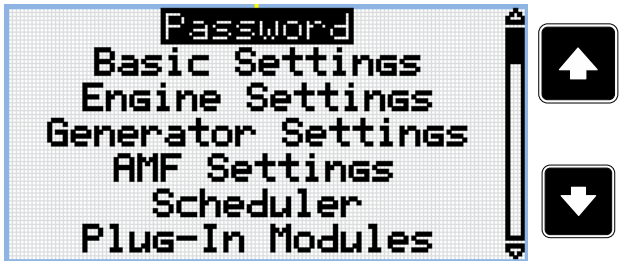
Note: *After setting new password again use Enter button to confirm adjusted password or Page button to discard changes and to cancel changing password.*

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.*

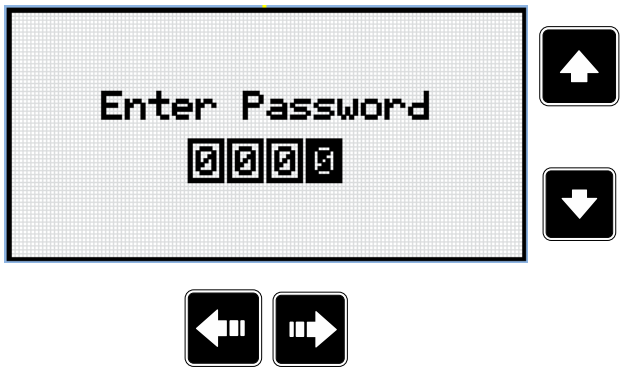


Note: *Use Up and Down button to select setpoint group Password.*

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

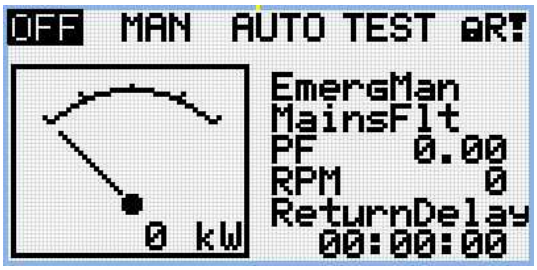
> **IMPORTANT: Display the information screen containing the serial number and password decode number as described in the chapter Information screen (page 77) and send them to your local distributor.**

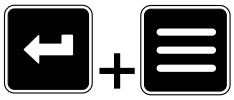
Password break protection

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

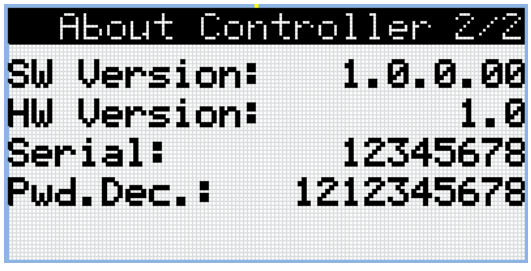




Note: *On Main measurement screen press Enter and Page button together. Enter button has to be pressed first.*

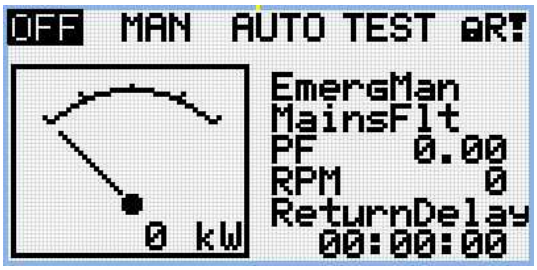
Note: *Use Page button to move to the next page.*

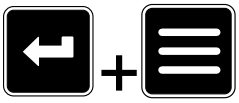
Note: *Use Page button to move to the next page.*



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

5.3.6 Language selection

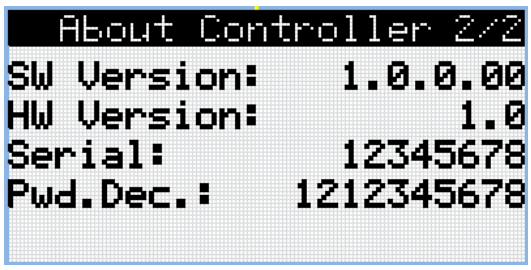




Note: *On Main measurement screen press Enter and Page button together. Enter button has to be pressed first.*

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

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

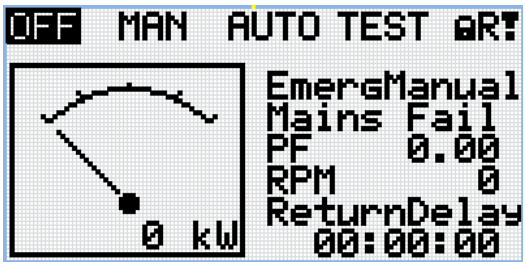


Note: *Use Page button to move to the next page.*

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

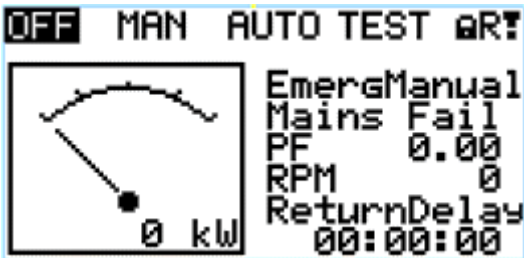
Note: *Use Enter button to confirm selected language.*

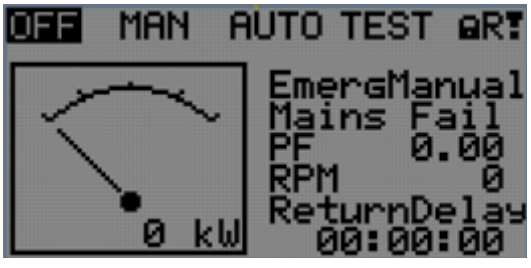
5.3.7 Display contrast adjustment



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.

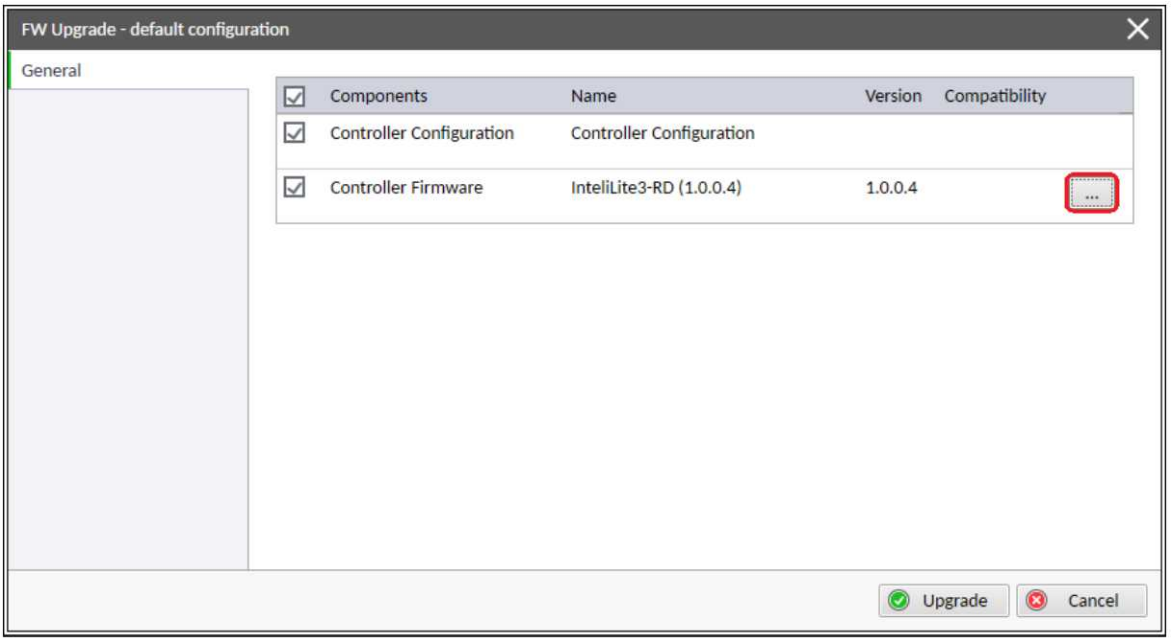
5.4.1 General description

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.*

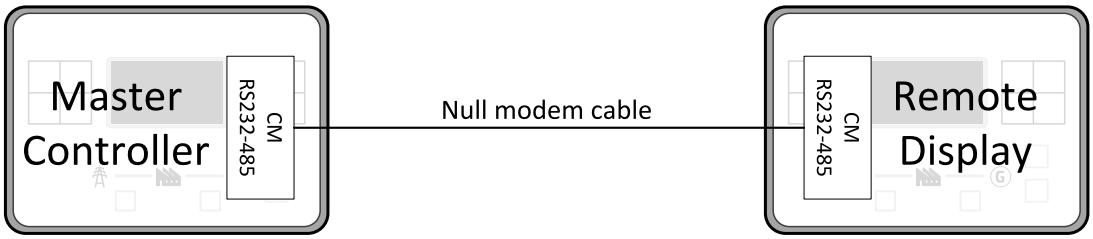
Note: *Please refer to InteliConfig Global Guide for details about firmware uploading to controller.*

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

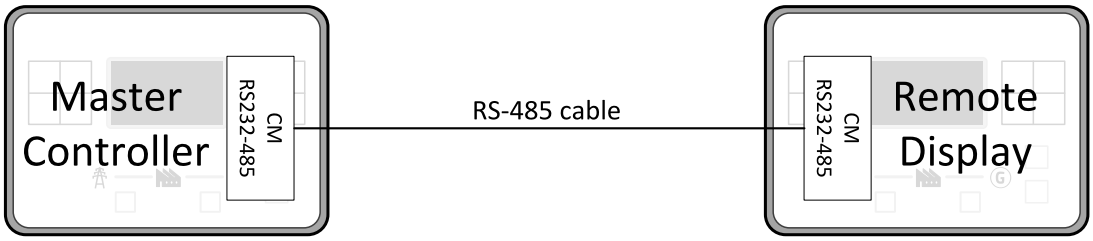


It is necessary to use CM-RS232-485 communication module on both Master controller and Remote display. COM 1 communication channel is used with these settings:

- 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



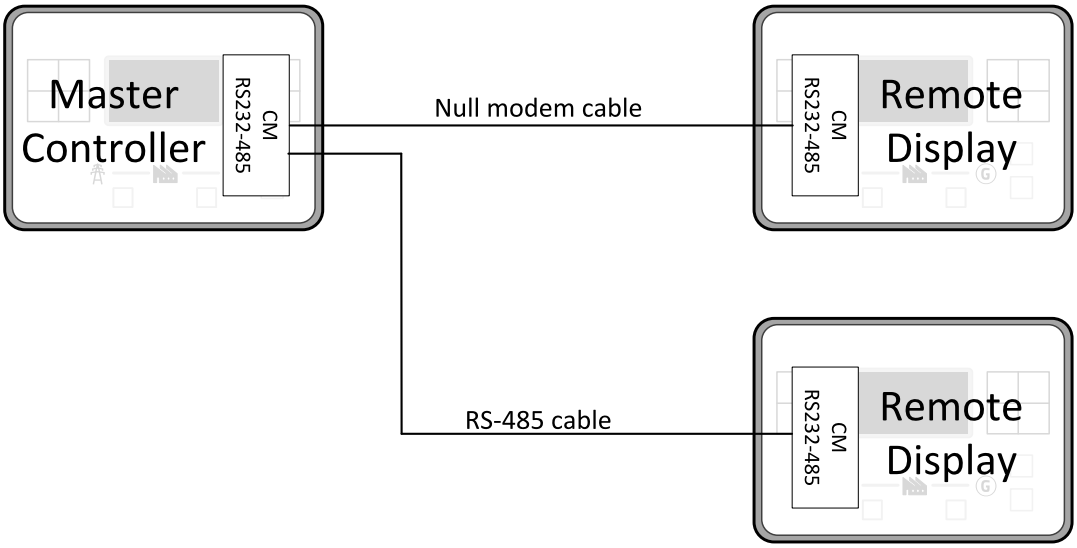
It is necessary to use CM-RS232-485 communication module on both Master controller and Remote display. COM 2 communication channel is used with these settings:

- 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

back to Controller setup

5.5.1 Start-stop sequence

State	Condition of the transition	Action	Next state
Ready	Start request	**PRESTART (PAGE 447)** on **Prestart Time (page 175)** counter started	Prestart
	RPM > 2 or Oil pressure > **Starting Oil Pressure (page 176)** or Generator voltage > 10V or D+ voltage is higher than **D+ Treshold (page 189)**		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 436)** on, **STARTER (PAGE 451)** on, **Maximum**	Cranking

		Cranking Time (page 174) counter started	
Cranking	RPM > Starting RPM	**STARTER (PAGE 451)** off, **PRESTART (PAGE 447)** off	Starting
	D+ input activated or oil pressure detected or Generator voltage > 25% Nominal voltage	**STARTER (PAGE 451)** off, **PRESTART (PAGE 447)** off	Cranking
	Maximum Cranking Time (page 174), 1st attempt	**STARTER (PAGE 451)** off, **FUEL SOLENOID (PAGE 436)** off, **STOP SOLENOID (PAGE 452)** on, **Cranking Fail Pause (page 174)** timer started	Crank pause
	Maximum Cranking Time (page 174) elapsed, last attempt	**STARTER (PAGE 451)** off, **PRESTART (PAGE 447)** off	Shutdown (Start fail)
Crank pause	**Cranking Fail Pause (page 174)** elapsed	**STARTER (PAGE 451)** on, **FUEL SOLENOID (PAGE 436)** on, **STOP SOLENOID (PAGE 452)** off, **Maximum Cranking Time (page 174)** counter started	Cranking
Starting	**Idle Time (page 182)** elapsed	**Minimal Stabilization Time (page 184)** and **Maximal Stabilization Time (page 185)** counter started	Running
	any shutdown condition	**FUEL SOLENOID (PAGE 436)** off, **STOP SOLENOID (PAGE 452)** on	Shutdown
	all cranking attempts elapsed	**FUEL SOLENOID (PAGE 436)** off, **STOP SOLENOID (PAGE 452)** on	Shutdown (Start fail)
Running	Stop request	**READY TO LOAD (PAGE 449)** off,**Cooling Time (page 186)** counter started	Cooling
	RPM = 0 or any other shutdown condition	**READY TO LOAD (PAGE 449)** off, **FUEL SOLENOID (PAGE 436)** off	Shutdown
	GCB CLOSE/OPEN (PAGE 437) closed		Loaded
Loaded	**GCB CLOSE/OPEN (PAGE 437)** opened		Running
	RPM = 0 or any other shutdown condition	**FUEL SOLENOID (PAGE 436)** off, **STOP SOLENOID (PAGE 452)** on, **READY TO LOAD (PAGE 449)** off,	Shutdown
Cooling	**Cooling Time (page 186)** elapsed	**FUEL SOLENOID (PAGE 436)** off, **STOP SOLENOID (PAGE 452)** on	Stop
	RPM = 0 or any other shutdown condition	**FUEL SOLENOID (PAGE 436)** off, **STOP SOLENOID (PAGE 452)** on	Shutdown

	Start request	READY TO LOAD (PAGE 449) 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 186)** elapsed.		Stop (Stop fail)

Note: *If all generator parameters are OK and* ***Minimal Stabilization Time (page 184)*** *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 Operating Modes

Selecting the operating mode is done through Left and Right buttons on the front panel or by changing the **Controller mode (page 167)** 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 415)**
- **Remote MAN (page 415)**
- **Remote AUTO (page 414)**

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 buttons GCB, Start and Stop 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.

AUTO

The controller does not respond to buttons Start, Stop and GCB ON/OFF .Engine start/stop request is given by binary input **Remote Start/Stop (page 415)**.

5.5.3 Engine start

Diesel engine

- 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 447)** and **GLOW PLUGS (PAGE 442)** are energized for time period given by the setpoints **Prestart Time (page 175)** and **Glow Plugs Time (page 176)**.
- After **Prestart Time (page 175)** and **Glow Plugs Time (page 176)**, the output **FUEL SOLENOID (PAGE 436)** is energized and after **Fuel Solenoid Lead (page 182)** the starter of motor is activated by energizing the output **STARTER (PAGE 451)**.
- 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 175)**, or
  - One of **Additional running engine indications (page 107)** signals becomes active.
- The controller remains in the Starting phase until the engine speed exceeds the value of **Starting RPM (page 175)**, after that it is considered as started and the Idle period will follow.
- The maximum duration that the output **STARTER (PAGE 451)** is energized is determined by the setpoint **Maximum Cranking Time (page 174)**. If the engine does not start within this period, the output **STARTER (PAGE 451)** is de-energized and a pause with length determined by **Cranking Fail Pause (page 174)** will follow. **PRESTART (PAGE 447)** and **GLOW PLUGS (PAGE 442)** 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 173)**.
- Once the engine is started, the Idle period follows. The binary output **IDLE/NOMINAL (PAGE 445)** remains inactive (as it was during the start). The idle period duration is adjusted by the setpoint **Idle Time (page 182)**. When controller is in the MAN mode, it is possible to finish the **Idle Time (page 182)** count down by pushing the Start button.
- After the idle period has finished, the output **IDLE/NOMINAL (PAGE 445)** is activated and the start-up sequence is finished. The **Stabilization (page 89)** phase follows.

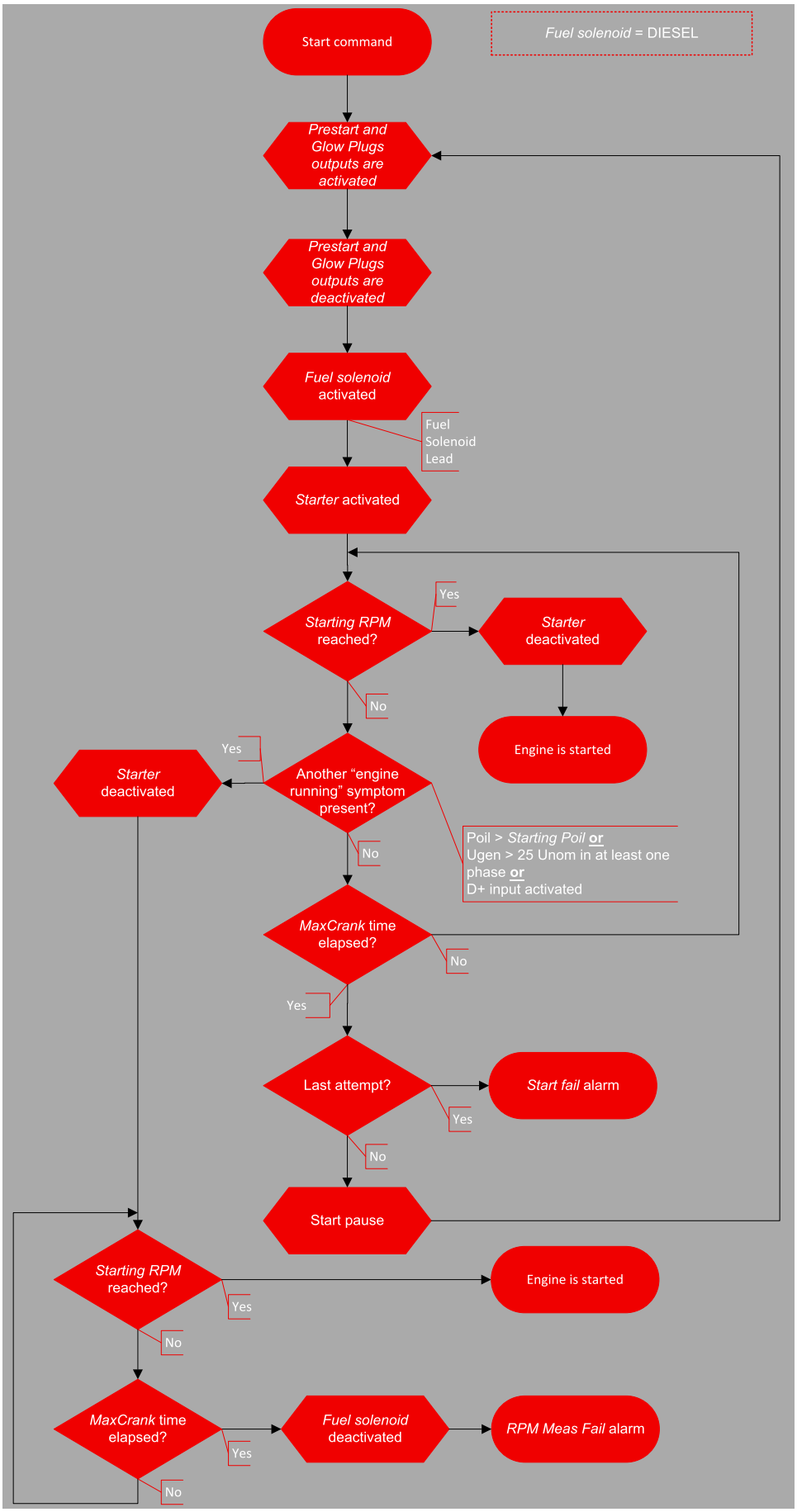


Image 5.11 Flowchart of start of diesel engine

5.5.4 Stabilization

When the **Engine start (page 87)** sequence is finished, the gen-set goes into the stabilization phase. There are two timers (setpoints) in this phase:

- **Minimal Stabilization Time (page 184)** 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 185)** 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 184)** has already elapsed.

In the event that the generator voltage or frequency are not within limits within the **Maximal Stabilization Time (page 185)** 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 203)**.*

Note: *The value of the **Minimal Stabilization Time (page 184)** setpoint has to be lower than the value of **Maximal Stabilization Time (page 185)** setpoint.*

5.5.5 Connecting to load

When the **Stabilization (page 89)** 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 184)** timer has elapsed.
- The gen-set voltage and frequency are within limits.

5.5.6 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.

5.5.7 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 186)**.
- 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 186)**.
- 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 436)** is de-energized and **STOP SOLENOID (PAGE 452)** is energized. The engine will stop within the time period determined by the setpoint **Stop Time (page 186)**. If the engine does not stop within this time, the alarm **Wrn Stop Fail (page 501)** will be issued.

The output **STOP SOLENOID (PAGE 452)** is energized until the engine is stopped, but at least for the duration of **Stop Time (page 186)**. If the **Stop Time (page 186)** has elapsed and the engine has still not stopped, the **STOP SOLENOID (PAGE 452)** is de-energized for 5 s and then energized again for **Stop Time (page 186)** and this repeats 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 107)** signals is active.

5.5.8 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 94)** with fixed alarm types.
- Each alarm is written to the **Alarmlist (page 94)**.
- 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.

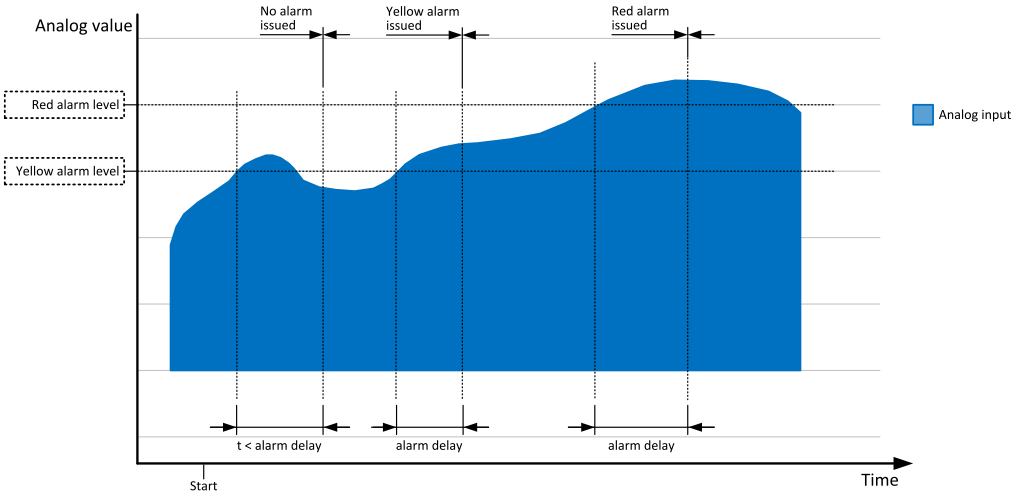


Image 5.12 Analog input alarm evaluation principle

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 185)**.
- 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 185)** has elapsed or the GCB has been closed. They remain evaluated until cooling has finished. Only Generator under/overvoltage 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 408)**, 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 416)** 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 5.13 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 422)** as well as the standard alarm outputs (**HORN (PAGE 444)** and **ALARM (PAGE 427)**).

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 444)** and **ALARM (PAGE 427)**) 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 422)** as well as the standard alarm outputs (**HORN (PAGE 444)** and **ALARM (PAGE 427)**).

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 421)** as well as the standard alarm outputs (**HORN (PAGE 444)** and **ALARM (PAGE 427)**).

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 94)**. 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.*

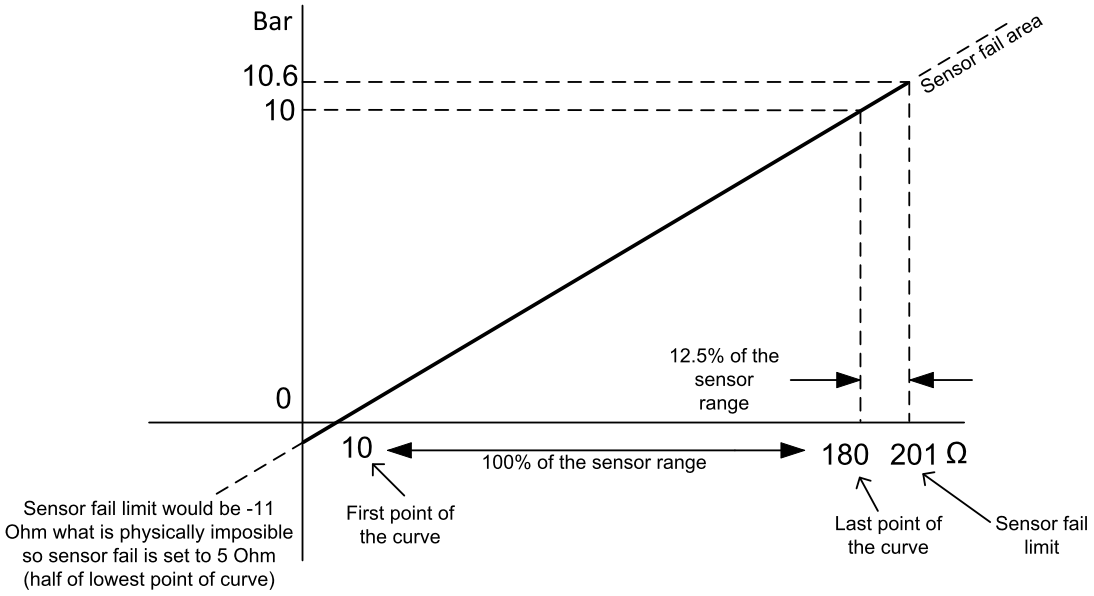


Image 5.14 Sensor fail detection principle

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 94)** or new event is written in **History log (page 96)**. The message will contain a copy of the **Alarmlist (page 94)** or reasons from **History log (page 96)**. To enable this function, adjust setpoints **Event Message (page 272)**, **Wrn Message (page 272)**, **BOC Message (page 272)** and **Sd Messages (page 273)** to ON. Also enter a valid GSM phone number or email address to the setpoints **Telephone Number 1 (page 270)**, **Email Address 1 (page 270)** .

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	no	no	no	no
CM-4G-GPS	yes	yes	yes	yes	no	no	no	no

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 209)** setpoint.
Analog Input 1 Sd	SD	Value measured on analog input 1 is </> than **Analog Protection 1 Sd (page 209)** setpoint.
Analog Input 2 Wrn	WRN	Value measured on analog input 2 is </> than **Analog Protection 2 Wrn (page 210)** setpoint.
Analog Input 2 Sd	SD	Value measured on analog input 2 is </> than **Analog Protection 2 Sd (page 211)** setpoint.

Events specification	Protection type	Description
Analog Input 3 Wrn	WRN	Value measured on analog input 3 is </> than **Analog Protection 3 Wrn (page 212)** setpoint.
Analog Input 3 Sd	SD	Value measured on analog input 3 is </> than **Analog Protection 3 Sd (page 212)** setpoint.
Wrn Battery Voltage	WRN	Battery voltage is out of limits given by **Battery Undervoltage (page 199)** and **Battery Overvoltage (page 200)** 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 451)** 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 >, <Frequency	BOC	The generator frequency is out of limits given by **Generator Overfrequency BOC (page 207)** and **Generator Underfrequency BOC (page 207)** setpoints.
BOC Overload	BOC	The load is greater than the value given by **Overload BOC (page 203)** setpoint.
Sd Overspeed	SD	The protection comes active if the speed is greater than **Overspeed Sd (page 190)** setpoint.
Sd Underspeed	SD	During starting of the engine when the RPM reach the value of **Starting RPM (page 175)** setpoint the starter is switched off and the speed of the engine can drop under **Starting RPM (page 175)** again. Then the Underspeed protection becomes active. Protection evaluation starts 5 seconds after reaching **Starting RPM (page 175)**.
Emergency Stop	SD	If the input Emergency Stop is opened shutdown is immediately activated.
GCB Fail	SD	Failure of generator 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 175)** (like oil pressure or D+) and at the end of timer **Maximum Cranking Time (page 174)** there are no RPMs > **Starting RPM (page 175)** 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**

Events specification	Protection type	Description
		198) setpoint. The protection comes if counter reaches zero.
Wrn Maintenance 2	WRN	The period for servicing is set by the **Maintenance Timer 2 (page 199)** setpoint. The protection comes if counter reaches zero.
Wrn Maintenance 3	WRN	The period for servicing is set by the **Maintenance Timer 3 (page 199)** 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.
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.*

5.5.9 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
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.*

5.5.10 Breaker control

The following power switches are controlled by the controller:

- The generator circuit breaker or contactor – GCB

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 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.

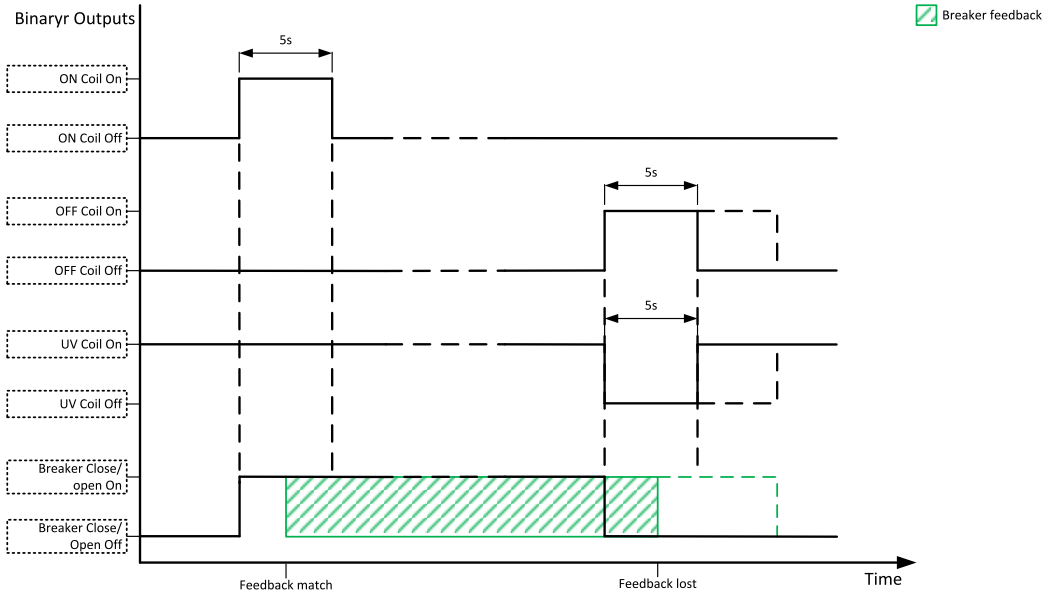


Image 5.15 Breaker control outputs

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).

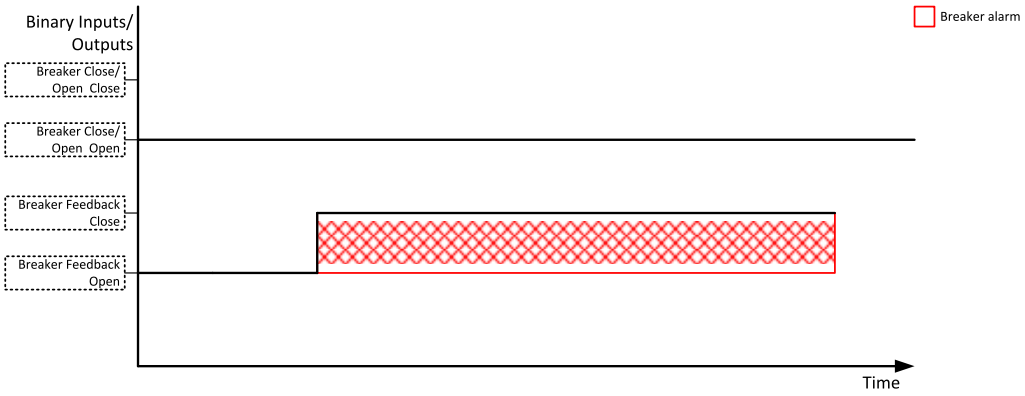


Image 5.16 Breaker fail - breaker close/open in steady position - open

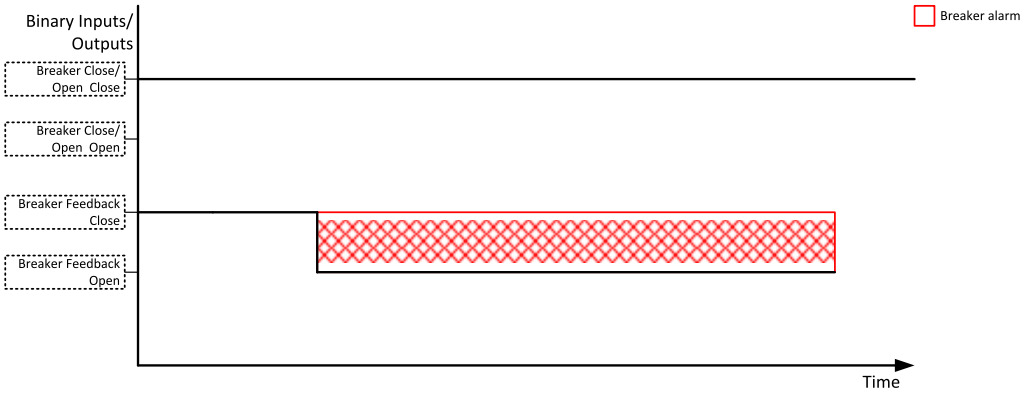


Image 5.17 Breaker fail - breaker close/open in steady position - close

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

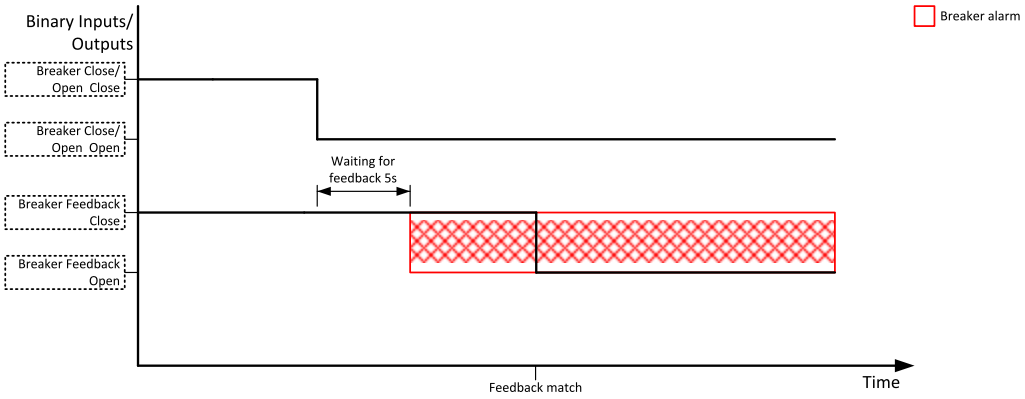


Image 5.18 Breaker fail - breaker close/open opens

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

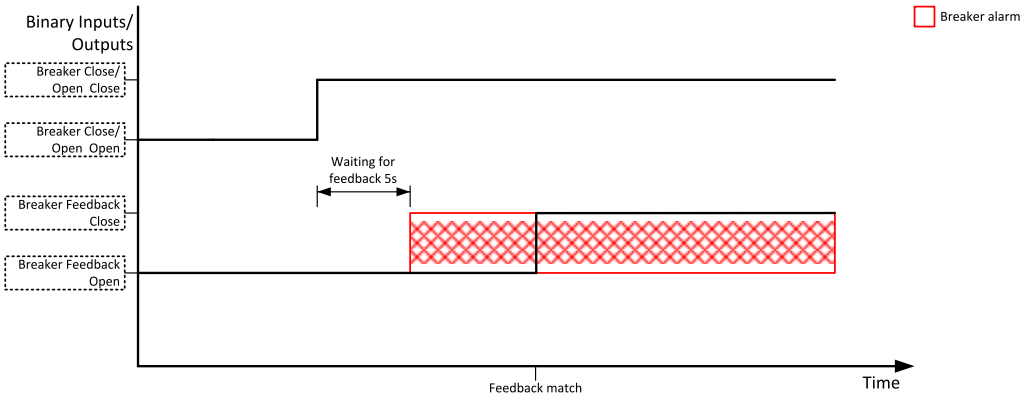


Image 5.19 Breaker fail - breaker close/open closes

5.5.11 Exercise timer

The exercise (general-purpose) timer in controller is 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 240)**
- **Timer 1 Repetition (page 241)**
- **Timer 1 First Occur. Date (page 242)**
- **Timer 1 First Occur. Time (page 242)**
- **Timer 1 Duration (page 242)**
- **Timer 1 Repeated (page 243)**
- **Timer 1 Repeat Day (page 246)**
- **Timer 1 Day (page 245)**
- **Timer 1 Repeated Day In Week (page 246)**
- **Timer 1 Repeat Day In Month (page 246)**
- **Timer 1 Repeat Week In Month (page 247)**
- **Timer 1 Refresh Period (page 244)**
- **Timer 1 Weekends (page 245)**

Available modes of 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 240)****.*

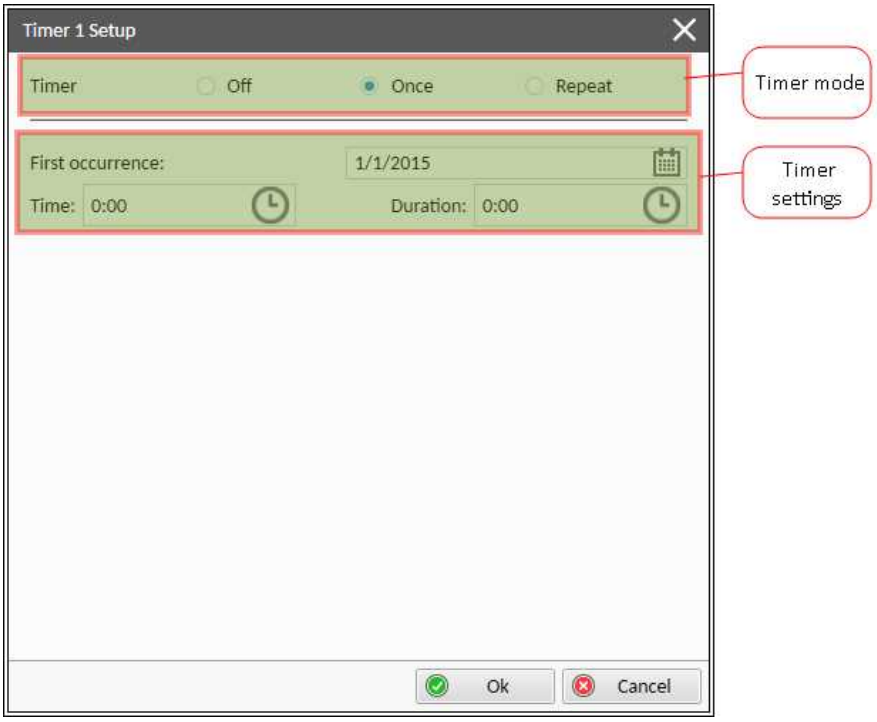


Image 5.20 Once mode - InteliConfig

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 240)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 241)** setpoint select Once mode. Than adjust **Timer 1 First Occur. Date (page 242)**, **Timer 1 First Occur. Time (page 242)** and **Timer 1 Duration (page 242)**.

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 240)****.*

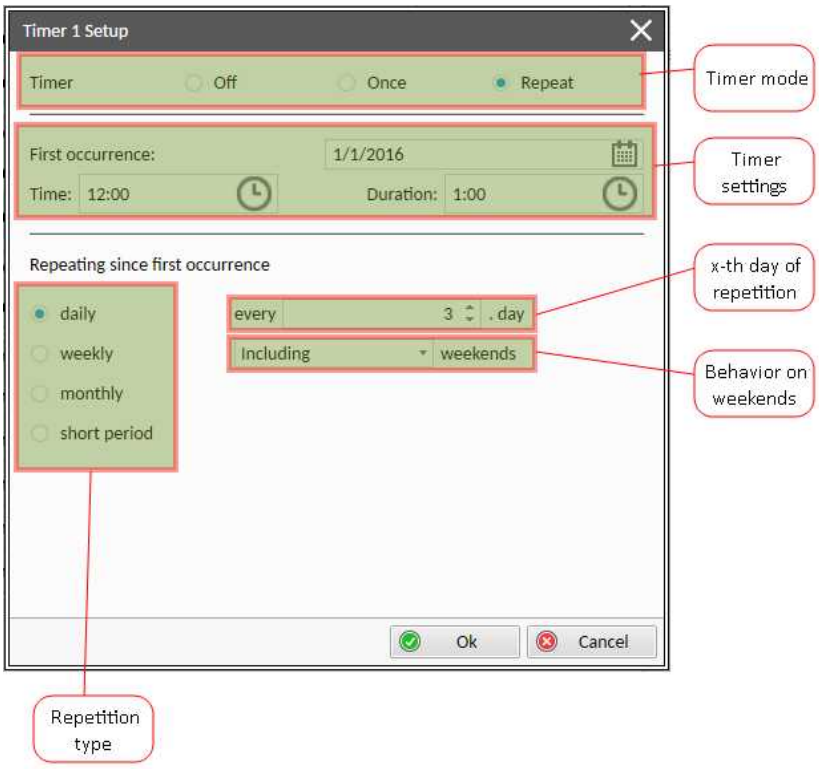


Image 5.21 Daily mode - InteliConfig

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 244)**) and behavior of timer on weekends (**Timer 1 Weekends (page 245)**).

