ComAp
The heart of smart control

InteliLite 9

Controller for single gen-set applications

SW version 1.6.0

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New Features List

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1.1 Clarification of Notation

Note: *This type of paragraph calls the reader's attention to a notice or related theme.*

IMPORTANT: This type of paragraph highlights a procedure, adjustment etc., which can cause a damage or improper 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 New Features List

This manual contains important instructions for InteliLite 9 controllers family that shall be followed during installation and maintenance of the controllers.

This manual provides general information how to install and operate InteliLite 9 controllers.

This manual is dedicated for:

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

1.3 Legal notice

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

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

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

General security recommendations and set of measures

1. AccessCode

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

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

• For each device use a different AccessCode.

2. Password

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

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

3. Controller Web interface

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

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

4. MODBUS/TCP

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

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

5. SNMP

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

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

Used Open Source Software: mBed-TLS

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

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

Used Font: zpix-pixel-font

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

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1.4 General warnings

1.4.1 Remote control and programing

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

To be sure:

- Disconnect remote control
- Disconnect binary outputs

1.4.2 SW and HW versions compatibility

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

1.4.3 Dangerous voltage

In no case touch the terminals for voltage and current measurement! Always connect grounding terminals! In any case do not disconnect controller CT terminals!	

1.4.4 Adjust the setpoints

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

IMPORTANT: Wrong adjustment of setpoints can destroy the Gen-set.

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

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

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

1.5 Functions and protections

Support of functions and protections as defined by ANSI (American National Standards Institute):

Description	ANSI code	Description	ANSI code
Master unit	1	**Incomplete sequence relay**	48
Stopping device	5	**Overcurrent**	50/50TD
Multi-function device	11	**Breaker failure**	50BF
Overspeed	12	**Over voltage**	59
Underspeed	14	**Aux Over Voltage**	59X
Starting-to-running transition contactor	19	**Pressure switch**	63
Thermal relay	26	**Liquid level switch**	71
Undervoltage	27	**Alarm relay****	74
Aux Battery Under Voltage	27X	**Overfrequency**	81O
Annunciator	30	**Underfrequency**	81U
Overload	32P	**Auto selective control/transfer**	83
Master sequence device	34		

** Extension module IGL-RA15 required

1.6 Certifications and standards

- EN 61000-6-2
- EN 61000-6-4
- EN 61010-1
- EN 60068-2-1 (-20 °C/16 h for std, -40 °C/16 h for LT version)
- EN 60068-2-2 (70 °C/16 h)
- EN 60068-2-6 (2÷25 Hz / ±1,6 mm; 25÷100 Hz / 4.0 g)
- EN 60068-2-27 (a=500 m/s^2; T=6 ms)
- EN 60068-2-30:2005 25/55°C, RH 95%, 48hours
- EN 60529 (front panel IP65, back side IP20)
- UL 6200

1.7 Document history

Revision number	Related sw. version	Date	Author
4	1.6.0	27.12.2021	Michal Slavata
3	1.3.0	20.7.2020	Michal Slavata
2	1.1.0	12.9.2018	Michal Slavata
1	1.0.0	2.1.2017	Daniel Švanda

1.8 Symbols in this manual

3 x Phases

Active current sensor

AirGate

Alternating current

Analog modem

Battery

Binary output

Breaker contact

Breaker contact

Breaker

Breaker

Breaker

Capacitor

Coil

Connector - female

Connector - male

Contact

Contactor

Controller simplified

Module simplified

Current measuring

Current measuring

Diode

Ethernet male

Ethernet female

Fuel solenoid

Fuse

Fuse switch

Generator

Generator schematic

Grounding

GSM

GSM modem

IG-AVRi

IG-AVRi TRANS

Jumper

Load

Mains

Mains

Mobile provider

Passive current sensor

Pick - up

Relay coil

Relay coil of slow-operating

Resistor

Resistor adjustable

Resistive sensor RPTC

RS 232 male

RS 232 female

Starter

Switch - manually operated

Transformer

USB type B male

USB type B female

Voltage measuring

Wifi / WAN / LAN

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2.1 General description

InteliLite 9 Family controllers is comprehensive Gen-set controllers for single Gen-set 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.

2.1.1 The key features of InteliLite 9

- 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 voltage should have a pure sinusoidal waveform. However some nonlinear elements of load produce harmonic waveforms with frequencies of multiplies of the basic 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

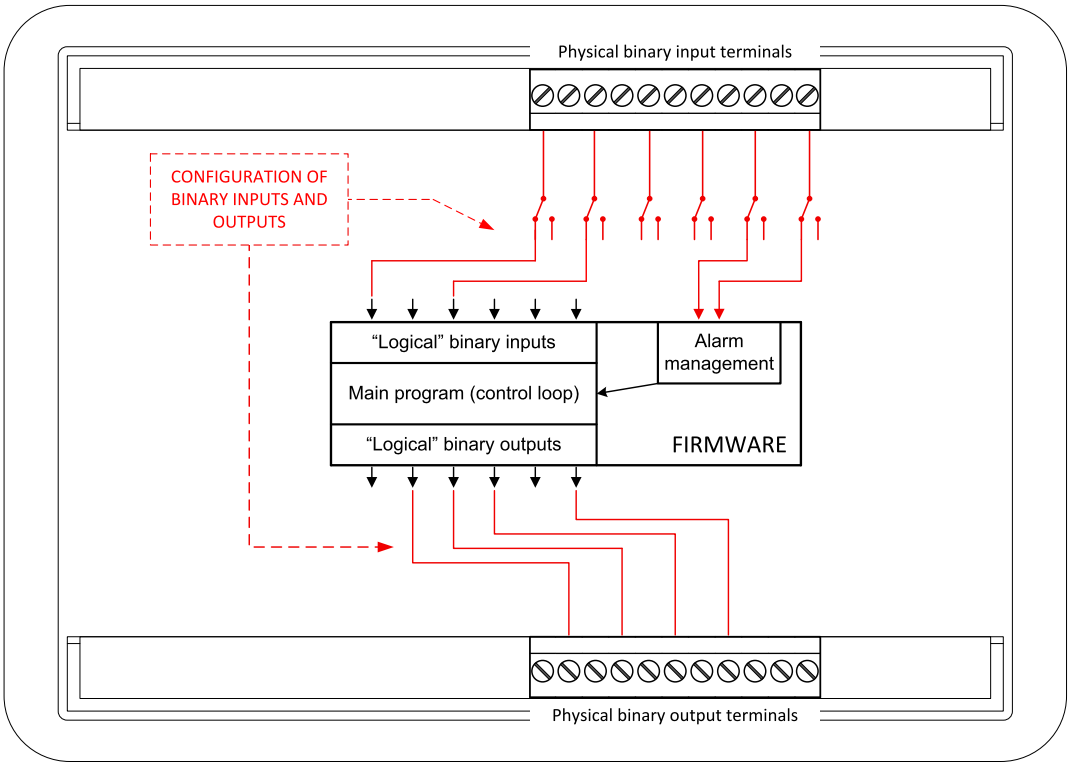


Image 2.1 Principle of binary inputs and outputs configuration

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 InteliConfig controllers. See more in InteliConfig Reference Guide.

This tool provides the following functions:

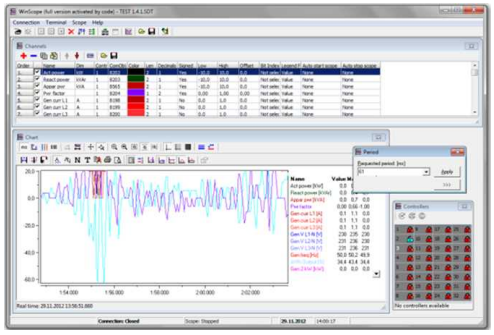
- Direct or internet communication with the controller
- Offline or online controller configuration
- Controller firmware upgrade
- Reading/writing/adjustment of setpoints
- Reading of measured values
- Browsing of controller history records
- Exporting data into a XLS file
- Controller language translation

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

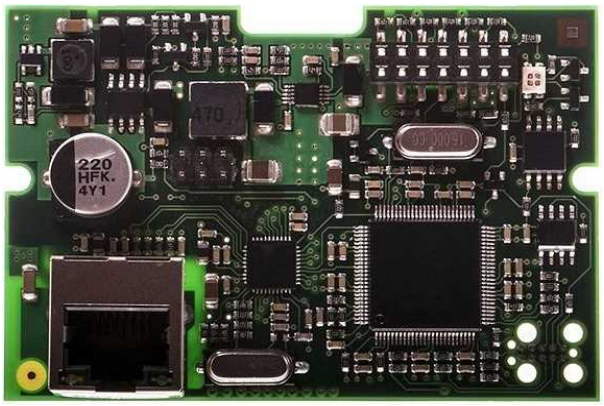


2.5 Plug-in Modules

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

- 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

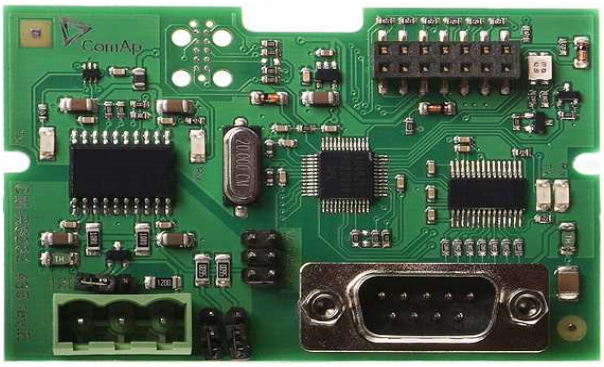
2.5.3 CM-GPRS

- 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.

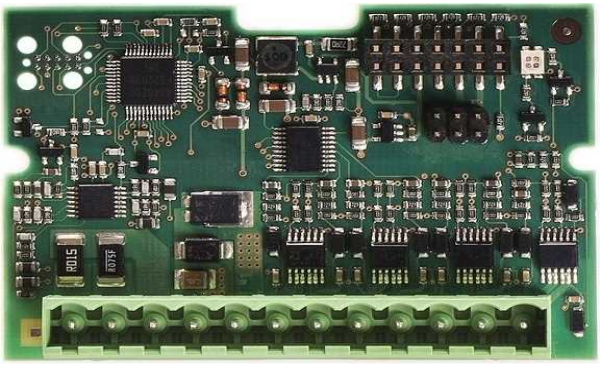
- RS232 and RS485 interface
- Modbus
- Serial connection to InteliConfig



2.5.5 EM-BIO8-EFCP

Hybrid current input and binary input/output extension module.

- Up to 8 additional configurable binary inputs or outputs



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3 Applications overview

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3.1 AMF – Automatic Mains Failure Start

The typical scheme of Automatic Mains Failure Start application is shown below. The controller controls two breakers – a mains breaker and a generator breaker. Feedback from both breakers isn't necessary. InteliLite 9 controllers can also work without breaker feedbacks.

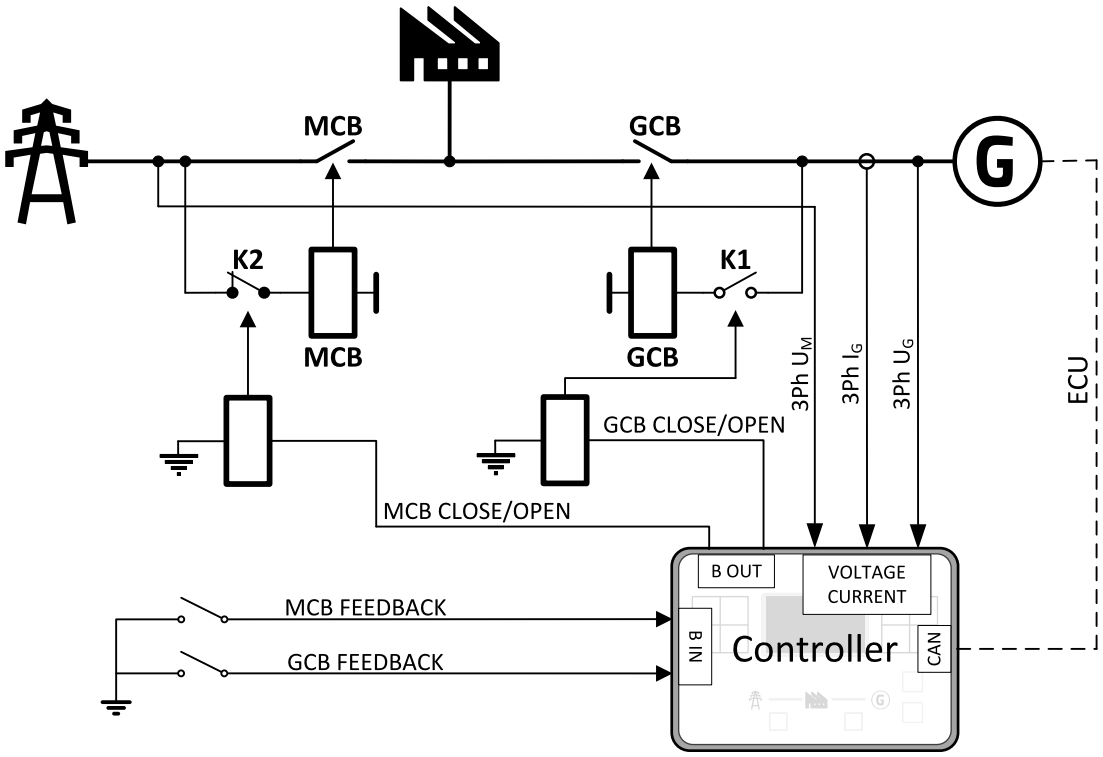

Image 3.1 AMF application overview

3.2 MRS – Manual Remote Start

The typical scheme of Manual Remote Start application is shown below. The controller controls one breaker – a generator breaker. Feedback from breaker isn't necessary. InteliLite 9 controllers can also work without breaker feedback.