> **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 240)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 241)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 242)**, **Timer 1 First Occur. Time (page 242)** and **Timer 1 Duration (page 242)**. In setpoint **Timer 1 Repeated (page 243)** select Daily and adjust **Timer 1 Refresh Period (page 244)** (x-th day of repetition) and **Timer 1 Weekends (page 245)** (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 240)**.*

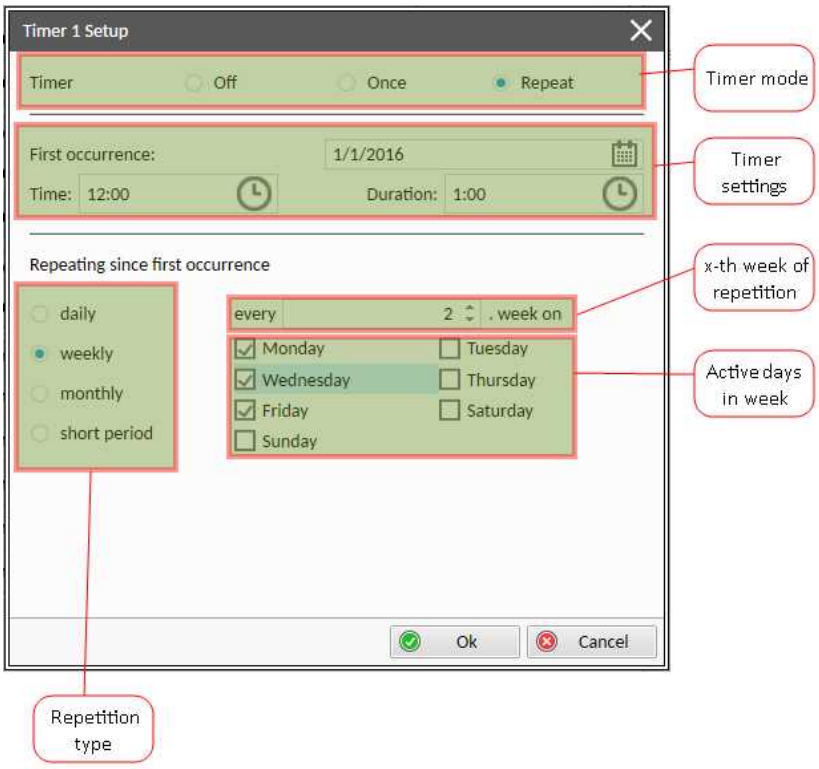


Image 5.22 Weekly mode - InteliConfig

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 244)**) and days when timer should be active (**Timer 1 Day (page 245)**).

> **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 240)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 241)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 242)**, **Timer 1 First Occur. Time (page 242)** and **Timer 1 Duration (page 242)**. In setpoint **Timer 1 Repeated (page 243)** select Weekly and adjust **Timer 1 Day (page 245)** (days when timer should be active) and **Timer 1 Refresh Period (page 244)** (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 240)**.*

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

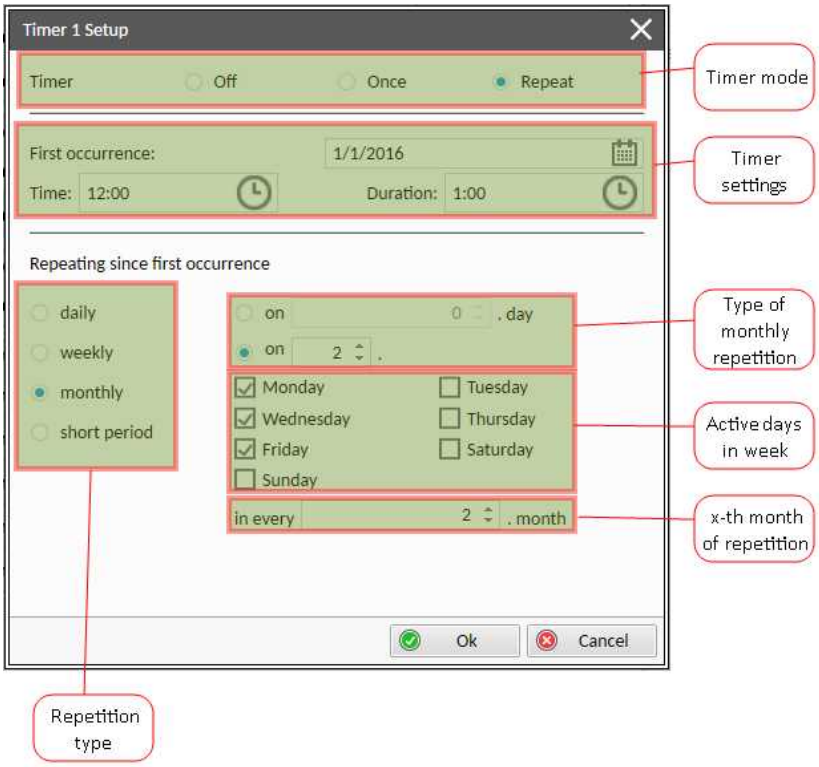


Image 5.23 Monthly mode - InteliConfig

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 246)**). 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.

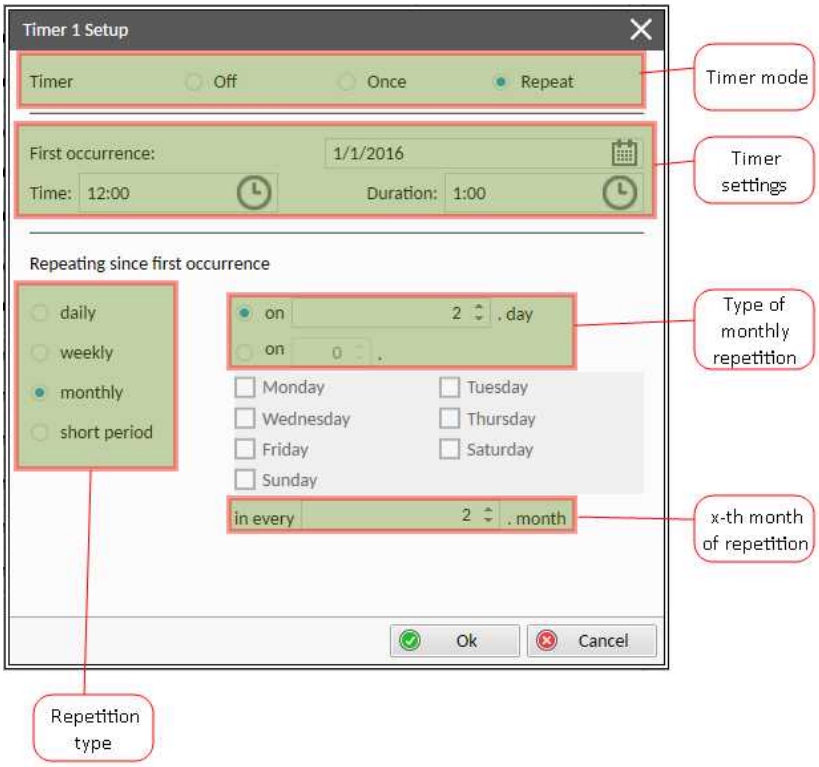


Image 5.24 Monthly mode - InteliConfig

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 240)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 241)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 242)**, **Timer 1 First Occur. Time (page 242)** and **Timer 1 Duration (page 242)**. In setpoint **Timer 1 Repeated (page 243)** select Monthly and adjust type of monthly repetition via **Timer 1 Repeat Day (page 246)**, **Timer 1 Refresh Period (page 244)** (x-th month of repetition) and **Timer 1 Repeat Day In Month (page 246)** (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 240)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 241)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 242)**, **Timer 1 First Occur. Time (page 242)** and **Timer 1 Duration (page 242)**. In setpoint **Timer 1 Repeated (page 243)** select Monthly and adjust type of monthly repetition via **Timer 1 Repeat Day (page 246)**, **Timer 1 Refresh Period (page 244)** (x-th month of repetition), **Timer 1 Repeated Day In Week (page 246)** (days in week when timer is active) and **Timer 1 Repeat Week In Month (page 247)** (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 240)****.*

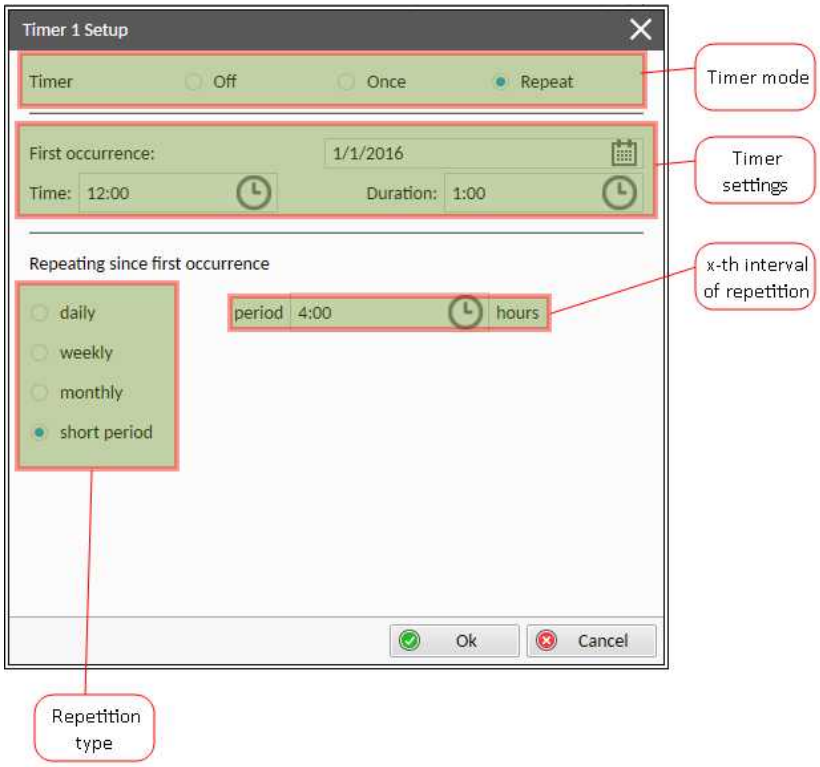


Image 5.25 Short period mode - InteliConfig

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 240)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 241)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 242)**, **Timer 1 First Occur. Time (page 242)** and **Timer 1 Duration (page 242)**. In setpoint **Timer 1 Repeated (page 243)** select Short Period and adjust **Timer 1 Refresh Period (page 244)** (interval of repetition).

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

5.5.12 Service timers

Running hours counters

Service timers are used as maintenance interval counters. Counters can be set by setpoints - **Maintenance Timer 1 (page 198)**, **Maintenance Timer 2 (page 199)** and **Maintenance Timer 3 (page 199)**. 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 198)**, **Maintenance Timer 2 (page 199)** and **Maintenance Timer 3 (page 199)** or as values **Maintenance 1 (page 360)**, **Maintenance 2 (page 360)** and **Maintenance 3 (page 361)**.

When the value of counter reaches 0, the alarm **Wrn Maintenance 1 (page 499)** or **Wrn Maintenance 2 (page 499)** or **Wrn Maintenance 3 (page 500)** is active until the respective counter is readjusted back to nonzero value.

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

5.5.13 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 189)** 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 188)**. 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 176)** setpoint. The oil pressure is evaluated from the analog input or from the ECU if an ECU is configured.
- Binary input **OIL PRESSURE (PAGE 413)** 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.

5.5.14 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 503)**

5.5.15 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 447)** output is closed. **Example:** Usually used for preheating or processes executed prior gen-set start.
Cranking	Engine is cranking, **STARTER (PAGE 451)** 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 437)** 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 408)** gen-set operation. **Example:** Used for bypass the controller and engine manual start.

Engine started conditions

- Engine speed (RPM) > **Starting RPM (page 175)** or
- Oil pressure > **Starting Oil Pressure (page 176)** or
- Binary input **OIL PRESSURE (PAGE 413)** is in logical 0 or
- D+ terminal active (reached **D+ Treshold (page 189)** of supply voltage) for minimum 1 s or
- Generator voltage > 25% of **Nominal Voltage Ph-N (page 164)** or **Nominal Voltage Ph-Ph (page 164)** (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 175)**.*

Engine running conditions

- Engine speed (RPM) > **Starting RPM (page 175)** or
- Oil pressure > **Starting Oil Pressure (page 176)** or
- Binary input **OIL PRESSURE (PAGE 413)** is in logical 0 or
- Generator voltage > 25% of **Nominal Voltage Ph-N (page 164)**

Still engine conditions

- Engine speed (RPM) < **Starting RPM (page 175)** or
- Oil pressure < **Starting Oil Pressure (page 176)** or
- Binary input **OIL PRESSURE (PAGE 413)** 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 501)** 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 176)**, Wrn Stop Fail has delay 1 s
- Binary input **OIL PRESSURE (PAGE 413)** 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 452)** output.

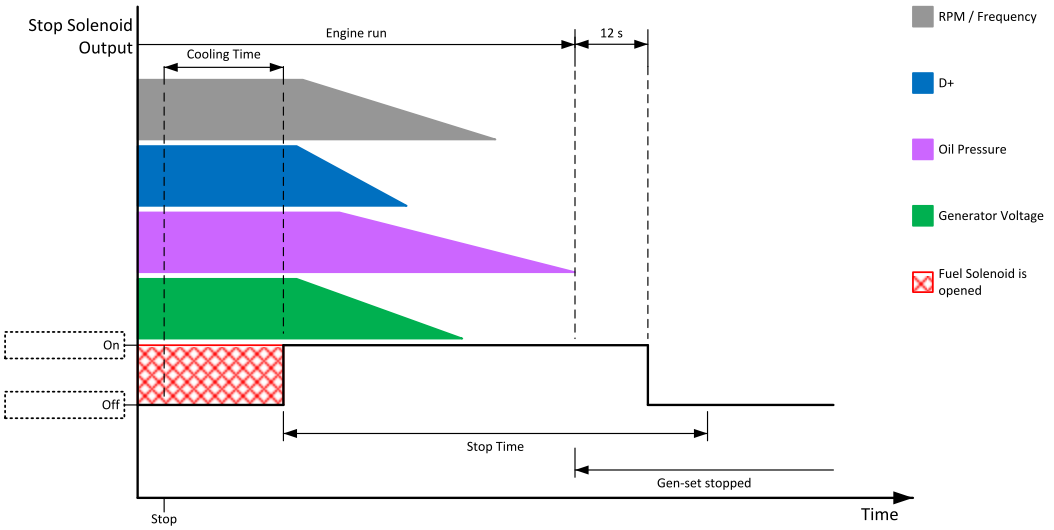


Image 5.26 Engine stops in **Stop Time (page 186)**

When the total time of stopping will exceed setpoint **Stop Time (page 186)** than the **Wrn Stop Fail (page 501)** and binary outputs are activated. The controller will continuously try to stop the engine.

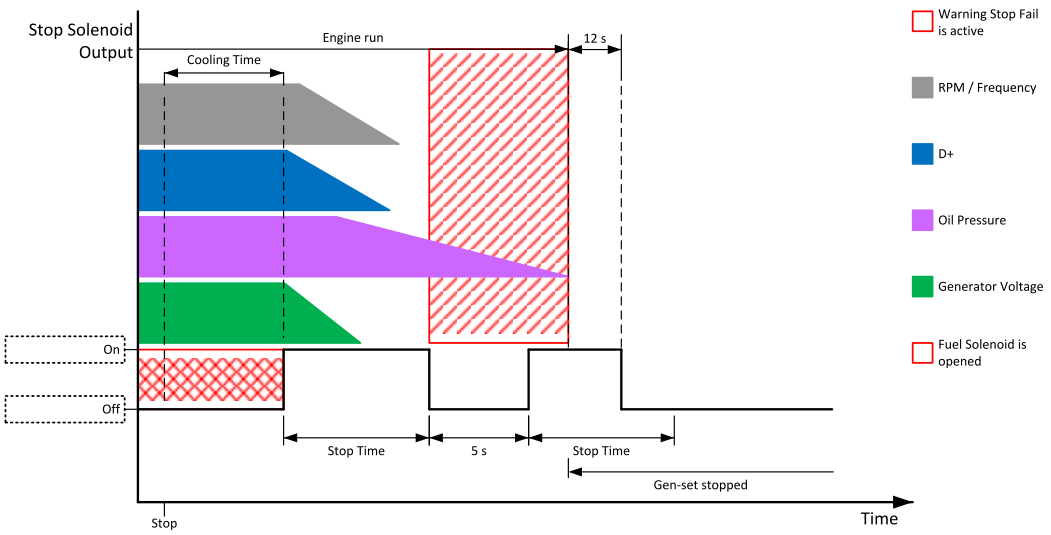


Image 5.27 Engine stops after first **Stop Time (page 186)**

Electric state machine

IslOper	Island operation
BrksOff	GCB opened

5.5.16 Sensor curves

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.

back to Functions

5.5.17 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.

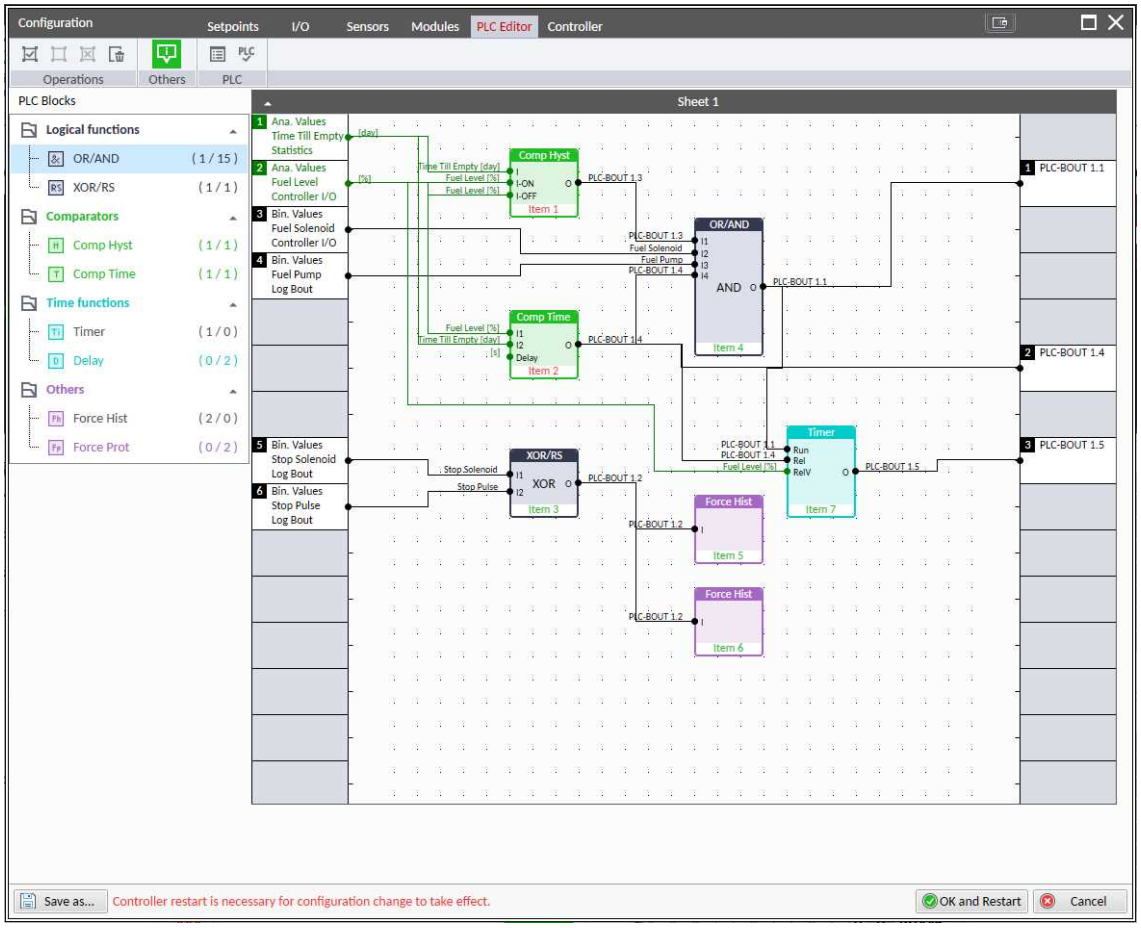


Image 5.28 PLC Editor main page

List of available PLC blocks

PLC block	Number of blocks
OR/AND	4
XOR/RS	0
Comparator with hysteresis (Comp Hyst)	1

Comparator with delay (Comp Time)	1
Timer	1
Delay	1
Force history record (Force Hist)	1
Force protection (Force Prot)	1

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 112)** for more information.
- Add PLC blocks into the sheets. See **Adding PLC blocks (page 113)** for more information.
- Define inputs and outputs of the PLC program. See **Define inputs and outputs (page 114)** for more information.
- Create connections between inputs, blocks and outputs. See **Creating wires (page 116)** for more information.
- Adjust properties of the blocks. See **List of PLC blocks (page 482)** for more information about blocks.

Working with sheets

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

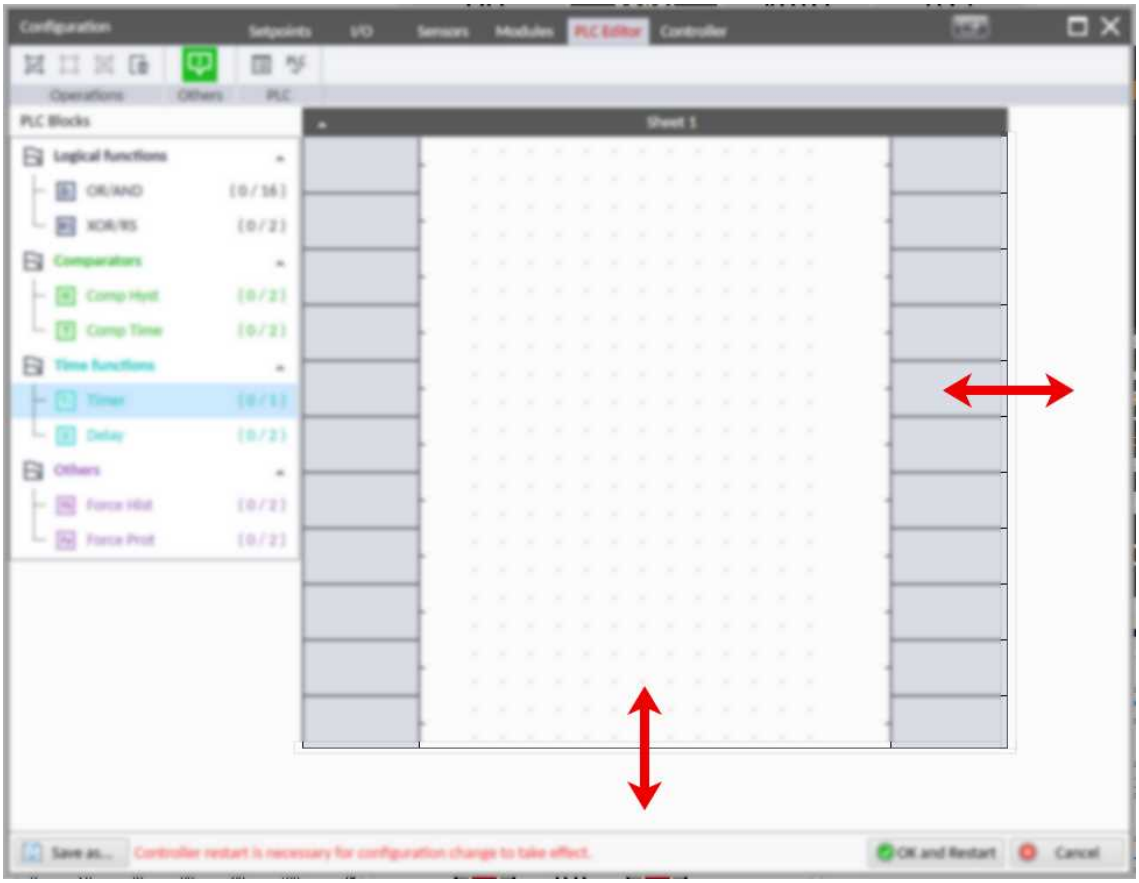


Image 5.29 Adjusting PLC sheet

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 482)** for more information about blocks.
- Connect the block inputs and outputs by drawing wires in the sheet. See **Define inputs and outputs (page 114)** for more information. It is also possible to connected inputs and outputs via properties of selected PLC block.

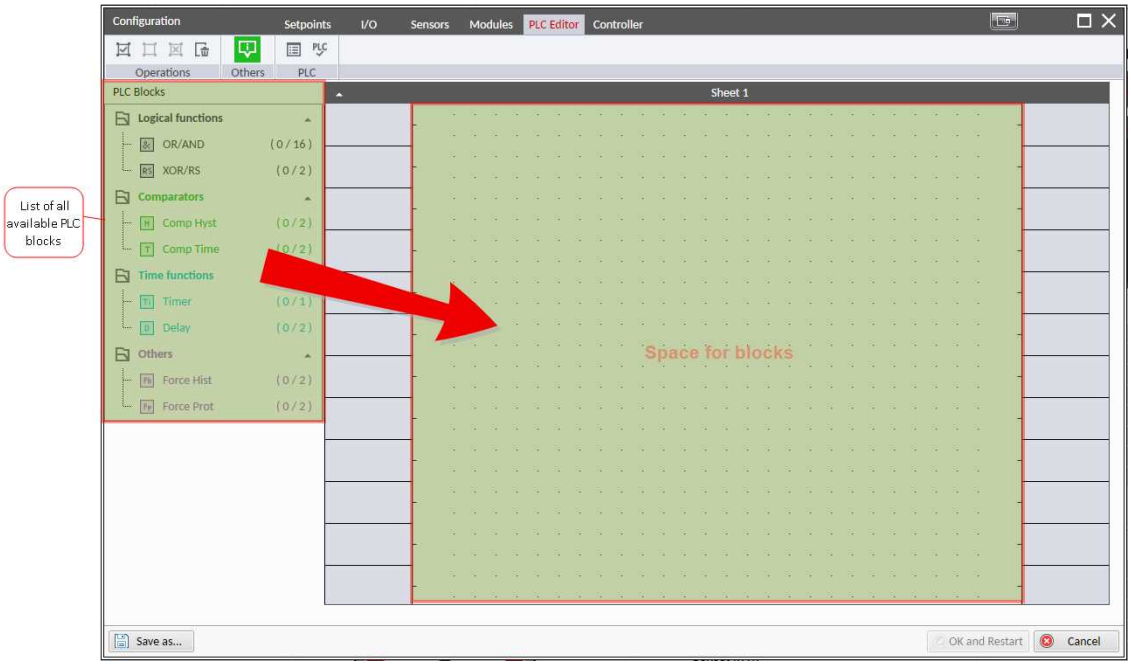


Image 5.30 Adding PLC blocks

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.*

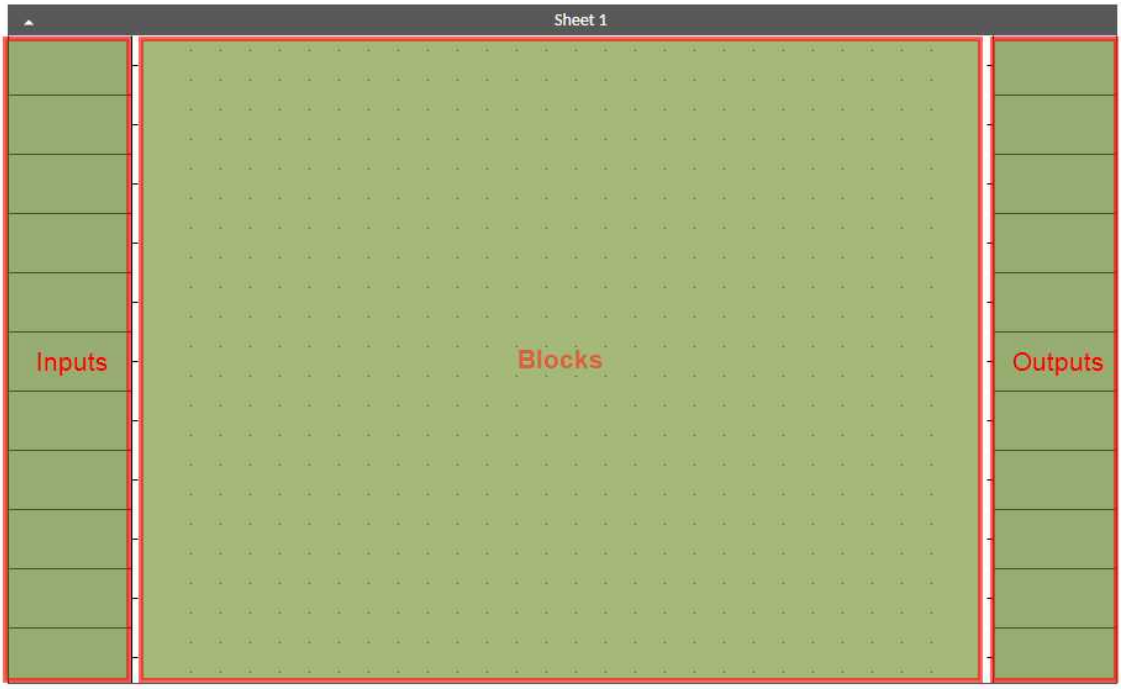
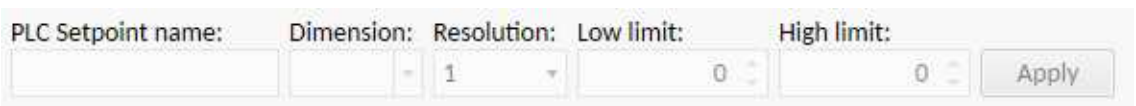


Image 5.31 Blank sheet of PLC editor

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.



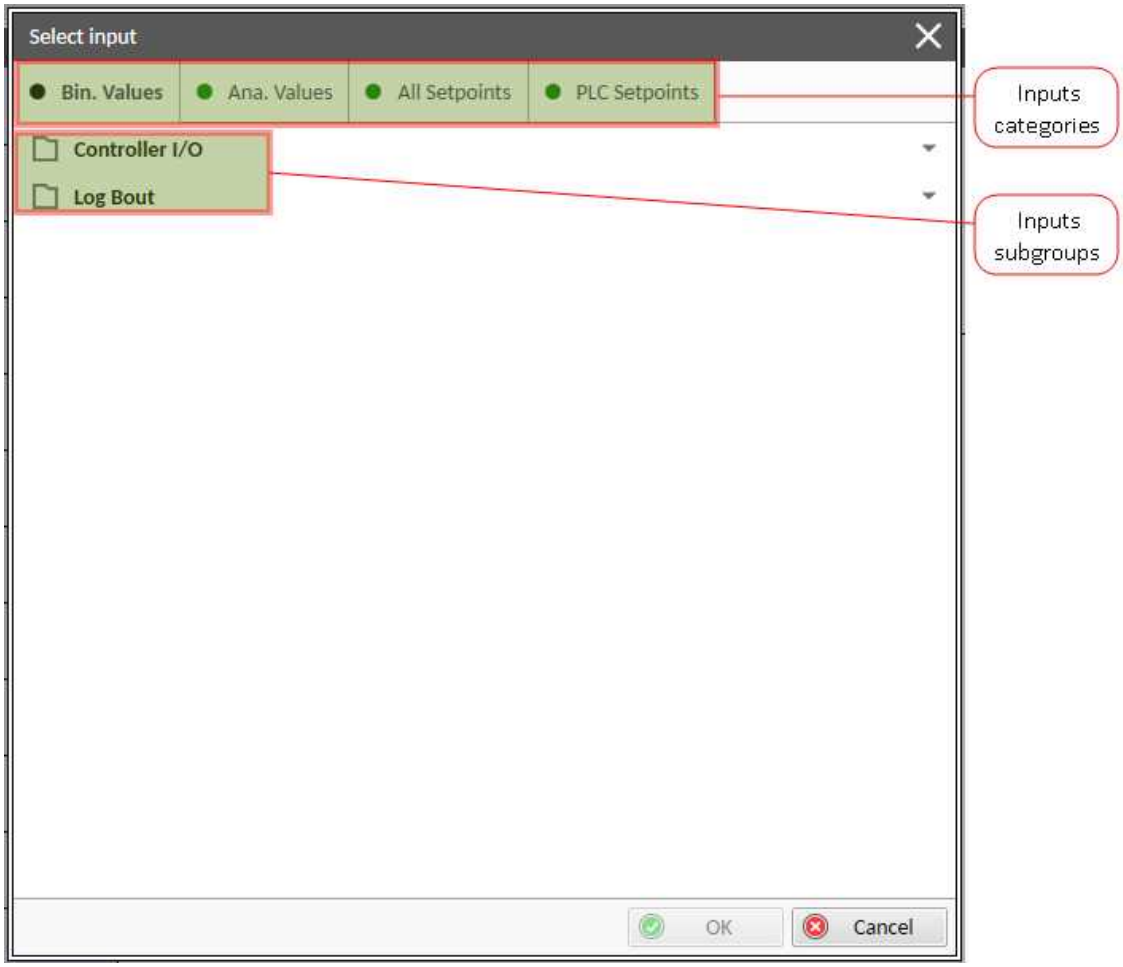


Image 5.32 PLC inputs

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).

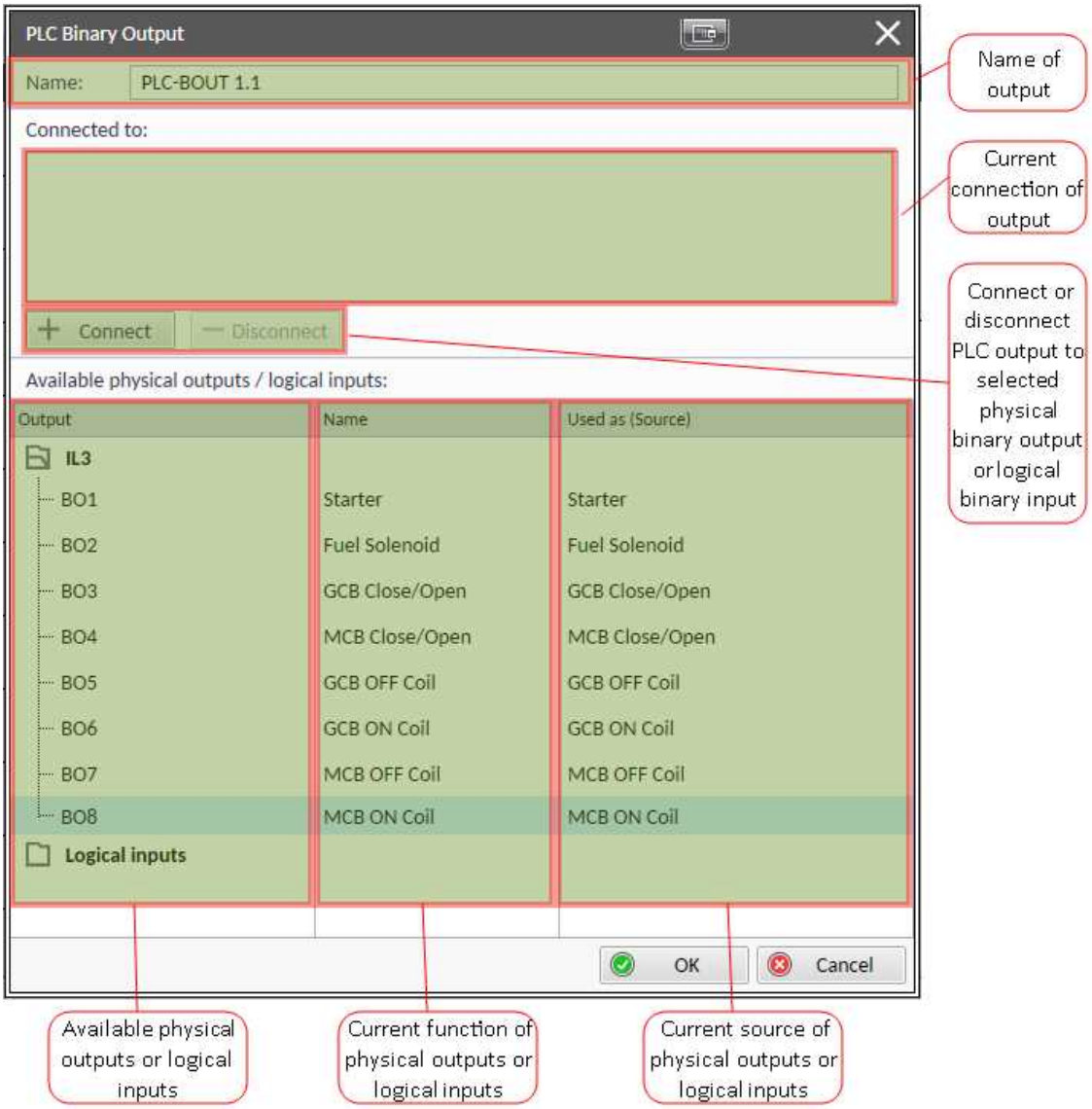


Image 5.33 PLC outputs

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.

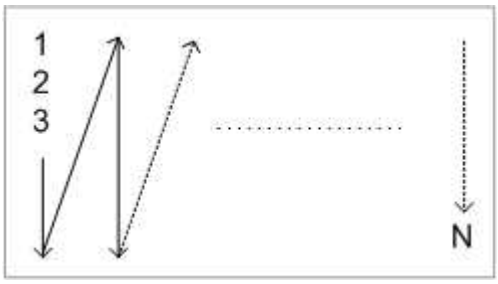
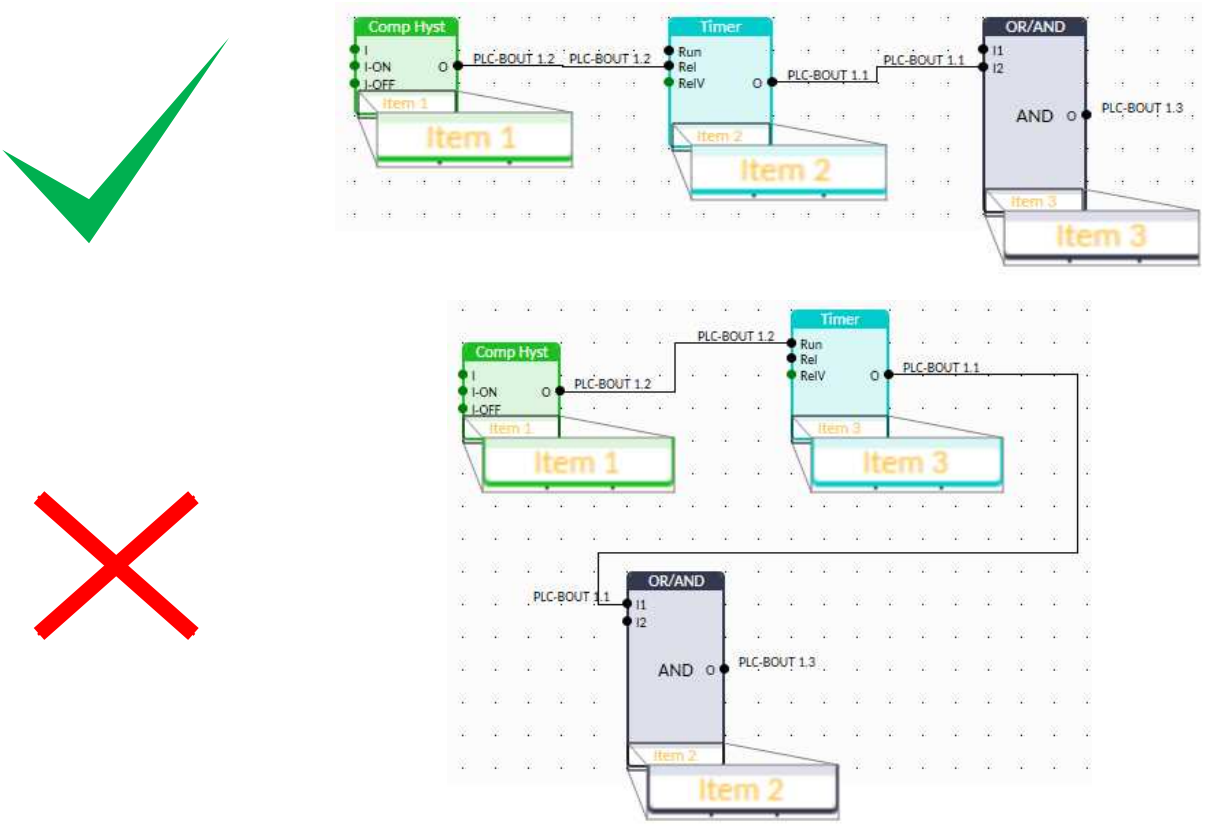


Image 5.34 PLC execution logic

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.**

5.5.18 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:

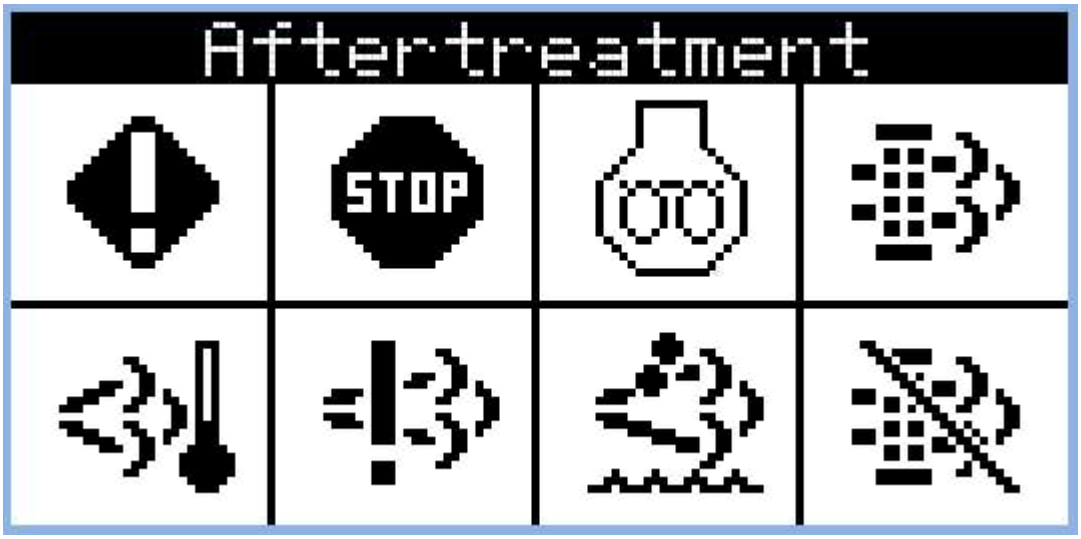


Image 5.35 Example of active Tier 4 Final screen

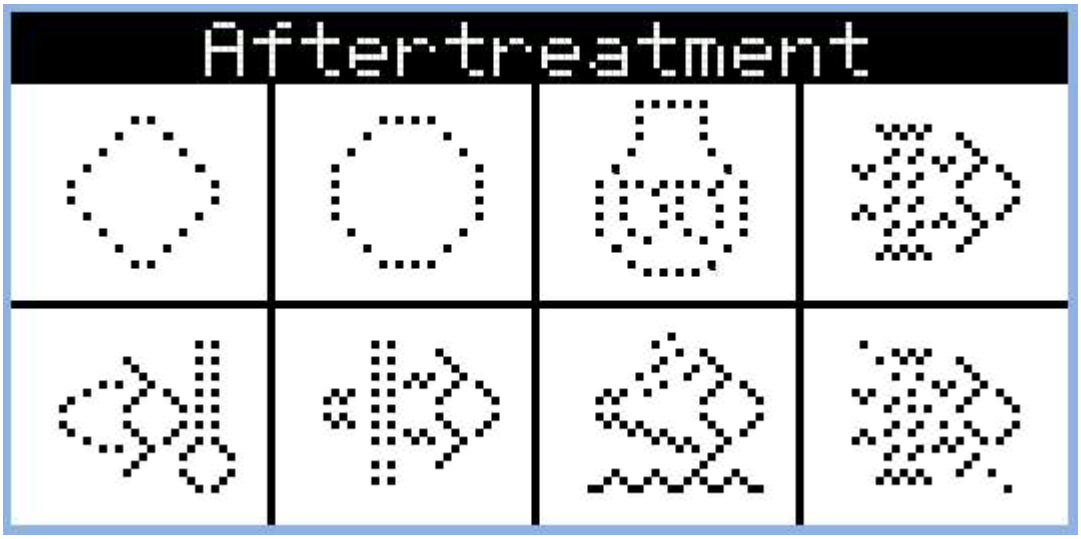


Image 5.36 Example of inactive Tier 4 Final screen

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 501)****.*
Exhaust system high temperature lamp command			***Note:*** *This lamp also activates alarm* ***After-Treatment (page 501)****.*
Malfunction indicator lamp			***Note:*** *This value can light or blink on both frequencies. This lamp also activates alarm* ***After-Treatment (page 501)****.*
Fluid tank low level indicator			***Note:*** *This lamp also activates alarm* ***After-Treatment (page 501)****.*
DPF regeneration inhibited			***Note:*** *Indicates the state of diesel particulate filter active regeneration inhibition. This lamp also activates alarm* ***After-Treatment (page 501)****.*

Analog values

Supported analog values:

- DPFAshLoad (page 346)
- DPFSootLoad (page 346)
- DEF Level (page 346)

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 409)
- REGENERATION INHIB (PAGE 414)

5.5.19 Alternate configuration

In controller are 3 sets of configuration.

Configuration set 1	Configuration set 2	Configuration set 3
Nominal Power Split Phase 1 (page 251)	Nominal Power Split Phase 2 (page 255)	Nominal Power Split Phase 3 (page 259)
Nominal Power 1 (page 251)	Nominal Power 2 (page 255)	Nominal Power 3 (page 259)
Nominal RPM 1 (page 250)	Nominal RPM 2 (page 254)	Nominal RPM 3 (page 258)
Nominal Frequency 1 (page 249)	Nominal Frequency 2 (page 253)	Nominal Frequency 3 (page 257)
Nominal Voltage Ph-N 1 (page 250)	Nominal Voltage Ph-N 2 (page 254)	Nominal Voltage Ph-N 3 (page 258)
Nominal Voltage Ph-Ph 1 (page 250)	Nominal Voltage Ph-Ph 2 (page 254)	Nominal Voltage Ph-Ph 3 (page 258)
Nominal Current 1 (page 249)	Nominal Current 2 (page 253)	Nominal Current 3 (page 257)
Connection Type 1 (page 247)	Connection type 2 (page 251)	Connection type 3 (page 255)
ECU Speed Adjustment 1 (page 260)	ECU Speed Adjustment 2 (page 260)	ECU Speed Adjustment 3 (page 261)

Configuration sets can be changed via logical binary inputs ALTERNATE CONFIG 2 (PAGE 381) and ALTERNATE CONFIG 3 (PAGE 381). Configuration set 1 is active when there is no input activated. In case that inputs ALTERNATE CONFIG 2 (PAGE 381) and ALTERNATE CONFIG 3 (PAGE 381) are active at the same time, the configuration set 3 is took in account.

ALTERNATE CONFIG 2 (PAGE 381)	ALTERNATE CONFIG 3 (PAGE 381)	Active configuration set
0	0	1
1	0	2
0	1	3
1	1	3

IMPORTANT: If LBO ECU POWER RELAY (PAGE 434) is used, change of alternate configuration can be made only in prestart phase. So prestart has to be set up for enough long time.

5.5.20 ECU Frequency selection

Setpoint *ECU Freq Select* is no longer in use. However **ECU Frequency Select (page 349)** value was kept and the value can be calculated from **Nominal Frequency (page 165)** 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 434)** anyhow.

Note: *If LBO **ECU POWER RELAY (PAGE 434)** is used, this change can be made only in prestart phase. So prestart has to be set up for enough long time.*

5.5.21 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.*

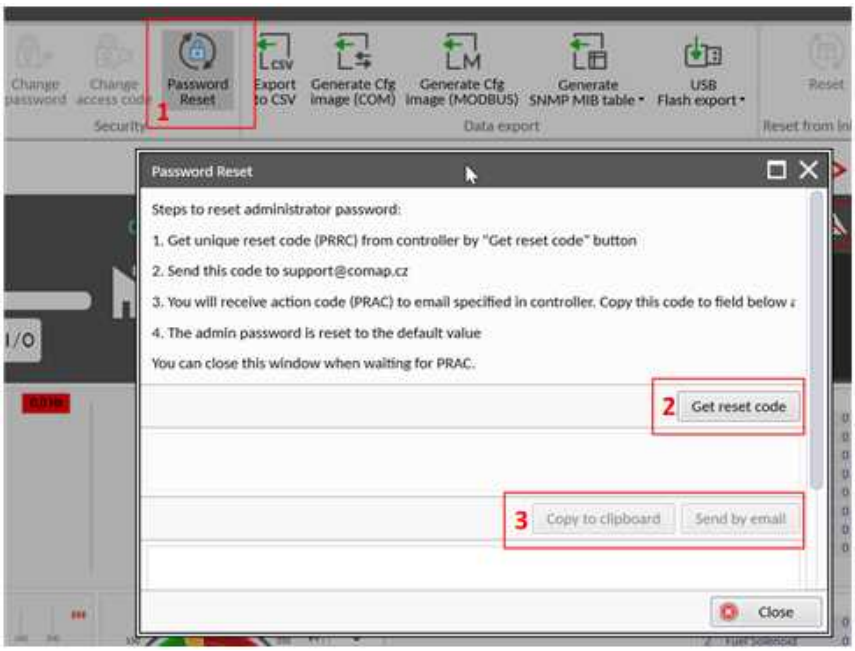
Resetting the administrator password

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+qU3FOMGl65tmqFGXESCu3cQ+FcsF3
Sxs43QAnYw3sSRPZa57JStdEB3Nk13ooNxH7Bv/gfwsUEjvII3s2WsbjQZ4x/a
XBQF+kpl59usnz0oXaY+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

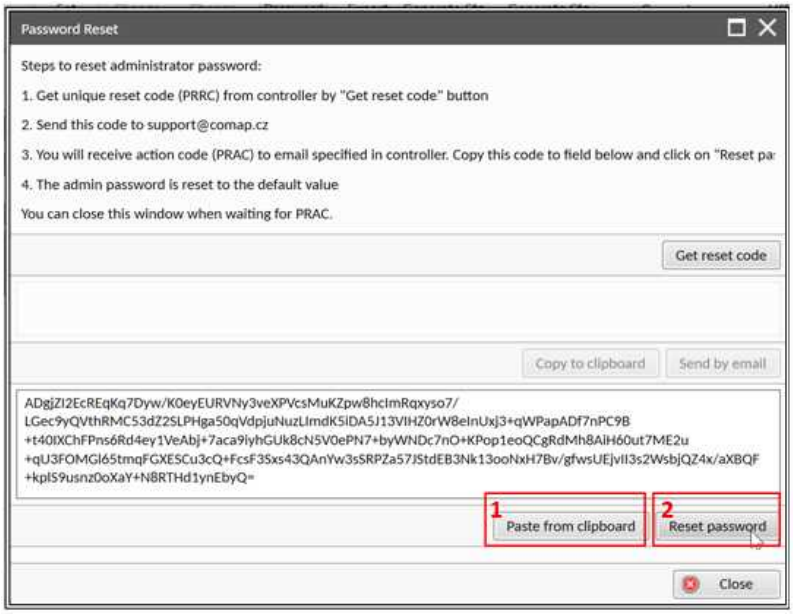
Sincerely
ComAp technical support

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.

Products | Solutions | Support | Insights | Training | About Us | Careers | Contact

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

back to Table of contents

6.1 PC

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 47**.

RS232 interface uses **COM1 Mode (page 261)** 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.*

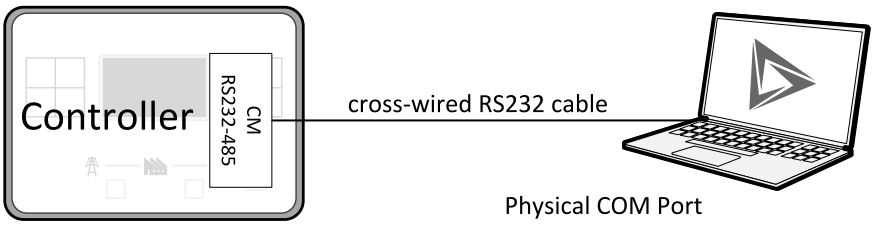


Image 6.1 Cross-wired RS232 cable is used

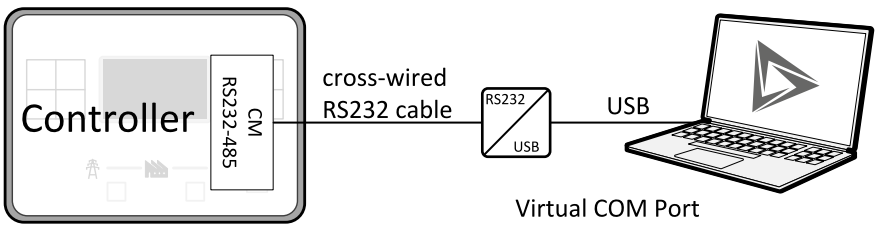


Image 6.2 Cross-wired RS232 cable and USB is used

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 47**.

RS485 interface uses **COM2 Mode (page 263)** port of the controller.

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

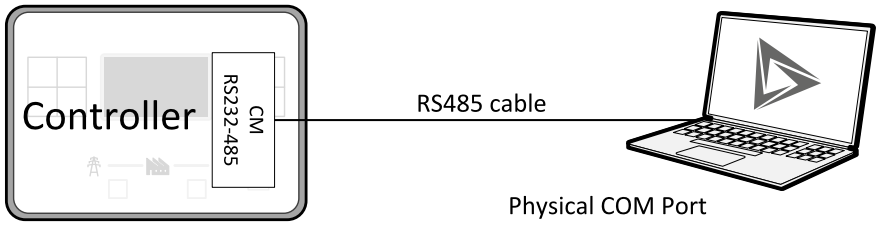


Image 6.3 Plug-in module CM RS232-485 is used

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 47**.

This connection type is used for communication with the controller from InteliConfig or any other PC tool. . Only three remote clients can be connected 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.

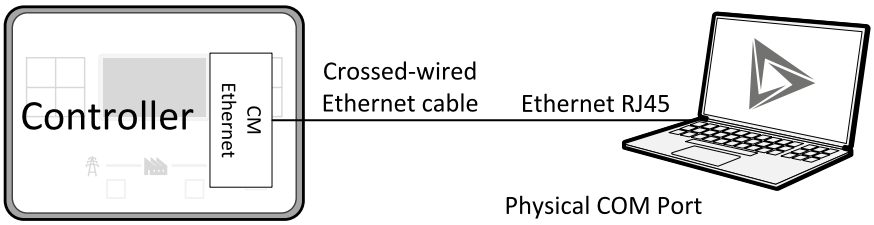


Image 6.4 Ethernet cable is used

Connection via USB

USB interface uses HID profile.

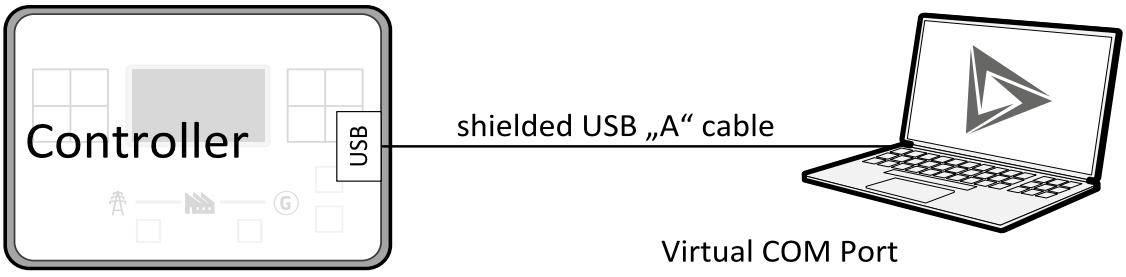


Image 6.5 Shielded USB type A cable is used

back to Communication

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.

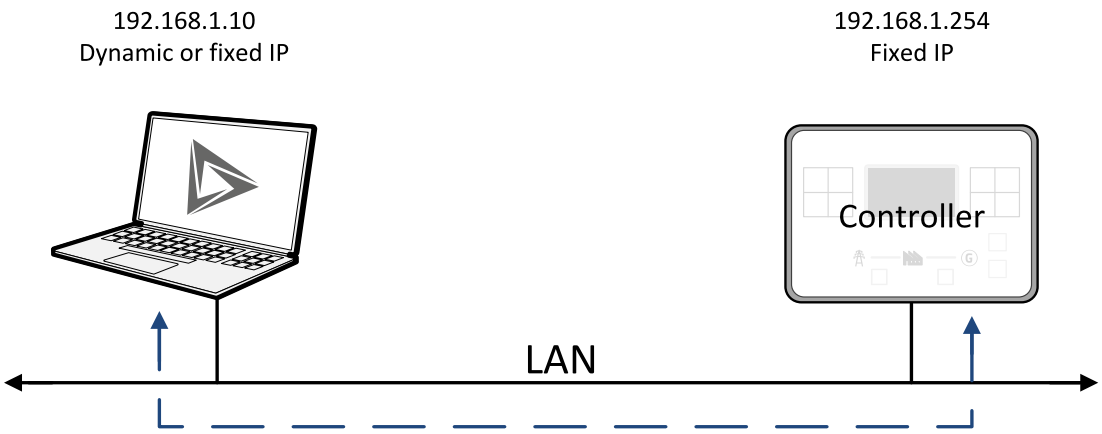


Image 6.6 Ethernet LAN connection

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 275)** to FIXED. In that case all setpoints of IP settings(**IP Address (page 275)**, **Subnet Mask (page 276)**, **Gateway IP (page 276)**, **DNS IP Address 1 (page 277)**) 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 275)** to AUTOMATIC. In that case all IP settings are assigned by DHCP server. Then configure the

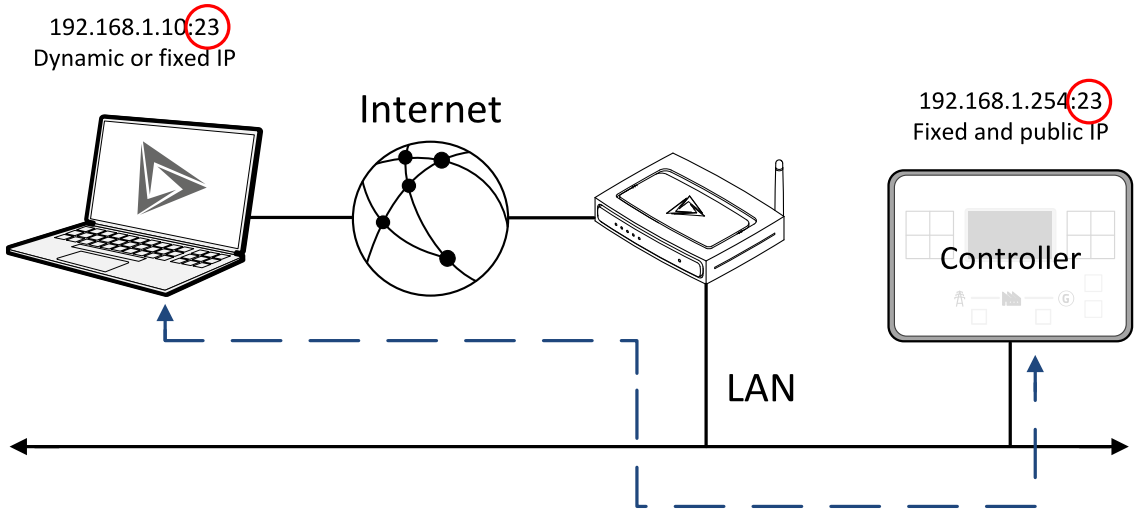
DHCP server to assign always the same IP address (i.e. static IP address) to the particular CM-Ethernet according to it's MAC address.

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.



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 272)**

***Note:** Firstly setpoint **Telephone Number 1 (page 270)** has to be adjusted.*

The following events can be received by mobile phone:

- Engine Start/Stop
  - Manual Start/Stop
  - Remote Start/Stop
- Load on Gen-set

Message structure:

- Genset Name (hh:mm:ss dd.mm.yyyy)
- hh:mm:ss Load on Genset

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 272)**
- **Sd Messages (page 273)**
- **BOC Message (page 272)**

Note: *Firstly setpoint* ***Telephone Number 1 (page 270)*** *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.
off	Switching to OFF mode.
man	Switching to MAN mode.
auto	Switching to AUTO 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 272)**

Note: *Firstly setpoints **Email Address 1 (page 270)** and **SMTP Sender Address (page 274)** (for CM-Ethernet) have to be adjusted.*

Note: ***#Summer Time Mode (page 240)*** *and **Time Zone (page 271)** 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 272)**
- **Sd Messages (page 273)**
- **BOC Message (page 272)**

Note: *Firstly setpoints **Email Address 1 (page 270)** and **SMTP Sender Address (page 274)** (for CM-Ethernet) have to be adjusted.*

Note: ***#Summer Time Mode (page 240)** and **Time Zone (page 271)** 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.*

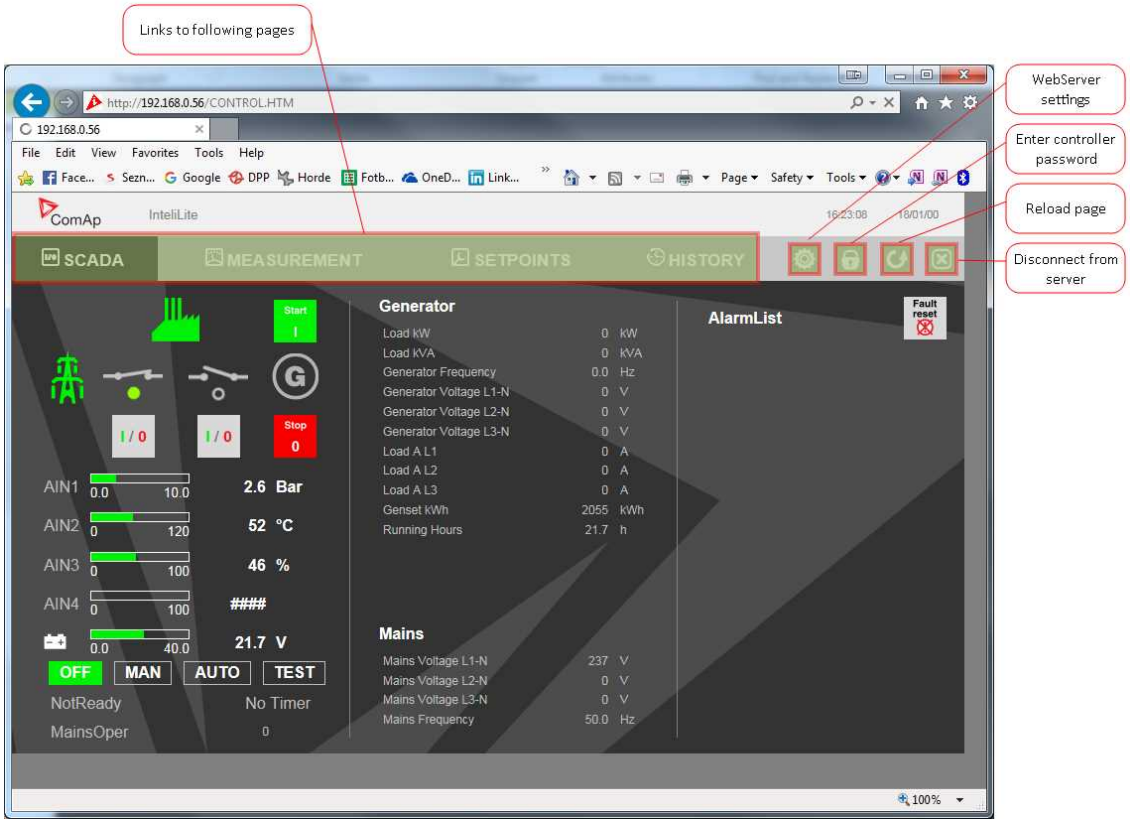


Image 6.7 Web Server main screen

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).

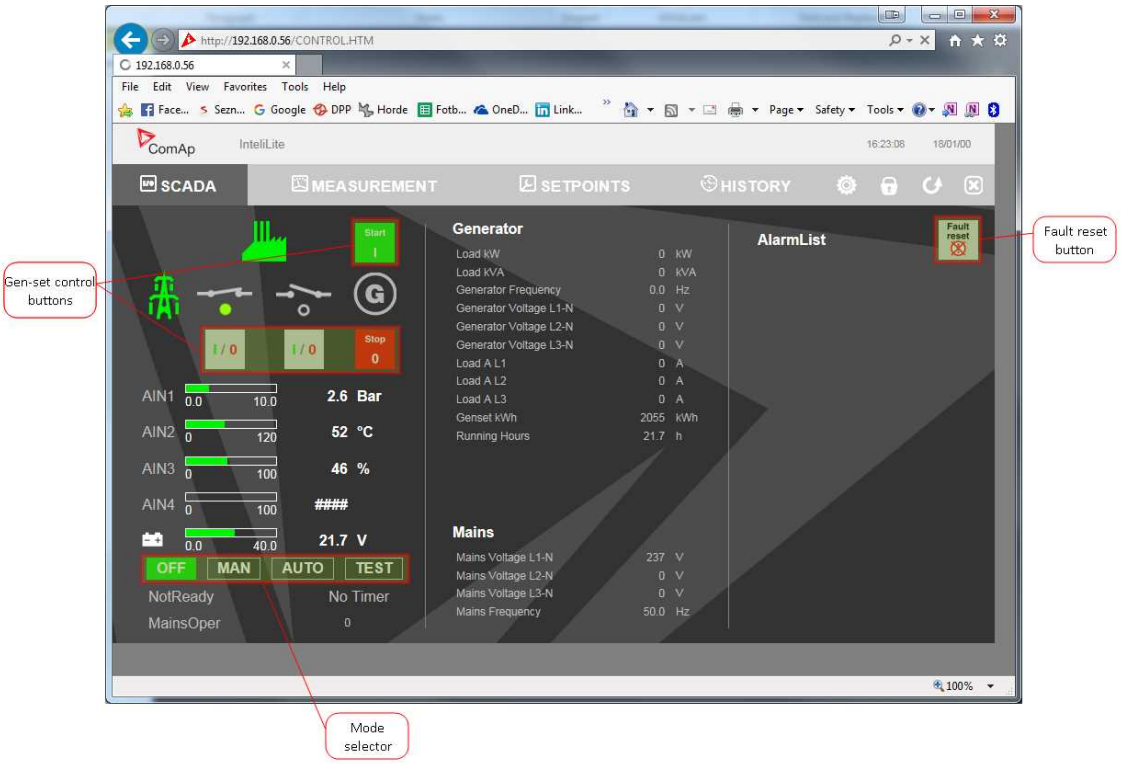


Image 6.8 Web Server - Scada screen

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).*

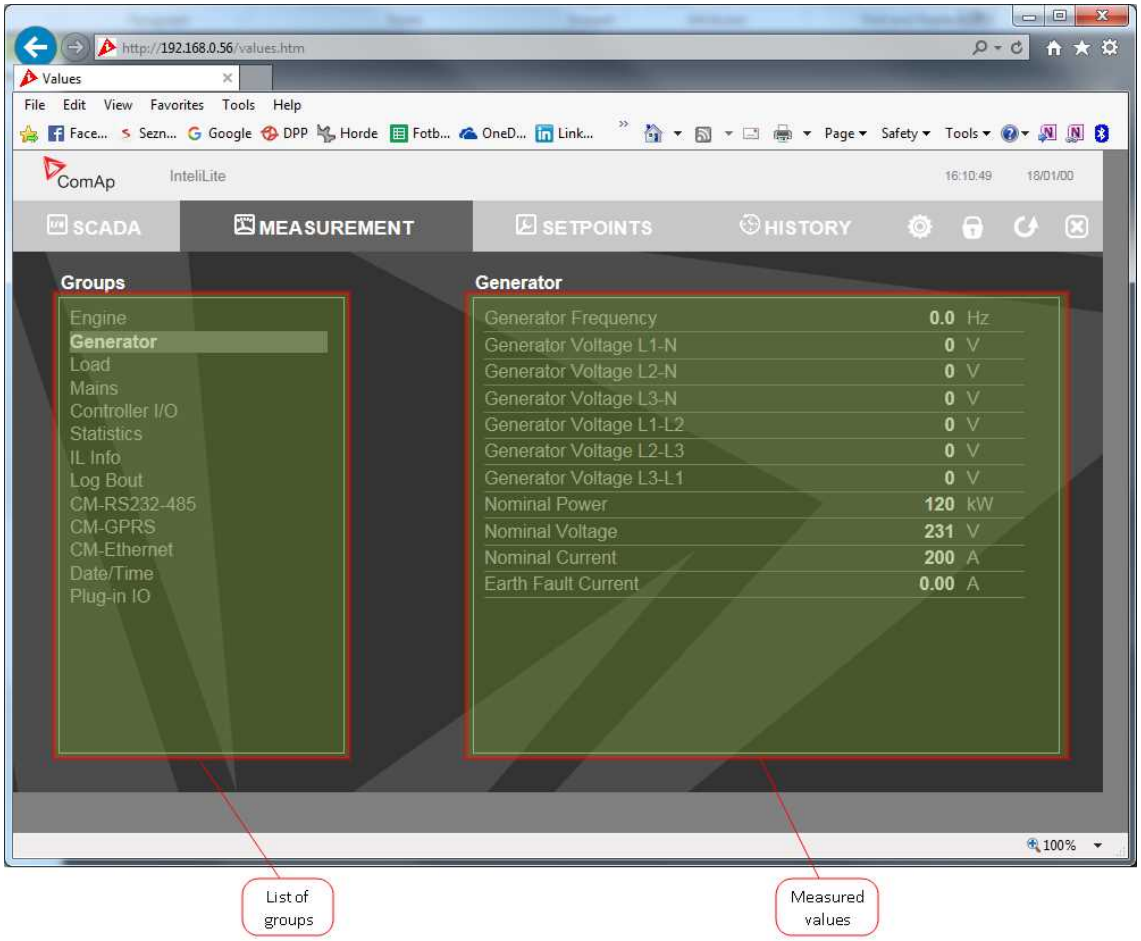


Image 6.9 Web Server - measurement screen

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.

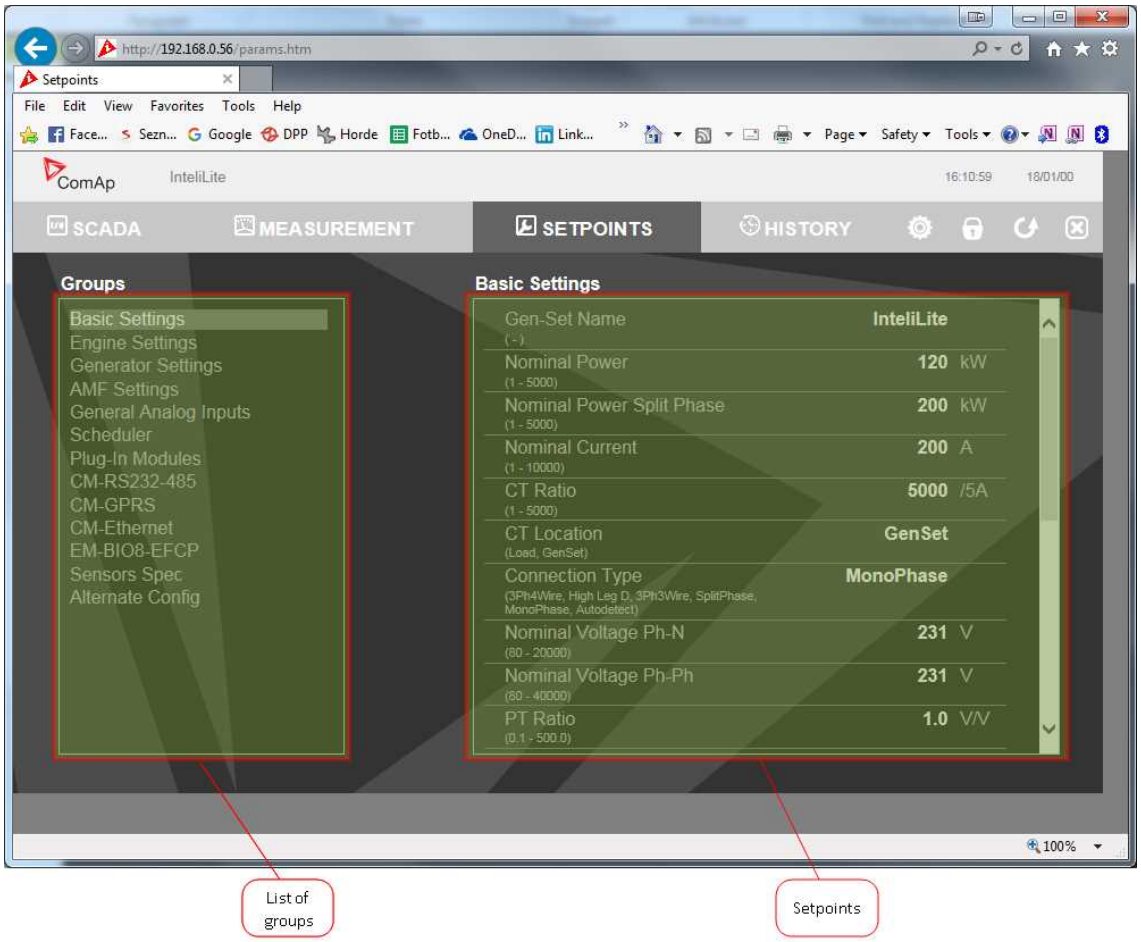


Image 6.10 Web Server - Setpoints screen

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.*

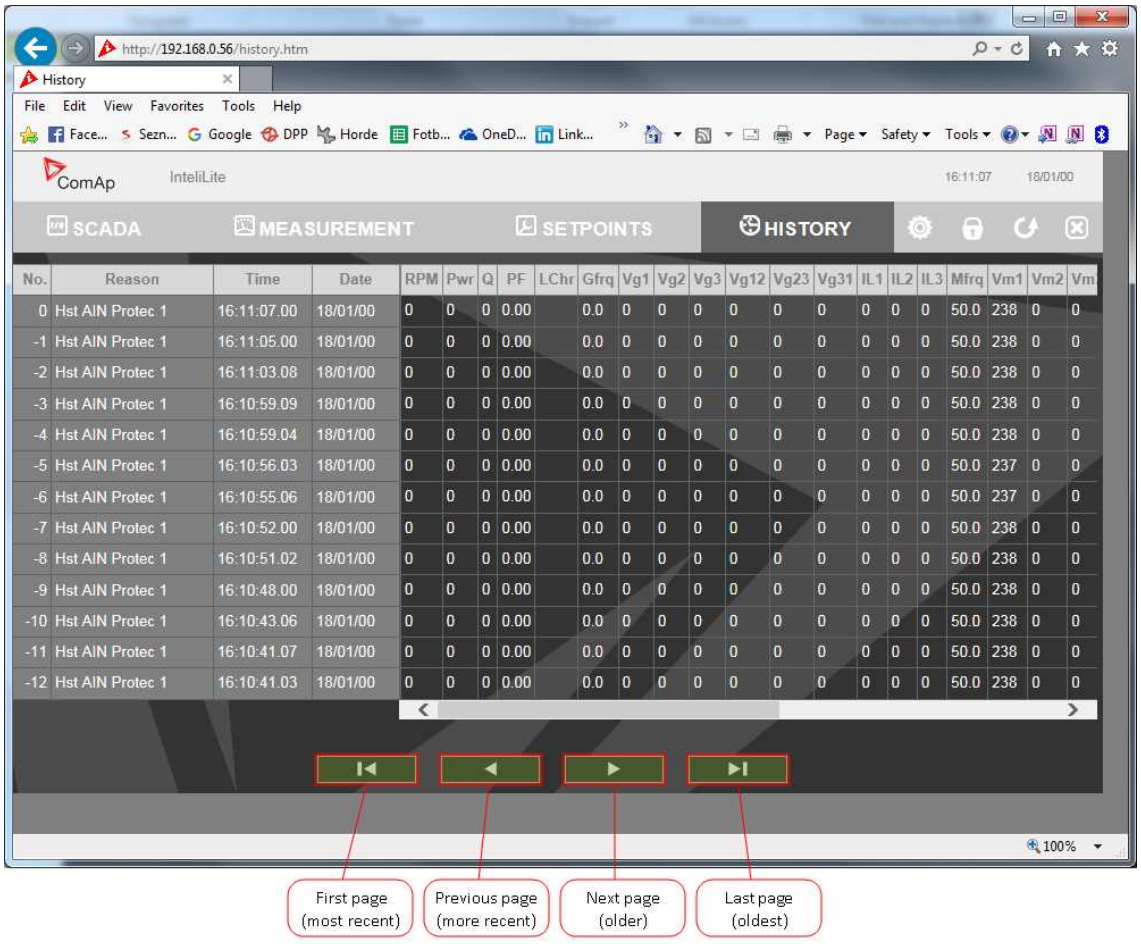


Image 6.11 Web Server - History screen

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.

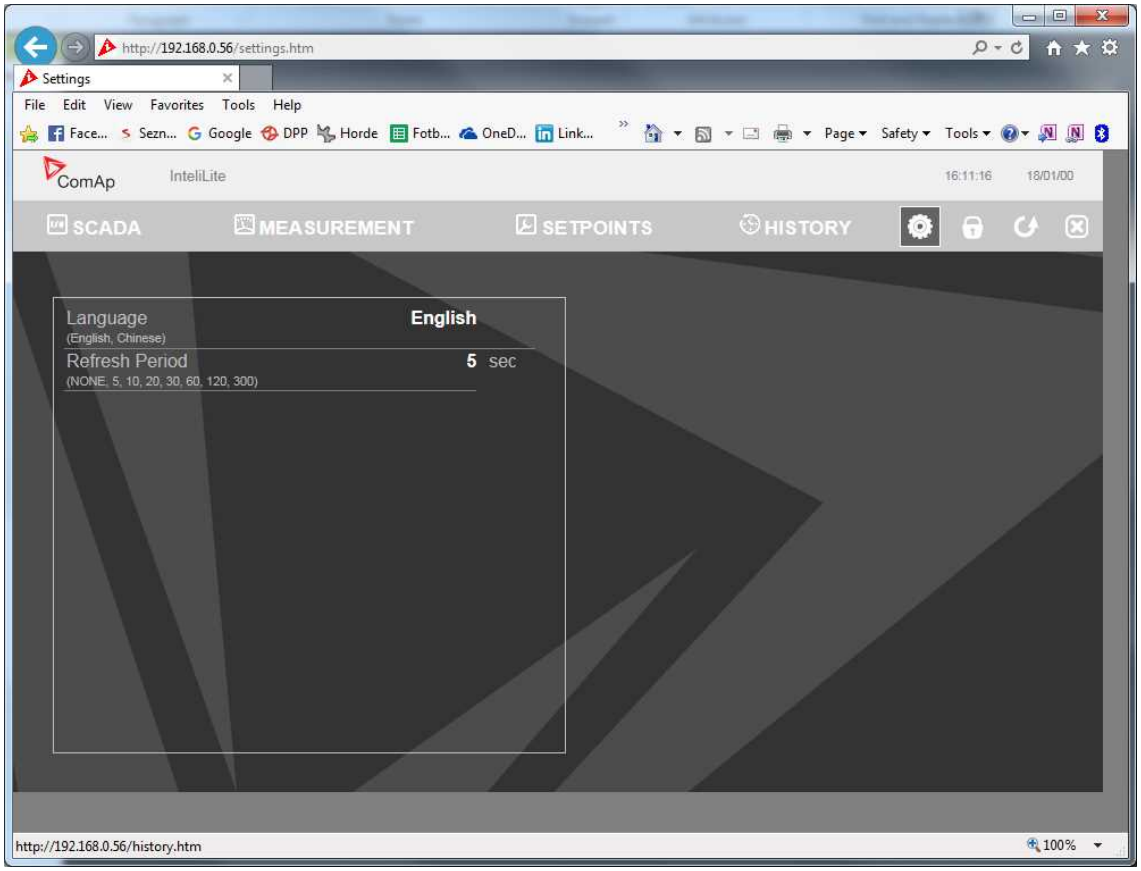


Image 6.12 Web Server - Adjustment screen

back to Communication

6.2 Connection to 3rd party systems

back to Communication

6.2.1 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 261)** or **COM2 Mode (page 263)** into the Modbus position. The serial speed for MODBUS-RTU communication is to be adjusted by the setpoint **COM1 MODBUS Communication Speed (page 262)** or **COM2 MODBUS Communication Speed (page 264)**.

- 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 278)**.

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

> **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

Data type	Meaning	Number of registers	Data maping
			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 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 …

Data type	Meaning	Number of registers	Data maping
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
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 142)**

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 143)**

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 142)**

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 142**	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**.

back to Connection to 3rd party systems

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

Binary outputs

Low current	4 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	3, 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

back to Table of contents

8 Appendix

back to Table of contents

8.1 Controller objects

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 71)** 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.**

List of setpoint groups

For full list of setpoints go to the chapter **List of setpoints (page 156)**.

List of setpoints

Basic settings

Engine settings

Generator settings

General Analog Inputs

Scheduler

Plug-In Modules

Alternate Config

Communication Modules

PLC

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.*

back to List of setpoints

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 162)**		
Description			

Nominal power of the gen-set for detected split-phase or mono phase connection. Generator **Overload BOC (page 203)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 162)** 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 251)**, **Nominal Power Split Phase 2 (page 255)** and **Nominal Power Split Phase 3 (page 259)**.*

back to List of setpoints

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 203)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint* ***Connection type (page 162)*** *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 251)***, ***Nominal Power 2 (page 255)*** *and* ***Nominal Power 3 (page 259)***.

back to List of setpoints

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 162)**.		
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 249)***, ***Nominal Current 2 (page 253)*** *and* ***Nominal Current 3 (page 257)***.

back to List of setpoints

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.*

back to List of setpoints

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

	or Mono Phase or ***Voltage Autodetect*** shutdown	L3 >=100V L1 >=100V L2 <= 20V L3 <= 20V

Note: *To lock this setpoint against editing you also have to lock setpoint* ***Connection Type 1 (page 247)****,* ***Connection type 2 (page 251)*** *and* ***Connection type 3 (page 255)****.*

back to List of setpoints

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 162)**.		
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 250)****,* ***Nominal Voltage Ph-N 2 (page 254)*** *and* ***Nominal Voltage Ph-N 3 (page 258)****.*			

back to List of setpoints

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 162)**.		
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 250)****,* ***Nominal Voltage Ph-Ph 2 (page 254)*** *and* ***Nominal Voltage Ph-Ph 3 (page 258)****.*			

back to List of setpoints

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.			

back to List of setpoints

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 168)**		
Description			
Mains voltage potential transformers ratio. If no PTs are used, adjust the setpoint to 1.			

back to List of setpoints

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 249)****,* ***Nominal Frequency 2 (page 253)*** *and* ***Nominal Frequency 3 (page 257)****.*			

back to List of setpoints

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.*

back to List of setpoints

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 250)**, **Nominal RPM 2 (page 254)** and **Nominal RPM 3 (page 258)**.*

back to List of setpoints

Subgroup: Controller settings

Controller mode

Setpoint group	Basic settings	**Related FW**	1.9.0
Range [units]	OFF / MAN / AUTO[-]		
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.			

back to List of setpoints

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*

back to List of setpoints

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 415)** binary input.

back to List of setpoints

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.*

back to List of setpoints

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.

back to List of setpoints

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.

back to List of setpoints

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 444)** binary output. The **HORN (PAGE 444)** 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.*

back to List of setpoints

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	Always		
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.*

back to List of setpoints

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.*

back to List of setpoints

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

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

Group: Engine settings

Subgroup: Starting

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.			

back to List of setpoints

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.**			

back to List of setpoints

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 173)**. **PRESTART (PAGE 447)** output is active in this pause until Cranking Fail Pause elapses.			

back to List of setpoints

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 447)** output prior to the engine start. Set to zero if you want to leave the output **PRESTART (PAGE 447)** open.