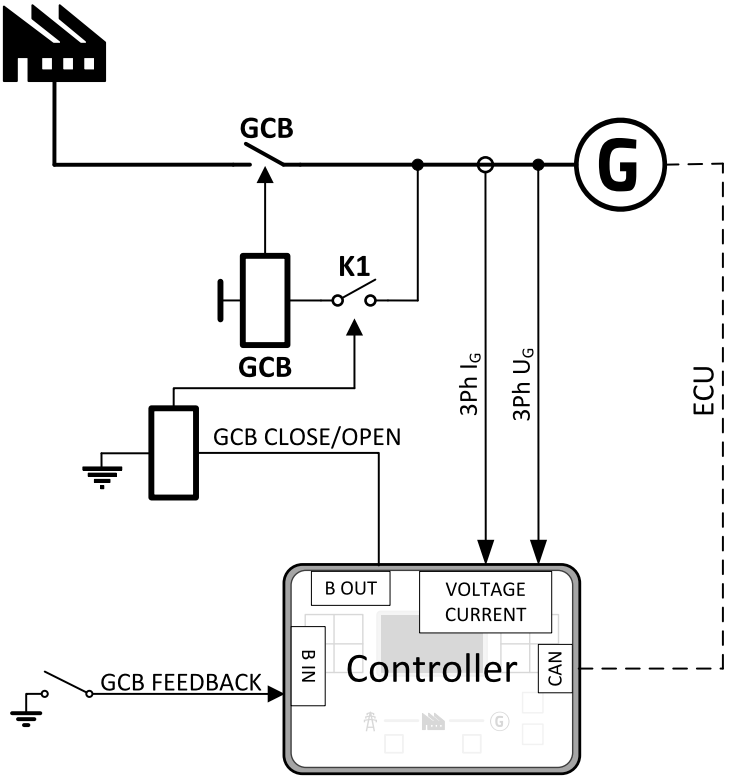

Image 3.2 MRS application overview

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4.1 Package content

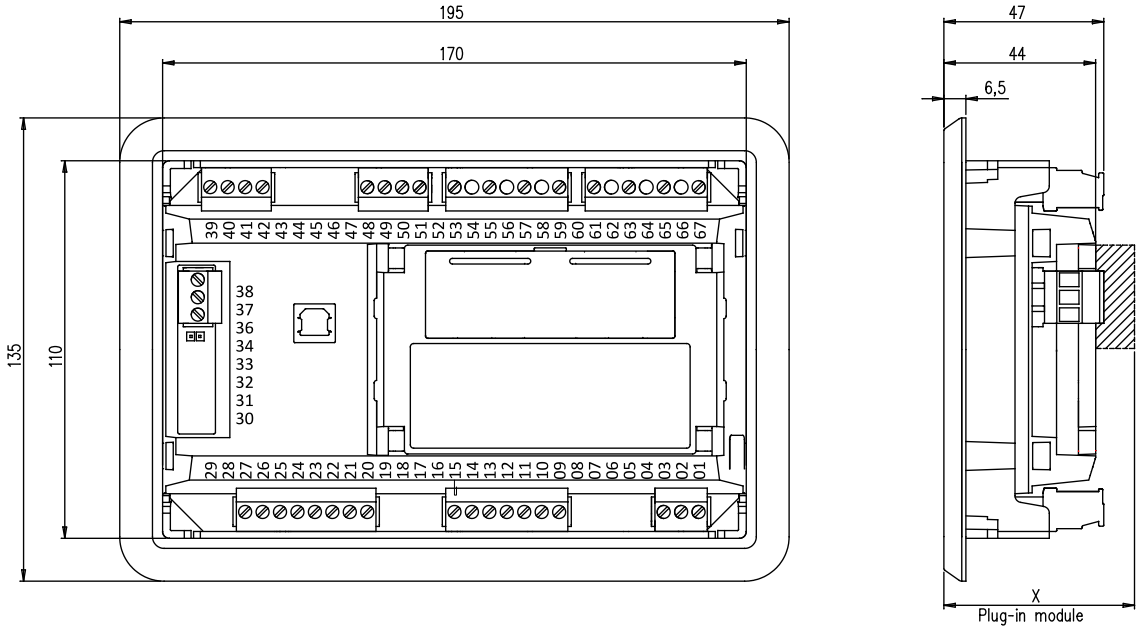
The package contains:

- Controller
- Mounting holders
- Terminal blocks

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

4.2 Controller installation

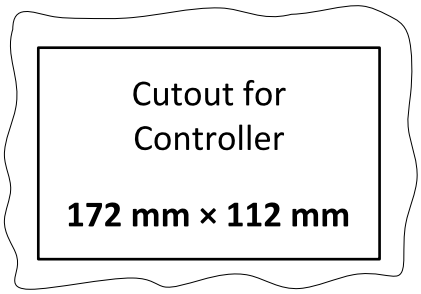
4.2.1 Dimensions



① Plug-in module

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

Note: *Dimensions are in millimeters.*

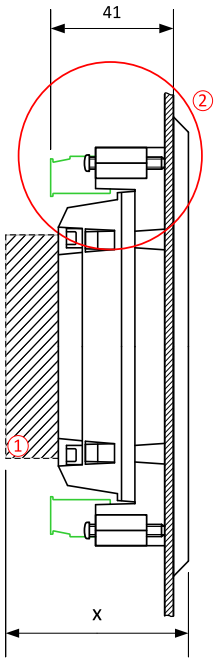


Note: *Cutout is in millimeters.*

4.2.2 Mounting

The controller is to be mounted onto the switchboard door. Requested cutout size is 172 × 112 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: *Cutout is in millimeters.*

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

4.3 Terminal Diagram

① POWER SUPPLY, D+		② BINARY OUTPUTS		③ BINARY INPUTS		④ CAN	
T01	BATT-	T09	ESTOP	T20	RPM GND	T36	CAN L
T02	D+	T10	BOUT1	T21	RPM IN	T37	CAN COM
T03	BATT+	T11	BOUT2	T22	BIN1	T38	CAN H
		T12	BOUT3	T23	BIN2		
		T13	BOUT4	T24	BIN3		
		T14	BOUT5	T25	BIN4		
		T15	BOUT6	T26	BIN5		
				T27	BIN6		

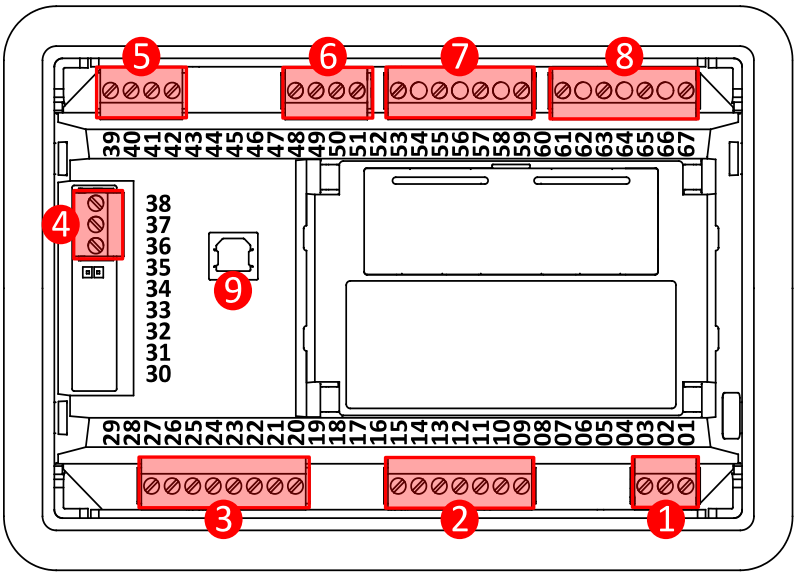
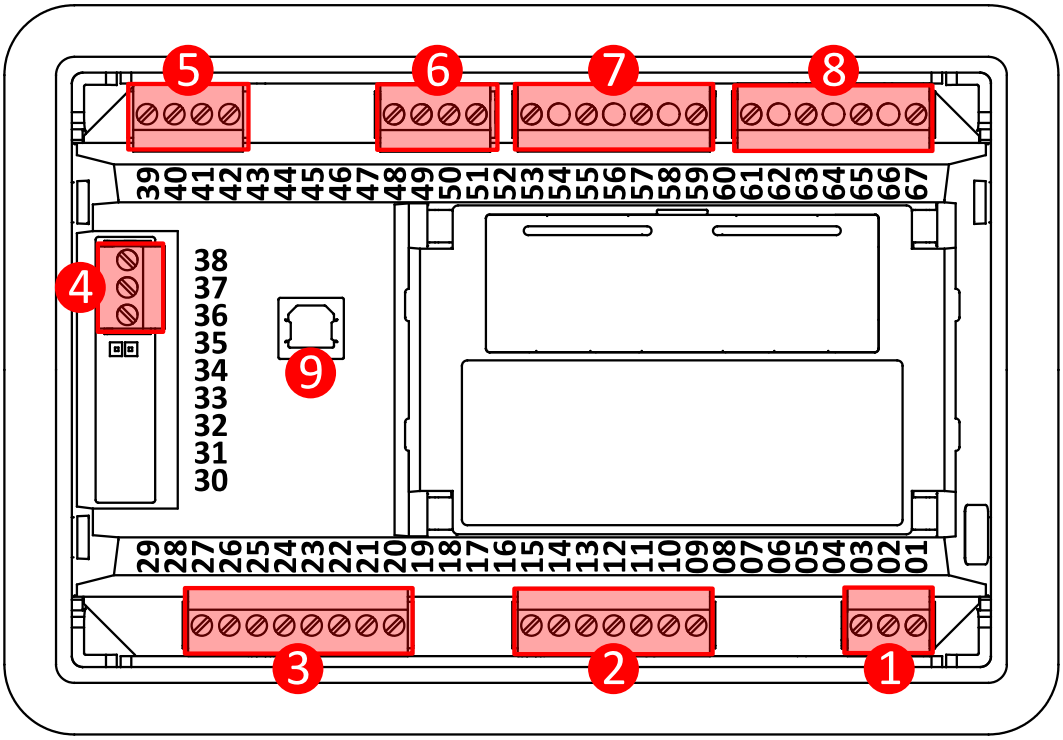


Image 4.1 Terminal diagram for InteliLite 9

⑤ ANALOG INPUTS		⑥ GENERATOR CURRENT MEASUREMENT		⑦ GENERATOR VOLTAGE MEASUREMENT		⑧ MAINS VOLTAGE MEASUREMENT	
T39	AIN COM	T48	COM	T53	N	T61	N
T40	AIN1	T49	L1	T55	L1	T63	L1
T41	AIN2	T50	L2	T57	L2	T65	L2
T42	AIN3	T51	L3	T59	L3	T67	L3

4.4 Recommended wiring



1	Power supply	"+", D, "-"	**Power supply (page 20)**
2	Binary outputs	09 - 15	**Binary Outputs (page 43)** ***Note:*** *T09 is dedicated for* ***Emergency stop (page 43)***
3	Binary inputs	22 - 27	**Binary inputs (page 42)**
4	CAN bus	H, COM, L	**CAN bus (page 48)**
5	Analog inputs	39 - 42	**Analog inputs (page 44)**
6	Current inputs	48 - 51	**Current measurement wiring (page 22)**
7	Generator voltage inputs	53 - 59	**Voltage measurement AMF wiring (page 26)** **Voltage measurement MRS wiring (page 34)**
8	Mains voltage inputs	61 - 67	**Voltage measurement AMF wiring (page 26)**
9	USB		**USB (page 50)**

Note: *Wiring terminal markings to included tightening torque: 0.5 N-m (4.5 lb-in)., and wire size: 2 mm^2 (12-26 AWG).*

4.4.1 General

To ensure proper function:

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

Tightening torque, allowable wire size and type, for the Field-Wiring Terminals:	
Example of used connectors:	
For Mains and Generator Voltage, and for Current terminals:	Use only diameter 0.5 – 2.0 mm^2 (AWG 12–26) conductor, rated for 90 °C minimum.
For other controller field wiring terminals:	Use only diameter 0.5 - 2.0 mm^2 (AWG 12–26) conductor, rated for 75 °C minimum.
Specified tightening torque is 0.56 N·m (5.0 In-lb).	
Use copper conductors only.	