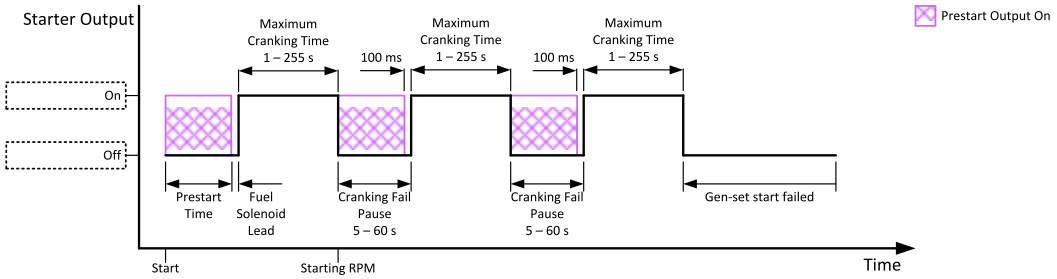


Image 8.1 Prestart Time

back to List of setpoints

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 166)**		
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 166)**. If this level is exceeded the engine is considered as started.

back to List of setpoints

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 451)** 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.**

back to List of setpoints

Glow Plugs Time

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. **Prestart Time (page 175)** [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 442)** will be close.

back to List of setpoints

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.

back to List of setpoints

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 432)** is configured.		
Description			

This setpoint defines choke function behavior.

Disabled	Choke function is disabled and logical binary output **CHOKE (PAGE 432)** is activated under no circumstances.
Fixed Time	Choke time is fixedly defined by **Choke Time (page 177)** setpoint.
Temp Based	Choke time is calculated using actual engine (coolant) temperature. Setpoints **Choke Start Temp (page 178)** and **Choke Increment (page 179)** are taken into consideration.

back to List of setpoints

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 432)** is configured and setpoint **Choke Function (page 177)** = Fixed Time.		
Description			

Defines time logical binary output **CHOKE (PAGE 432)** is activated for when fixed time is used. When setpoint **Choke Function (page 177)** is set to *Temp Based* value, *Choke Time* value have no effect.

> ***Note:*** *If setpoint **Choke Lead (page 181)** 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.*

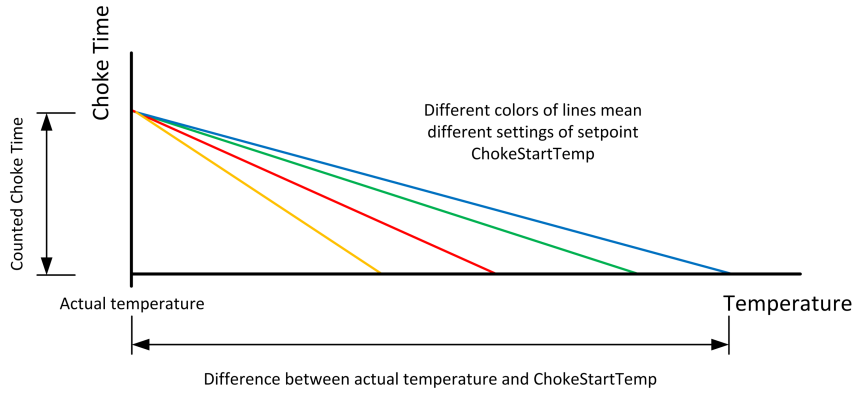
back to List of setpoints

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 432)** is configured and setpoint **Choke Function (page 177)** = 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 179)**. When setpoint **Choke Function (page 177)** is set to *Fixed Time* value, setpoint *Choke Start Temp* has no effect.



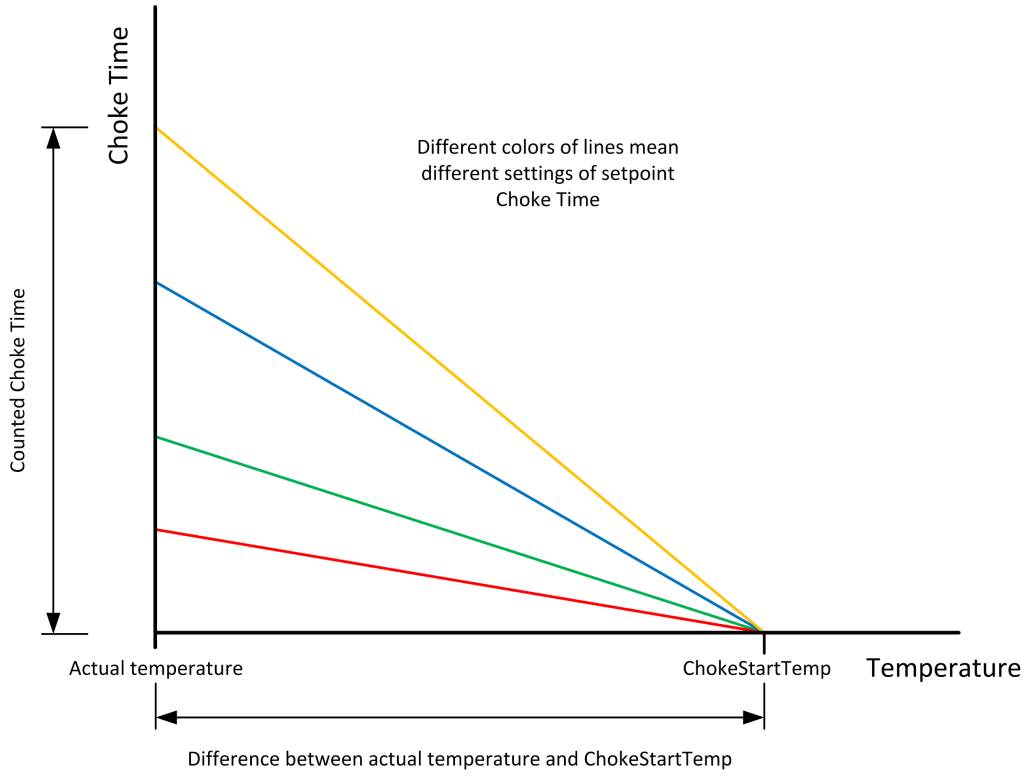
back to List of setpoints

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 432)** is configured and setpoint **Choke Function (page 177)** = Temp Based.		

Description

This setpoint adjust the maximal time of activation of binary output **CHOKE (PAGE 432)**. Calculated time depends on engine (coolant) temperature. Setpoint adjust curve which is used for calculating actual Choke Time. When setpoint **Choke Function (page 177)** is set to *Fixed Time* value, setpoint *Choke Increment* has no effect.



Note: *If setpoint **Choke Lead (page 181)** 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 178)**) This mean that adjusted parameters should ensure that calculated Choke Time will be longer than Choke Leadto ensure expected Choke behavior.*

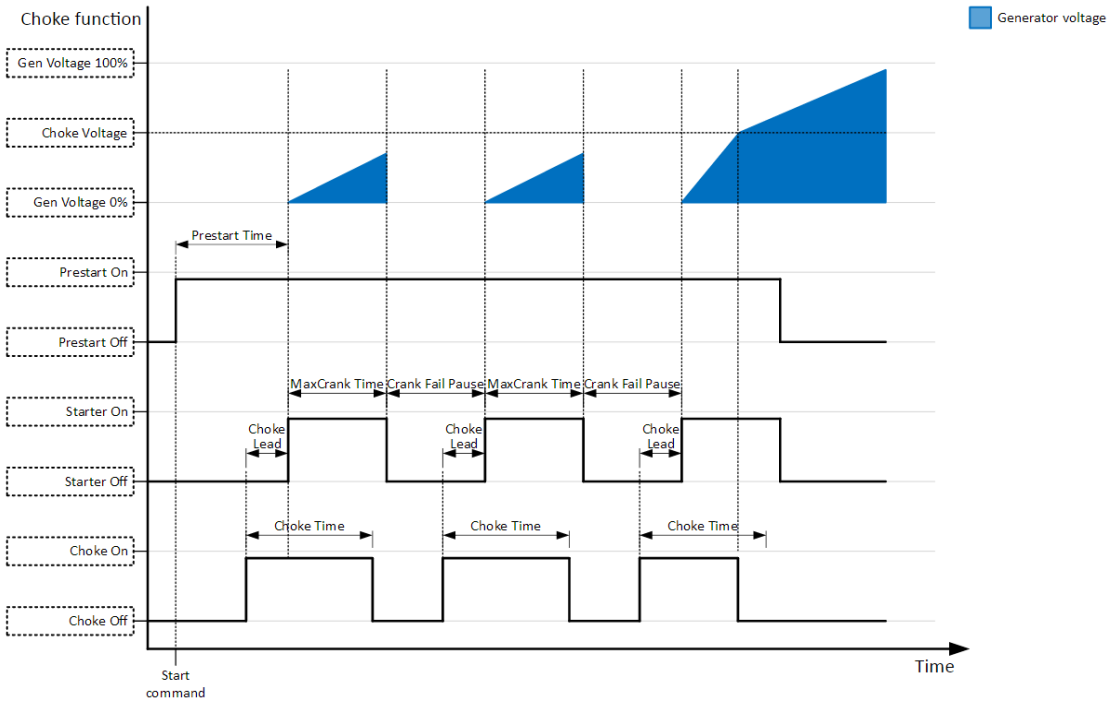
back to List of setpoints

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 432)** is configured.		

Description

This setpoint adjust threshold level for deactivation of **CHOKE (PAGE 432)** 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.



back to List of setpoints

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 432)** is configured.		
Description			

This setpoint adjust the lead of logical binary output CHOKE. **CHOKE (PAGE 432)** is activated before logical binary output **STARTER (PAGE 451)**.

> ***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.*

back to List of setpoints

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 436)** and **STARTER (PAGE 451)** logical binary outputs.**FUEL SOLENOID (PAGE 436)** is closed before **STARTER (PAGE 451)**. Lead time is adjusted via this setpoint.

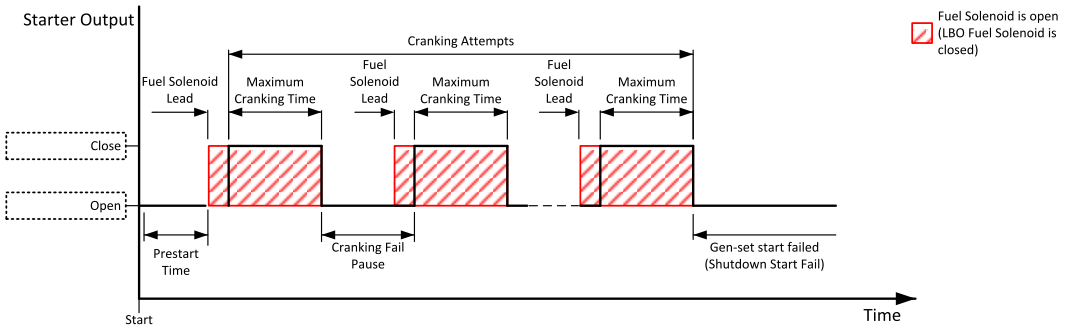


Image 8.2 Fuel Solenoid Lead

***Note:** LBO **PRESTART (PAGE 447)** goes to logical zero when Fuel Solenoid Lead goes to logical one.*

back to List of setpoints

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 175)**. Start fail is detected when during Idle state RPM decreases below 2 RPM.
The output **IDLE/NOMINAL (PAGE 445)** 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.

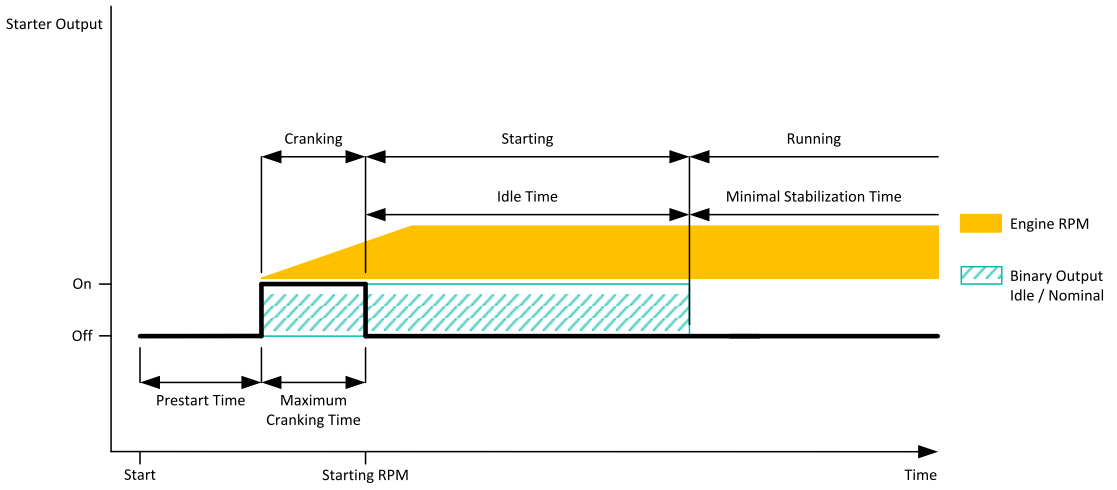


Image 8.3 Idle Time 1

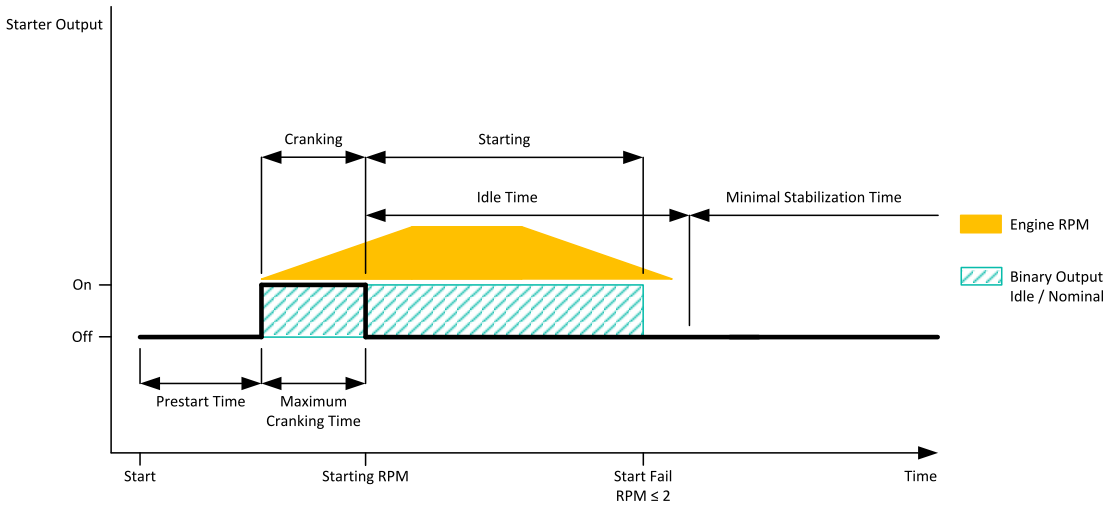


Image 8.4 Idle Time 2

back to List of setpoints

Minimal Stabilization Time

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	1 .. **Maximal Stabilization Time (page 185)** [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.

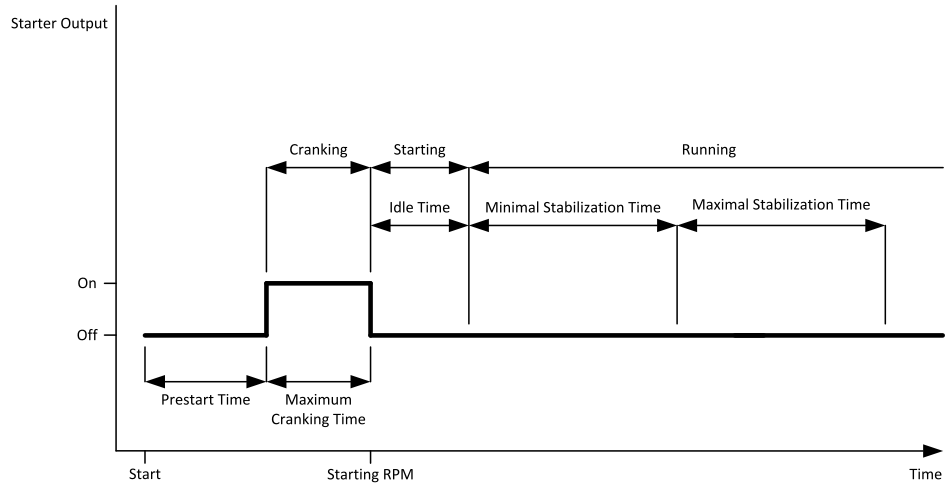


Image 8.5 Minimal Stabilization Time

back to List of setpoints

Maximal Stabilization Time

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	**Minimal Stabilization Time (page 184)** .. 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.			

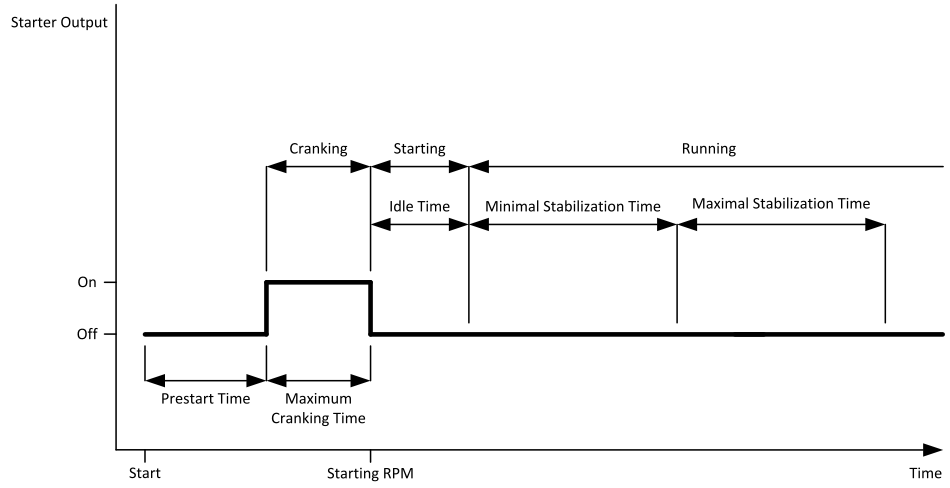


Image 8.6 Maximal Stabilization Time

back to List of setpoints

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.			

back to List of setpoints

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 445)** 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 445)** must be configured and connected to speed governor. Engine Idle speed must be adjusted on speed governor.*

back to List of setpoints

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.

back to List of setpoints

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 436)** has been de-energized and the **STOP SOLENOID (PAGE 452)** energized. The Stop Solenoid output is deactivated 12 s after last running engine indication went off.

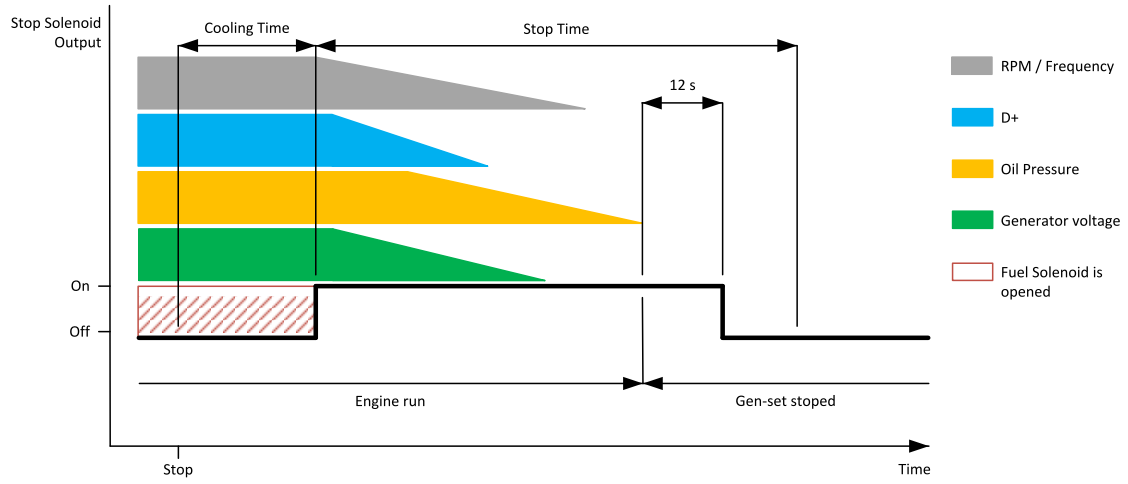


Image 8.7 Stop Time 1

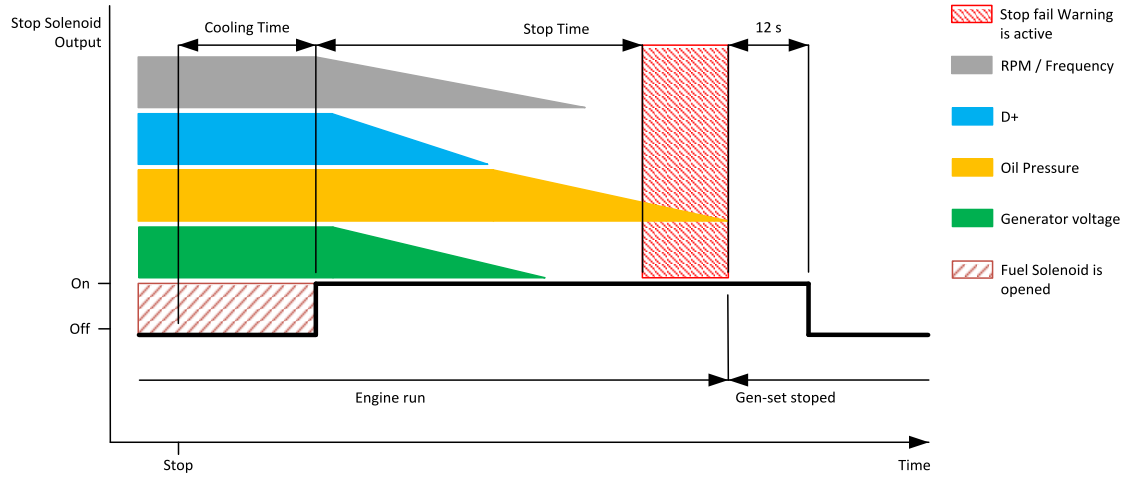


Image 8.8 Stop Time 2

back to List of setpoints

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.			

back to List of setpoints

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.

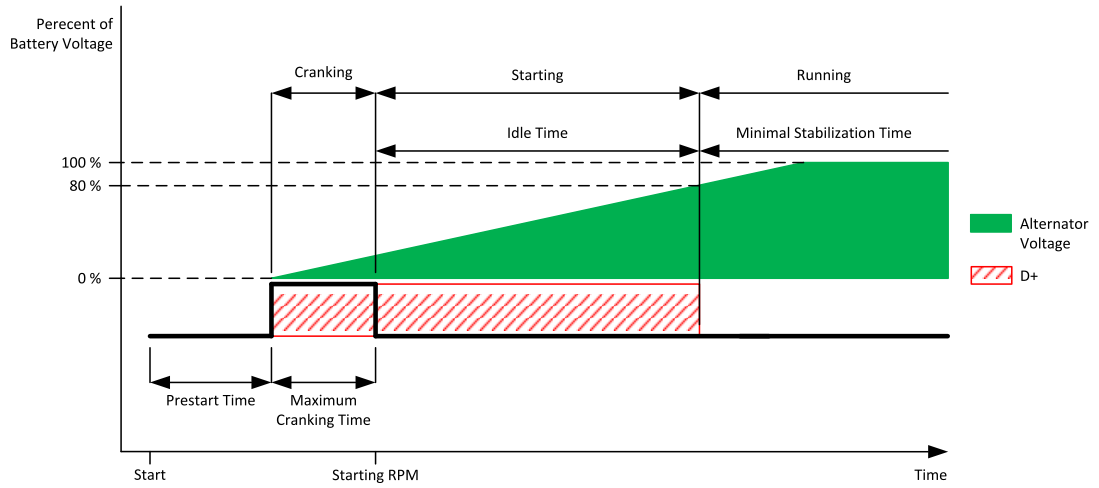


Image 8.9 D+ Function 1

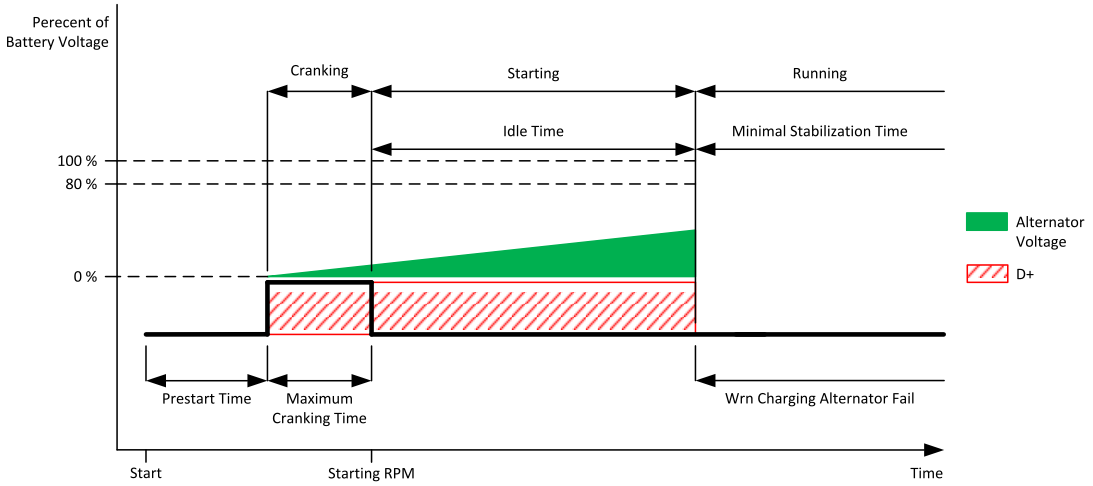


Image 8.10 D+ Function 2

back to List of setpoints

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 188)** is not set to *Disabled* value.		
Description			
This setpoint adjusts threshold level for D+ function.			

back to List of setpoints

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 188)** 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			

back to List of setpoints

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 188)** is not set to *Disabled* value.		
Description			
This setpoint adjusts type of alarm Charging Alternator Fail.			

back to List of setpoints

Subgroup: Engine Protections

Overspeed Sd

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	**Underspeed Sd (page 191)** .. 200 [%]		
Default value	115%	**Alternative config**	NO
Step	1 % of **Nominal RPM (page 166)**		
Comm object	8263	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for over speed protection. Relative to the nominal speed.			

back to List of setpoints

Underspeed Sd

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	0 .. **Overspeed Sd (page 190)** [%]		
Default value	25%	**Alternative config**	NO
Step	1 % of **Nominal RPM (page 166)**		
Comm object	8260	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for underspeed protection. Relative to the nominal speed.			

back to List of setpoints

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 166)**		
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 191)**. In this time the upper limit of protection is **Overspeed Sd (page 190)** + Overspeed Overshoot.			

back to List of setpoints

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 191)**		
Description			
Time for which is **Overspeed Overshot (page 191)** active. The timer starts in the same time when starter starts. ***Note:*** *The setpoint is visible only, if **Overspeed Overshot (page 191)** is greater than 0.*			

back to List of setpoints

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 480)** is configured		
Description			
Warning or history threshold level for **OIL PRESSURE (PAGE 480)**.			

back to List of setpoints

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 480)** is configured		
Description			
Shutdown threshold level for **OIL PRESSURE (PAGE 480)**.			

back to List of setpoints

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 480)** is configured or logical binary input **OIL PRESSURE (PAGE 413)** is configured		
Description			
Delay for **OIL PRESSURE (PAGE 480)**.			

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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 477)** is configured		
Description			
Warning or history threshold level for **COOLANT TEMP (PAGE 477)**.			

back to List of setpoints

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 477)** is configured		
Description			
Shutdown or BOC threshold level for **COOLANT TEMP (PAGE 477)**.			

back to List of setpoints

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 477)** is configured or logical binary input **COOLANT TEMP (PAGE 406)** is configured		
Description			
Delay for **COOLANT TEMP (PAGE 477)**.			

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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 477)** is configured		
Description			
Threshold level for lower limit of **COOLANT TEMP (PAGE 477)**.			

back to List of setpoints

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 477)** is configured		
Description			
Delay for **Coolant Temperature Low Wrn (page 196)**.			

back to List of setpoints

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 478)** is configured		
Description			
Warning or history threshold level for **FUEL LEVEL (PAGE 478)**.			

back to List of setpoints

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 478)** is configured		
Description			
Shutdown or BOC threshold level for **FUEL LEVEL (PAGE 478)**.			

back to List of setpoints

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 478)** is configured or logical binary input **FUEL LEVEL (PAGE 409)** is configured		
Description			
Delay for **FUEL LEVEL (PAGE 478)**.			

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

Subgroup: Battery Protections

Battery Undervoltage

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	8,0 V .. **Battery Overvoltage (page 200)** [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.			

back to List of setpoints

Battery Overvoltage

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	**Battery Undervoltage (page 199)** .. 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.			

back to List of setpoints

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 199)** and **Battery Overvoltage (page 200)** protection.			

back to List of setpoints

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 381)**		
Description			
Delay for LBI **BATTERY CHARGER (PAGE 381)**.			

back to List of setpoints

Low Battery Charging Cycle

Setpoint group	Engine settings	**Related FW**	1.9.0
Range [units]	Disabled / 1–240 [min]		
Default value	Disabled	**Alternative config**	NO
Step	1 min		
Comm object	15766	**Related applications**	MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint enables battery charging and defines the time gen-set is running for to recharge battery. If battery charging is enabled and battery undervoltage is detected for more than 5 minutes, gen-set is started and will run for time defined in setpoint *Low Battery Charging Cycle*.
Battery charging is only initiated in AUT mode when no Shutdown alarm and Fuel Level alarm is active.
If there is battery undervoltage detected again after previous Charging Cycle is finished (and undervoltage lasts more than 5 minutes) next Charging Cycle is initiated.
If controller is switched to MAN mode during battery charging, gen-set stay running regardless timer (*Low Battery Charging Cycle* setpoint) elapsing. Gen-set is stopped by STOP button or by any SD alarm event only in this case.
If there is *Charging Alternator Fail* alarm occurred during battery recharging period, current battery recharging continues until time is elapsed. Next gen-set start due to battery undervoltage is blocked until controller is restarted.

> **IMPORTANT: If controller is in MAN mode and the battery voltage is under the limit more than 5 minutes engine is started immediately when controller is switched to AUT mode.**

Note: *Low Battery Charging function is available only when separate MRS archive is used.*

back to List of setpoints

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 413)** 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 413)** and if the input pulses counter reaches value given by this setpoint, the counter value **Pulse Counter 1 (page 361)** 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 List of setpoints

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 414)** 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 414)** and if the input pulses counter reaches value given by this setpoint, the counter value **Pulse Counter 2 (page 361)** 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 List of setpoints

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 454)** or **VENTILATION OFF PULSE (PAGE 454)** is configured.		
Description			
This setpoint defines duration of pulse generated on logical binary outputs **VENTILATION ON PULSE (PAGE 454)** or **VENTILATION OFF PULSE (PAGE 454)** at the moment when logical binary output **VENTILATION (PAGE 454)** is activated or deactivated respectively.			

back to List of setpoints

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 260)**, **ECU Speed Adjustment 2 (page 260)** and **ECU Speed Adjustment 3 (page 261)**.*

back to List of setpoints

Group: Generator settings

Subgroup: Overload Protection

Overload BOC

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	**Overload Wrn (page 204)** .. 200 [%]		
Default value	120 %	**Alternative config**	NO
Step	1 % of **Nominal Power (page 161)**		
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.*

back to List of setpoints

Overload Wrn

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	0 .. **Overload BOC (page 203)** [%]		
Default value	120 %	**Alternative config**	NO
Step	1 % of **Nominal Power (page 161)**		
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.			

back to List of setpoints

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 203)****Overload BOC (page 203)** and **Overload Wrn (page 204)** protection.			

back to List of setpoints

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 161)**		
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.*			

back to List of setpoints

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 204)** protection.			

back to List of setpoints

Subgroup: Voltage Protection

Generator Overvoltage Sd

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	**Generator Overvoltage Wrn (page 205)** .. 200 [%]		
Default value	110 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 164)** or **Nominal Voltage Ph-Ph (page 164)**		
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 206)** .. **Generator Overvoltage Sd (page 205)** [%]		
Default value	110 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 164)** or **Nominal Voltage Ph-Ph (page 164)**		
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.*			

back to List of setpoints

Generator Undervoltage BOC

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	0 .. **Generator Undervoltage Wrn (page 206)** [%]		
Default value	70 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 164)** or **Nominal Voltage Ph-Ph (page 164)**		
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.*			

back to List of setpoints

Generator Undervoltage Wrn

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	**Generator Undervoltage BOC (page 206)** .. **Generator Overvoltage Wrn (page 205)** [%]		
Default value	70 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 164)** or **Nominal Voltage Ph-Ph (page 164)**		
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.*			

back to List of setpoints

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 205)**, **Generator Overvoltage Wrn (page 205)**, **Generator Undervoltage BOC (page 206)** and **Generator Undervoltage Wrn (page 206)** protection.			

back to List of setpoints

Subgroup: Frequency Protection

Generator Overfrequency BOC

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	**Generator Overfrequency Wrn (page 207)** .. 200,0 [%]		
Default value	110,0 %	**Alternative config**	NO
Step	0,1 % of **Nominal Frequency (page 165)**		
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.*			

back to List of setpoints

Generator Overfrequency Wrn

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	**Generator Underfrequency Wrn (page 208)** .. **Generator Overfrequency BOC (page 207)** [%]		
Default value	110,0 %	**Alternative config**	NO
Step	0,1 % of **Nominal Frequency (page 165)**		
Comm object	9688	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator phase L1 overfrequency.			

back to List of setpoints

Generator Underfrequency BOC

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	0,0 .. **Generator Underfrequency Wrn (page 208)** [%]		
Default value	85,0 %	**Alternative config**	NO
Step	0,1 % of **Nominal Frequency (page 165)**		
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.*			

back to List of setpoints

Generator Underfrequency Wrn

Setpoint group	Generator settings	**Related FW**	1.9.0
Range [units]	**Generator Underfrequency BOC (page 207)** .. **Generator Overfrequency Wrn (page 207)** [%]		
Default value	85,0 %	**Alternative config**	NO
Step	0,1 % of **Nominal Frequency (page 165)**		
Comm object	9689	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator phase L1 underfrequency.			

back to List of setpoints

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 207)**, **Generator Overfrequency Wrn (page 207)**, **Generator Underfrequency Wrn (page 208)** and **Generator Underfrequency BOC (page 207)** protection.			

back to List of setpoints

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 457)** is configured		
Description			
Warning or history threshold level for **AIN PROT01 (PAGE 457)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT01 (PAGE 457)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 457)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT01 (PAGE 457)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT01 (PAGE 457)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 457)** is configured		
Description			
Delay for **AIN PROT01 (PAGE 457)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT01 (PAGE 457)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 458)** is configured		
Description			
Warning or history threshold level for **AIN PROT02 (PAGE 458)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT02 (PAGE 458)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 458)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT02 (PAGE 458)**.			
Note: *These setpoints are used only if LAI **AIN PROT02 (PAGE 458)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 458)** is configured		
Description			
Delay for **AIN PROT02 (PAGE 458)**.			
Note: *These setpoints are used only if LAI **AIN PROT02 (PAGE 458)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 459)** is configured		
Description			
Warning or history threshold level for **AIN PROT03 (PAGE 459)**.			

Note: *These setpoints are used only if LAI **AIN PROT03 (PAGE 459)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 459)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT03 (PAGE 459)**.			

Note: *These setpoints are used only if LAI **AIN PROT03 (PAGE 459)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 459)** is configured		
Description			
Delay for **AIN PROT03 (PAGE 459)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT03 (PAGE 459)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 460)** is configured		
Description			
Warning or history threshold level for **AIN PROT04 (PAGE 460)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT04 (PAGE 460)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 460)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT04 (PAGE 460)**.			
Note: *These setpoints are used only if LAI **AIN PROT04 (PAGE 460)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 460)** is configured		
Description			
Delay for **AIN PROT04 (PAGE 460)**.			
Note: *These setpoints are used only if LAI **AIN PROT04 (PAGE 460)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 461)** is configured		
Description			
Warning or history threshold level for **AIN PROT05 (PAGE 461)**.			

Note: *These setpoints are used only if LAI **AIN PROT05 (PAGE 461)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 461)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT05 (PAGE 461)**.			

Note: *These setpoints are used only if LAI **AIN PROT05 (PAGE 461)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 461)** is configured		
Description			
Delay for **AIN PROT05 (PAGE 461)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT05 (PAGE 461)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 462)** is configured		
Description			
Warning or history threshold level for **AIN PROT06 (PAGE 462)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT06 (PAGE 462)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 462)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT06 (PAGE 462)**.			

Note: *These setpoints are used only if LAI **AIN PROT06 (PAGE 462)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 462)** is configured		
Description			
Delay for **AIN PROT06 (PAGE 462)**.			

Note: *These setpoints are used only if LAI **AIN PROT06 (PAGE 462)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 463)** is configured		
Description			
Warning or history threshold level for **AIN PROT07 (PAGE 463)**.			

Note: *These setpoints are used only if LAI **AIN PROT07 (PAGE 463)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 463)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT07 (PAGE 463)**.			

Note: *These setpoints are used only if LAI **AIN PROT07 (PAGE 463)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 463)** is configured		
Description			
Delay for **AIN PROT07 (PAGE 463)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT07 (PAGE 463)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 464)** is configured		
Description			
Warning or history threshold level for **AIN PROT08 (PAGE 464)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT08 (PAGE 464)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 464)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT08 (PAGE 464)**.			
Note: *These setpoints are used only if LAI **AIN PROT08 (PAGE 464)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 464)** is configured		
Description			
Delay for **AIN PROT08 (PAGE 464)**.			
Note: *These setpoints are used only if LAI **AIN PROT08 (PAGE 464)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 465)** is configured		
Description			
Warning or history threshold level for **AIN PROT09 (PAGE 465)**.			

Note: *These setpoints are used only if LAI **AIN PROT09 (PAGE 465)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 465)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT09 (PAGE 465)**.			

Note: *These setpoints are used only if LAI **AIN PROT09 (PAGE 465)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 465)** is configured		
Description			
Delay for **AIN PROT09 (PAGE 465)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT09 (PAGE 465)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 466)** is configured		
Description			
Warning or history threshold level for **AIN PROT10 (PAGE 466)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT10 (PAGE 466)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 466)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT10 (PAGE 466)**.			

Note: *These setpoints are used only if LAI **AIN PROT10 (PAGE 466)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 466)** is configured		
Description			
Delay for **AIN PROT10 (PAGE 466)**.			

Note: *These setpoints are used only if LAI **AIN PROT10 (PAGE 466)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 467)** is configured		
Description			
Warning or history threshold level for **AIN PROT11 (PAGE 467)**.			

Note: *These setpoints are used only if LAI **AIN PROT11 (PAGE 467)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 467)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT11 (PAGE 467)**.			

Note: *These setpoints are used only if LAI **AIN PROT11 (PAGE 467)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 467)** is configured		
Description			
Delay for **AIN PROT11 (PAGE 467)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT11 (PAGE 467)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 468)** is configured		
Description			
Warning or history threshold level for **AIN PROT12 (PAGE 468)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT12 (PAGE 468)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 468)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT12 (PAGE 468)**.			

Note: *These setpoints are used only if LAI **AIN PROT12 (PAGE 468)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 468)** is configured		
Description			
Delay for **AIN PROT12 (PAGE 468)**.			

Note: *These setpoints are used only if LAI **AIN PROT12 (PAGE 468)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 469)** is configured		
Description			
Warning or history threshold level for **AIN PROT13 (PAGE 469)**.			

Note: *These setpoints are used only if LAI **AIN PROT13 (PAGE 469)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 469)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT13 (PAGE 469)**.			

Note: *These setpoints are used only if LAI **AIN PROT13 (PAGE 469)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 469)** is configured		
Description			
Delay for **AIN PROT13 (PAGE 469)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT13 (PAGE 469)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 470)** is configured		
Description			
Warning or history threshold level for **AIN PROT14 (PAGE 470)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT14 (PAGE 470)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 470)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT14 (PAGE 470)**.			
Note: *These setpoints are used only if LAI **AIN PROT14 (PAGE 470)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 470)** is configured		
Description			
Delay for **AIN PROT14 (PAGE 470)**.			
Note: *These setpoints are used only if LAI **AIN PROT14 (PAGE 470)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 471)** is configured		
Description			
Warning or history threshold level for **AIN PROT15 (PAGE 471)**.			

Note: *These setpoints are used only if LAI **AIN PROT15 (PAGE 471)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 471)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT15 (PAGE 471)**.			

Note: *These setpoints are used only if LAI **AIN PROT15 (PAGE 471)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 471)** is configured		
Description			
Delay for **AIN PROT15 (PAGE 471)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT15 (PAGE 471)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 472)** is configured		
Description			
Warning or history threshold level for **AIN PROT16 (PAGE 472)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT16 (PAGE 472)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 472)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT16 (PAGE 472)**.			

Note: *These setpoints are used only if LAI **AIN PROT16 (PAGE 472)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 472)** is configured		
Description			
Delay for **AIN PROT16 (PAGE 472)**.			

Note: *These setpoints are used only if LAI **AIN PROT16 (PAGE 472)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 473)** is configured		
Description			
Warning or history threshold level for **AIN PROT17 (PAGE 473)**.			

Note: *These setpoints are used only if LAI **AIN PROT17 (PAGE 473)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 473)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT17 (PAGE 473)**.			

Note: *These setpoints are used only if LAI **AIN PROT17 (PAGE 473)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 473)** is configured		
Description			
Delay for **AIN PROT17 (PAGE 473)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT17 (PAGE 473)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 474)** is configured		
Description			
Warning or history threshold level for **AIN PROT18 (PAGE 474)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT18 (PAGE 474)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 474)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT18 (PAGE 474)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT18 (PAGE 474)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 474)** is configured		
Description			
Delay for **AIN PROT18 (PAGE 474)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT18 (PAGE 474)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 475)** is configured		
Description			
Warning or history threshold level for **AIN PROT19 (PAGE 475)**.			

Note: *These setpoints are used only if LAI **AIN PROT19 (PAGE 475)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 475)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT19 (PAGE 475)**.			

Note: *These setpoints are used only if LAI **AIN PROT19 (PAGE 475)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 475)** is configured		
Description			
Delay for **AIN PROT19 (PAGE 475)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT19 (PAGE 475)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 476)** is configured		
Description			
Warning or history threshold level for **AIN PROT20 (PAGE 476)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT20 (PAGE 476)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

back to List of setpoints

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 476)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT20 (PAGE 476)**.			

Note: *These setpoints are used only if LAI **AIN PROT20 (PAGE 476)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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 476)** is configured		
Description			
Delay for **AIN PROT20 (PAGE 476)**.			

Note: *These setpoints are used only if LAI **AIN PROT20 (PAGE 476)** is adjusted to required protection type. Otherwise these setpoints are useless.*

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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.*			

back to List of setpoints

#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.

back to List of setpoints

Subgroup: Timer 1

Timer 1 Function

Setpoint group	Scheduler	**Related FW**	1.9.0
Range [units]	Disable / No Func / /Auto Run / 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 435)** is always activated when Timer is active regardless of chosen timer function. Timer functions require controller running in AUTO 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.
Auto Run	When this option is chosen then the binary output of timer is internally connected to the **REMOTE START/STOP (PAGE 415)** binary input.
Mode OFF	When this option is chosen then the binary output of timer is internally connected to the Remote OFF binary input.

back to List of setpoints

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 240)**
- **Timer 1 Repetition (page 241)**
- **Timer 1 First Occur. Date (page 242)**
- **Timer 1 First Occur. Time (page 242)**
- **Timer 1 Duration (page 242)**
- **Timer 1 Repeated (page 243)**
- **Timer 1 Repeat Day (page 246)**
- **Timer 1 Day (page 245)**
- **Timer 1 Repeated Day In Week (page 246)**
- **Timer 1 Repeat Day In Month (page 246)**
- **Timer 1 Repeat Week In Month (page 247)**
- **Timer 1 Refresh Period (page 244)**
- **Timer 1 Weekends (page 245)**

back to List of setpoints

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 240)**		
Description			

Defines repetition of **Timer 1 Function (page 240)**.

Off	**Timer 1 Function (page 240)** will not be activated.
Once	**Timer 1 Function (page 240)** will be activated only one time.
Repeated	**Timer 1 Function (page 240)** will be repeatedly activated.

back to List of setpoints

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 240)**		
Description			
Date of first occurrence of **Timer 1 Function (page 240)**.			

back to List of setpoints

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 240)**		
Description			
Time of first occurrence of **Timer 1 Function (page 240)**.			

back to List of setpoints

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 240)**		
Description			
Timer 1 Function (page 240) duration time.			

back to List of setpoints

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 240)**		
Description			

Repeated interval of **Timer 1 Function (page 240)**.

Daily	**Timer 1 Function (page 240)** is repeated every day.
Weekly	**Timer 1 Function (page 240)** is repeated every week in chosen days.
Monthly	**Timer 1 Function (page 240)** is repeated in chosen day every month or in chosen days of chosen week of month
Short Period	**Timer 1 Function (page 240)** is repeated in adjusted period.

back to List of setpoints

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 240)**		

Description

Refresh period of **Timer 1 Function (page 240)**. Meaning of this setpoint depends on type of repetition adjusted in **Timer 1 Repeated (page 243)**.

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 240)**, the **Timer 1 Function (page 240)** 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 240)**, the **Timer 1 Function (page 240)** will be activated in selected days adjusted by **Timer 1 Day (page 245)**.
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 240)**, the **Timer 1 Function (page 240)** will be activated in selected day of month adjusted by **Timer 1 Repeat Day In Month (page 246)** or in selected days of week of month adjusted by **Timer 1 Day (page 245)** and **Timer 1 Repeat Week In Month (page 247)**.
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 240)**, the **Timer 1 Function (page 240)** will be activated.

back to List of setpoints

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 240)**		
Description			

Behavior of **Timer 1 Function (page 240)** on weekends.

Including	**Timer 1 Function (page 240)** counter is running on the weekends and **Timer 1 Function (page 240)** can be active.
Skip	**Timer 1 Function (page 240)** counter is running on the weekends but **Timer 1 Function (page 240)** isn't active.
Postpone	**Timer 1 Function (page 240)** counter isn't running on the weekends and **Timer 1 Function (page 240)** 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.

back to List of setpoints

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 240)**		
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.

back to List of setpoints

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 240)**		
Description			

Use this setpoint to adjust behavior of monthly repetition of the **Timer 1 Function (page 240)**.

Repeated Day	Chose one day in month when **Timer 1 Function (page 240)** will be activated.
Repeated Day In Week	Chose days in one week when **Timer 1 Function (page 240)** will be activated.

back to List of setpoints

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 240)**		
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 156)

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 240)**		
Description			

Use this setpoint to chose the day in month when the **Timer 1 Function (page 240)** will be activated.

back to List of setpoints

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 240)**		
Description			
This setpoint adjust the week of month in which the **Timer 1 Function (page 240)** will be activated.			

back to List of setpoints

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.			

back to List of setpoints

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

	or Mono Phase or ***Voltage Autodetect*** shutdown	L2 <= 20V L3 >=100V L1 >=100V L2 <= 20V L3 <= 20V

Note: *This value is used when binary input* ***ALTERNATE CONFIG 2*** *(****PAGE 381****) is active.*

back to List of setpoints

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.*

back to List of setpoints

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.*

back to List of setpoints

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.*			

back to List of setpoints

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 247)**.		
Description			
Nominal system voltage (phase to neutral). ***Note:*** *This value is used when any other alternate configuration is not active.*			

back to List of setpoints

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 247)**.		
Description			
Nominal system voltage (phase to phase). ***Note:*** *This value is used when any other alternate configuration is not active.*			

back to List of setpoints

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 203)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint* ***Connection type (page 162)*** *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.*

back to List of setpoints

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 162)**		
Description			

Nominal power of the gen-set for detected split-phase or mono phase connection. Generator **Overload BOC (page 203)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint* ***Connection type (page 162)*** *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.*

back to List of setpoints

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 381) is active.*

back to List of setpoints

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 381) is active.*

back to List of setpoints

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 381) is active.*

back to List of setpoints

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 381)*** *is active.*			

back to List of setpoints

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 251)**.		
Description			
Nominal system voltage (phase to neutral). ***Note:*** *This value is used when binary input* ***ALTERNATE CONFIG 2 (PAGE 381)*** *is active.*			

back to List of setpoints

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 251)**.		
Description			
Nominal system voltage (phase to phase). ***Note:*** *This value is used when binary input* ***ALTERNATE CONFIG 2 (PAGE 381)*** *is active.*			

back to List of setpoints

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 203)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 162)** 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 381)** is active.*

back to List of setpoints

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 162)**		
Description			

Nominal power of the gen-set for detected split-phase or mono phase connection. Generator **Overload BOC (page 203)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 162)** 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 381)** is active.*

back to List of setpoints

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	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 3*** *(PAGE 381) is active.*

back to List of setpoints

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 381) is active.*

back to List of setpoints

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 381) is active.*

back to List of setpoints

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 381)*** *is active.*			

back to List of setpoints

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 255)**.		
Description			
Nominal system voltage (phase to neutral). ***Note:*** *This value is used when binary input* ***ALTERNATE CONFIG 3 (PAGE 381)*** *is active.*			

back to List of setpoints

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 255)**.		
Description			
Nominal system voltage (phase to phase). ***Note:*** *This value is used when binary input* ***ALTERNATE CONFIG 3 (PAGE 381)*** *is active.*			

back to List of setpoints

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 203)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 162)** 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 381)** is active.*

back to List of setpoints

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 162)**		
Description			

Nominal power of the gen-set for detected split-phase or mono phase connection. Generator **Overload BOC (page 203)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 162)** 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 381)** is active.*

back to List of setpoints

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.*

back to List of setpoints

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 381****) is active.*

back to List of setpoints

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 381****) is active.*

back to List of setpoints

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.

back to List of setpoints

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 261)**		
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.*			

List of setpoints (page 156)

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 261)**		
Description			
If the MODBUS mode is selected on COM1 channel, the MODBUS communication speed can be adjusted here.			

List of setpoints (page 156)

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.			

back to List of setpoints

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 263)**		
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 156)

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 263)**		
Description			
If the MODBUS mode is selected on COM2 channel, the MODBUS communication speed can be adjusted here.			

List of setpoints (page 156)

Group: CM-GPRS

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 78)*** *more information.*

This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.

back to List of setpoints

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.*			

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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.**

back to List of setpoints

Group: CM-4G-GPS

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 78)*** *more information.*

This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.

back to List of setpoints

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.*

back to List of setpoints

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.

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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.**

back to List of setpoints

Group: CM-Ethernet

Email Address 1

Setpoint group	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		
Description			

Enter in this setpoint a valid e-mail address where the alarm and event e-mails shall be sent.

> ***Note:*** *This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.*

back to List of setpoints

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 78)*** *more information.*

This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.

back to List of setpoints

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.*

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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.			

back to List of setpoints

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.**

back to List of setpoints

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.

back to List of setpoints

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 275)**		
Description			

The setpoint is used to set the address when you are in static mode.

If **IP Address Mode (page 275)** 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 275)** is AUTOMATIC this setpoint is inactive. The IP address is assigned by the DHCP server.

back to List of setpoints

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 275)**		
Description			
The setpoint is used to select the method how the Subnet Mask is adjusted. If **IP Address Mode (page 275)** 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 275)** is AUTOMATIC this setpoint is inactive. The Subnet Mask is assigned by the DHCP server.			

back to List of setpoints

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 275)**		
Description			
The setpoint is used to select the method how the Gateway IP is adjusted. If **IP Address Mode (page 275)** 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 275)** 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.			

back to List of setpoints

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 275)** 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 275)** is AUTOMATIC this setpoint is inactive. The DNS server IP address is assigned by the DHCP server.			

back to List of setpoints

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 275)** 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 275)** is AUTOMATIC this setpoint is inactive. The DNS server IP address is assigned by the DHCP server.			

back to List of setpoints

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.			

back to List of setpoints

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 275)**		
Description			
The setpoint is used to enable/disable WebServer function.			

back to List of setpoints

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

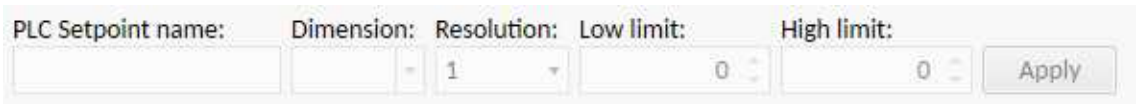


Image 8.11 Screen of configuration from InteliConfig

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 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

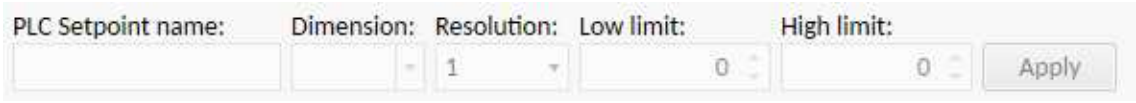


Image 8.12 Screen of configuration from InteliConfig

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 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

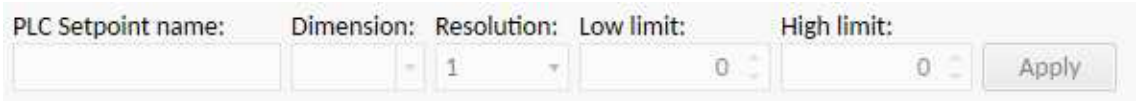


Image 8.13 Screen of configuration from InteliConfig

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 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

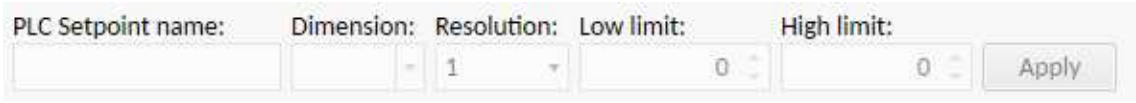


Image 8.14 Screen of configuration from InteliConfig

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 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

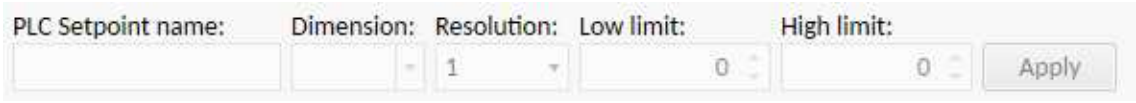


Image 8.15 Screen of configuration from InteliConfig

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 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

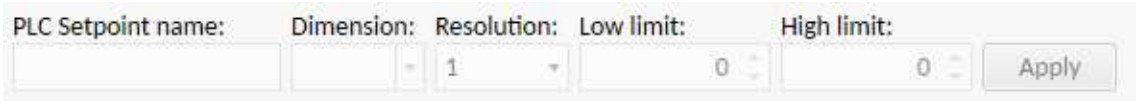


Image 8.16 Screen of configuration from InteliConfig

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 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

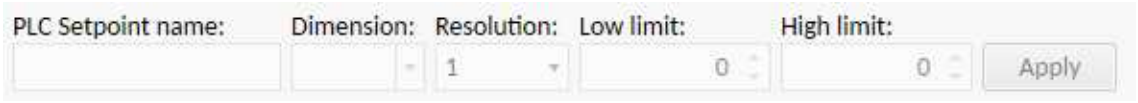


Image 8.17 Screen of configuration from InteliConfig

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 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

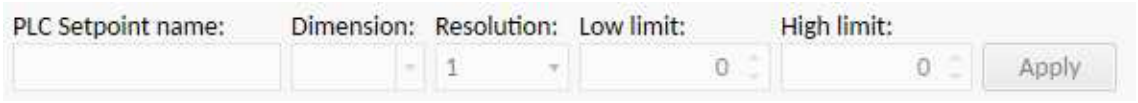


Image 8.18 Screen of configuration from InteliConfig

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 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

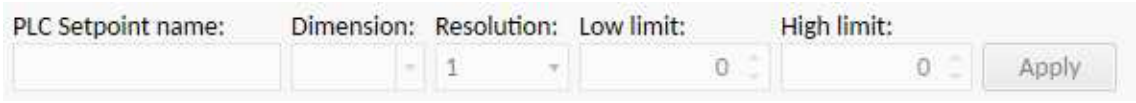


Image 8.19 Screen of configuration from InteliConfig

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 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

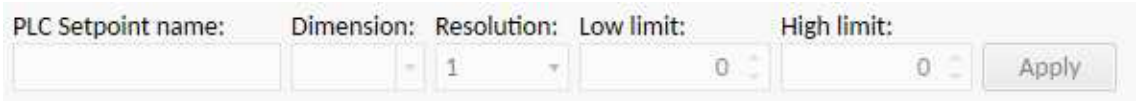


Image 8.20 Screen of configuration from InteliConfig

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 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

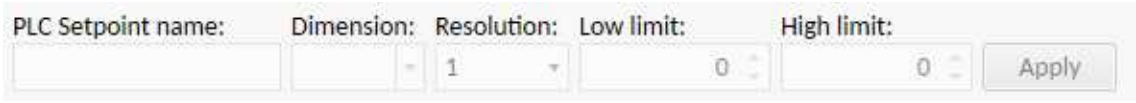


Image 8.21 Screen of configuration from InteliConfig

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 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

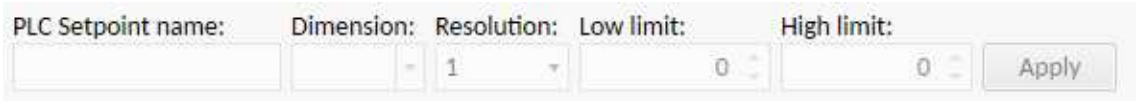


Image 8.22 Screen of configuration from InteliConfig

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 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

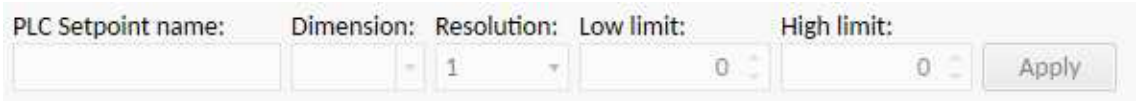


Image 8.23 Screen of configuration from InteliConfig

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 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

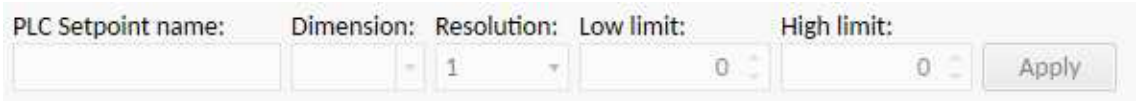


Image 8.24 Screen of configuration from InteliConfig

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 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

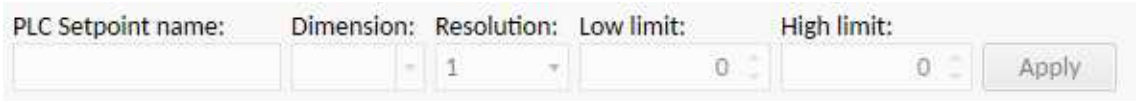


Image 8.25 Screen of configuration from InteliConfig

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 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

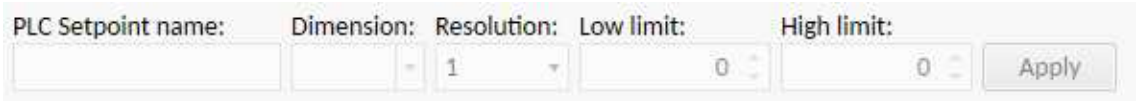


Image 8.26 Screen of configuration from InteliConfig

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 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

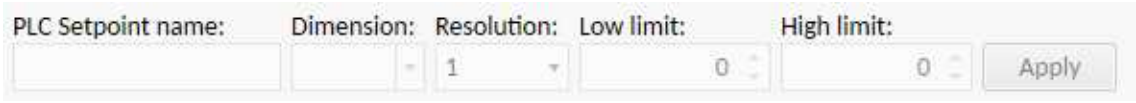


Image 8.27 Screen of configuration from InteliConfig

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 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

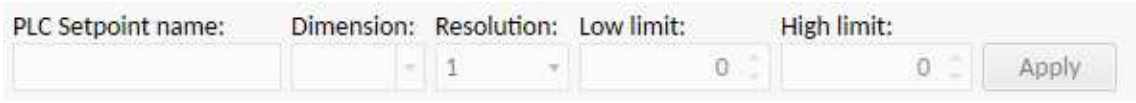


Image 8.28 Screen of configuration from InteliConfig

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 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

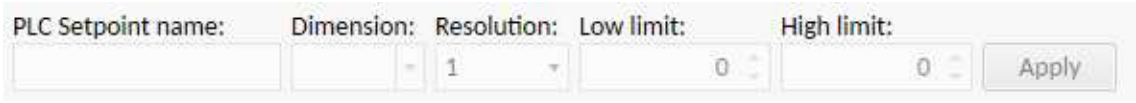


Image 8.29 Screen of configuration from InteliConfig

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 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

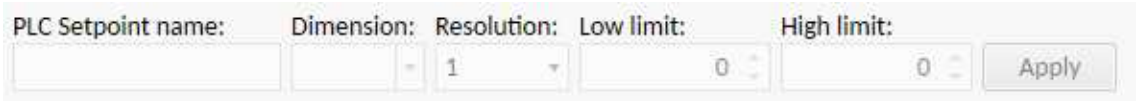


Image 8.30 Screen of configuration from InteliConfig

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 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

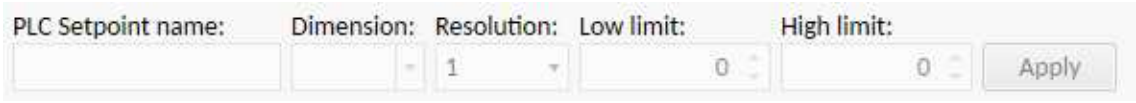


Image 8.31 Screen of configuration from InteliConfig

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 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

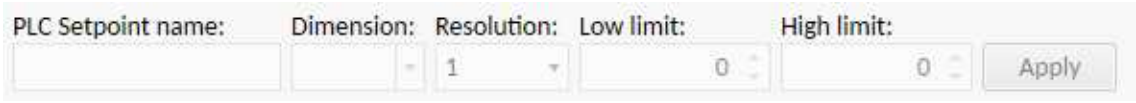


Image 8.32 Screen of configuration from InteliConfig

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 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

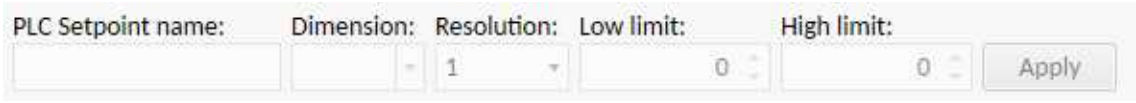


Image 8.33 Screen of configuration from InteliConfig

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 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

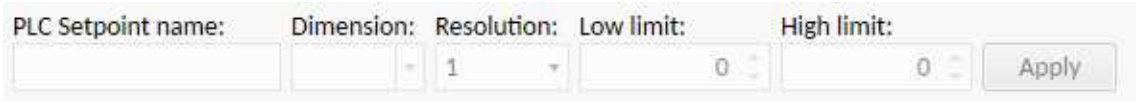


Image 8.34 Screen of configuration from InteliConfig

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 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

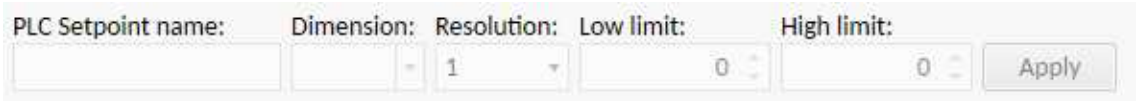


Image 8.35 Screen of configuration from InteliConfig

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 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

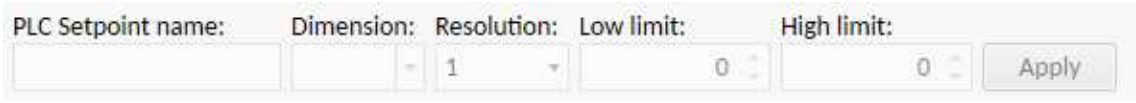


Image 8.36 Screen of configuration from InteliConfig

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 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

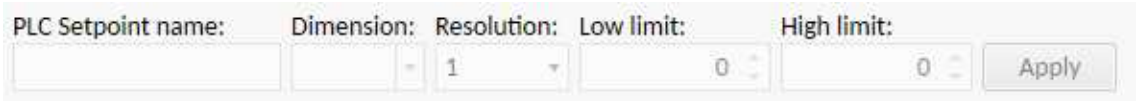


Image 8.37 Screen of configuration from InteliConfig

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 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

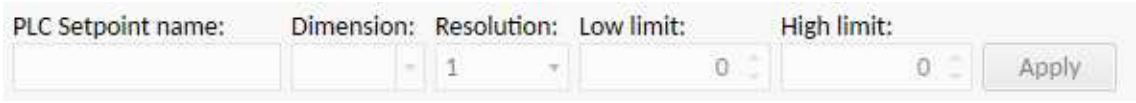


Image 8.38 Screen of configuration from InteliConfig

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 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

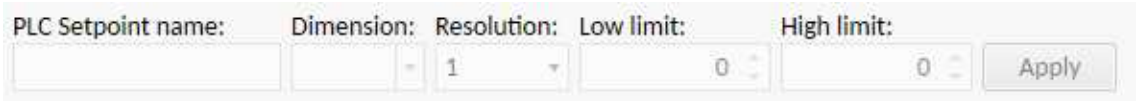


Image 8.39 Screen of configuration from InteliConfig

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 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

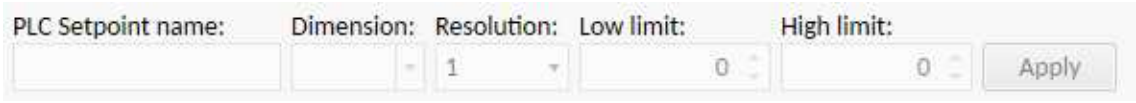


Image 8.40 Screen of configuration from InteliConfig

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 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

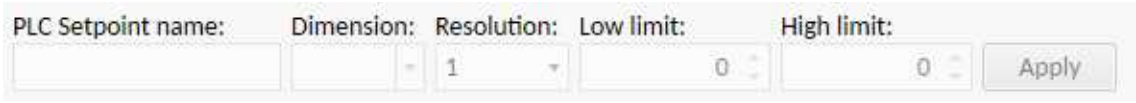


Image 8.41 Screen of configuration from InteliConfig

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 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

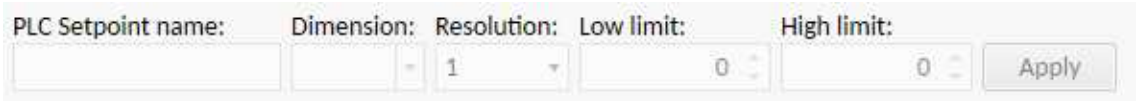


Image 8.42 Screen of configuration from InteliConfig

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 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

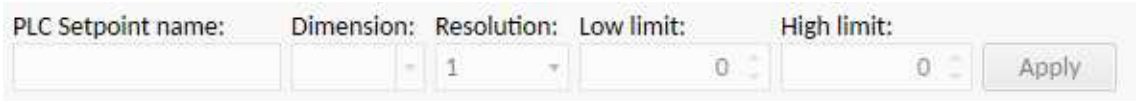


Image 8.43 Screen of configuration from InteliConfig

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 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

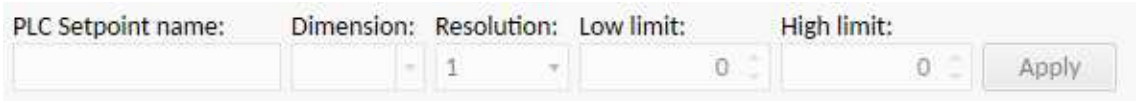


Image 8.44 Screen of configuration from InteliConfig

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 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

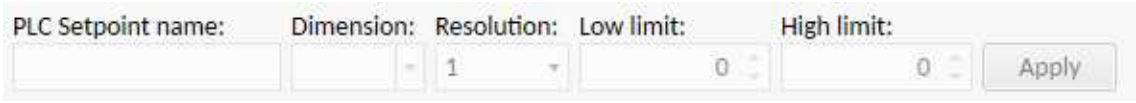


Image 8.45 Screen of configuration from InteliConfig

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 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

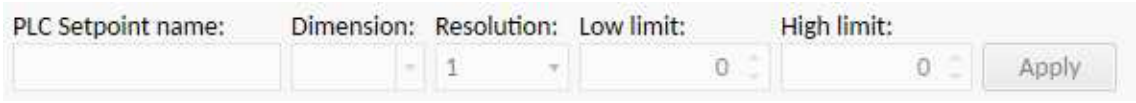


Image 8.46 Screen of configuration from InteliConfig

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 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

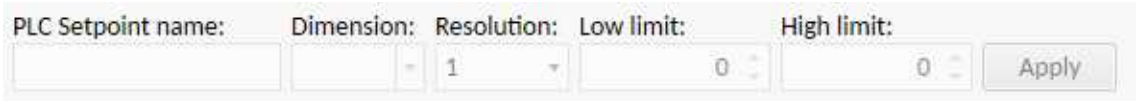


Image 8.47 Screen of configuration from InteliConfig

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 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

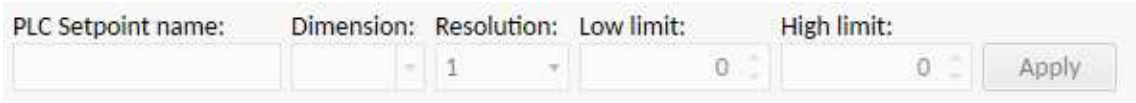


Image 8.48 Screen of configuration from InteliConfig

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 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

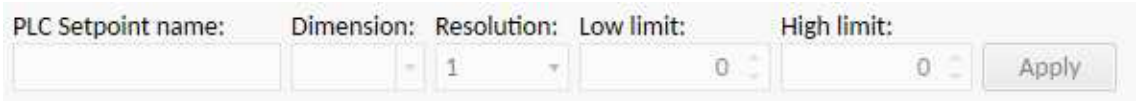


Image 8.49 Screen of configuration from InteliConfig

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 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

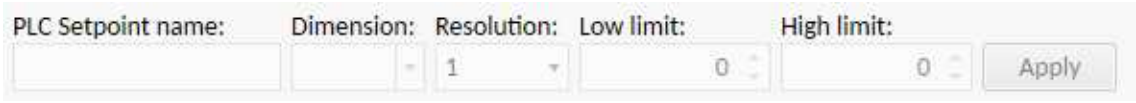


Image 8.50 Screen of configuration from InteliConfig

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 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

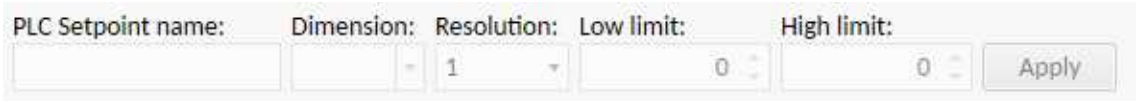


Image 8.51 Screen of configuration from InteliConfig

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 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

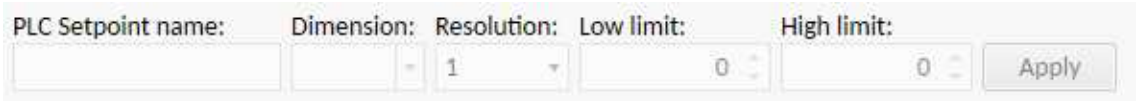


Image 8.52 Screen of configuration from InteliConfig

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 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

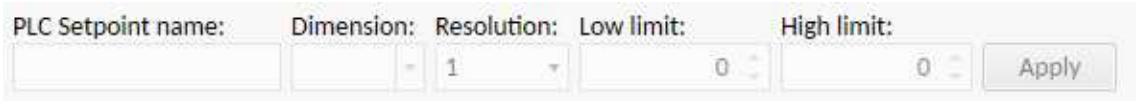


Image 8.53 Screen of configuration from InteliConfig

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 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

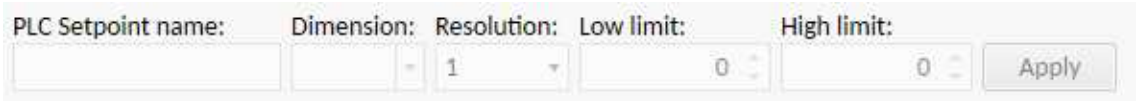


Image 8.54 Screen of configuration from InteliConfig

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 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

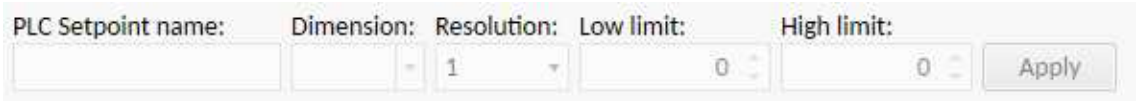


Image 8.55 Screen of configuration from InteliConfig

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 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

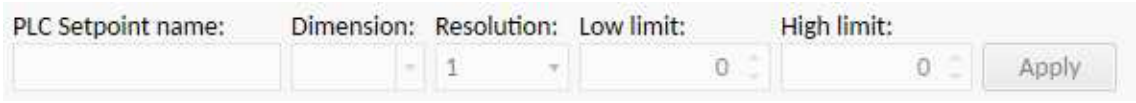


Image 8.56 Screen of configuration from InteliConfig

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 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

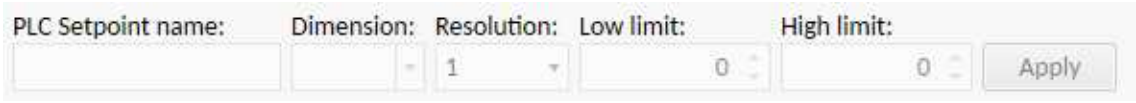


Image 8.57 Screen of configuration from InteliConfig

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 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

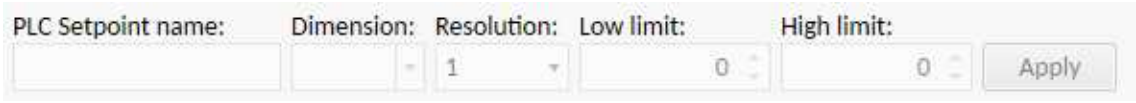


Image 8.58 Screen of configuration from InteliConfig

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 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

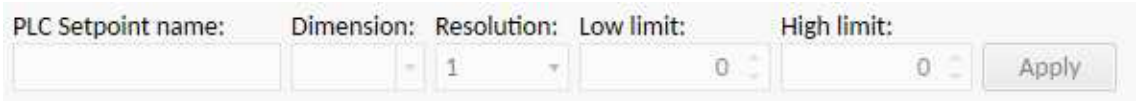


Image 8.59 Screen of configuration from InteliConfig

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 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

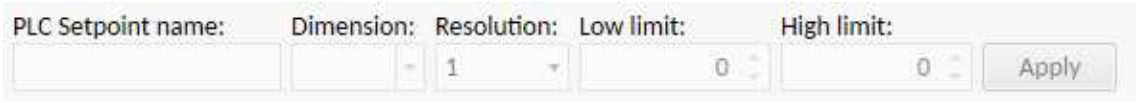


Image 8.60 Screen of configuration from InteliConfig

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 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

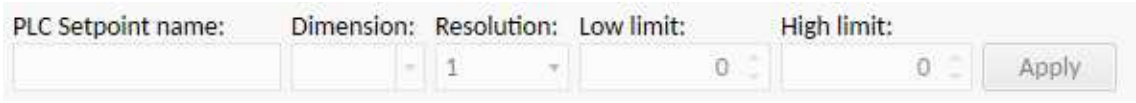


Image 8.61 Screen of configuration from InteliConfig

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 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

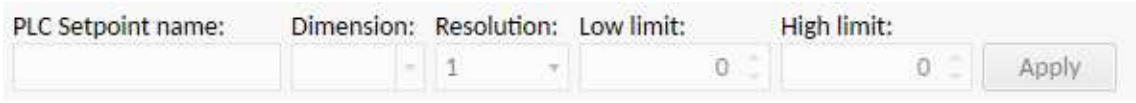


Image 8.62 Screen of configuration from InteliConfig

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 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

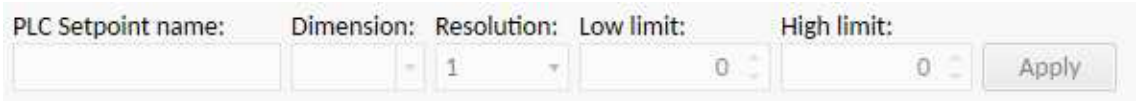


Image 8.63 Screen of configuration from InteliConfig

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 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

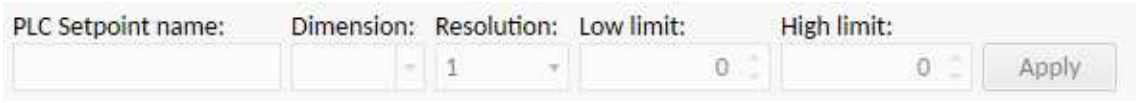


Image 8.64 Screen of configuration from InteliConfig

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 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

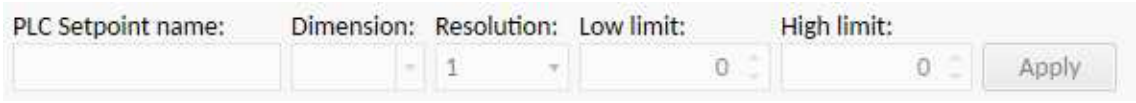


Image 8.65 Screen of configuration from InteliConfig

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 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

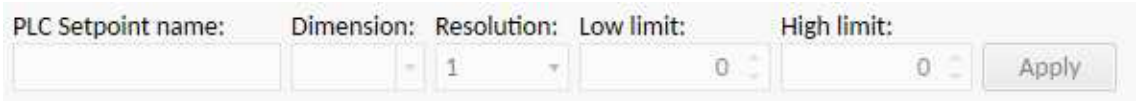


Image 8.66 Screen of configuration from InteliConfig

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 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

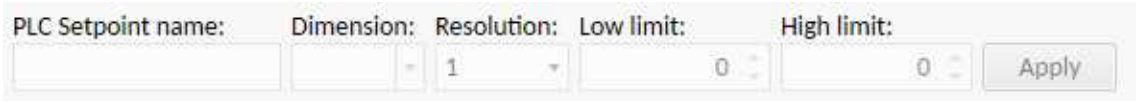


Image 8.67 Screen of configuration from InteliConfig

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 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

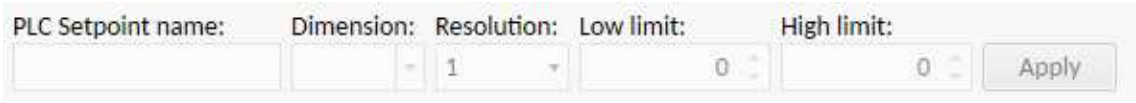


Image 8.68 Screen of configuration from InteliConfig

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

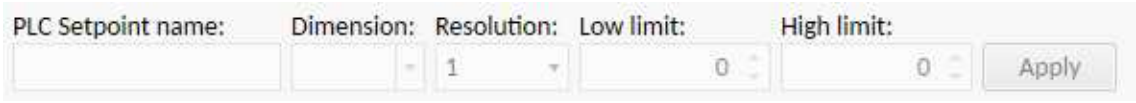


Image 8.69 Screen of configuration from InteliConfig

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.

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

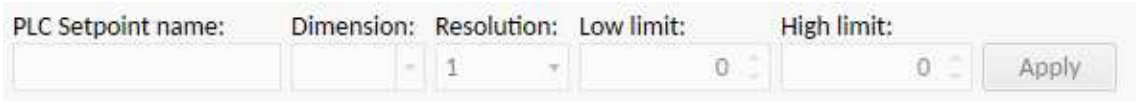


Image 8.70 Screen of configuration from InteliConfig

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.

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

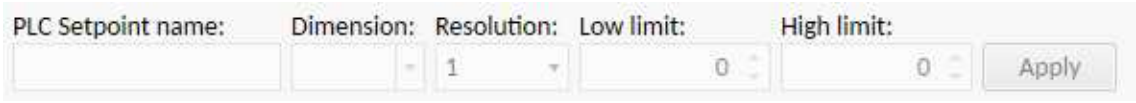


Image 8.71 Screen of configuration from InteliConfig

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.

back to List of setpoints

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

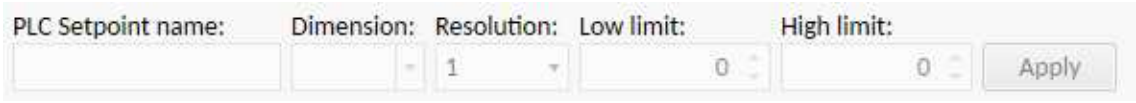


Image 8.72 Screen of configuration from InteliConfig

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.

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

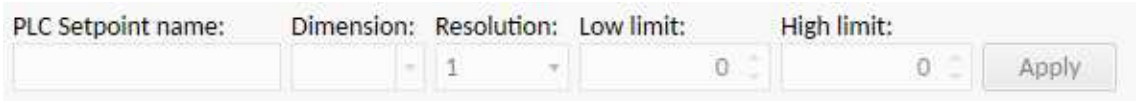


Image 8.73 Screen of configuration from InteliConfig

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.

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

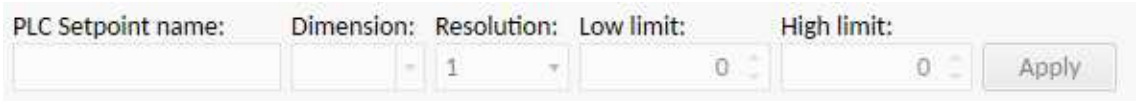


Image 8.74 Screen of configuration from InteliConfig

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.

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.

List of values groups

For full list of setpoints go to the chapter **List of values (page 344)**.

List of values

CM-4G-GPS (GPS part)

CM-Ethernet

Date/Time

Plug-In I/O

PLC

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 165)** ▶ If is **Nominal Frequency (page 165)** 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 165)** 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

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.			

back to List of values

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.			

back to List of values

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.			

back to List of values

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.			

back to List of values

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.			

back to List of values

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.			

back to List of values

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

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 198)**.			

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 199)**.			

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 199)**.			

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 413)** 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 414)** function.			

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

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.			

back to List of values

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 162)**.			

back to List of values

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.			

back to List of values

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

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.			

back to List of values

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.			

back to List of values

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.			

back to List of values

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.			

back to List of values

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.			

back to List of values

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.			

back to List of values

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.			

back to List of values

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.			

back to List of values

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.			

back to List of values

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.			

back to List of values

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.			

back to List of values

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.			

back to List of values

Group: CM-GPRS

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

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

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

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

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.			

back to List of values

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).

back to List of values

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

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

For full list of Logical binary inputs go to the chapter **Logical binary inputs alphabetically (page 380)**.

Logical binary inputs alphabetically

LBI: A

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 434) 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 434) 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

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 200)** is out of time then alarm **Battery Charger Fail (page 492)** is activated, written into history log and logical binary output **AL BATTERY CHARGER (PAGE 421)** 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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

back to Logical binary inputs alphabetically

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.