4.4.2 Grounding

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

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

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

4.4.3 Power supply

To ensure proper function:

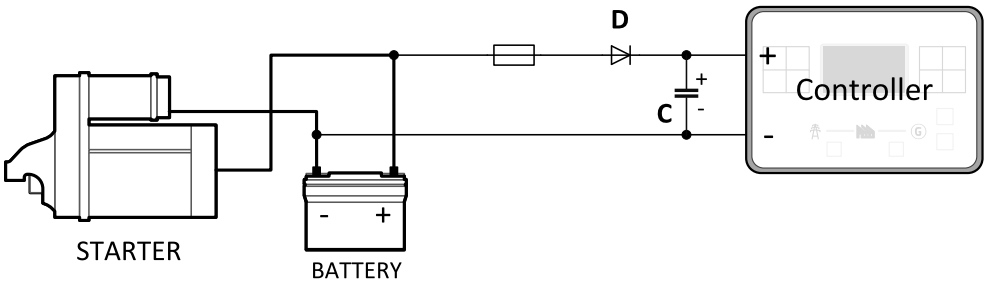
- Use power supply cable min. 1.5 mm^2

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

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

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

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



Note: *Recommended fusing is 3 A fuse.*

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

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

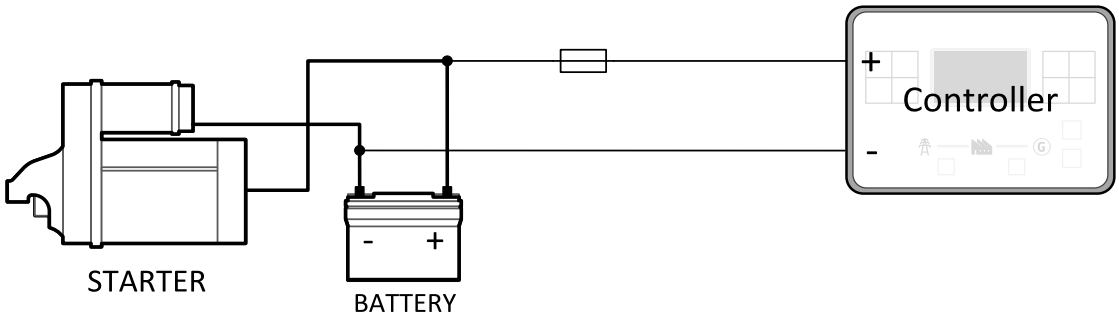
Note: *Suitable conductor protection shall be provided in accordance with NFPA 70, Article 240.*

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

Note: *It is also possible to further support the controller by connecting the external capacitor and separating diode. The capacitor size depends on required time. It shall be approximately thousands of µF. The capacitor size should be 5 000 µF to withstand 150 ms voltage dip under following conditions: Voltage before dip is 12 V, after 150 ms the voltage recovers to min. allowed voltage, i.e. 8 V. Diode should be able to withstand at least 1 kV.*

Power supply fusing

Controller should never be connected directly to the starting battery. A 3 A fuse should be connected in-line with the battery positive terminal to the controller and CAN modules. 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.*

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 165)**, **Nominal Voltage Ph-N (page 166)**, **Nominal Voltage Ph-Ph (page 167)**, **Nominal Current (page 163)**, **PT Ratio (page 167)**, **Vm PT Ratio (page 167)** and **CT Ratio (page 164)** by appropriate setpoints in the Basic Settings group.

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

CT Location

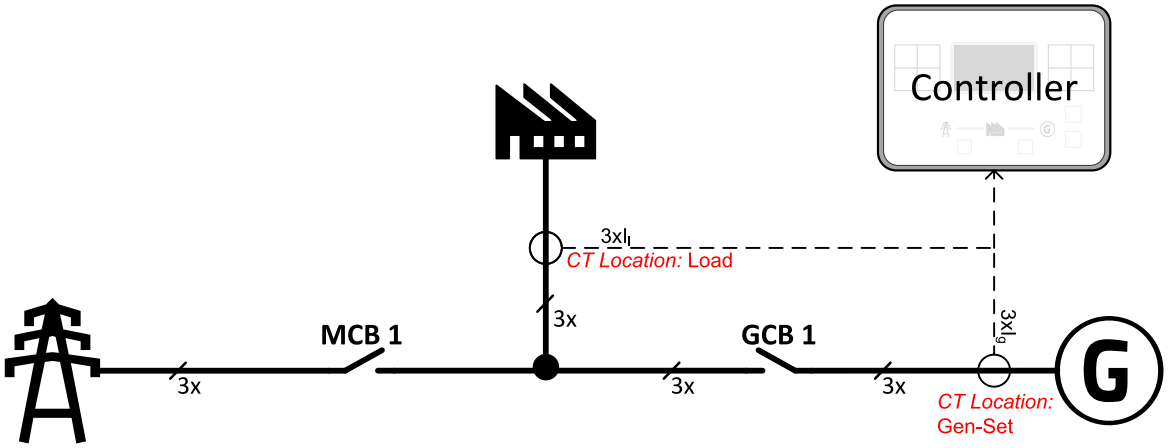


Image 4.2 CT Location

There are three options of CT location.

- Load
- Gen-set
- None

Note: *The current measurement protections are active only when the Gen-set is running.*
If the CT Location is set to Load the ***Short Circuit BOC (page 208)*** *protection is enabled only when GCB is closed.*

Current measurement wiring

The number of CT's is automatically selected based on selected value of setpoint **Connection type (page 165)** [3Ph4Wire / High Leg D / 3Ph3Wire / SplPhL1L2 / SplPhL1L3 / Mono Ph].

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

To ensure proper function:

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

3 phase application

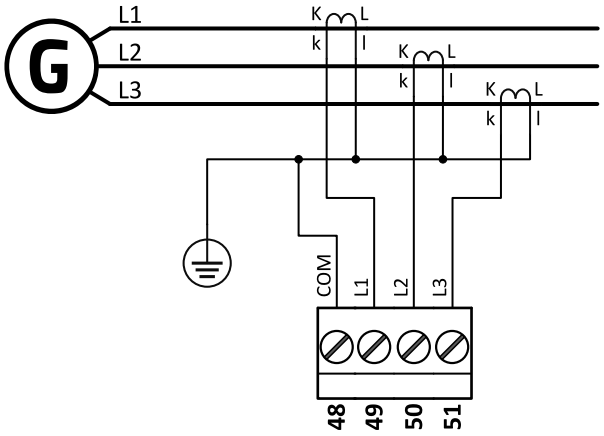


Image 4.3 3 phase application

IMPORTANT: It is necessary to ensure that potential difference between current COM terminal and power supply "–" terminal is maximally ±2 V. To do so ground properly both terminals.

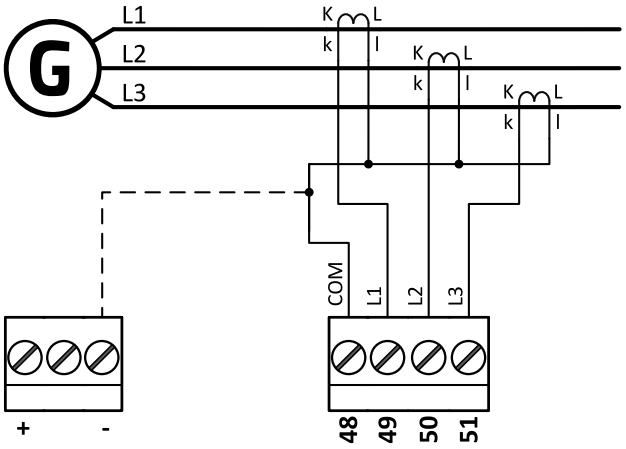


Image 4.4 3 phase application

IMPORTANT: It is necessary to ensure that potential difference between current COM terminal and power supply "–" terminal is maximally ±2 V. To do so interconnect these two terminals.

Note: *This wiring is recommended for India market.*

SplPhL1L2 application

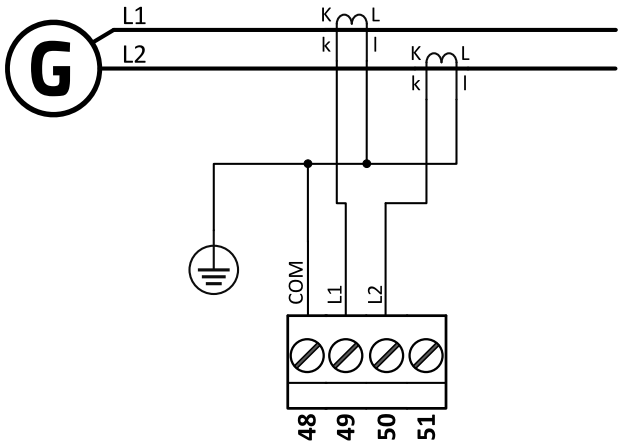


Image 4.5 Split phase application

IMPORTANT: It is necessary to ensure that potential difference between current COM terminal and power supply "–" terminal is maximally ±2 V. To do so ground properly both terminals.

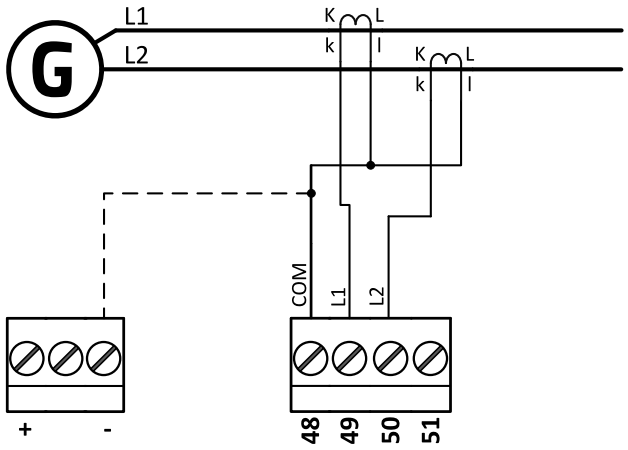


Image 4.6 3 phase application

IMPORTANT: It is necessary to ensure that potential difference between current COM terminal and power supply "–" terminal is maximally ±2 V. To do so interconnect these two terminals.

Note: *This wiring is recommended for India market.*

SplPhL1L3 application

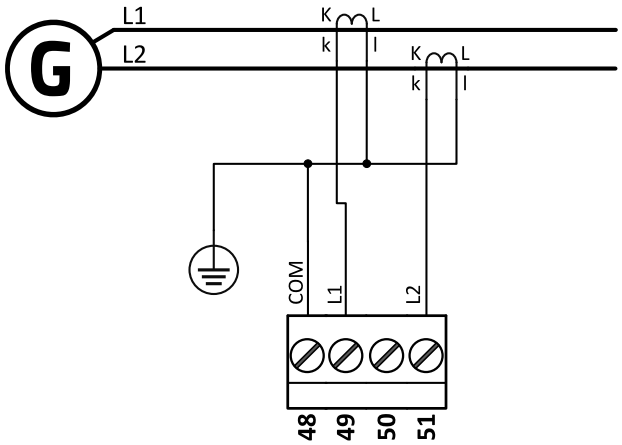


Image 4.7 Split phase application

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. To do so ground properly both terminals.

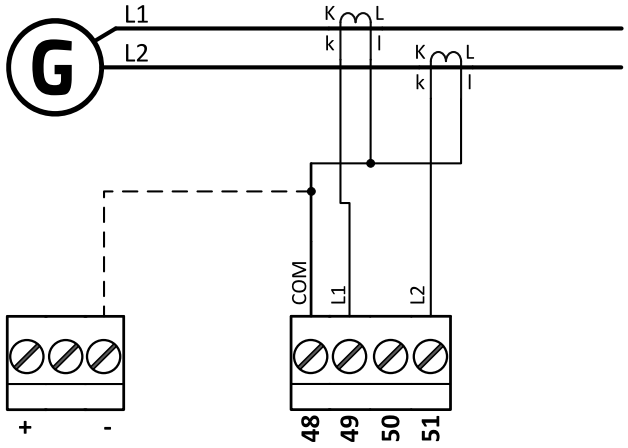


Image 4.8 3 phase application

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. To do so interconnect these two terminals.

Note: *This wiring is recommended for India market.*

Mono phase application

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

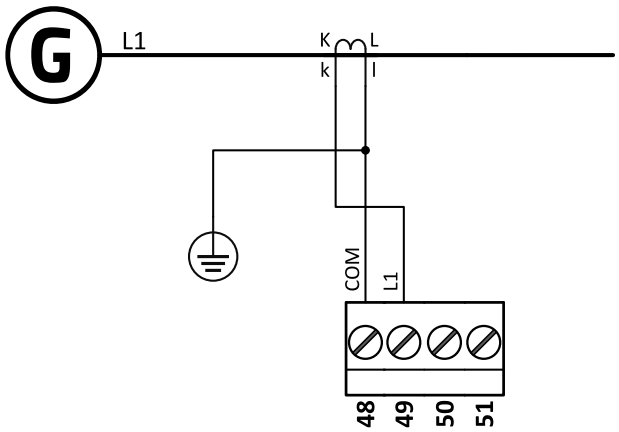


Image 4.9 Mono phase application

IMPORTANT: It is necessary to ensure that potential difference between current COM terminal and power supply "–" terminal is maximally ±2 V. To do so ground properly both terminals.