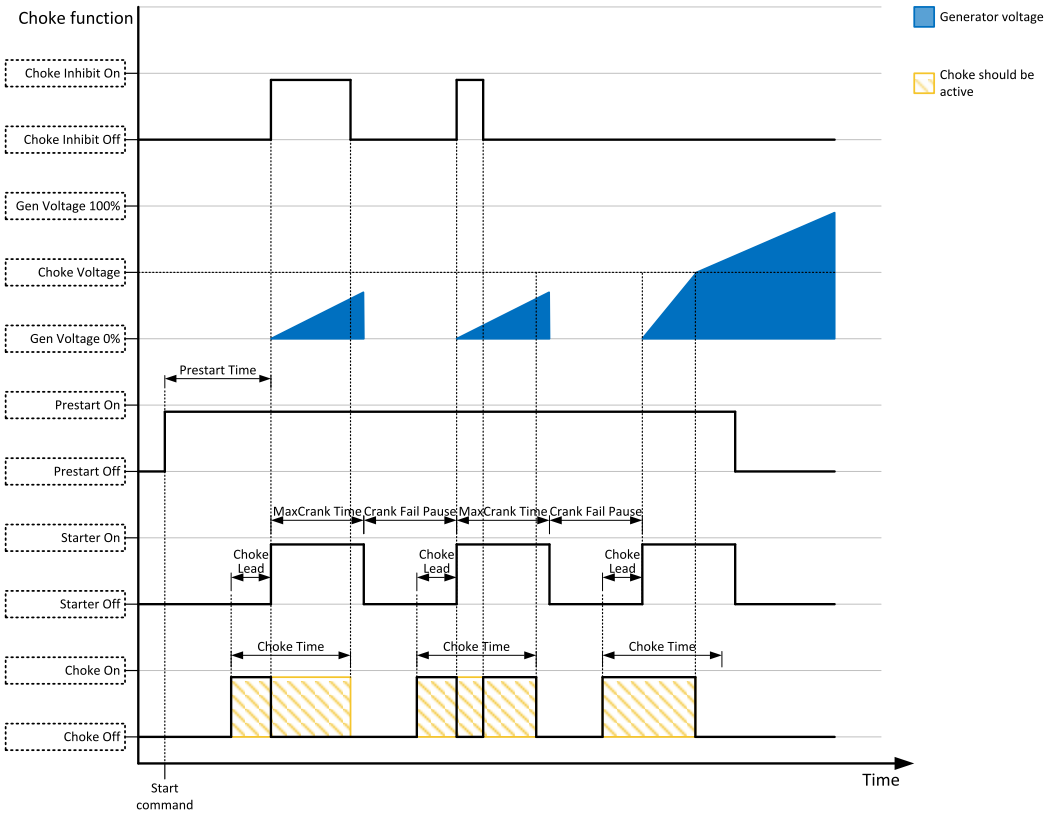
back to Logical binary inputs alphabetically

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 432)** 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.



back to Logical binary inputs alphabetically

Coolant Temp

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	625		
Description			

Binary input for **COOLANT TEMP (PAGE 477)** 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

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.*			

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 434)**, 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 434)** is active too. When this binary input is inactive, function of **ECU POWER RELAY (PAGE 434)** 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 203)** 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 203)** 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 478)** 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

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.

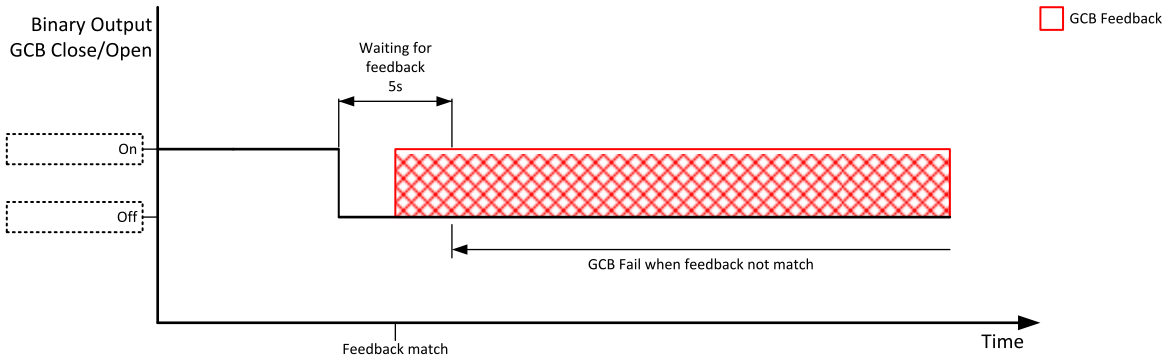


Image 8.75 GCB Feedback 1

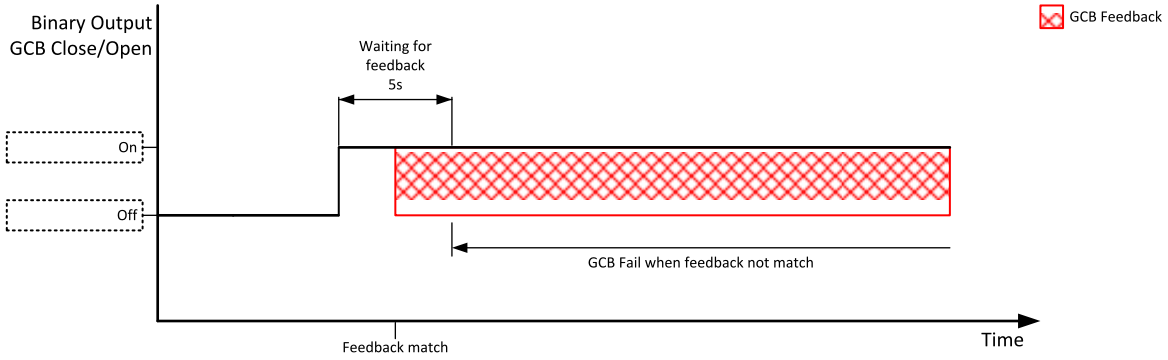


Image 8.76 GCB Feedback 2

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

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 412)** and **LANG SELECTION 3 (PAGE 412)** 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 412) is active	2	Second language
Language Selection 1 and **LANG SELECTION 2 (PAGE 412)** are active	3	Third language
LANG SELECTION 3 (PAGE 412) is active	4	Fourth language
Language Selection 1 and **LANG SELECTION 3 (PAGE 412)** 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 411)** and **LANG SELECTION 3 (PAGE 412)** to choose required language of controller. The system is based on binary numbers.

Binary input	Binary number	Active language
LANG SELECTION 1 (PAGE 411) is active	1	First language (English)
Lang Selection 2 is active	2	Second language
LANG SELECTION 1 (PAGE 411) and Lang Selection 2 are active	3	Third language
LANG SELECTION 3 (PAGE 412) is active	4	Fourth language
LANG SELECTION 1 (PAGE 411) and **LANG SELECTION 3 (PAGE 412)** 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 411)** and **LANG SELECTION 2 (PAGE 412)** 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 412) is active	2	Second language
Language Selection 1 and **LANG SELECTION 2 (PAGE 412)** are active	3	Third language
Lang Selection 3 (page 1) is active	4	Fourth language
LANG SELECTION 1 (PAGE 411) and Lang Selection 3 (page 1) are active	5	Fifth language

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 480)** 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 382)****.*

back to Logical binary inputs alphabetically

LBI: P

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 201)** the counter value **Pulse Counter 1 (page 361)** 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 202)** the counter value **Pulse Counter 2 (page 361)** 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.			

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 416) 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

For full list of Logical binary outputs go to the chapter **Logical binary outputs alphabetically (page 418)**.

Logical binary outputs alphabetically

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 447)** and opens after the engine is stopped or in case that engine is not ready.			

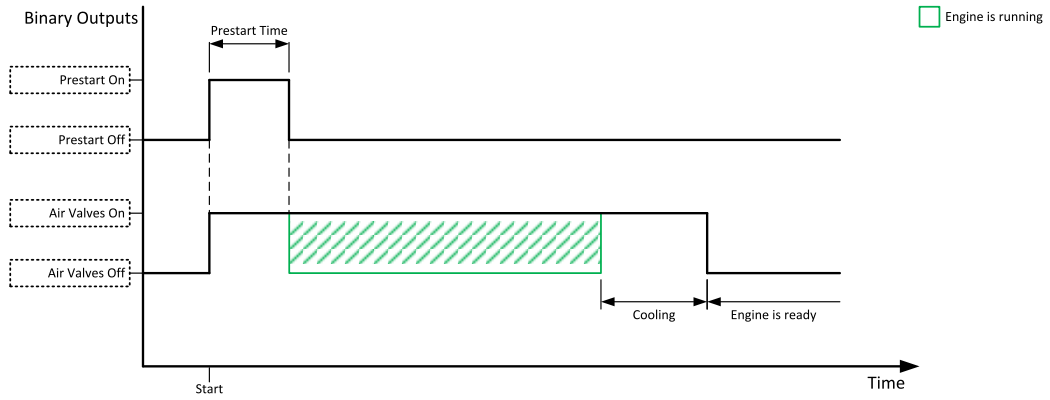


Image 8.77 Air Valves

back to Logical binary outputs alphabetically

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 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 506)** or **Wrn Battery < Voltage (page 493)** 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 492) 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 493) 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 493) 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 493) or Wrn Battery < Voltage (page 493) alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

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 Fls

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			

back to Logical binary outputs alphabetically

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 494) alarm from the COOLANT TEMP (PAGE 477) in the alarmlist or isn't confirmed.			

Logical binary outputs alphabetically (page 418)

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 477) in the alarmlist or isn't confirmed.			

Logical binary outputs alphabetically (page 418)

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 477) 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 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 478) in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

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 478) 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 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.			

back to Logical binary outputs alphabetically

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.			

back to Logical binary outputs alphabetically

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.			

back to Logical binary outputs alphabetically

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.			

back to Logical binary outputs alphabetically

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 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.			

back to Logical binary outputs alphabetically

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 480)** 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 480)** 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 Overload BOC

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	1268		
Description			
This output is active when the **Sd Overload (page 512)** alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

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 500)** alarm is present in alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Overspeed

Related FW	1.9.0	Related applications	AMF, MRS
Comm object	779		
Description			
This output is active when the **Sd Overspeed (page 512)** alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

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 513)** alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

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 501)** alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Underspeed

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	1296		
Description			
This output is active when the **Sd Underspeed (page 513)** alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

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

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.			

back to Logical binary outputs alphabetically

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.			

back to Logical binary outputs alphabetically

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.*

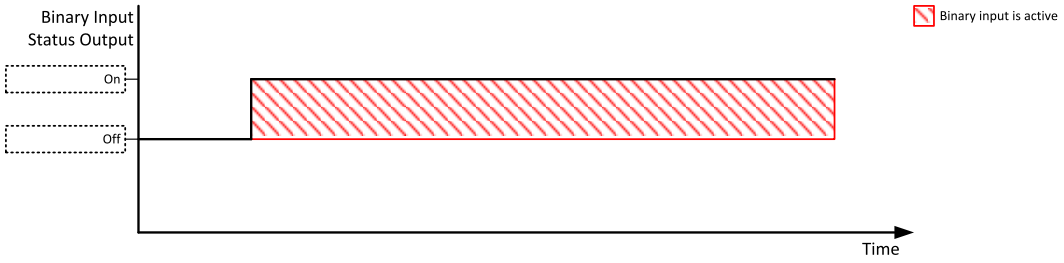


Image 8.78 Binary Input 1 Status

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.*

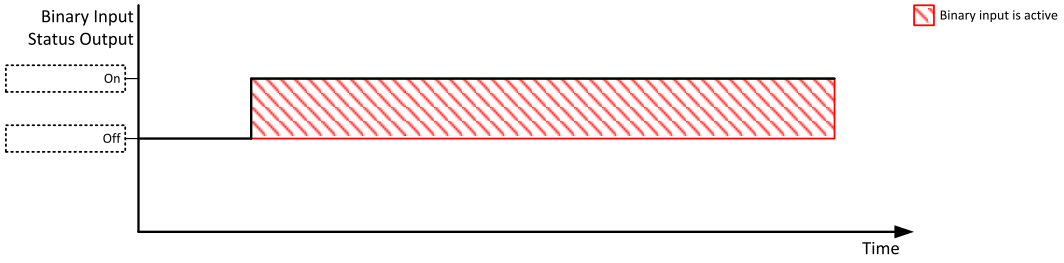


Image 8.79 Binary Input 2 Status

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.*

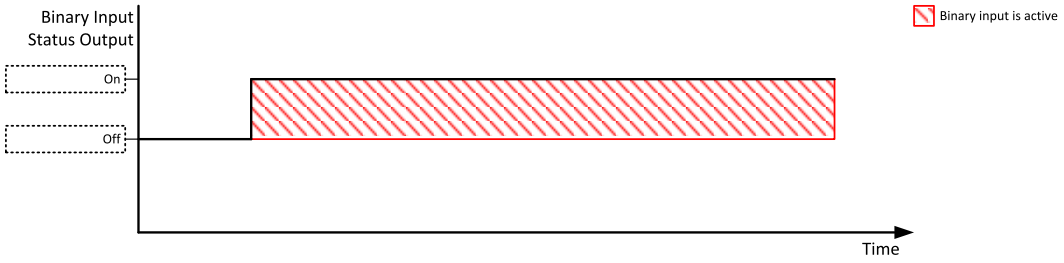


Image 8.80 Binary Input 3 Status

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.*

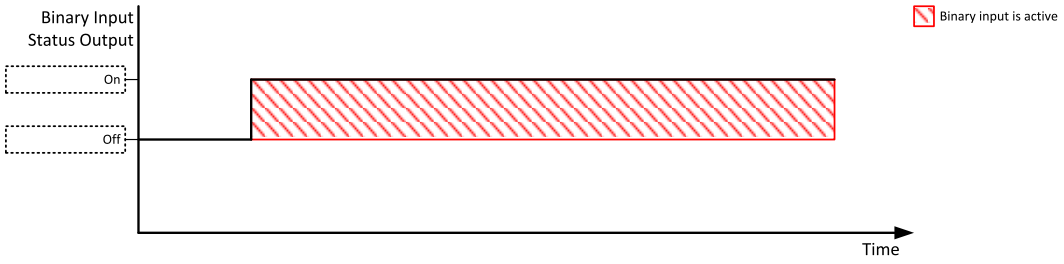


Image 8.81 Binary Input 4 Status

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.*

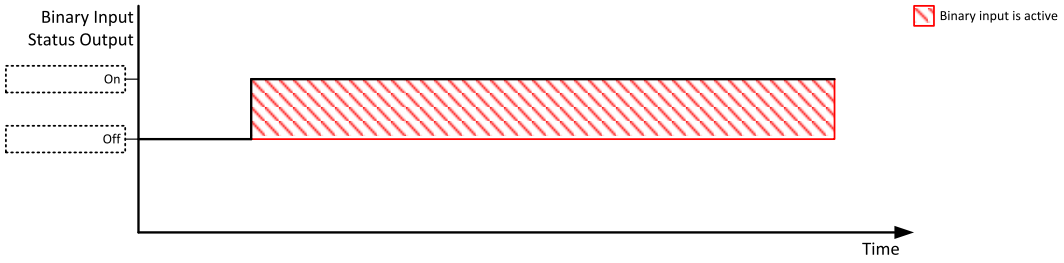


Image 8.82 Binary Input 5 Status

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.*

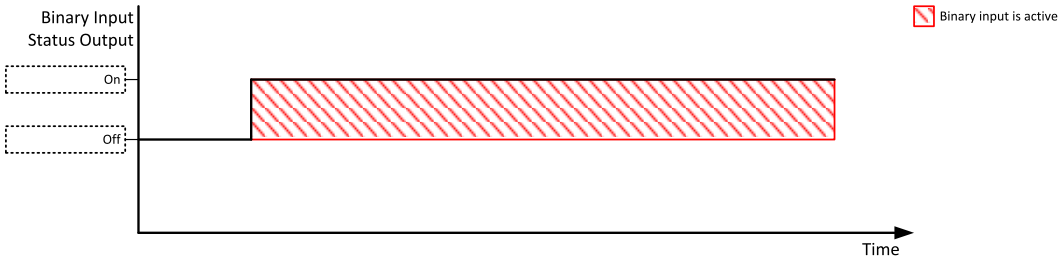


Image 8.83 Binary Input 6 Status

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 451)** 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 188)** elapses or the cranking pause or the Emergency Stop occurs or the controller is switched to OFF mode.

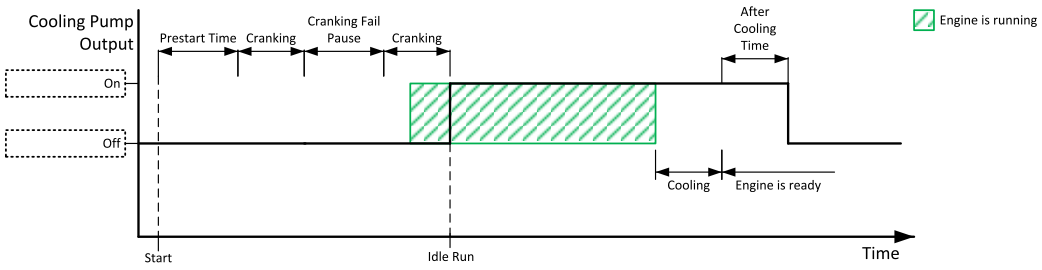


Image 8.84 Cooling Pump

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: 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 434)*** *is not configured, output is evaluated all the time. If* ***ECU POWER RELAY (PAGE 434)*** *is configured, output is evaluated only when engine is not stop (****ECU POWER RELAY (PAGE 434)*** *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 434)*** *is not configured, output is evaluated all the time. If* ***ECU POWER RELAY (PAGE 434)*** *is configured, output is evaluated only when engine is not stop (****ECU POWER RELAY (PAGE 434)*** *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 447)** 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 436)**).

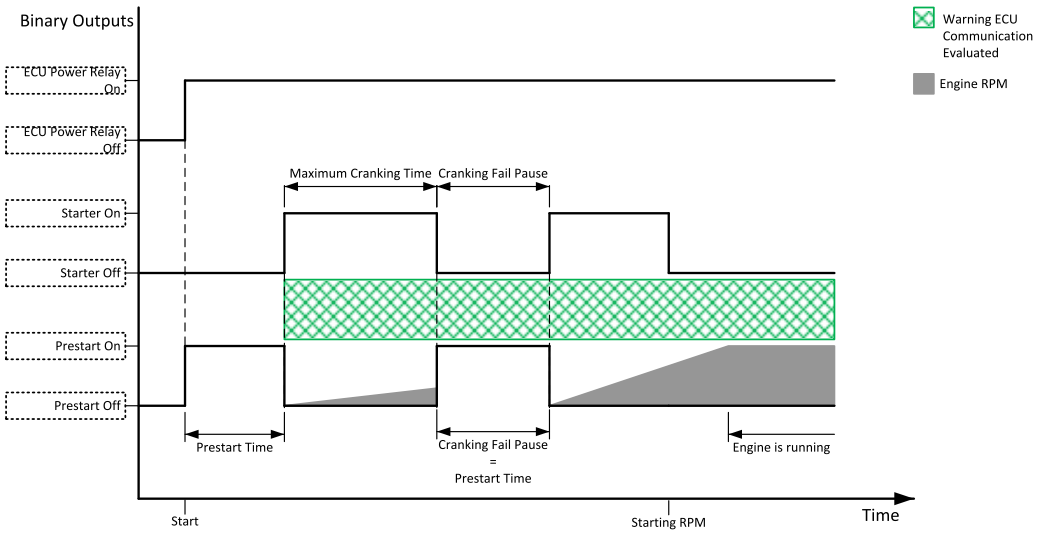


Image 8.85 ECU Power Relay

IMPORTANT: This LBO also affects evaluation of Sd ECU Communication Fail (page 507) or Wrn ECU Communication Fail (page 495) 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 240)** subgroup. This output is active when Timer 1 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 Solenoid

Related FW	1.9.0	**Related applications**	AMF, MRS
Comm object	22		
Description			

This output controls the fuel solenoid valve.

The output closes before binary output **STARTER (PAGE 451)**.The lead time is adjusted by setpoint **Fuel Solenoid Lead (page 182)**.

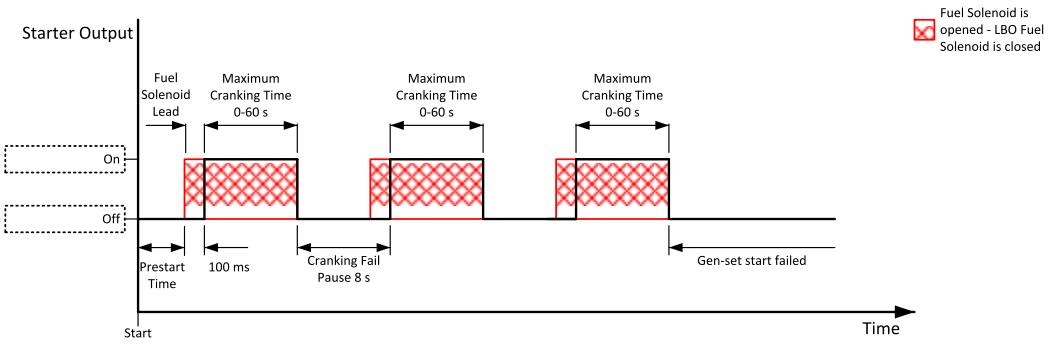


Image 8.86 Fuel Solenoid 1

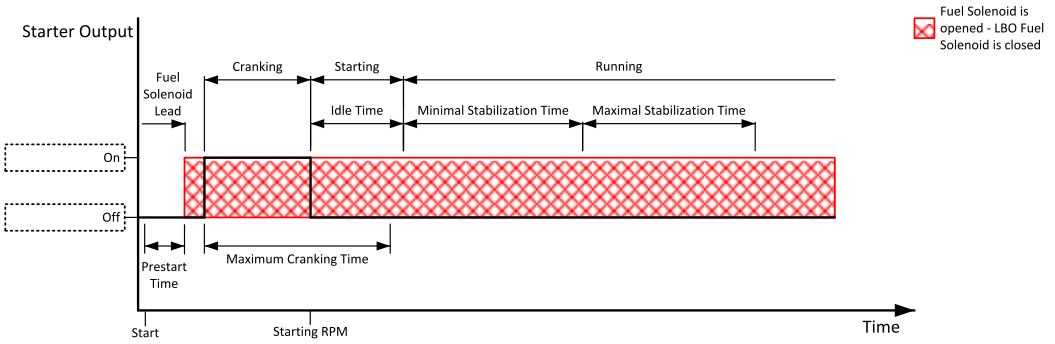


Image 8.87 Fuel Solenoid 2

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.*

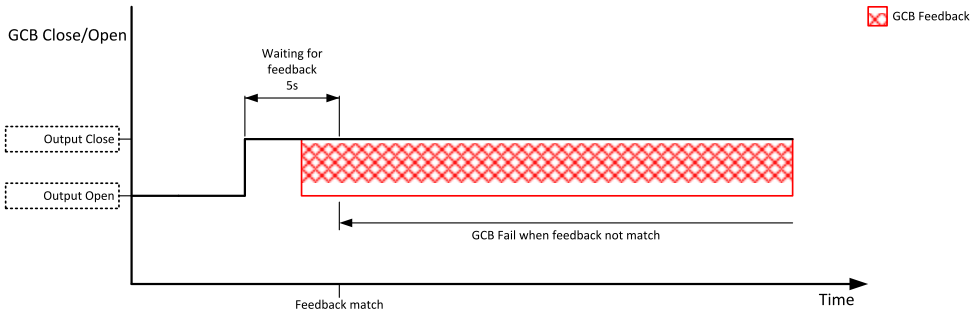


Image 8.88 GCB Close command

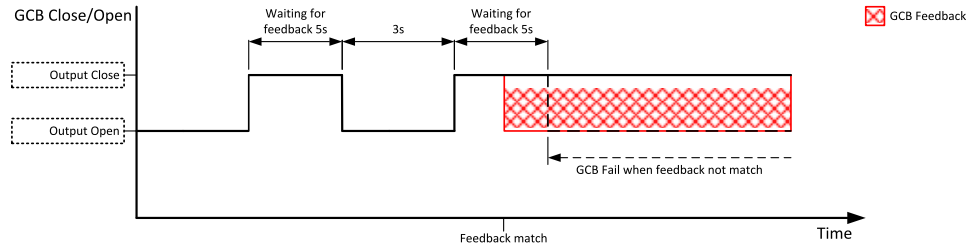


Image 8.89 Repeated GCB Close command

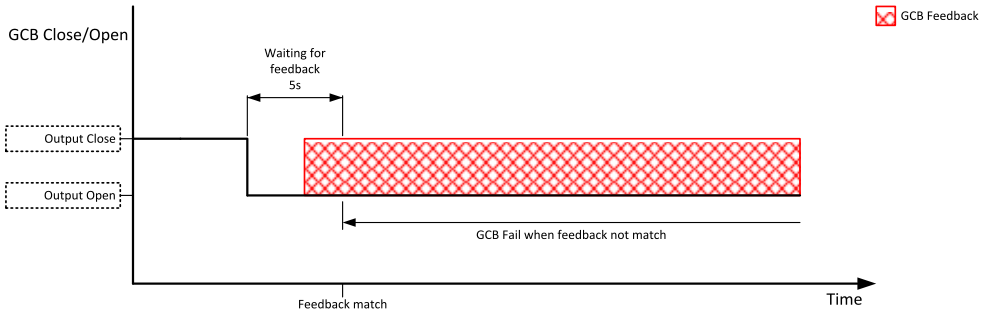


Image 8.90 GCB Open command

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.

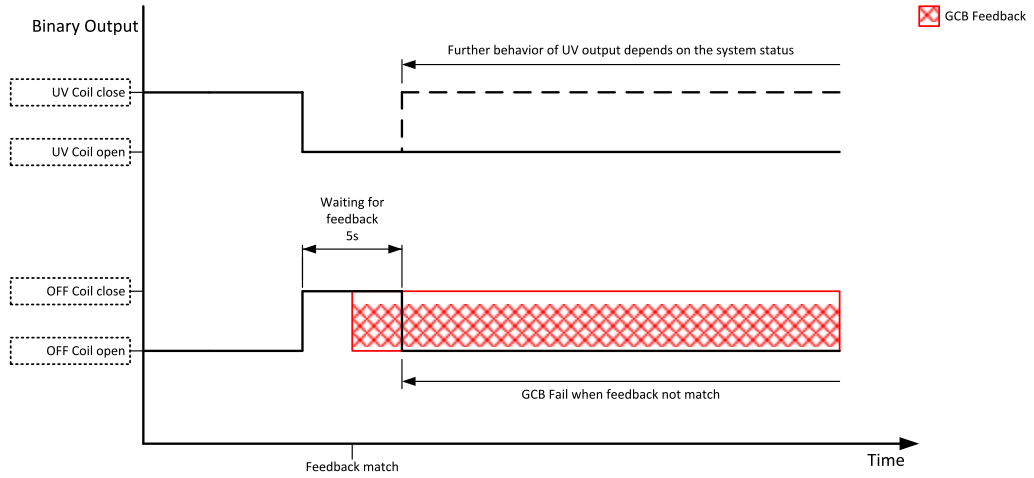


Image 8.91 GCB OFF Coil command

Image 8.92 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.			

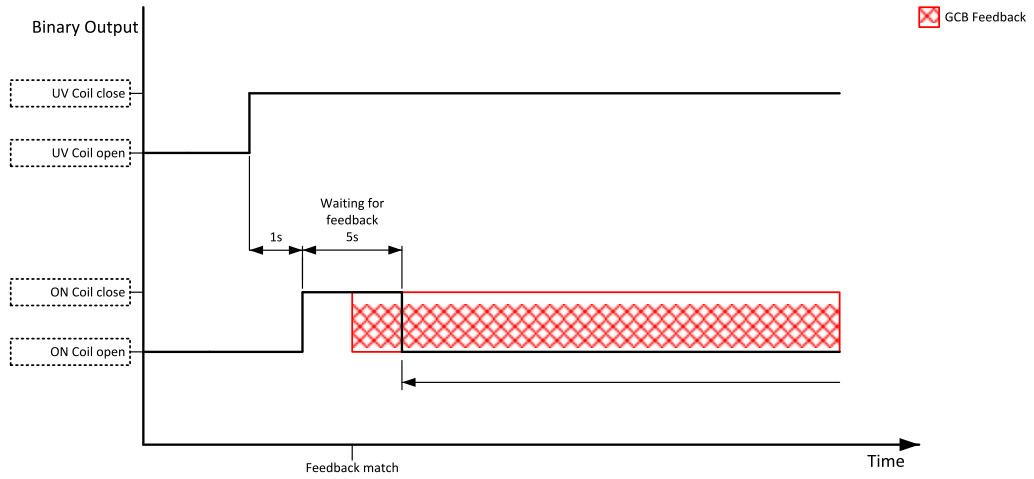


Image 8.93 GCB ON Coil close command

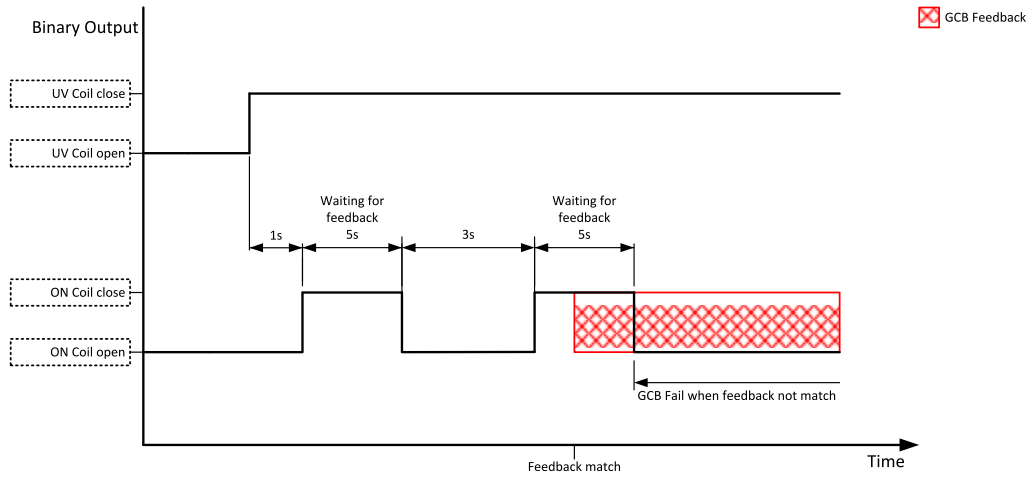


Image 8.94 Repeated GCB ON coil close command

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.

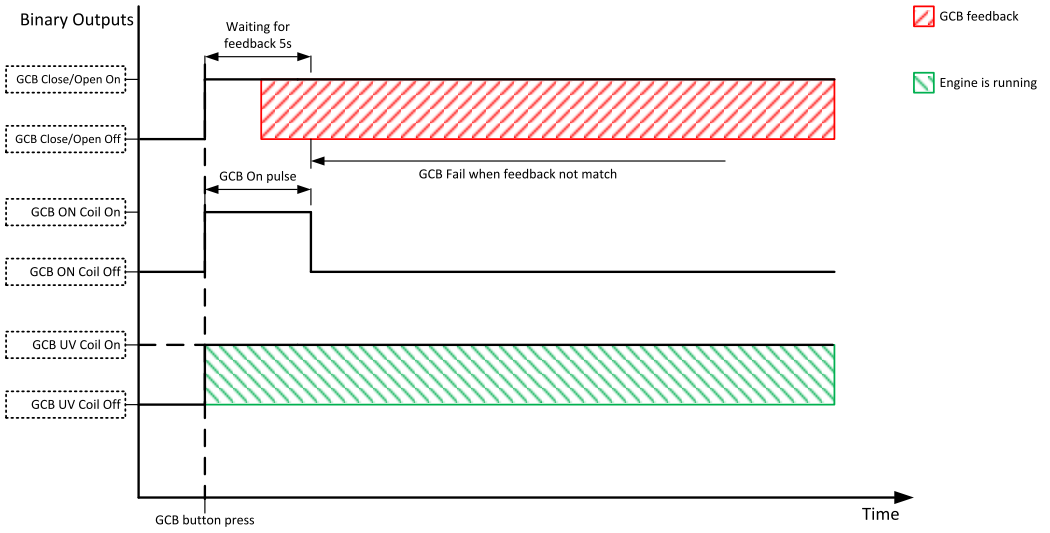


Image 8.95 GCB UV Coil close command

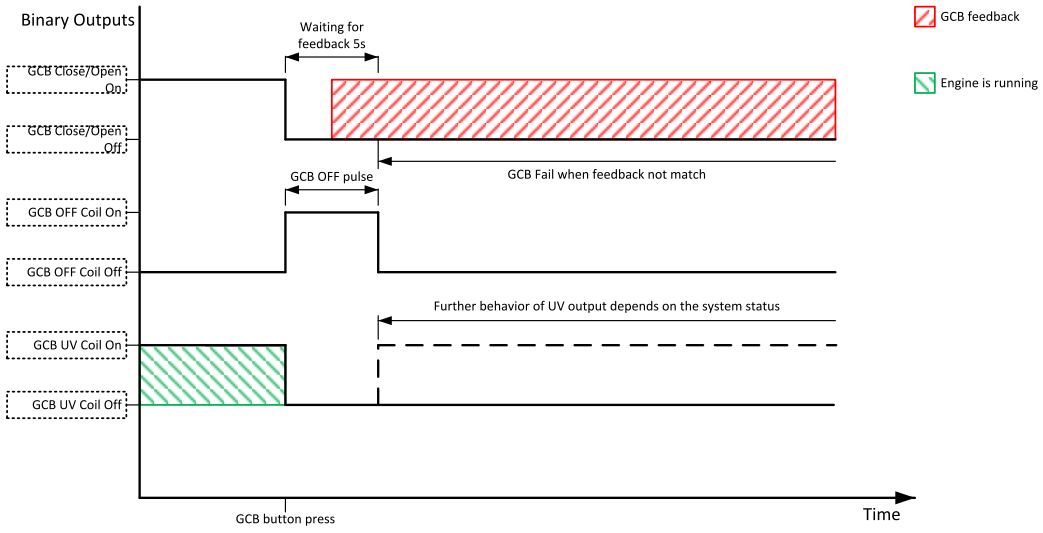


Image 8.96 GCB UV Coil open command

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 176)** before every starting attempt. The output opens in same time as the **STARTER (PAGE 451)** output closes (100 ms after **PRESTART (PAGE 447)** output opens).

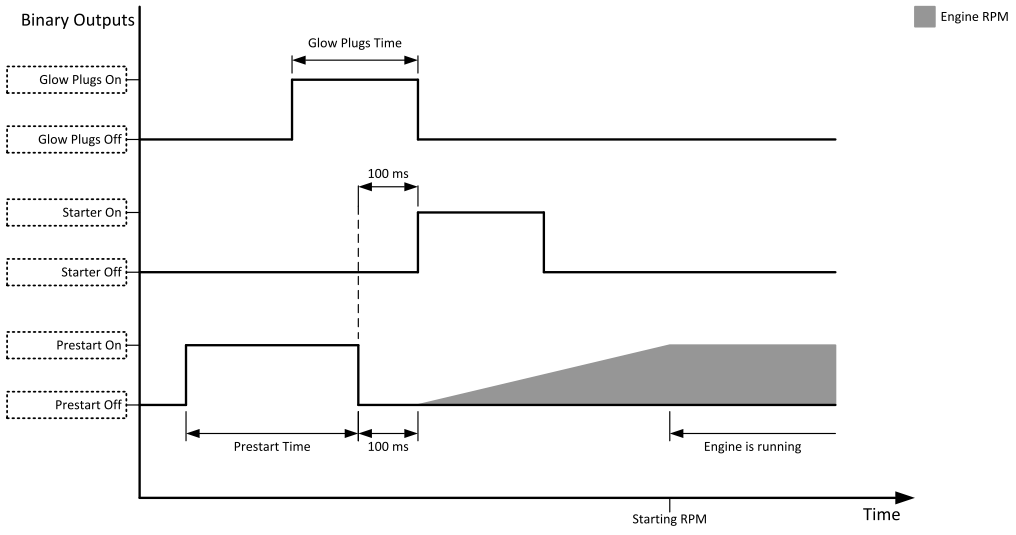


Image 8.97 Glow Plugs

When the **Glow Plugs Time (page 176)** is longer than **Cranking Fail Pause (page 174)** then the **Glow Plugs Time (page 176)** in **Cranking Fail Pause (page 174)** is long as **Cranking Fail Pause (page 174)**.

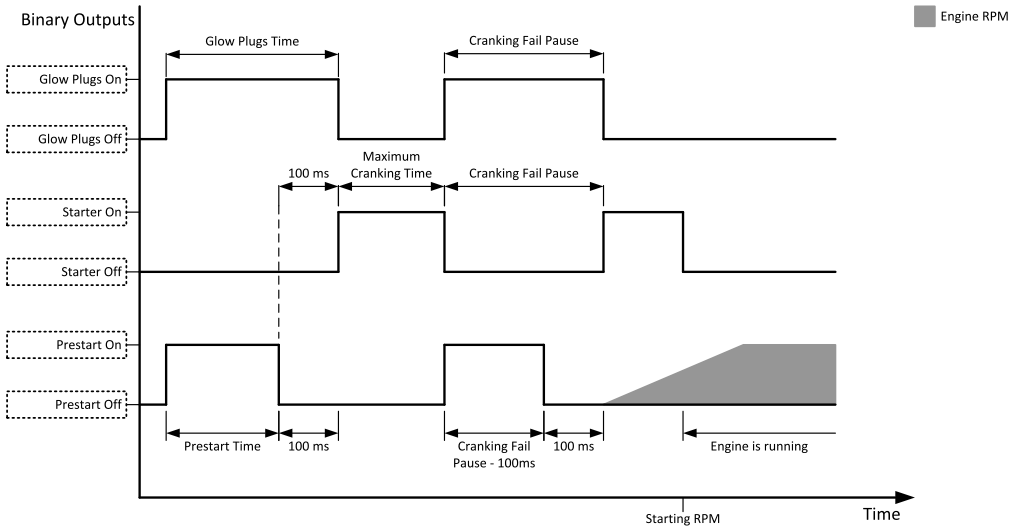


Image 8.98 Glow Plugs in Cranking Fail Pause 1

When the **Glow Plugs Time (page 176)** is shorter than **Cranking Fail Pause (page 174)** then the **Glow Plugs Time (page 176)** in **Cranking Fail Pause (page 174)** is long as normal **Glow Plugs Time (page 176)**.

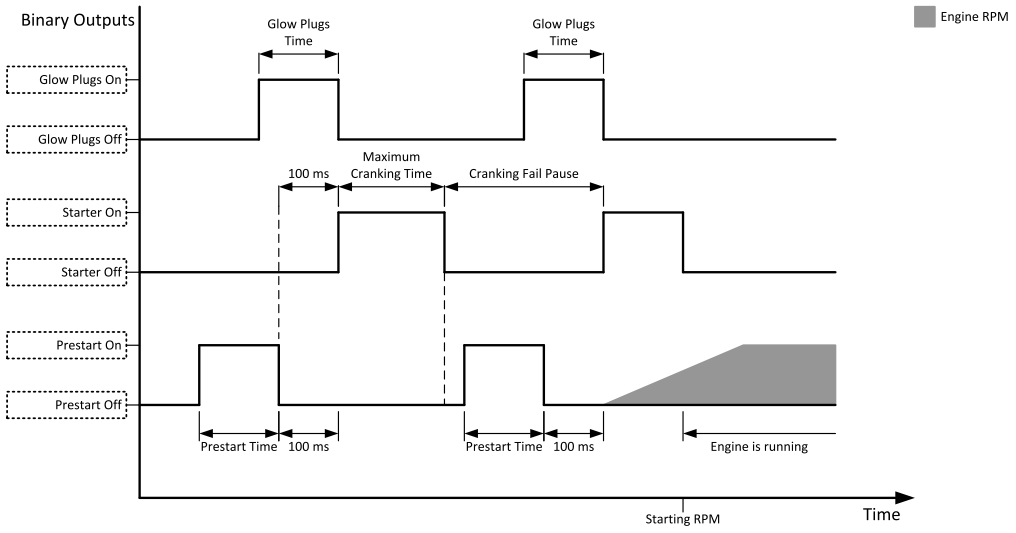


Image 8.99 Glow Plugs in Cranking Fail Pause 2

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 170)** 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 182)** elapses. The **Idle Time (page 182)** starts to countdown when **Starting RPM (page 175)** reached. The underspeed protection is not evaluated during fixed 5 seconds period after reaching **Starting RPM (page 175)**. A Start Fail protection occurs if the RPM drop below 2RPM during idle.

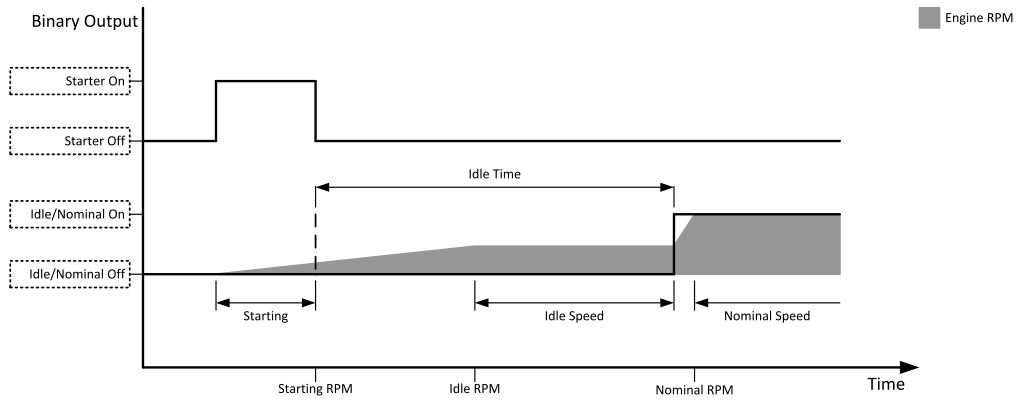


Image 8.100 Idle/Nominal

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 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 434)** . Ignition ON stays there from historical reasons.*

back to Logical binary outputs alphabetically

LBO: M

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 416)** is active (Output **READY (PAGE 449)** is active).			

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

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

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 175)**. The output opens 100 ms before the **STARTER (PAGE 451)** output closes.			

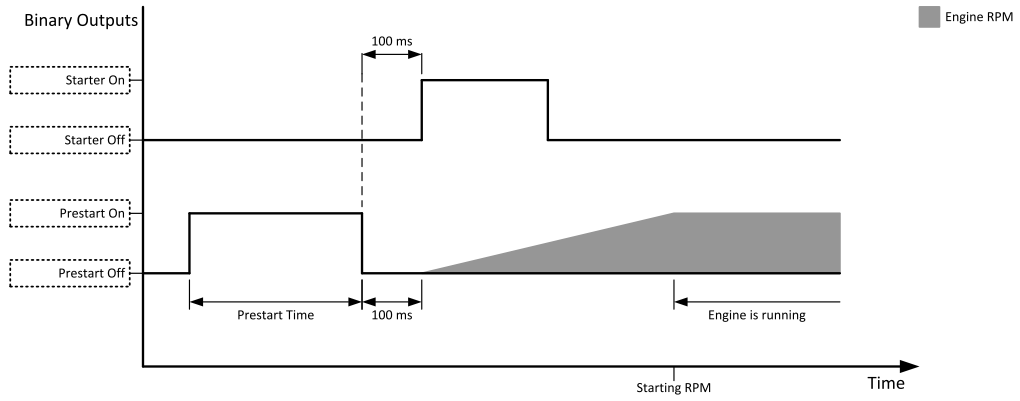


Image 8.101 Engine start

When the **Prestart Time (page 175)** is longer than **Cranking Fail Pause (page 174)** then the **Prestart Time (page 175)** in **Cranking Fail Pause (page 174)** is long as **Cranking Fail Pause (page 174)** minus 100ms.