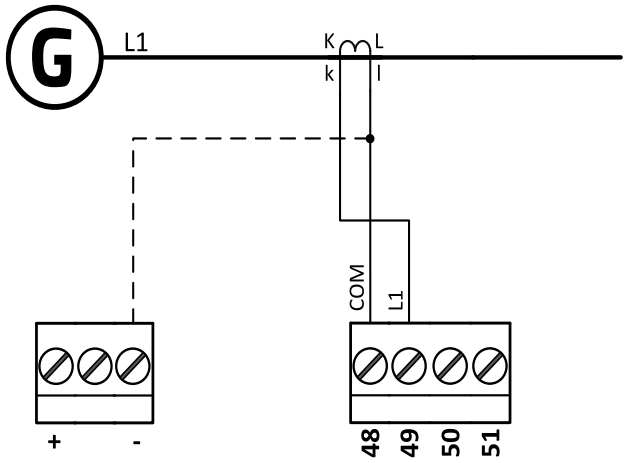


Image 4.10 3 phase application

IMPORTANT: It is necessary to ensure that potential difference between current COM terminal and power supply "–" terminal is maximally ±2 V. To do so interconnect these two terminals.

Note: *This wiring is recommended for India market.*

Voltage measurement AMF wiring

There are 4 voltage measurement Connection Type (setpoint **Connection type (page 165)** [3Ph4Wire / High Leg D / 3Ph3Wire / SplPhL1L2 / SplPhL1L3 / 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 165)** setting:

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

ConnectionType: 3 Phase 4 Wires

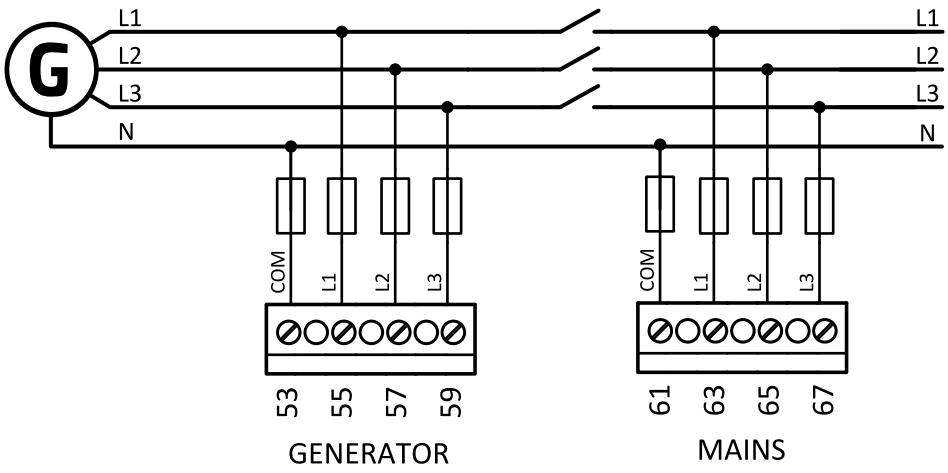


Image 4.11 3 phase application with neutral

Note: *Fuse on "N" wire is not obligatory but recommended.*

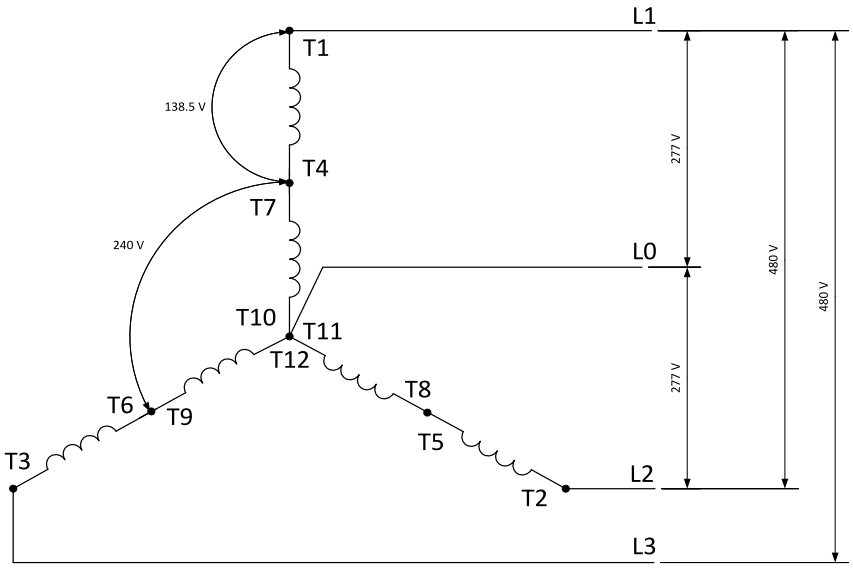


Image 4.12 Typical 3 Phase 4 Wires generator wiring

ConnectionType: High Leg D

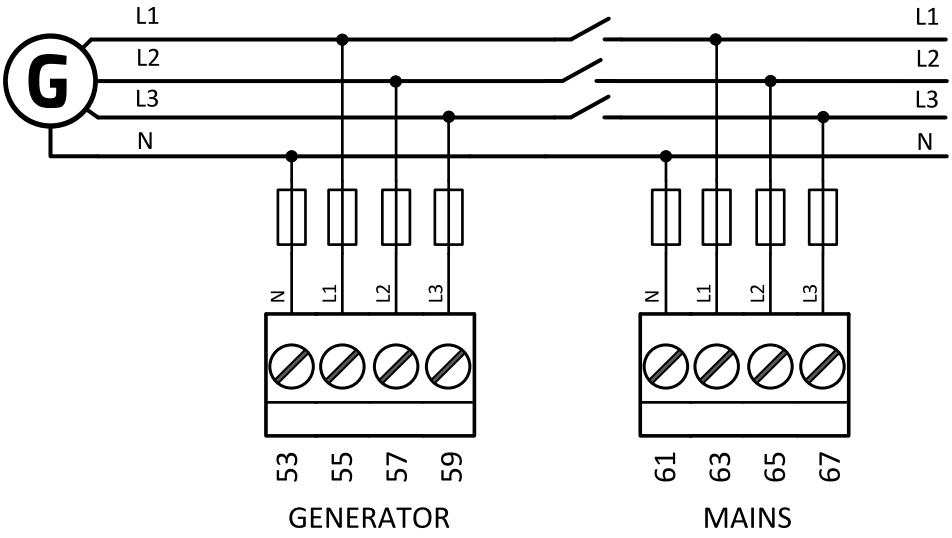


Image 4.13 High Leg Delta application

Note: *Fuse on "N" wire is not obligatory but recommended.*

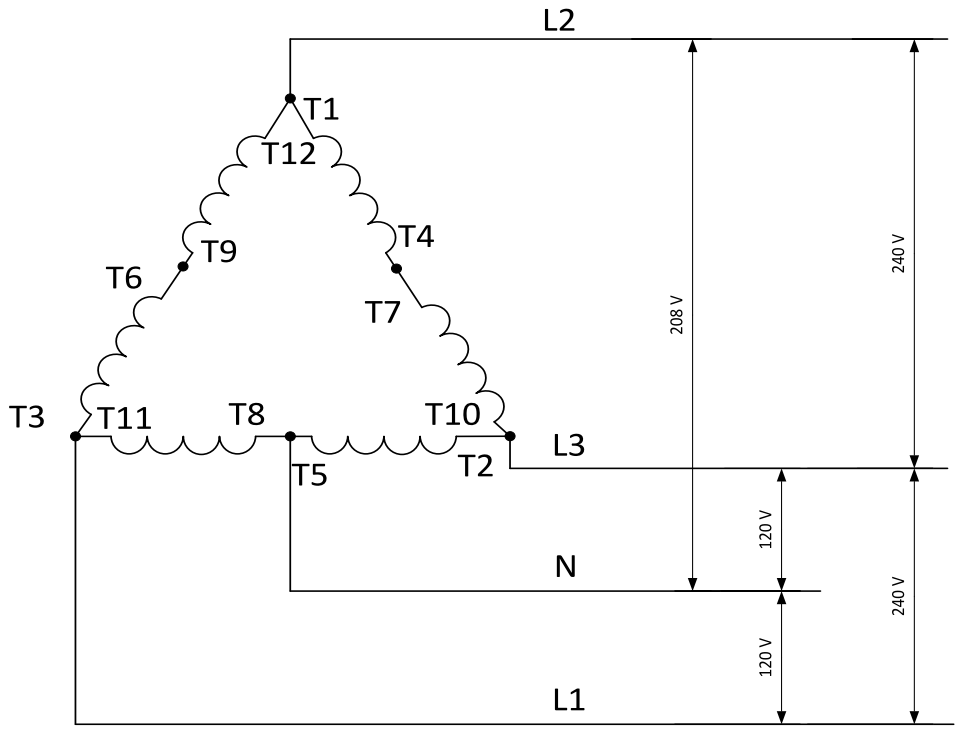


Image 4.14 Typical High Leg D generator wiring

ConnectionType: 3 Phase 3 Wires

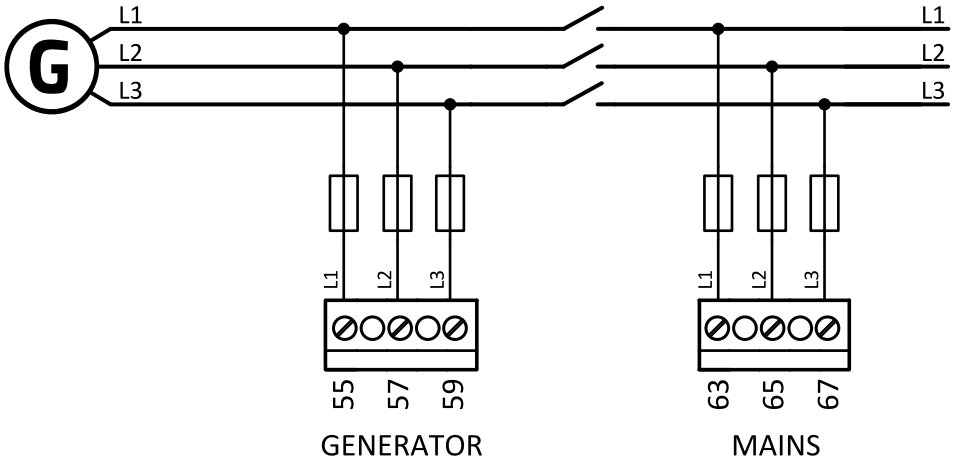


Image 4.15 3 phase application without neutral

Note: *Fuse on "N" wire is not obligatory but recommended.*

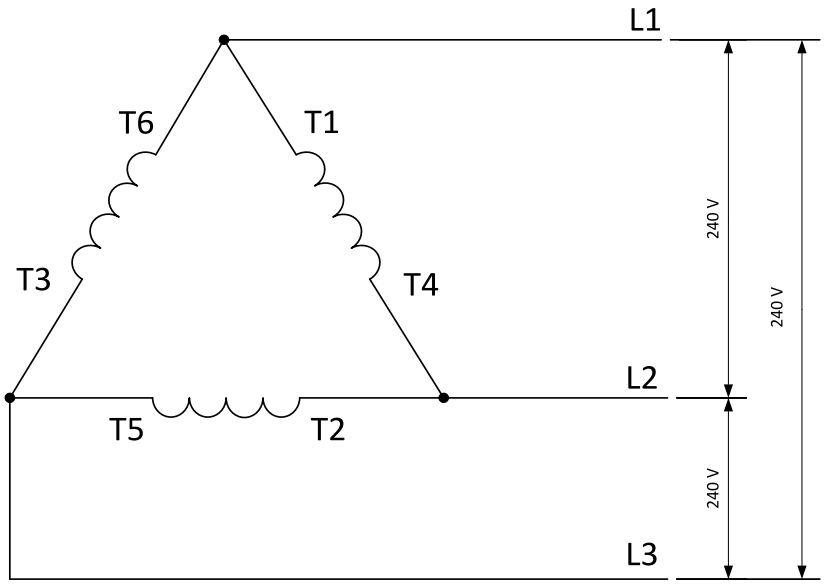


Image 4.16 Typical 3 Phase 3 Wires generator wiring

ConnectionType: SplPhL1L2

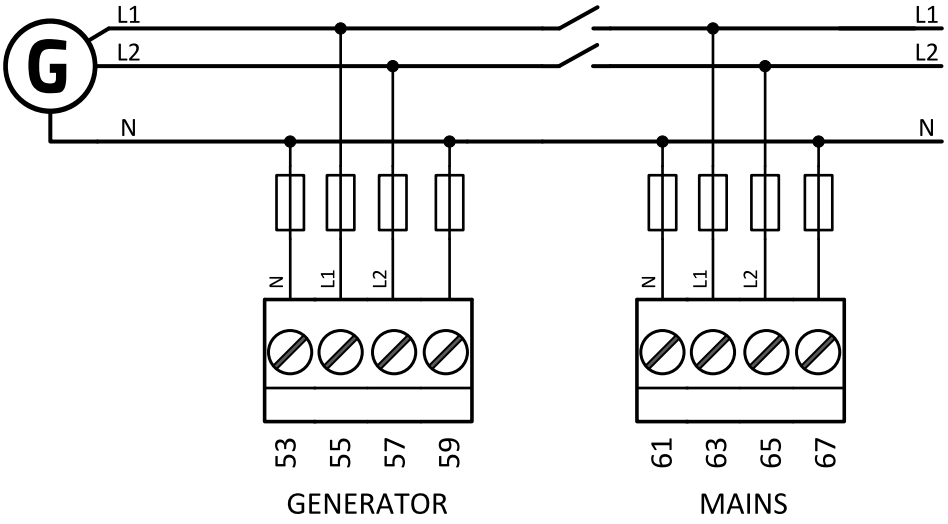


Image 4.17 Split phase L1L2 application

Note: *Fuse on "N" wire is not obligatory but recommended.*

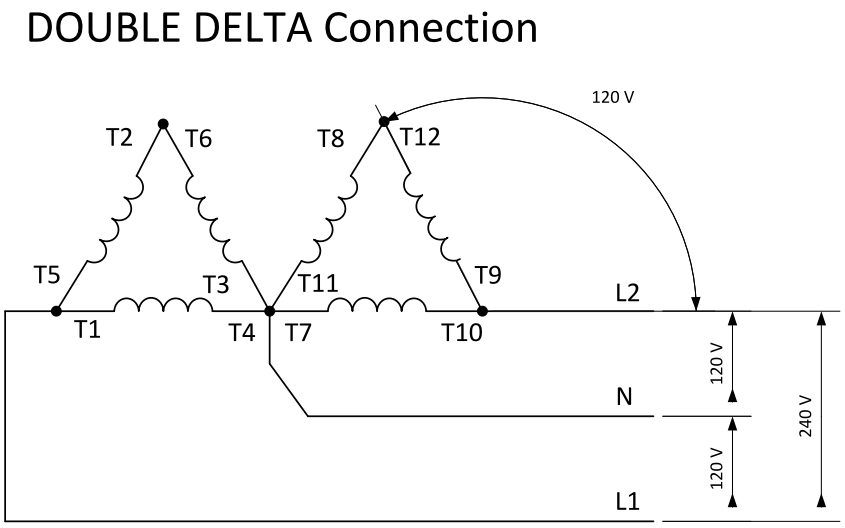


Image 4.18 Typical Split Phase generator wiring

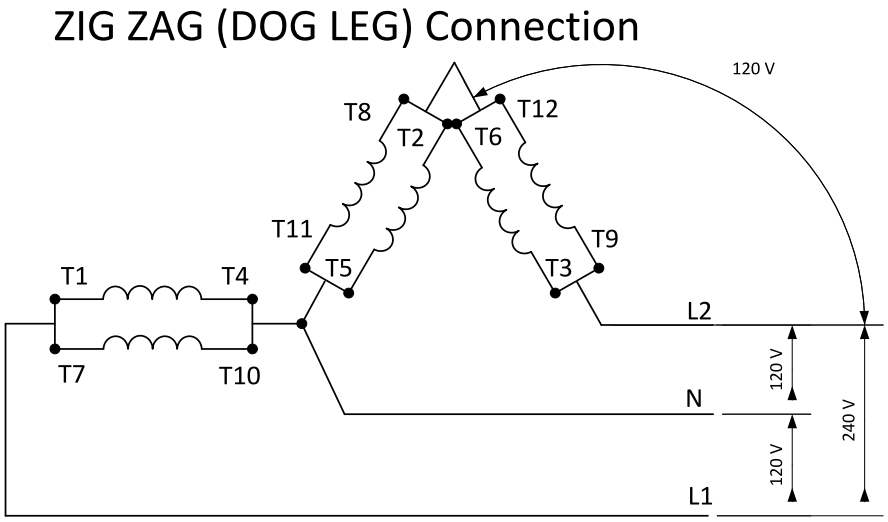


Image 4.19 Typical Split Phase generator wiring

ConnectionType: SplPhL1L3

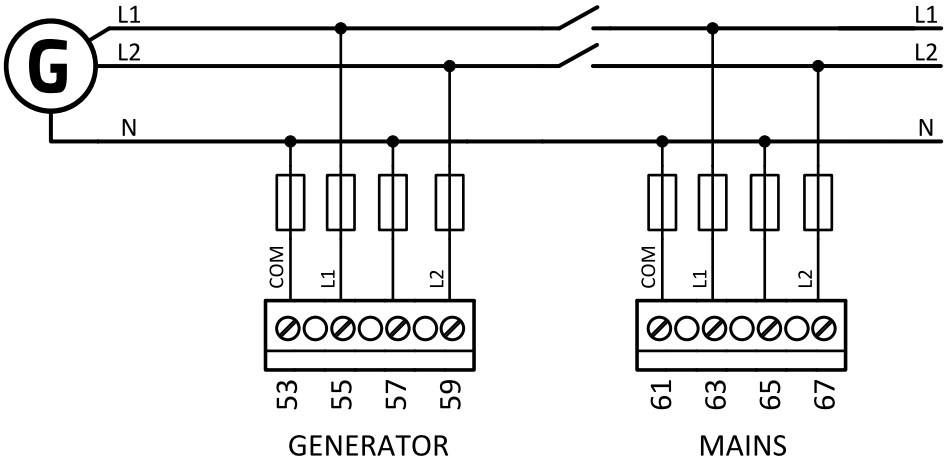


Image 4.20 Split phase L1L3 application

Note: *Fuse on "N" wire is not obligatory but recommended.*

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

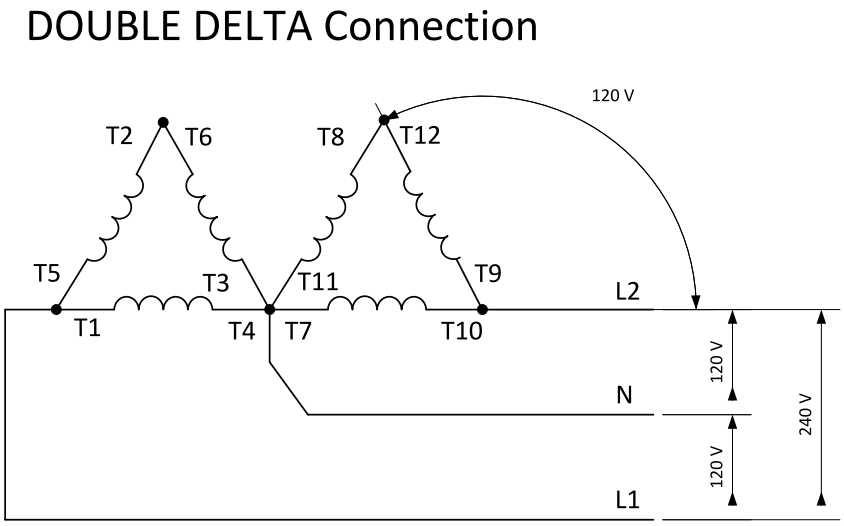


Image 4.21 Typical Split Phase generator wiring

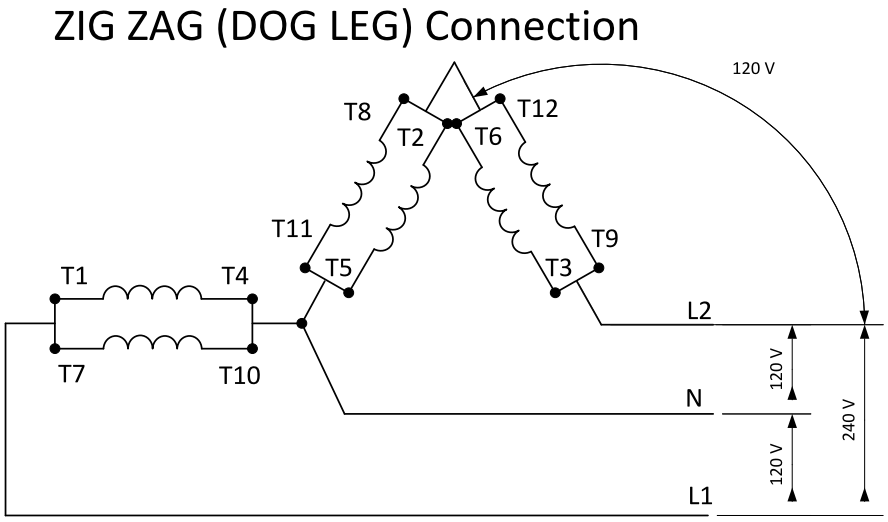


Image 4.22 Typical Split Phase generator wiring

ConnectionType: Mono Phase

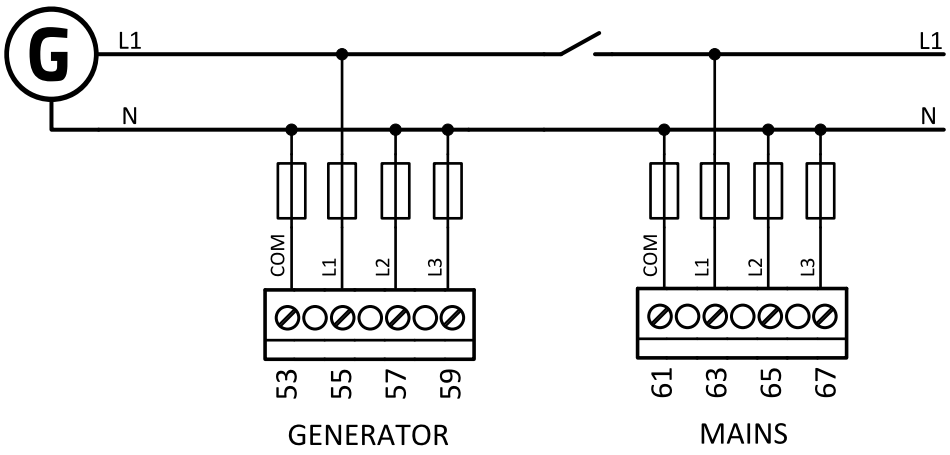


Image 4.23 Mono phase application

Note: *Fuse on "N" wire is not obligatory but recommended.*

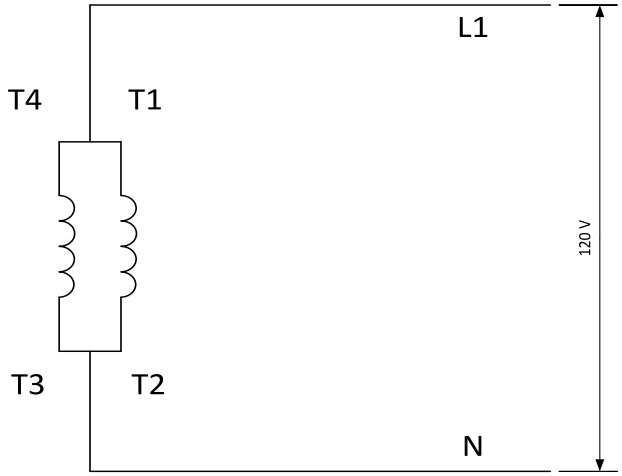


Image 4.24 Typical Mono Phase generator wiring

Voltage measurement MRS wiring

There are 4 voltage measurement Connection Type (setpoint **Connection type (page 165)** [3Ph4Wire / High Leg D / 3Ph3Wire / SplPhL1L2 / SplPhL1L3 / 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 165)** setting:

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

ConnectionType: 3 Phase 4 Wires

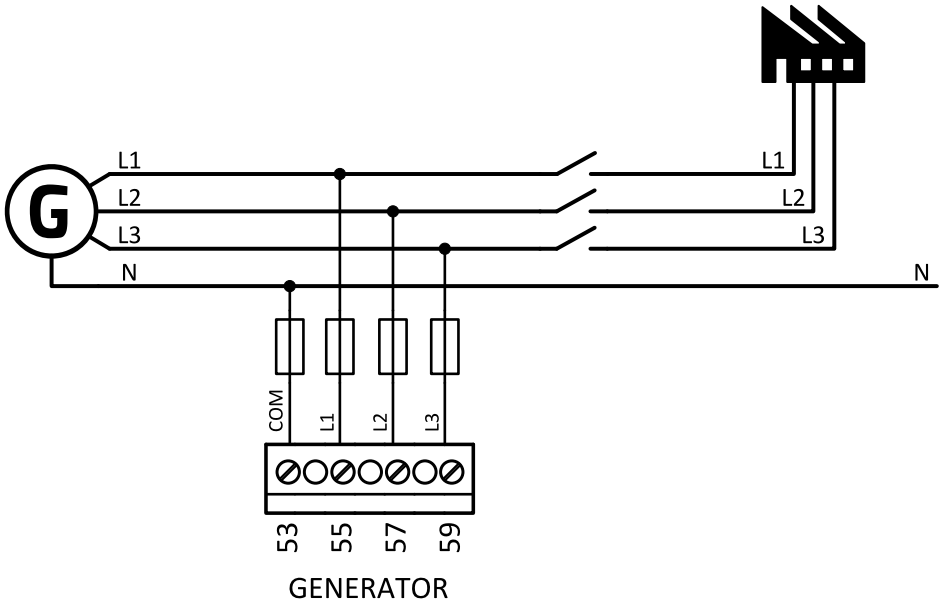


Image 4.25 3 phase application with neutral

Note: *Fuse on "N" wire is not obligatory but recommended.*

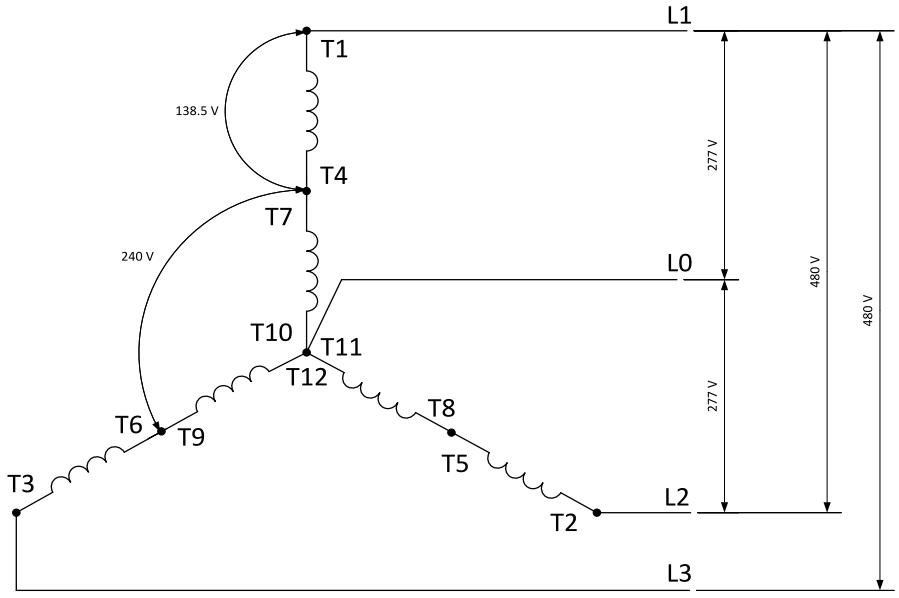


Image 4.26 Typical 3 Phase 4 Wires generator wiring

ConnectionType: High Leg D

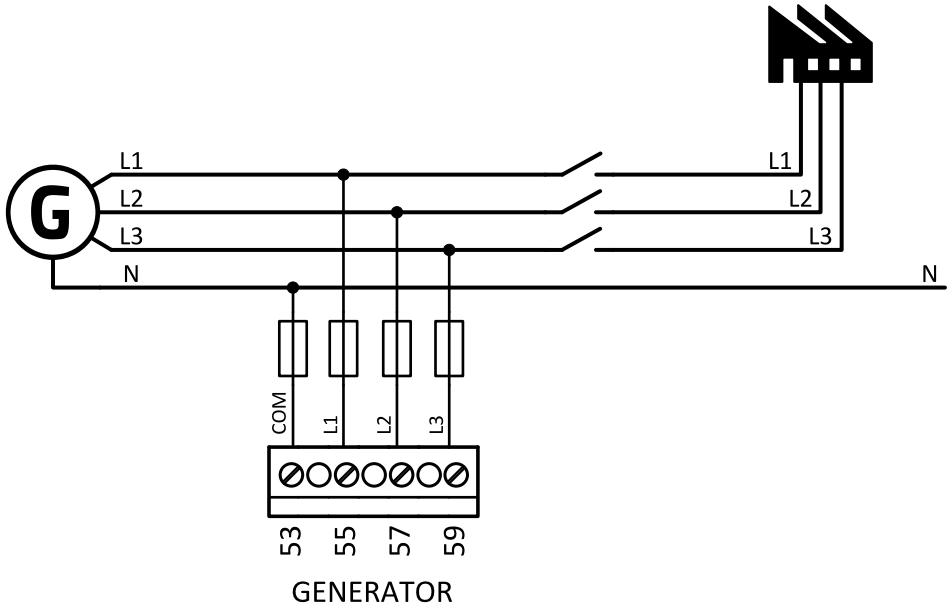


Image 4.27 High Leg Delta application

Note: *Fuse on "N" wire is not obligatory but recommended.*

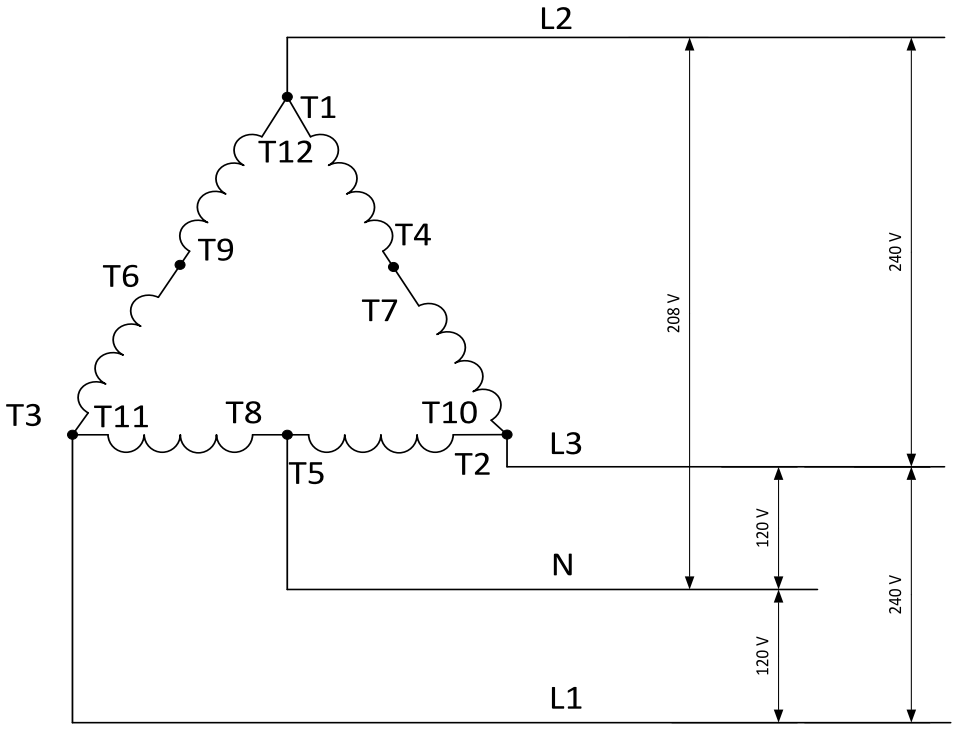


Image 4.28 Typical High Leg D generator wiring

ConnectionType: 3 Phase 3 Wires

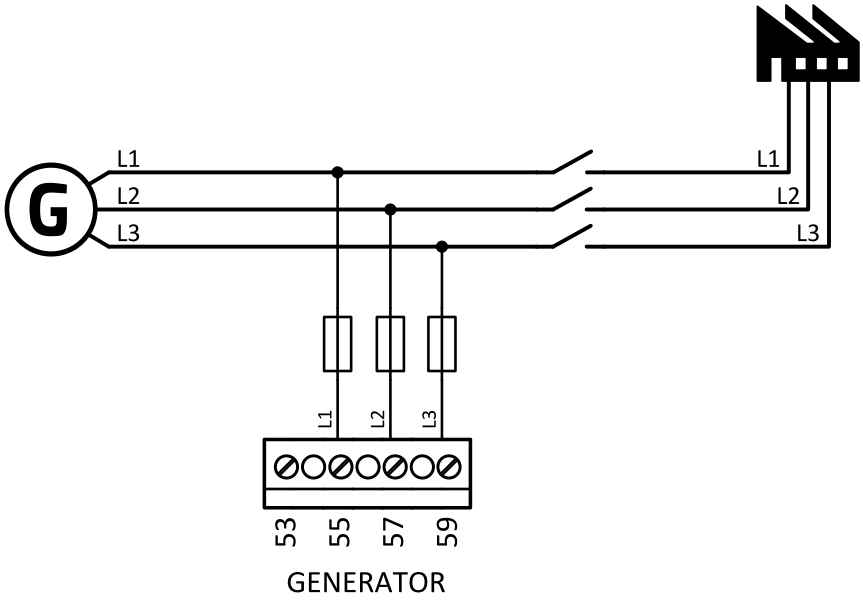


Image 4.29 3 phase application without neutral

Note: *Fuse on "N" wire is not obligatory but recommended.*

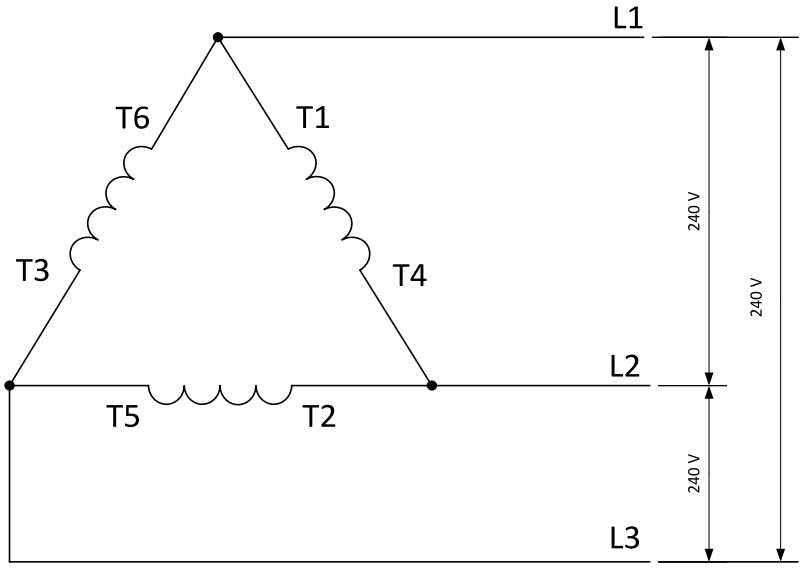


Image 4.30 Typical 3 Phase 3 Wires generator wiring

ConnectionType: SplPhL1L2

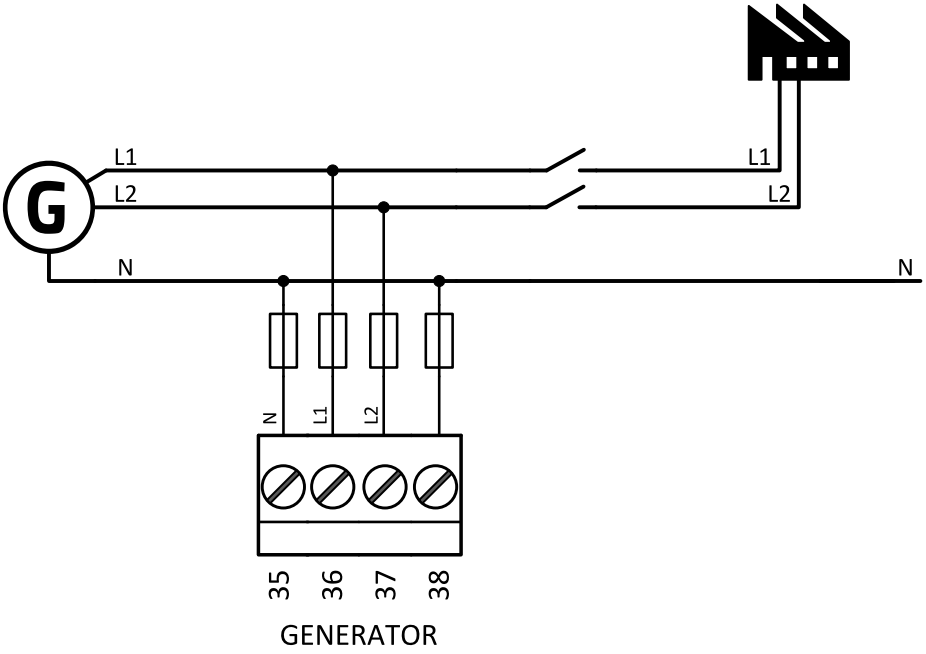


Image 4.31 Split phase L1L2 application

Note: *Fuse on "N" wire is not obligatory but recommended.*

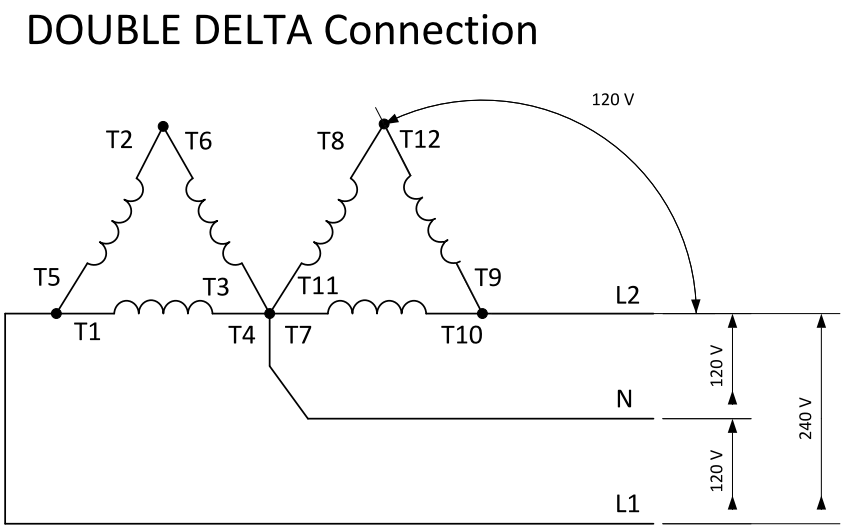


Image 4.32 Typical Split Phase generator wiring

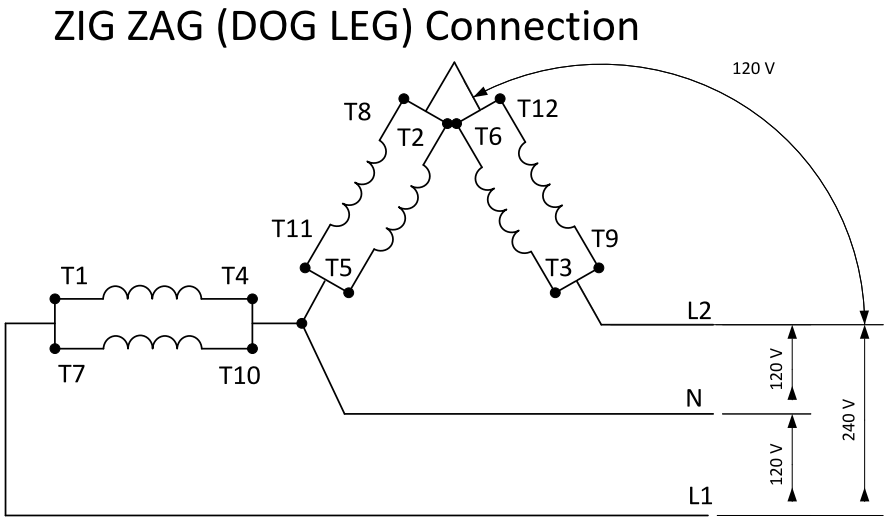


Image 4.33 Typical Split Phase generator wiring

ConnectionType: SplPhL1L3

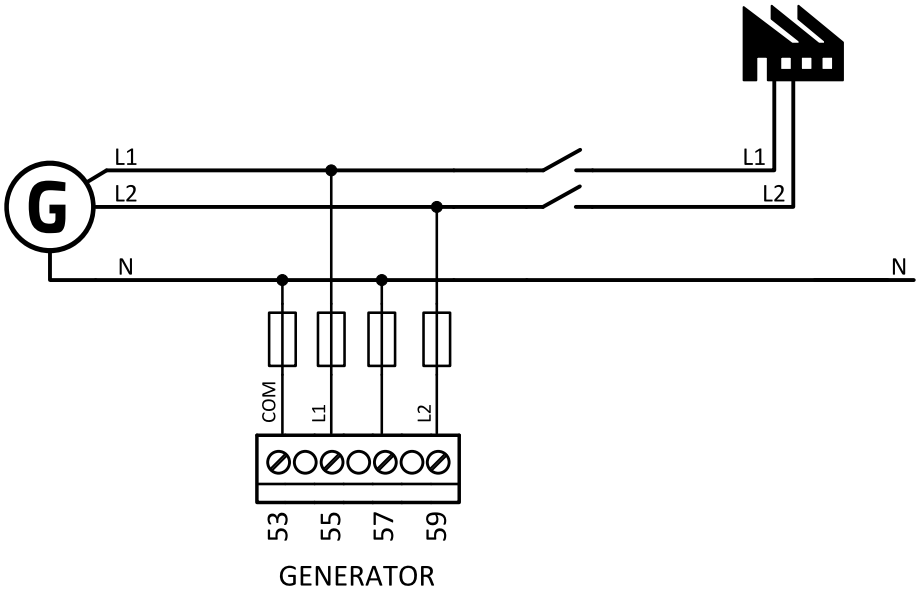


Image 4.34 Split phase L1L3 application

Note: *Fuse on "N" wire is not obligatory but recommended.*

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

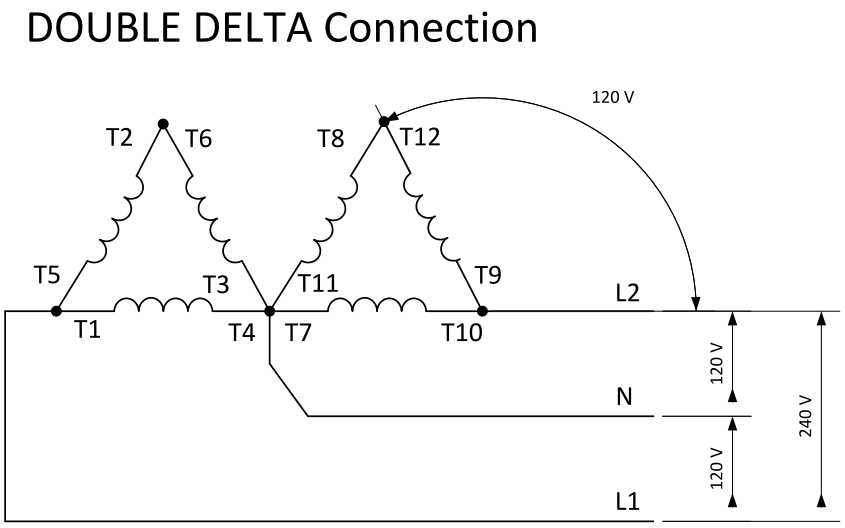


Image 4.35 Typical Split Phase generator wiring

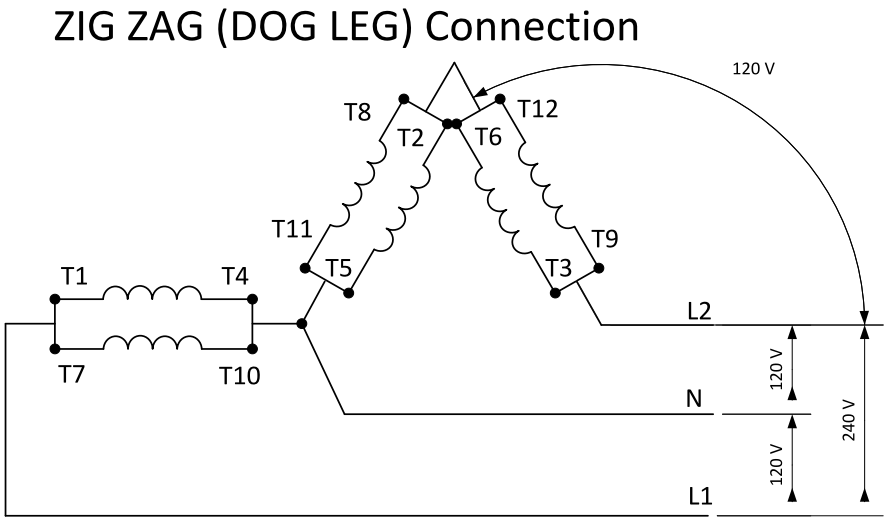


Image 4.36 Typical Split Phase generator wiring

ConnectionType: Mono Phase

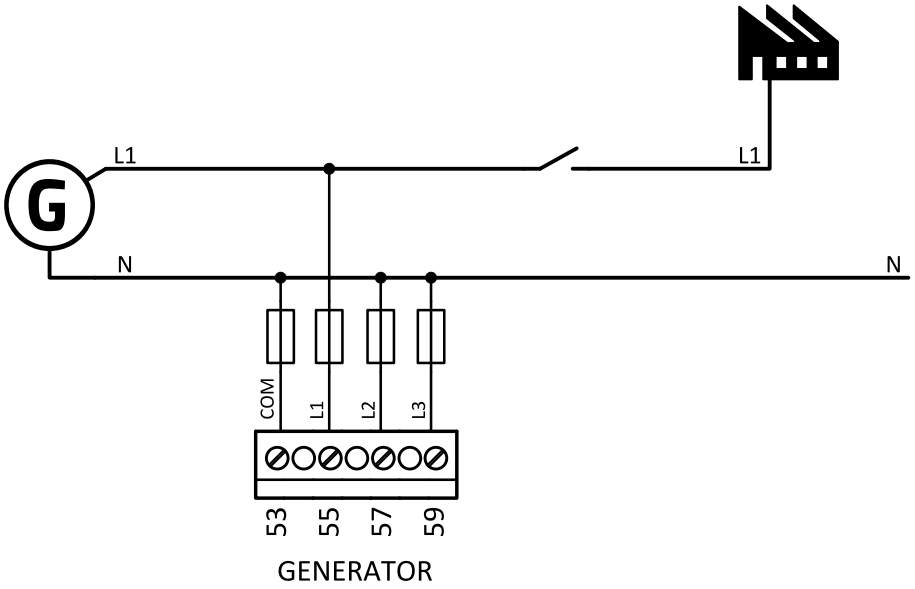


Image 4.37 Mono phase application

Note: *Fuse on "N" wire is not obligatory but recommended.*

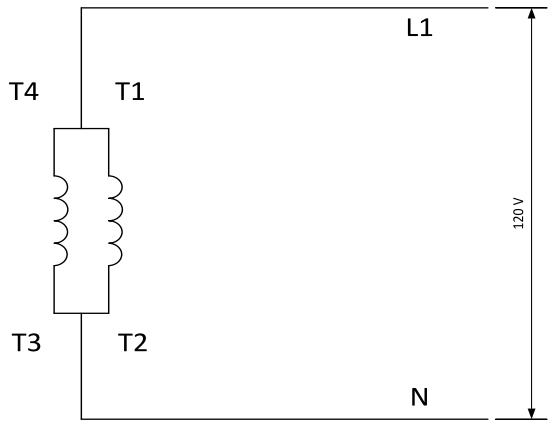


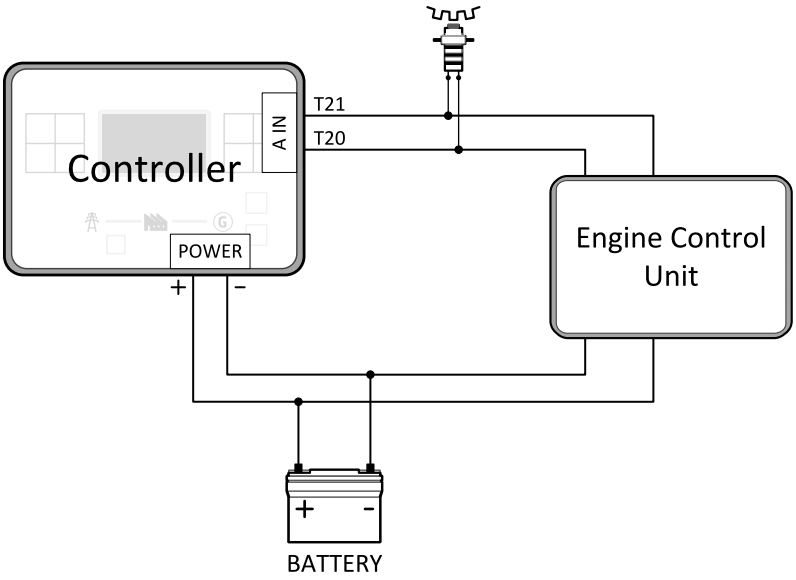
Image 4.38 Typical Mono Phase generator wiring

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

For the details about the pick-up input parameters **see Technical data on page 157**

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.

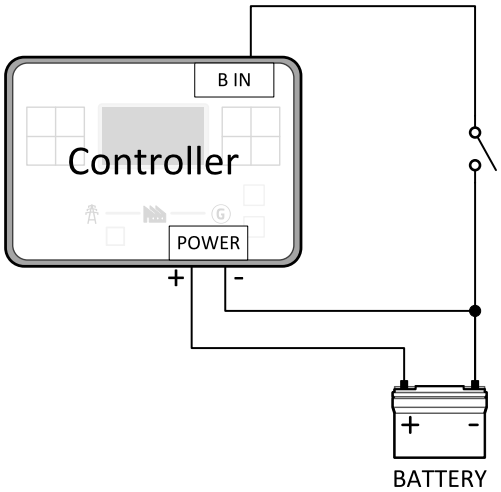


Image 4.39 Wiring binary inputs

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!