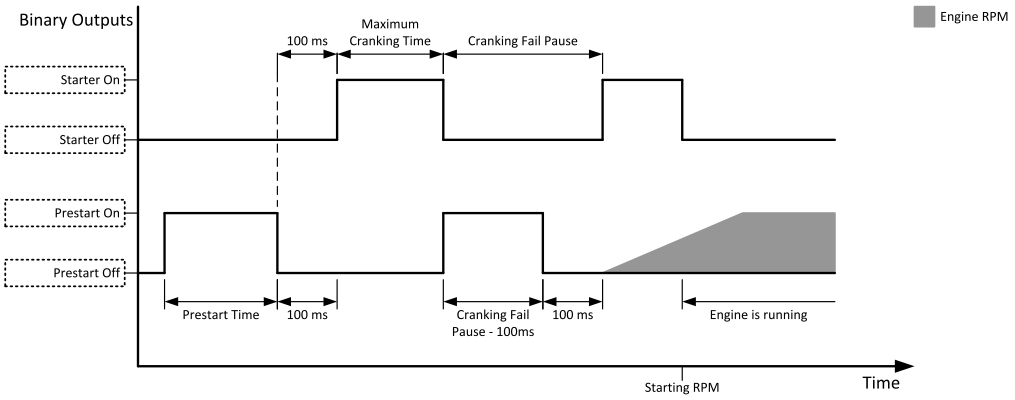


Image 8.102 Prestart in Cranking Fail Pause 1

When the **Prestart Time (page 175)** is shorter than **Cranking Fail Pause (page 174)** then the **Prestart Time (page 175)** in **Cranking Fail Pause (page 174)** is long as normal **Prestart Time (page 175)**.

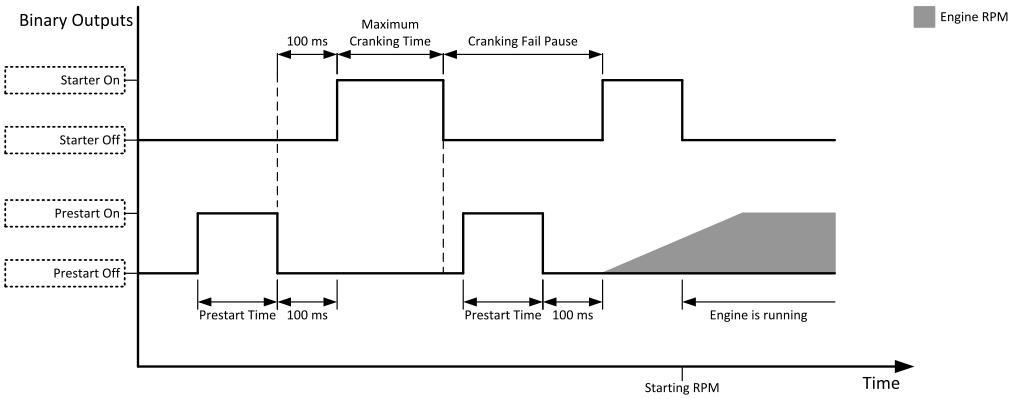


Image 8.103 Prestart in Cranking Fail Pause 2

back to Logical binary outputs alphabetically

LBO: R

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 184)** 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 416)** 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

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 436) is closed and STARTER (PAGE 451) and PRESTART (PAGE 447) are open. The out remains close until engine stop and cooling period elapses.			

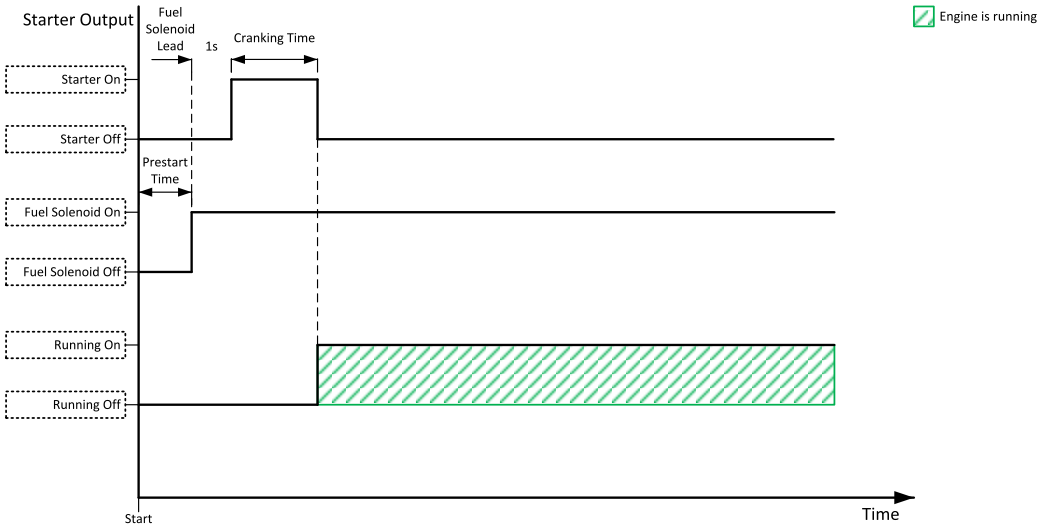


Image 8.104 Running

back to Logical binary outputs alphabetically

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 416) input is active and open if SD OVERRIDE (PAGE 416) input is inactive. This output is usually used to send information about SD OVERRIDE (PAGE 416) 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 173)** in Engine Settings group. Cranking fail pause is adjusted by setpoint **Cranking Fail Pause (page 174)**.			

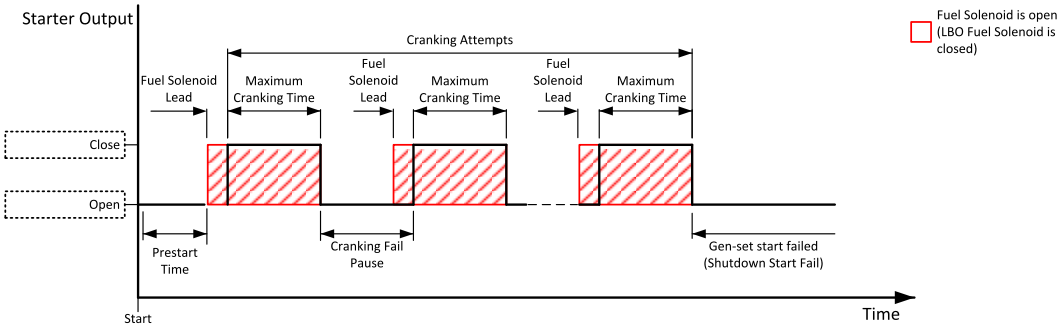


Image 8.105 Starter

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 189)**
- Oil pressure value is higher than **Starting Oil Pressure (page 176)**
- Generator voltage > 25% of **Nominal Voltage Ph-N (page 164)** or **Nominal Voltage Ph-Ph (page 164)** (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.			

back to Logical binary outputs alphabetically

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 452)** output activation. This signal is sent to ECU in case of engine stop request.			

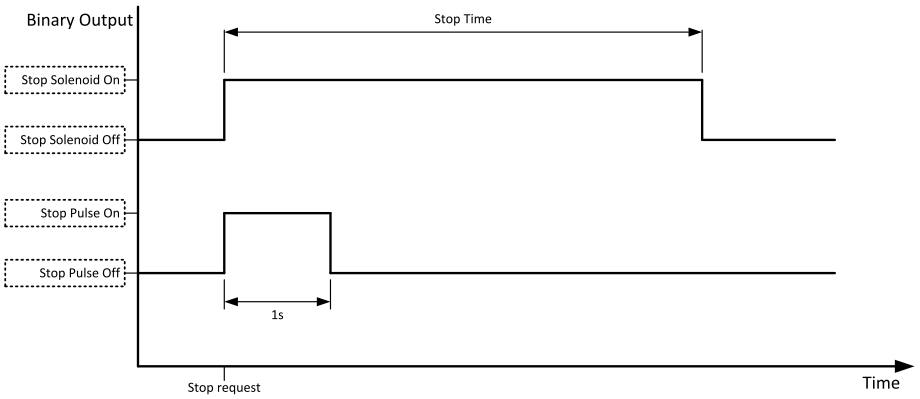


Image 8.106 Stop Pulse

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.			

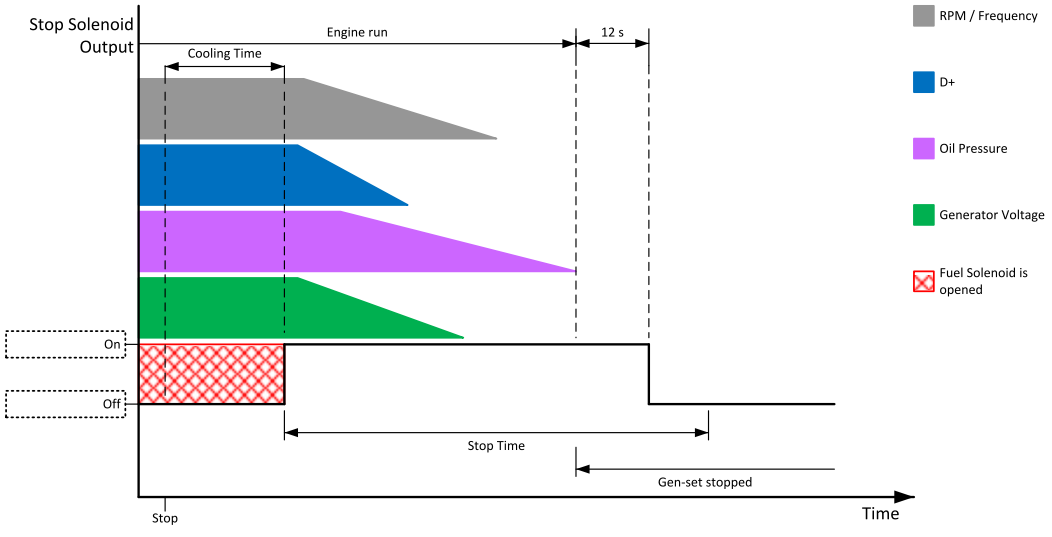


Image 8.107 Stop Solenoid 1

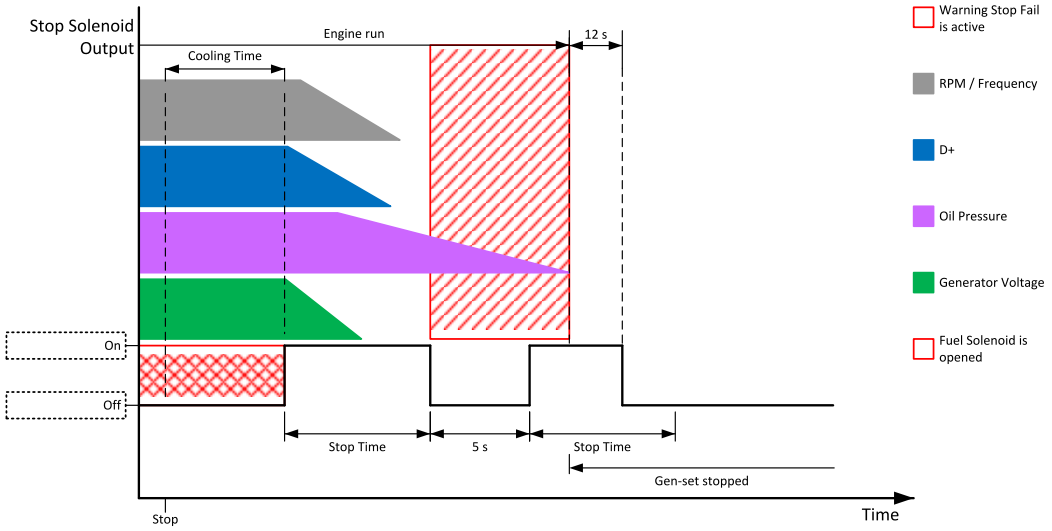


Image 8.108 Stop Solenoid 2

Note: *If **Additional running engine indications (page 107)** went off during 5 s pause than Stop Solenoid is not activated again otherwise stop solenoid is activated again.*

Logical binary outputs alphabetically (page 418)

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 161)** 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 161)** 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 362)** and **Pulse Counter 2 (page 361)**. Binary output is active when **Running Hours (page 362)** are equal or higher than the **Pulse Counter 2 (page 361)**.			

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 447)** LBO. Ventilation output is deactivated when engine stops revolving. Ventilation LBO is also deactivated immediately when **EMERGENCY STOP (PAGE 408)** (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 454)** LBO (when engine stops). The pulse duration is adjusted by **Ventilation Pulse Time (page 202)** 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 454)** LBO (at the begining of prestart period). The pulse duration is adjusted by **Ventilation Pulse Time (page 202)** 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

For full list of Logical analog inputs go to the chapter **Logical analog inputs alphabetically (page 456)**.

Logical analog inputs alphabetically

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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 1 Wrn (page 209)** and **Analog Protection 1 Sd (page 209)**. Delay is adjusted by setpoint **Analog Protection 1 Delay (page 210)**.

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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 2 Wrn (page 210)** and **Analog Protection 2 Sd (page 211)**. Delay is adjusted by setpoint **Analog Protection 2 Delay (page 211)**.

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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 3 Wrn (page 212)** and **Analog Protection 3 Sd (page 212)**. Delay is adjusted by setpoint **Analog Protection 3 Delay (page 213)**.

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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 4 Wrn (page 213)** and **Analog Protection 4 Sd (page 214)**. Delay is adjusted by setpoint **Analog Protection 4 Delay (page 214)**.

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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 5 Wrn (page 215)** and **Analog Protection 5 Sd (page 215)**. Delay is adjusted by setpoint **Analog Protection 5 Delay (page 216)**.

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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 6 Wrn (page 216)** and **Analog Protection 6 Sd (page 217)**. Delay is adjusted by setpoint **Analog Protection 6 Delay (page 217)**.

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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 7 Wrn (page 218)** and **Analog Protection 7 Sd (page 218)**. Delay is adjusted by setpoint **Analog Protection 7 Delay (page 219)**.

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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 8 Wrn (page 219)** and **Analog Protection 8 Sd (page 220)**. Delay is adjusted by setpoint **Analog Protection 8 Delay (page 220)**.

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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 9 Wrn (page 221)** and **Analog Protection 9 Sd (page 221)**. Delay is adjusted by setpoint **Analog Protection 9 Delay (page 222)**.

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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 10 Wrn (page 222)** and **Analog Protection 10 Sd (page 223)**. Delay is adjusted by setpoint **Analog Protection 10 Delay (page 223)**.

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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 11 Wrn (page 224)** and **Analog Protection 11 Sd (page 224)**. Delay is adjusted by setpoint **Analog Protection 11 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.
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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 12 Wrn (page 225)** and **Analog Protection 12 Sd (page 226)**. Delay is adjusted by setpoint **Analog Protection 12 Delay (page 226)**.

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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 13 Wrn (page 227)** and **Analog Protection 13 Sd (page 227)**. Delay is adjusted by setpoint **Analog Protection 13 Delay (page 228)**.

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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 14 Wrn (page 228)** and **Analog Protection 14 Sd (page 229)**. Delay is adjusted by setpoint **Analog Protection 14 Delay (page 229)**.

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 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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 15 Wrn (page 230)** and **Analog Protection 15 Sd (page 230)**. Delay is adjusted by setpoint **Analog Protection 15 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.
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 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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 16 Wrn (page 231)** and **Analog Protection 16 Sd (page 232)**. Delay is adjusted by setpoint **Analog Protection 16 Delay (page 232)**.

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 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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 17 Wrn (page 233)** and **Analog Protection 17 Sd (page 233)**. Delay is adjusted by setpoint **Analog Protection 17 Delay (page 234)**.

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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 18 Wrn (page 234)** and **Analog Protection 18 Sd (page 235)**. Delay is adjusted by setpoint **Analog Protection 18 Delay (page 235)**.

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 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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 19 Wrn (page 236)** and **Analog Protection 19 Sd (page 236)**. Delay is adjusted by setpoint **Analog Protection 19 Delay (page 237)**.

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 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 39**. Limits for this protection are adjusted by setpoints **Analog Protection 20 Wrn (page 237)** and **Analog Protection 20 Sd (page 238)**. Delay is adjusted by setpoint **Analog Protection 20 Delay (page 238)**.

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

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 39**. Limits for this protection are adjusted by setpoints **Coolant Temperature Wrn (page 194)** and **Coolant Temperature Sd (page 194)**. Delay is adjusted by setpoint **Coolant Temperature Delay (page 194)**.

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 406)*** *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: 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 39**. Limits for this protection are adjusted by setpoints **Fuel Level Wrn (page 196)** and **Fuel Level Sd (page 197)**. Delay is adjusted by setpoint **Fuel Level Delay (page 197)**.

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.

Note: *This analog function can by also configured on binary input as binary function. In this case chose* ***FUEL LEVEL (PAGE 409)*** *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 39**. Limits for this protection are adjusted by setpoints **Oil Pressure Wrn (page 192)** and **Oil Pressure Sd (page 192)**. Delay is adjusted by setpoint **Oil Pressure Delay (page 192)**.

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 413)*** *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

For full list of PLC blocks go to the chapter **List of PLC blocks (page 482)**.

List of PLC blocks

Group: Basic logical functions

Group: Comparison of analog inputs

Group: Time functions

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.

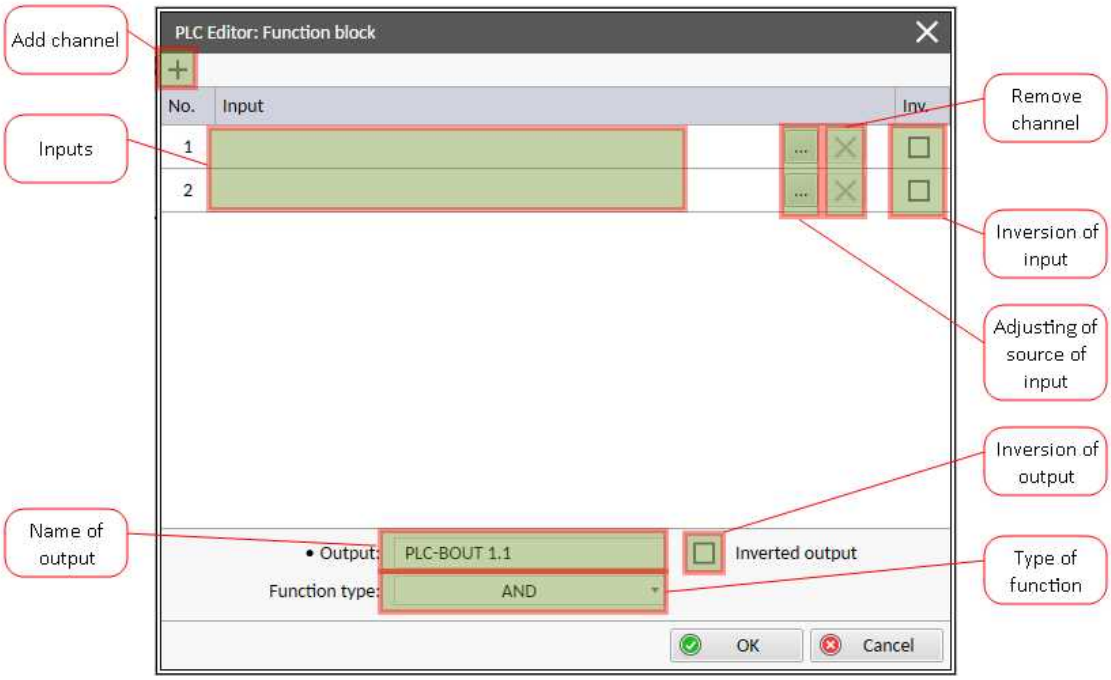


Image 9.1 Configuration of OR/AND block

back to List of PLC blocks

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.

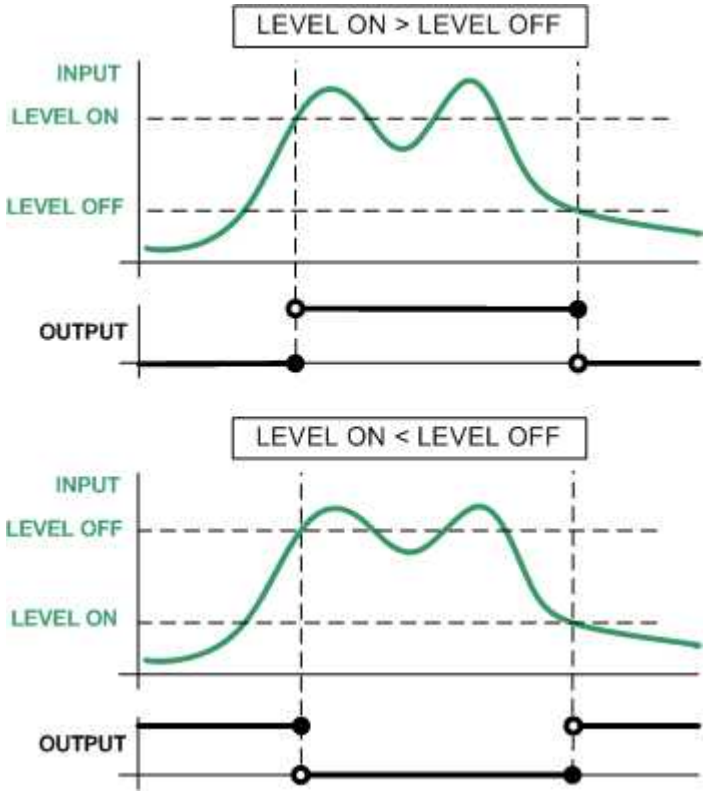


Image 9.2 Different On and Off levels

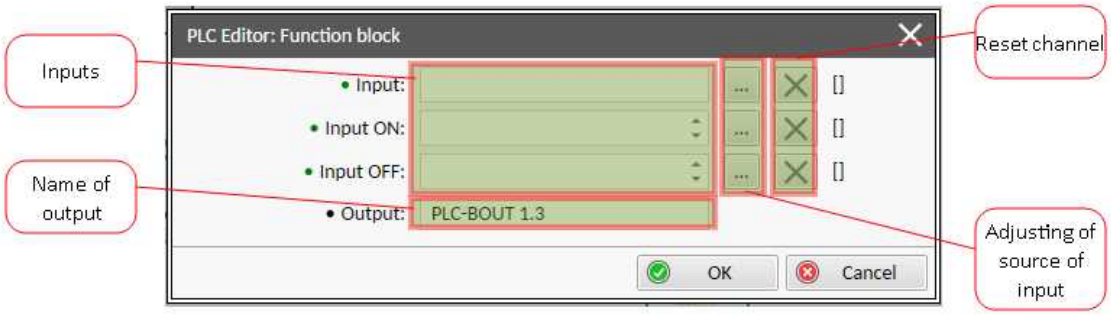


Image 9.3 Configuration of Comp Hyst block

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.

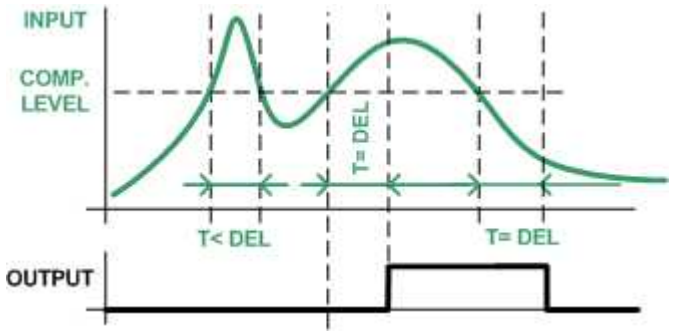


Image 9.4 Principle of delay

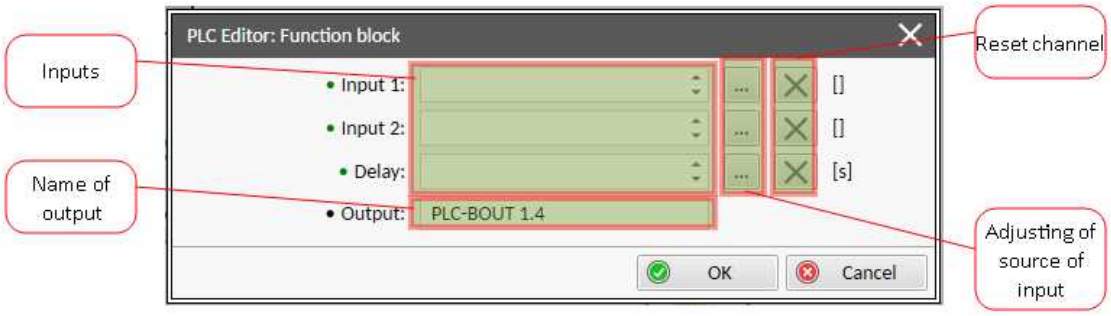


Image 9.5 Configuration of Comp Time block

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.

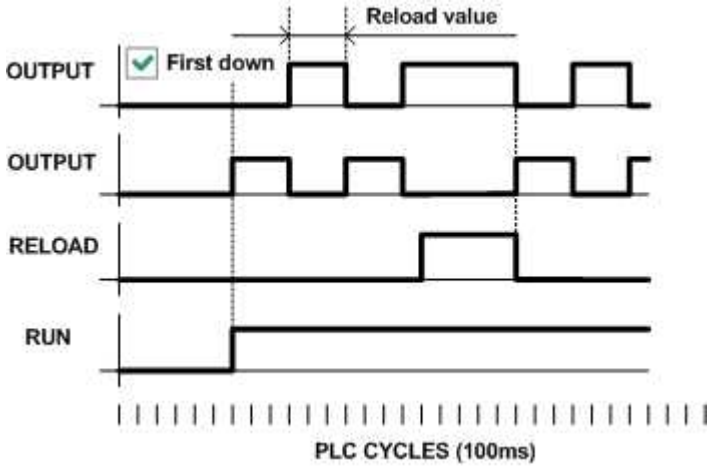


Image 9.6 Principle of timer

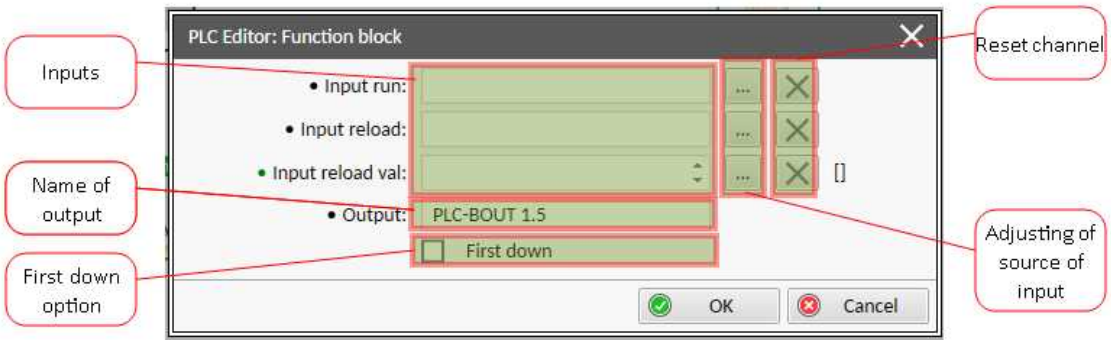


Image 9.7 Configuration of Timer block

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.

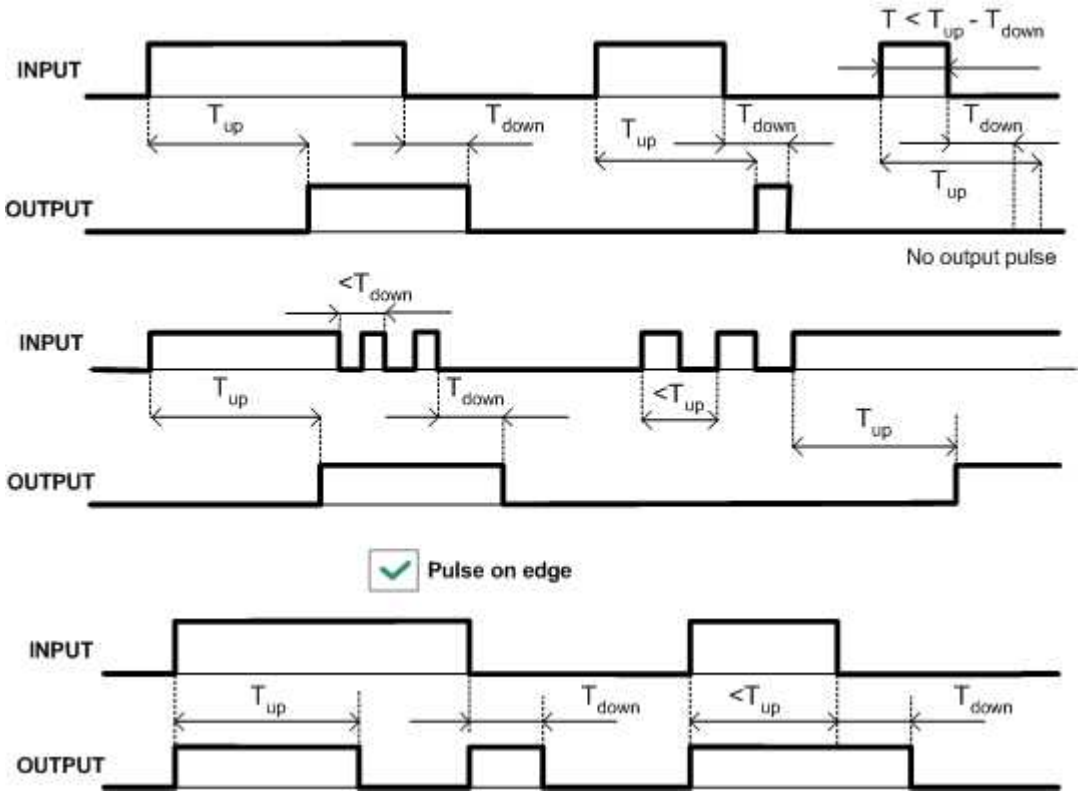


Image 9.8 Delay modes principles

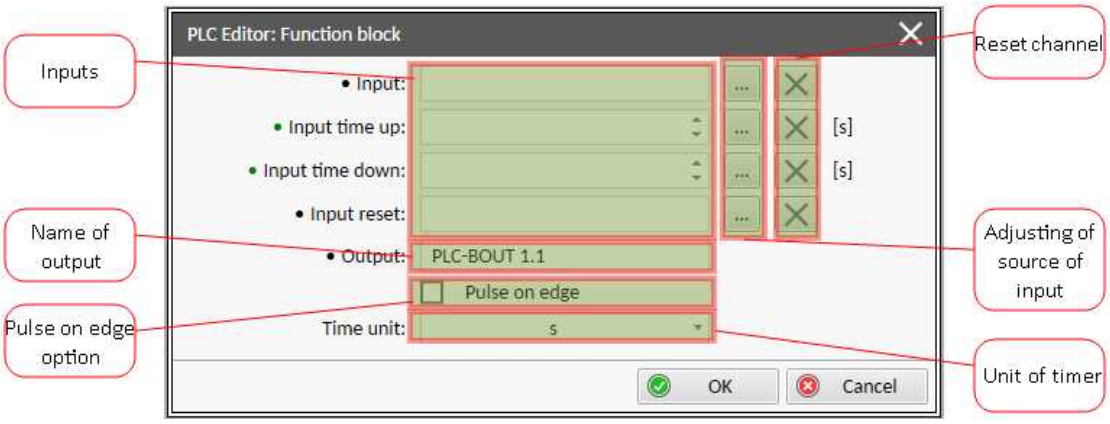


Image 9.9 Configuration of Delay block

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

8.2 Alarms

What alarms are:

The controller evaluates two levels of alarms. For more information **see Alarm management on page 90**.

8.2.1 Alarms level 1

For full list of Alarms level 1 go to **List of alarms level 1 (page 491)**.

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 92**.

List of alarms level 1

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 270)** 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 270)** 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 381)** 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 270)** 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 270)** and SMS wasn't send.

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 200)** ▶ **Battery <> Voltage Delay (page 200)**

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 199)** ▶ **Battery <> Voltage Delay (page 200)**

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 189)** 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 196)** 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 194)** 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 434)** - only when this LBO is active Without configured LBO **ECU Power Relay (page 434)** - 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 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 196)** setpoint.

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 205)** ▶ **Generator <> Voltage Delay (page 206)**

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 206)** ▶ **Generator <> Voltage Delay (page 206)**

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 205)** ▶ **Generator <> Voltage Delay (page 206)**

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 206)** ▶ **Generator <> Voltage Delay (page 206)**

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 205)** ▶ **Generator <> Voltage Delay (page 206)**

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 206)** ▶ **Generator <> Voltage Delay (page 206)**

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 205)** ▶ **Generator <> Voltage Delay (page 206)**

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 206)** ▶ **Generator <> Voltage Delay (page 206)**

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 205)** ▶ **Generator <> Voltage Delay (page 206)**

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 206)** ▶ **Generator <> Voltage Delay (page 206)**

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 205)** ▶ **Generator <> Voltage Delay (page 206)**

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 206)** ▶ **Generator <> Voltage Delay (page 206)**

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 207)** ▶ **Generator <> Frequency Delay (page 208)**

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 208)** ▶ **Generator <> Frequency Delay (page 208)**

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 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 198)** 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 199)** 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 199)** 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 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 192)** 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 204)** adjusts the overload limit. ▶ **Overload Delay (page 204)** Overload Del adjusts the delay.

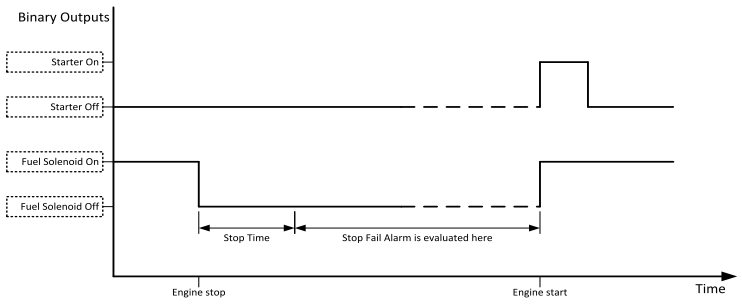
back to List of alarms level 1

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 416)** is activated.

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 436)** has been switched off and time delay **Stop Time (page 186)** has elapsed and lasts for the entire time the **FUEL SOLENOID (PAGE 436)** or **STARTER (PAGE 451)** are off.  Image 9.10 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

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 427)**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 427)**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

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

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) - 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

8.2.2 Alarms level 2

For full list of Alarms level 2 go to **List of alarms level 2 (page 505)**.

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 92**.

List of alarms level 2

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 408)** 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 194)** setpoint.

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 434)** - only when this LBO is active Without configured LBO **ECU Power Relay (page 434)** - 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 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 197)** 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 410)** input does not match the expected position given by the **GCB Close/Open (page 437)** 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 205)** ▶ **Generator <> Voltage Delay (page 206)**

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 206)** ▶ **Generator <> Voltage Delay (page 206)**

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 205)** ▶ **Generator <> Voltage Delay (page 206)**

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 206)** ▶ **Generator <> Voltage Delay (page 206)**

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 205)** ▶ **Generator <> Voltage Delay (page 206)**

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 206)** ▶ **Generator <> Voltage Delay (page 206)**

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 205)** ▶ **Generator <> Voltage Delay (page 206)**

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 206)** ▶ **Generator <> Voltage Delay (page 206)**

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 205)** ▶ **Generator <> Voltage Delay (page 206)**

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 206)** ▶ **Generator <> Voltage Delay (page 206)**

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 205)** ▶ **Generator <> Voltage Delay (page 206)**

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 206)** ▶ **Generator <> Voltage Delay (page 206)**

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 207)** ▶ **Generator <> Frequency Delay (page 208)**

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 207)** ▶ **Generator <> Frequency Delay (page 208)**

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 192)** 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 203)** adjusts the overload limit. ▶ **Overload Delay (page 204)** 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 190)** adjust the overspeed limit ▶ **Overspeed Overshot (page 191)** adjust the additional overspeed limit ▶ **Overspeed Overshot Period (page 191)** 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 175)** within the **Maximum Cranking Time (page 174)**, 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 204)** adjusts the short current limit ▶ **Short Circuit BOC Delay (page 205)** 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 173)** 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 191)**. 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 194)** setpoint.

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 197)** 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 206)** ▶ **Generator <> Voltage Delay (page 206)**

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 206)** ▶ **Generator <> Voltage Delay (page 206)**

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 206)** ▶ **Generator <> Voltage Delay (page 206)**

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 206)** ▶ **Generator <> Voltage Delay (page 206)**

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 206)** ▶ **Generator <> Voltage Delay (page 206)**

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 206)** ▶ **Generator <> Voltage Delay (page 206)**

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 207)** ▶ **Generator <> Frequency Delay (page 208)**

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 207)** ▶ **Generator <> Frequency Delay (page 208)**

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 203)** adjusts the overload limit. ▶ **Overload Delay (page 204)** adjusts the delay

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 204)** adjusts the short current limit ▶ **Short Circuit BOC Delay (page 205)** 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 427)**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

For full list of Fails sensor and other types of alarms go to **List of fail sensor alarms (page 519)**.

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 93**.

List of fail sensor alarms

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 519)

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

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

Note: *Controller has 1 plug-in module slot.*

Communication modules

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 9.11 CM-RS232-485 interface

IMPORTANT: Any manipulation with plug-in module shall be done with disconnected power supply to controller.

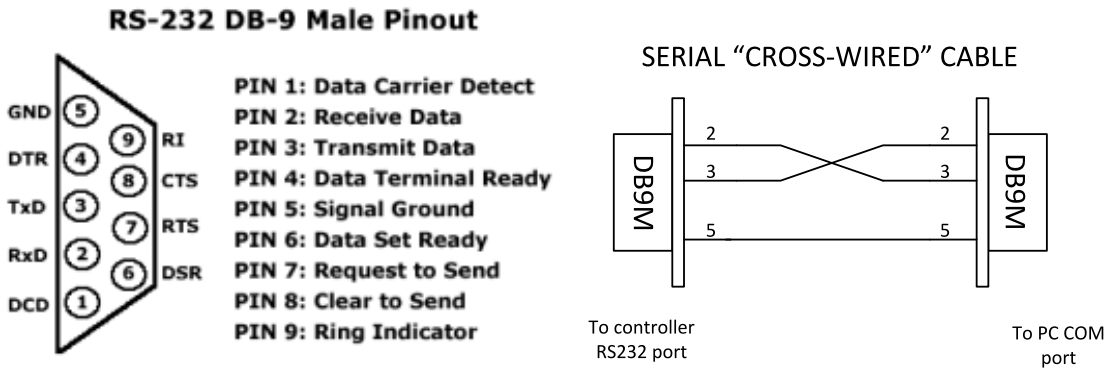


Image 9.12 Pinout of RS-232 line

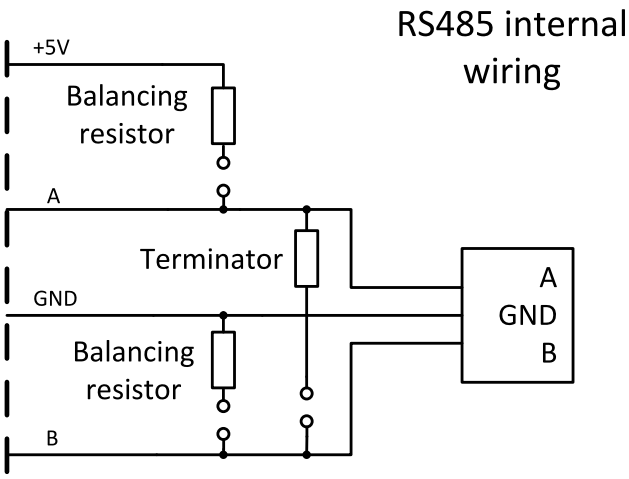


Image 9.13 Pinout of RS-485 line

Image 9.14 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.

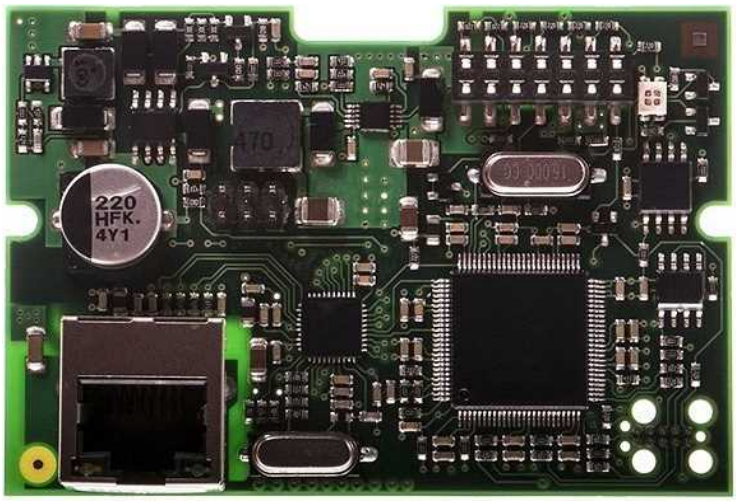


Image 9.15 CM-Ethernet interface

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.

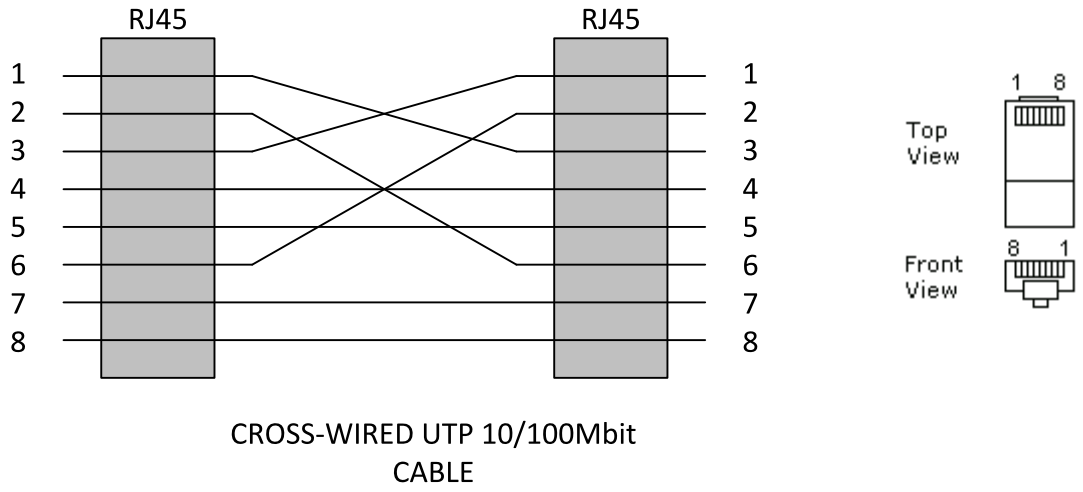


Image 9.16 Cross-wired cable

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 270)**.

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

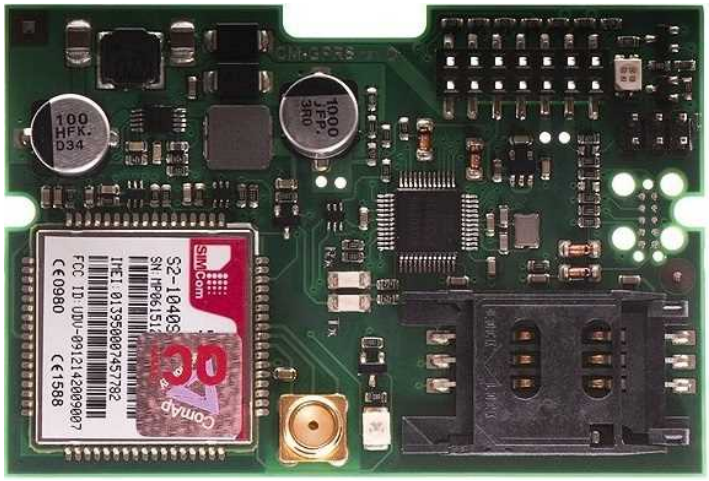


Image 9.17 CM-GPRS module

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.*

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.

- 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.

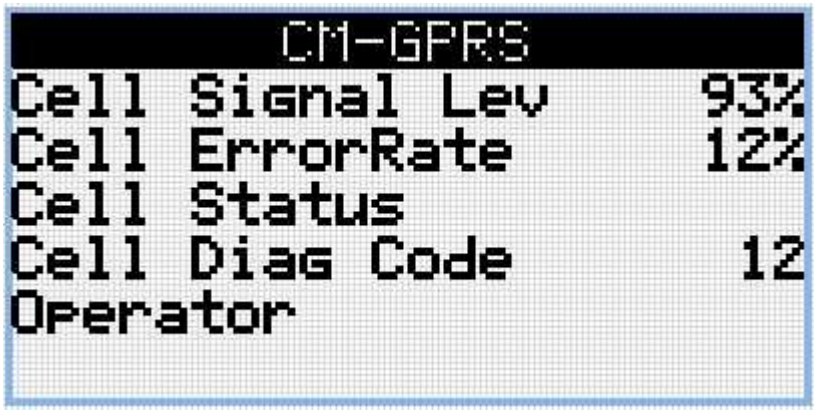


Image 9.18 Main screen of CM-GPRS module

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

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

Image 9.19 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.*

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.*

- 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.
- Switch off the controller.
- Insert CM-4G-GPS module into controller
- Power up the controller.

Image 9.20 Main screen of CM-4G-GPS module

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
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

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

EM-BIO8-EFCP is optional plug-in card. Through this card controller can accommodate 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 9.21 EM-BIO8-EFCP interface

IMPORTANT: Any manipulation with plug-in module shall be done with disconnected power supply to controller.

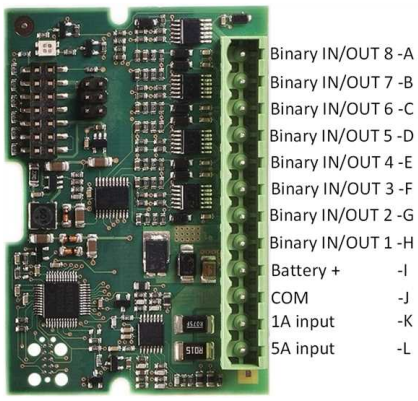


Image 9.22 Overview of EM-BIO8-EFCP

Note: *Current inputs are supported only in MRS16 and AMF25 controllers.*

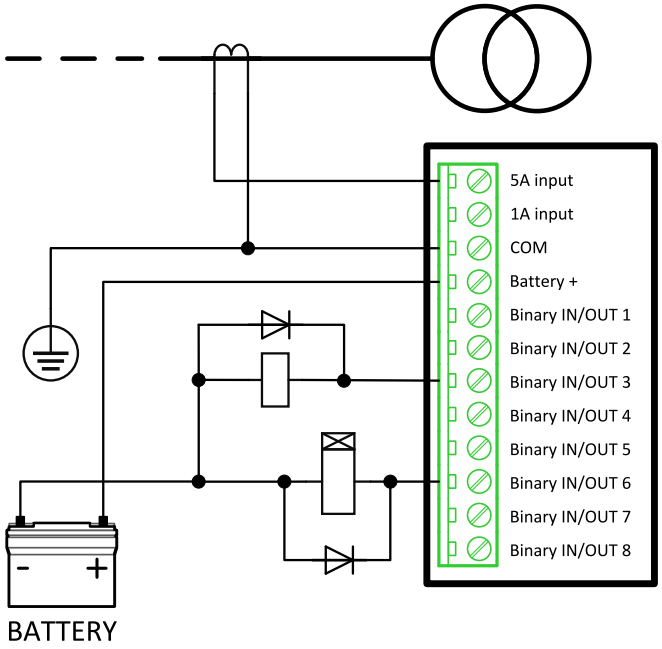


Image 9.23 EM-BIO8-EFCP wiring

Note: *Current inputs are supported only in MRS16 and AMF25 controllers.*

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

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

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

Inteli AIN8 module is extension module equipped with analog inputs. Inteli AIN8 module is connected to controller by CAN1 bus.

Image 9.24 Inteli AIN8

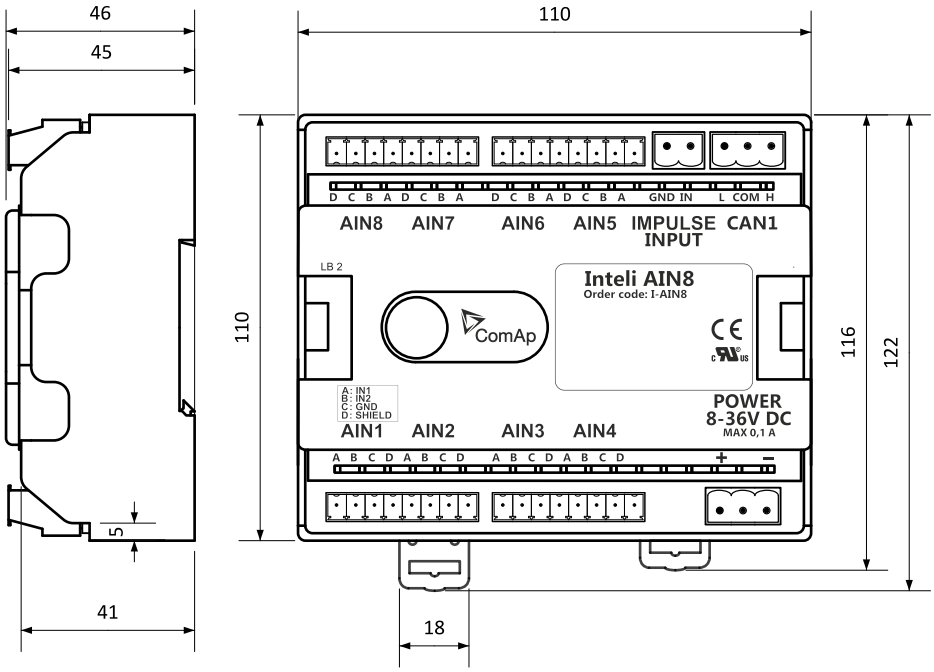
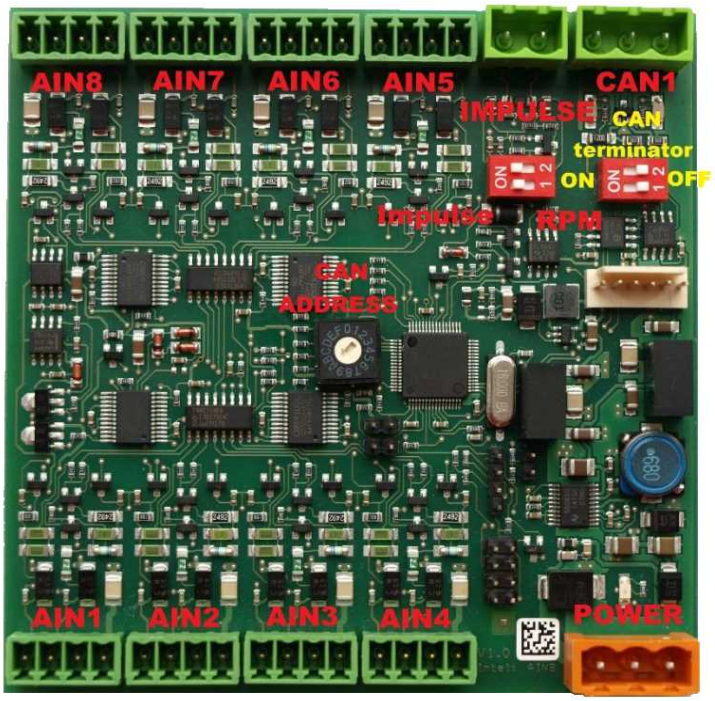


Image 9.25 Inteli AIN8 dimensions

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

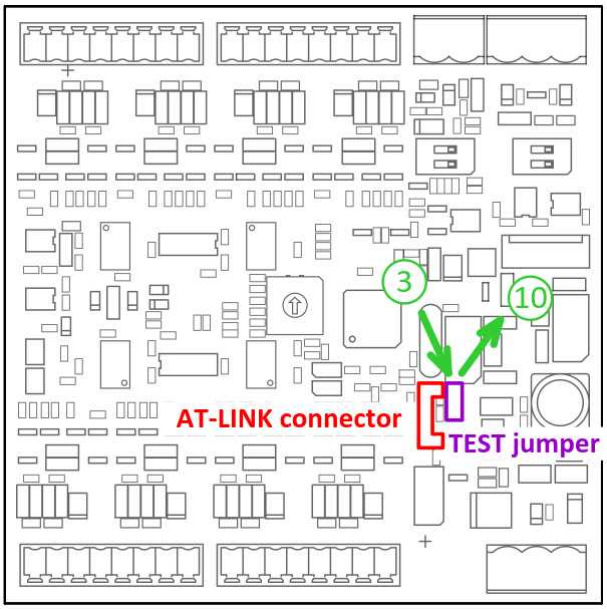
DIP switch determinates CAN address for analog inputs.

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

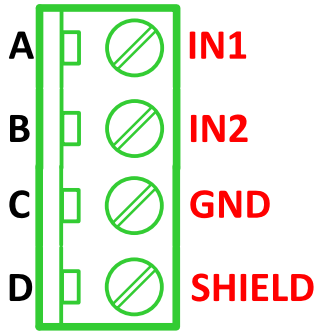
LED indication

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).

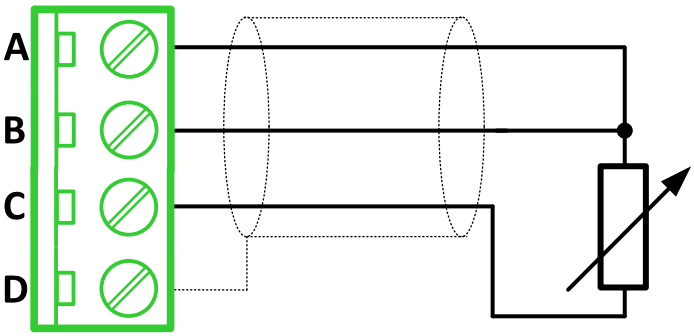
Wiring

The following diagrams show the correct connection of sensors.

Terminator

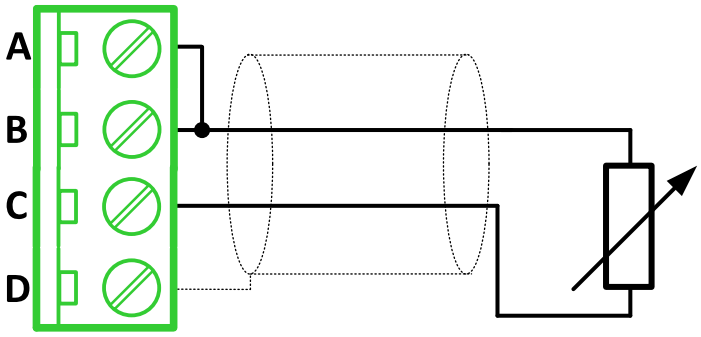


Resistance sensor - 3 wires



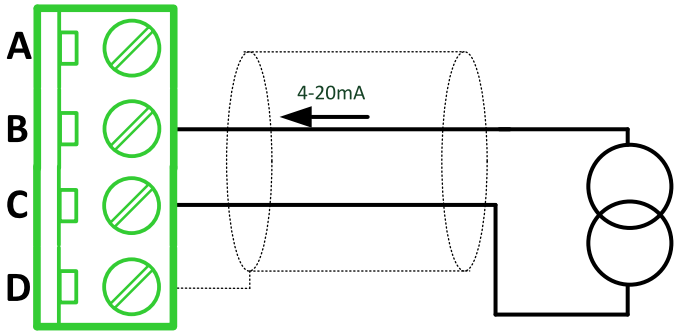
Note: *Ranges: Pt100, Pt1000, Ni100, Ni1000, 0 – 2400 Ω, 0 – 10 kΩ*

Resistance sensor - 2 wires



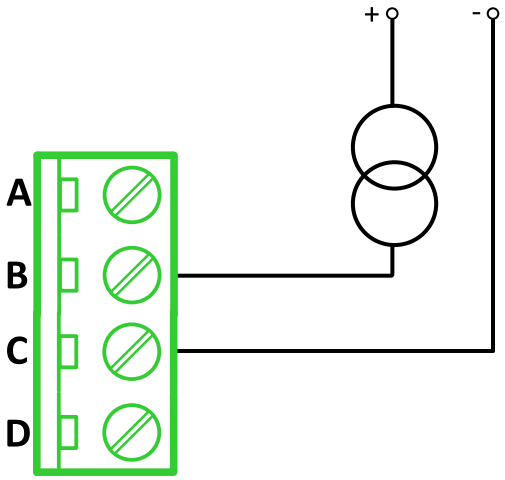
Note: *Ranges: Pt100, Pt1000, Ni100, Ni1000, 0 – 2400 Ω, 0 – 10 kΩ*

Current sensor - active



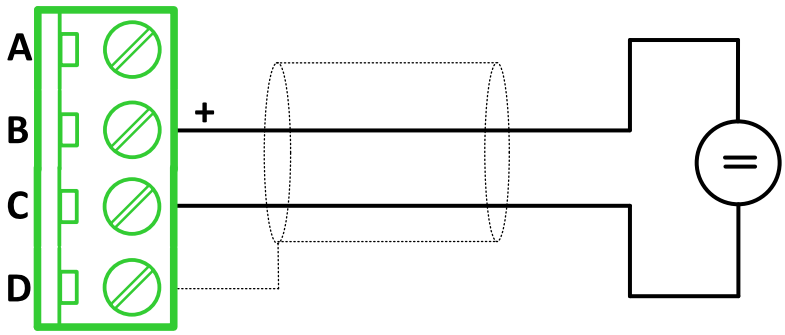
Note: *Ranges: ±20 mA, 4 – 20 mA*

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 9.26 Inteli IO8/8

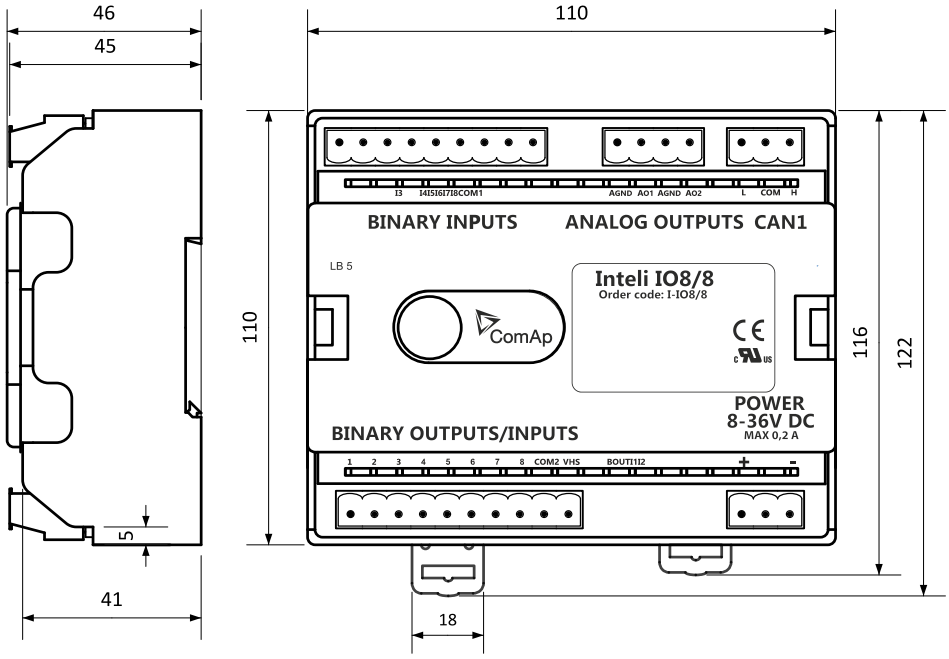
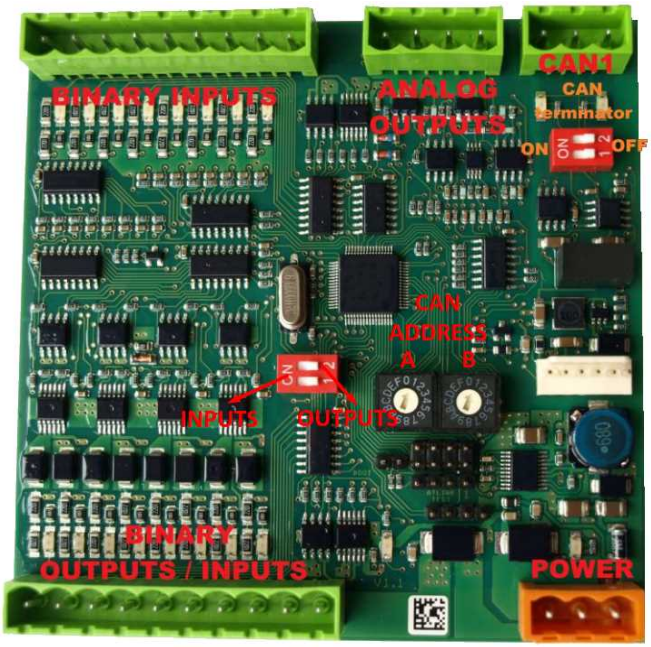


Image 9.27 Inteli IO8/8 dimensions

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.

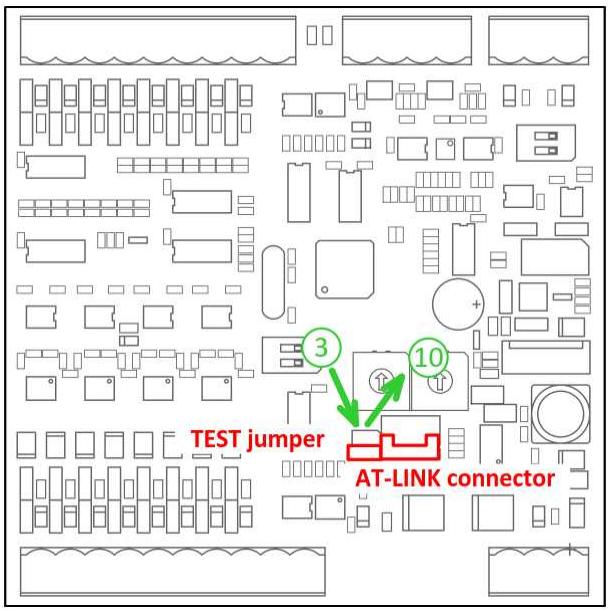
Note: *In case of setting the CAN address to zero, the appropriate group of signals is deactivated.*

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.

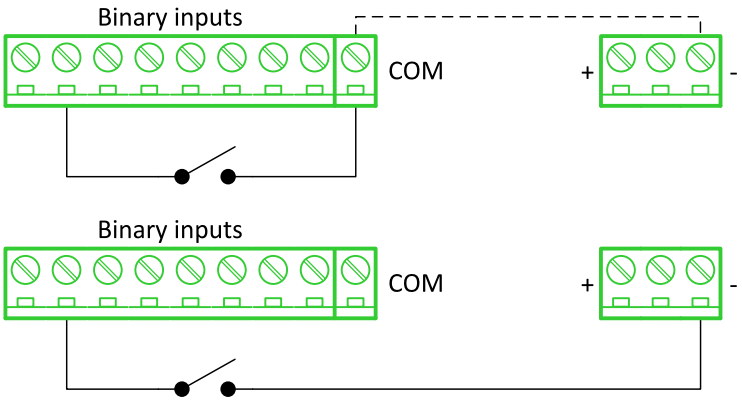
LED at power connector - status LED

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.

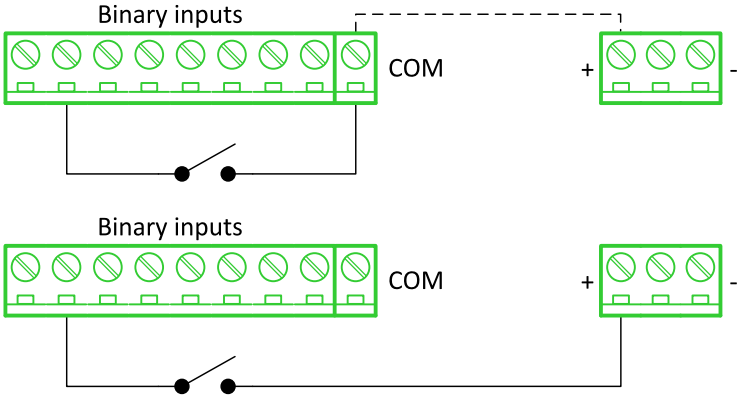
Binary inputs - pull up



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.

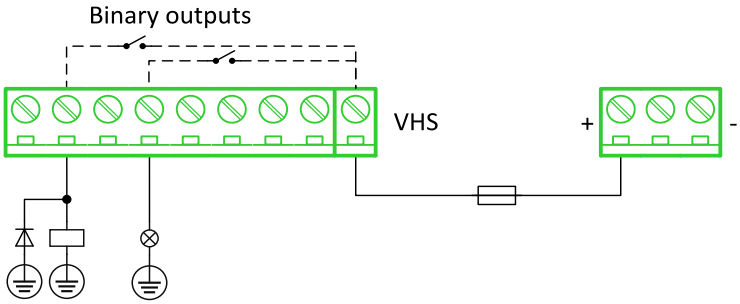
Binary inputs - pull down



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).

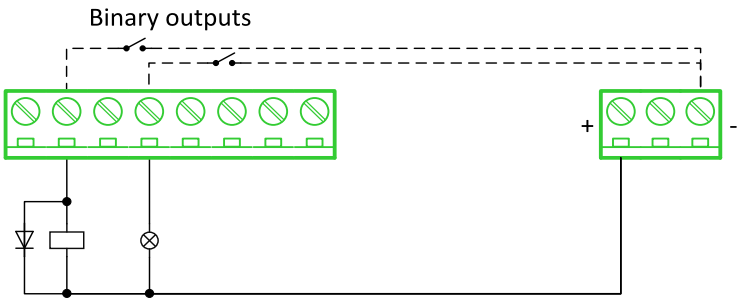
On lower picture is case of wiring between BIN2 and Ucc (+). Both ways are correct.

Binary outputs - high side



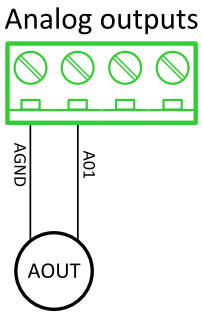
When high side setting of outputs is chosen - binary output must be connected to the minus potential directly Terminal VHS (voltage High side) has to be connected to positive potential directly. Maximal current of each binary output is 500 mA. Size of fuse depends on load.

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 9.28 IGS-PTM

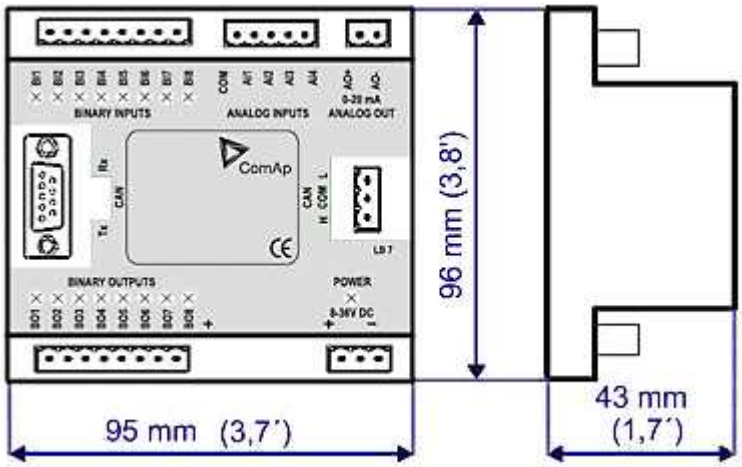
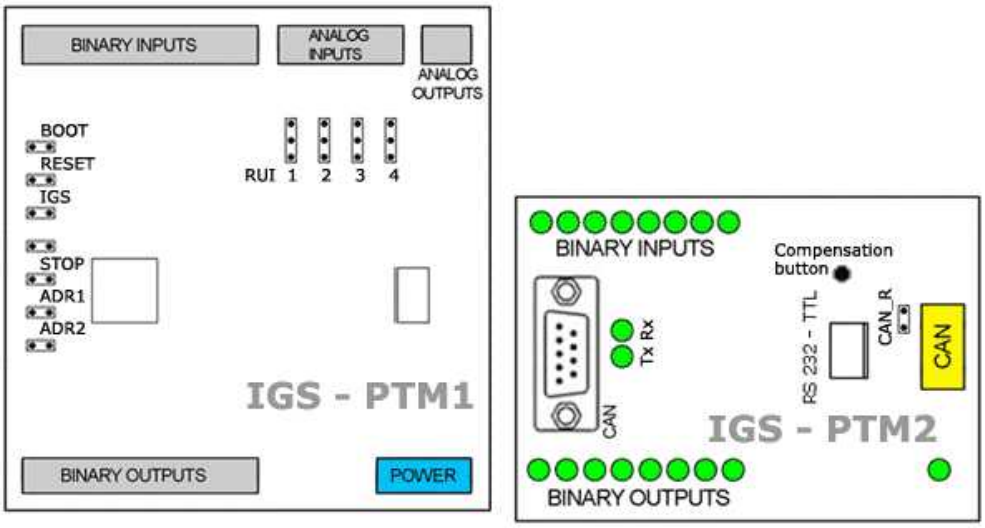


Image 9.29 IGS-PTM dimensions

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

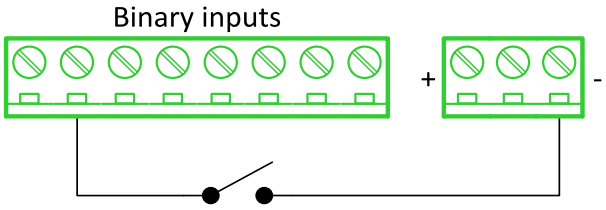
Each binary output has LED which indicates output signal. Binary output LED is shining when binary output is set.

LED at power connector - status LED

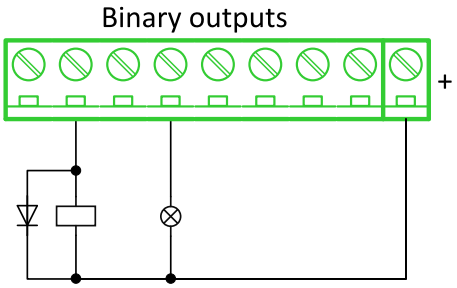
LED status	Description
Dark	No required power connected.
Quick flashing	Program check failure.
One flash and pause	Compensation fail.
Three flashes and pause	Compensation successful.
Flashes	There is no communication between IGS-PTM and the controller.
Lights	Power supply is in the range and communication between IGS-PTM and controller properly works.

Wiring

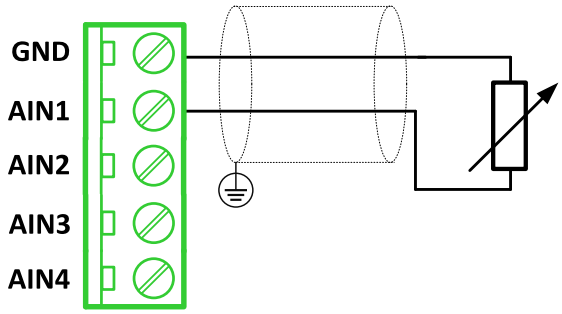
Binary inputs



Binary outputs



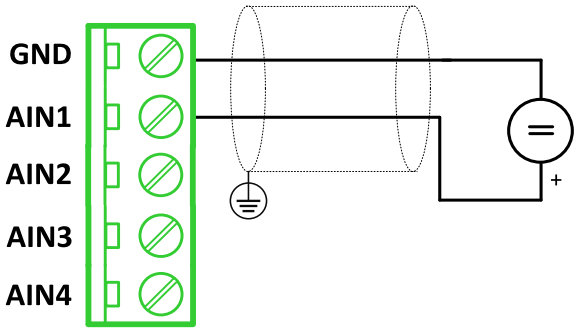
Resistance sensor



Note: *Range: 0- 2400 Ω*

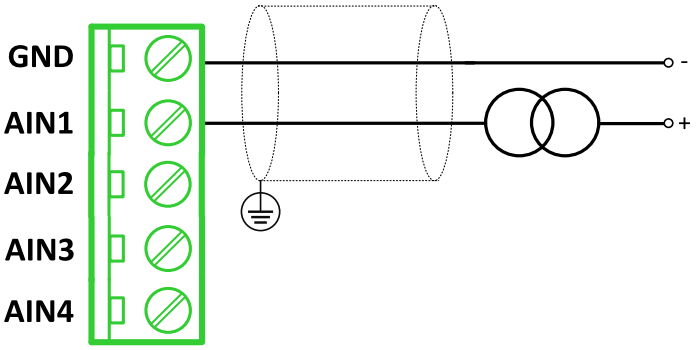
IMPORTANT: Physical analog input range is 0-250 Ω. In sensor configuration in PC tool it is necessary to chose 0-2400 Ω sensor HW type to ensure proper function of analog input.

Voltage sensor



Note: *Range 0-100 mV*

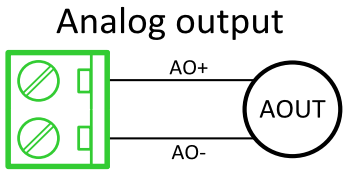
Current sensor - passive



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 9.30 Inteli AIN8TC

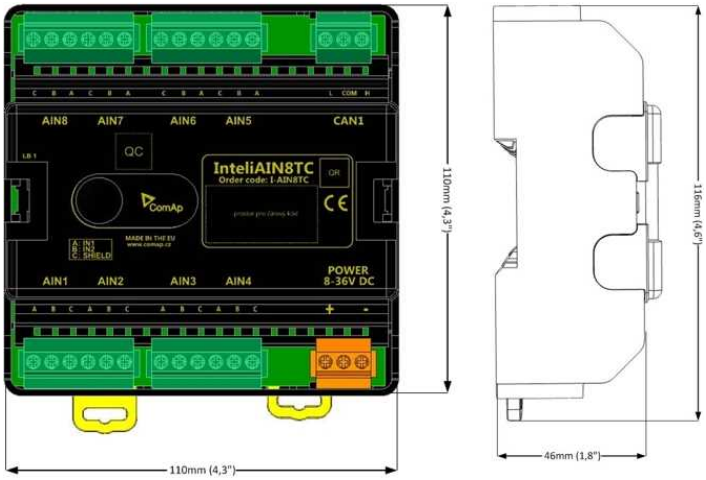
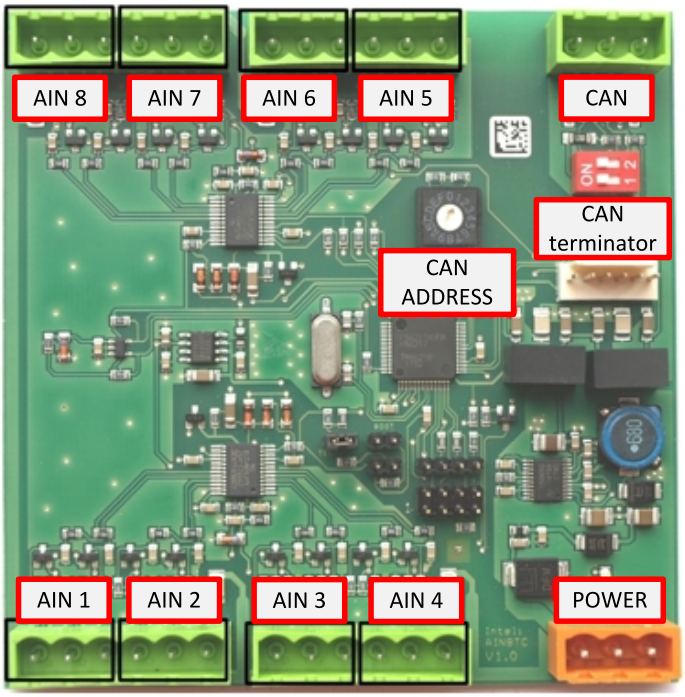


Image 9.31 Inteli AIN8TC dimensions

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.

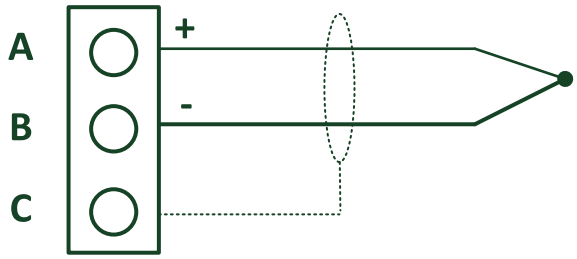
For programming FlashProg PC tool version 4.2 or higher must be used.

LED indication

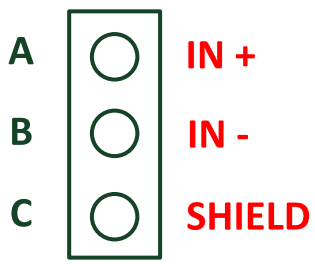
LED status	Description
Dark	Fw in module does not work correctly.
Flashing	Module does not communicate with controller (in case non-zero CAN address)
Fast flashing	Detection of CAN communication speed
Lights	Power supply is in the range and the communication between Inteli AIN8TC and controller works 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 9.32 Inteli AIO9/1

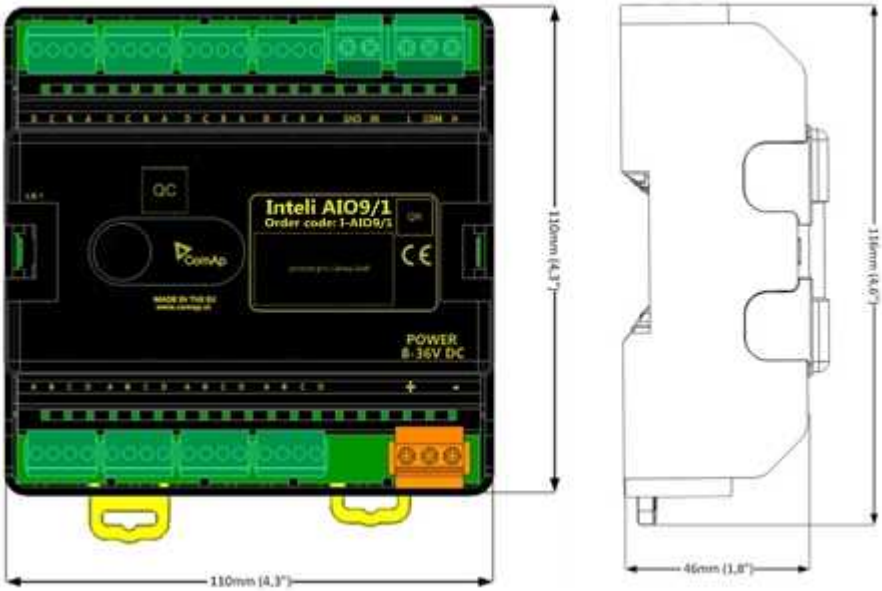
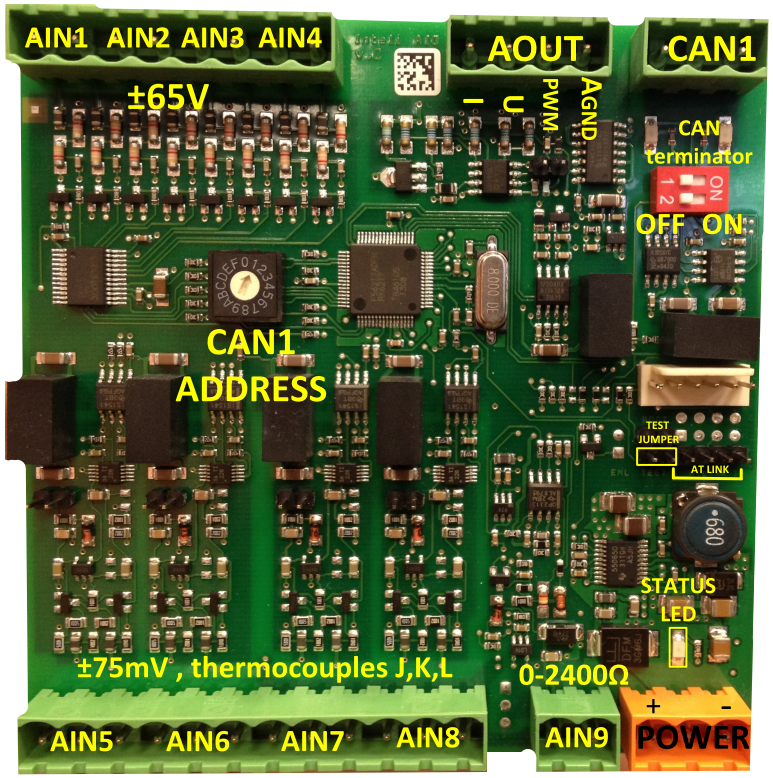


Image 9.33 Inteli AIO9/1 dimensions

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.

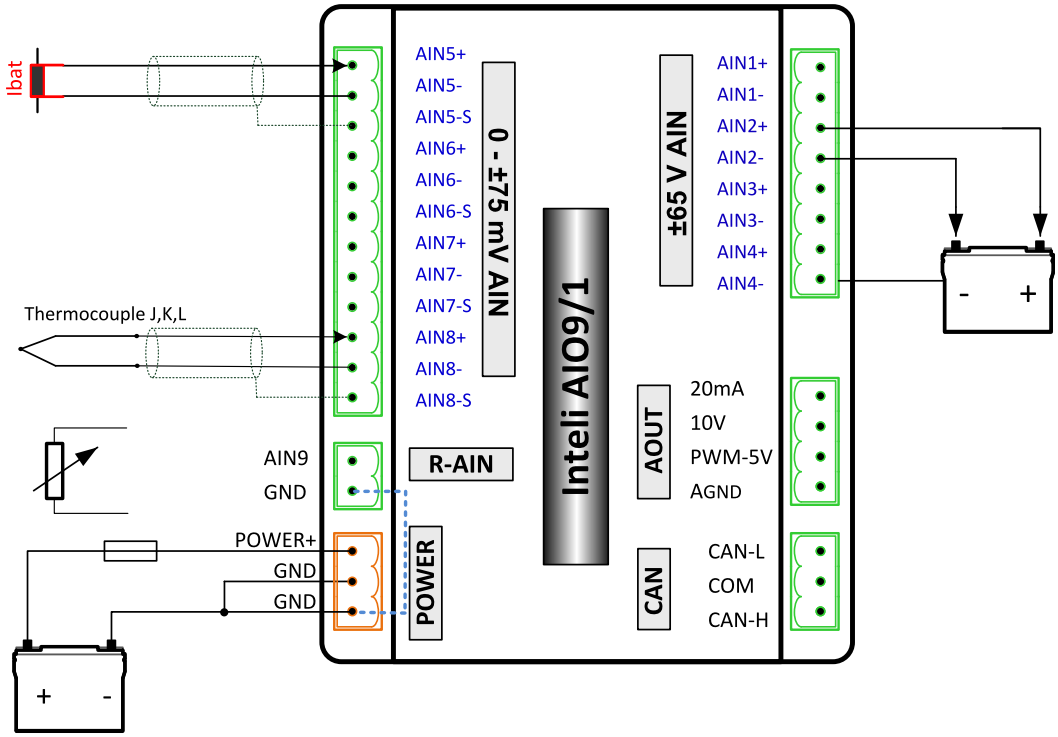
LED indication

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)

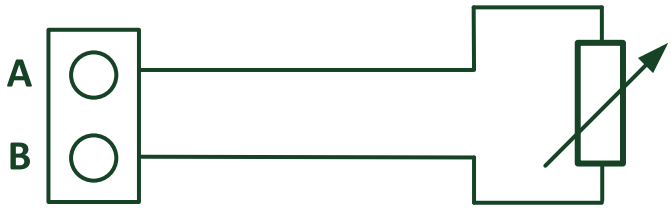
Wiring

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.