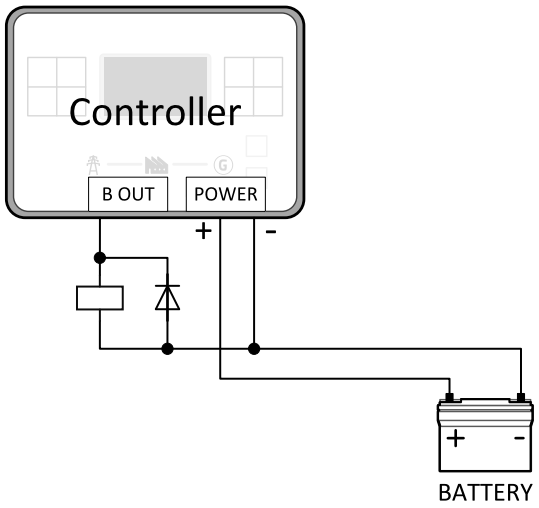
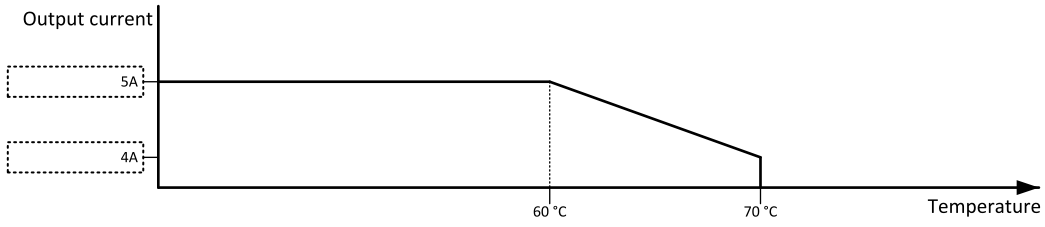


Image 4.40 Binary outputs wiring

Note: *Every single low current binary output can provide up to 0.5 A of steady current.*

Note: *Binary output 1 (terminal 10) and binary output 2 (terminal 11) 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 10 and terminal 11) to 4 A (each).



4.4.8 Emergency stop

E-Stop has dedicated terminal T09. Power supply of binary output 1 (terminals 10) and binary output 2 (terminals 11) is internally connected (in controller) to E-Stop terminal. It means higher security and faster disconnection of these outputs. More information about E-Stop functions **see E-Stop on page 124**.

Note: *This function has the same behavior as binary input* ***EMERGENCY STOP (PAGE 319)****.*

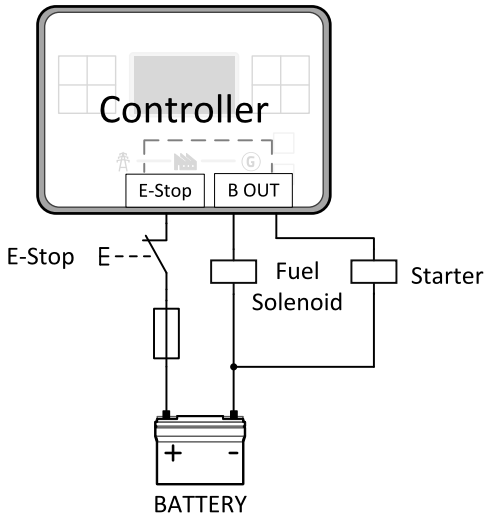


Image 4.41 E-Stop wiring

Note: *Recommended fusing is 12 A fuse.*

Note: *Grey dashed line symbolizes internal connection between E-Stop and binary outputs 1 and 2.*

Note: *For proper functionality of E-Stop, the terminal T09 must be always wired. Terminal can be connected to battery+ or to terminal T03 (BATT+)*

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.

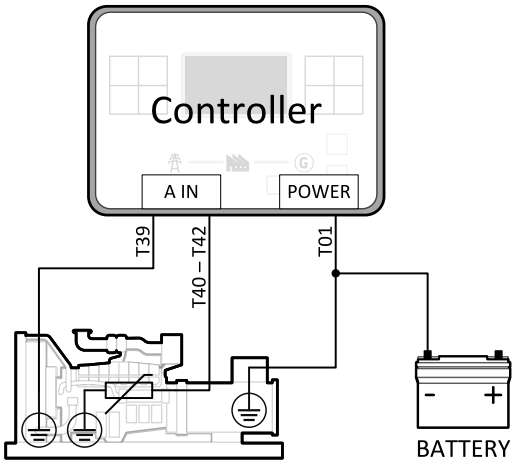


Image 4.42 Grounded sensors

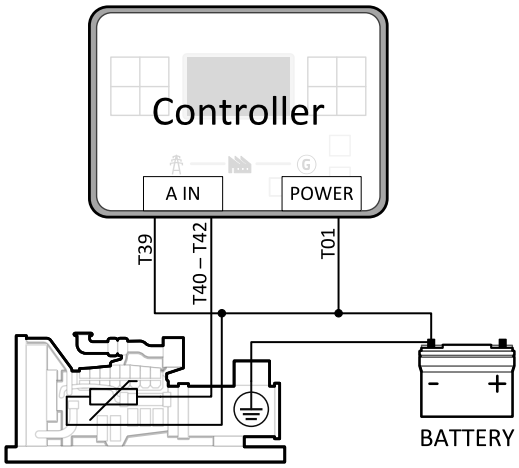


Image 4.43 Isolated sensors

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

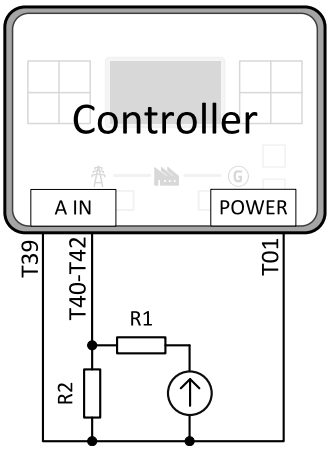


Image 4.44 Wiring of analog input with voltage sensor

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

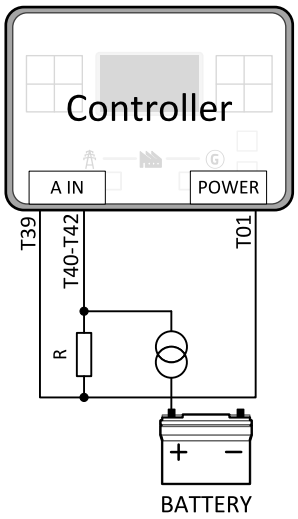


Image 4.45 Wiring of analog input with current sensor

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

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

Analog as binary or tristate inputs

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

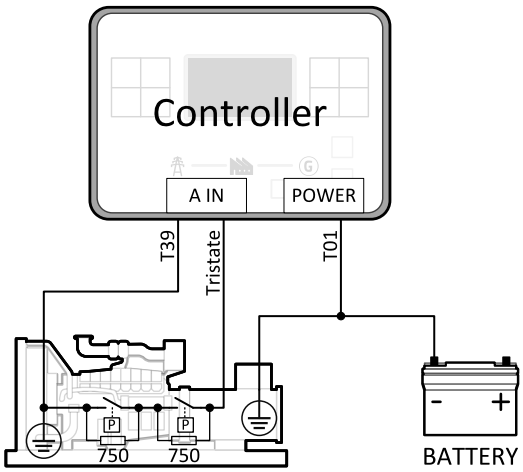


Image 4.46 Analog inputs as tristate

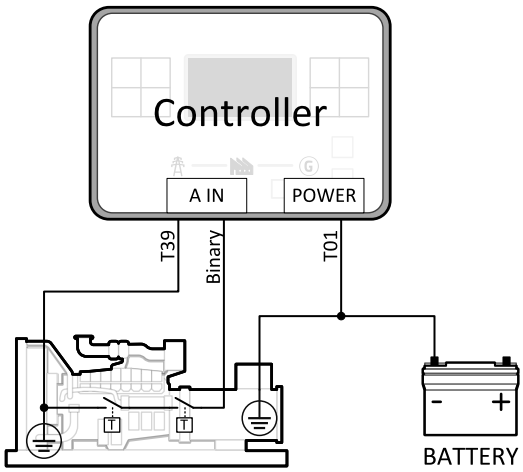


Image 4.47 Analog inputs as binary

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

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

4.4.10 CAN bus

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 (, 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 120Ω 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)

[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)

Wire crosscut	≥ 0.25 mm^2
Attenuation (@1MHz)	≤ 2 dB / 100 m

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

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

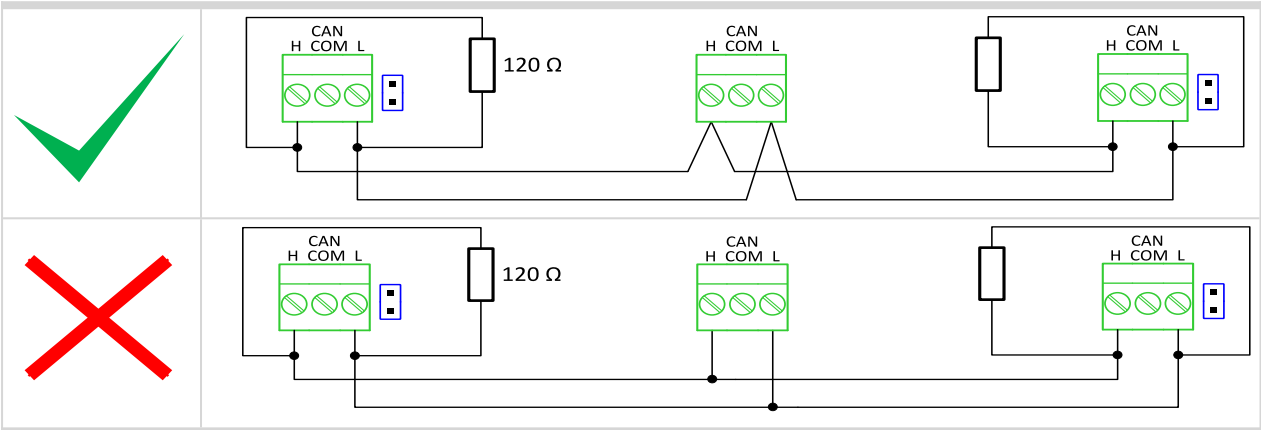


Image 4.48 CAN bus topology

› For shorter distances (connection within one building)

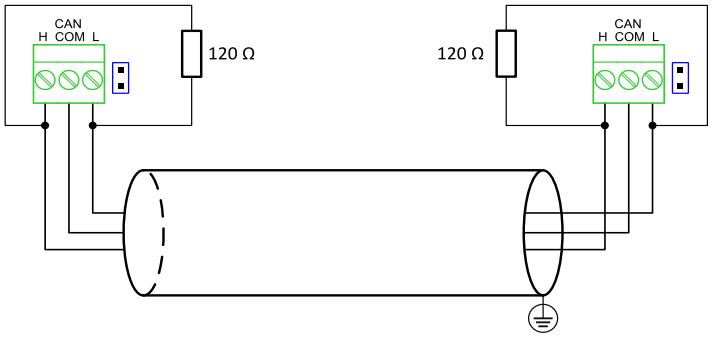


Image 4.49 CAN bus wiring for shorter distances

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

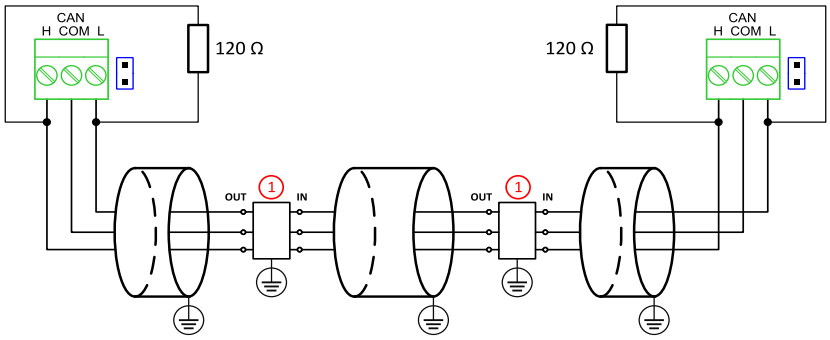


Image 4.50 CAN bus wiring for longer distances

① Recommended PT5-HF-12DC-ST[1]

4.4.11 USB

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

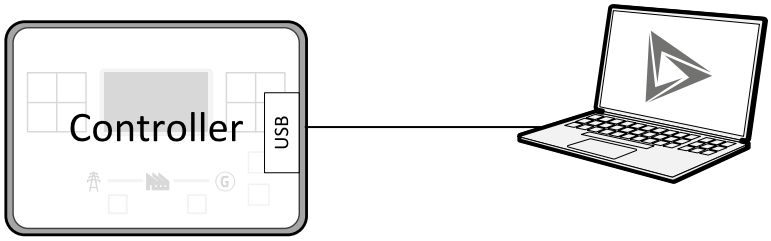


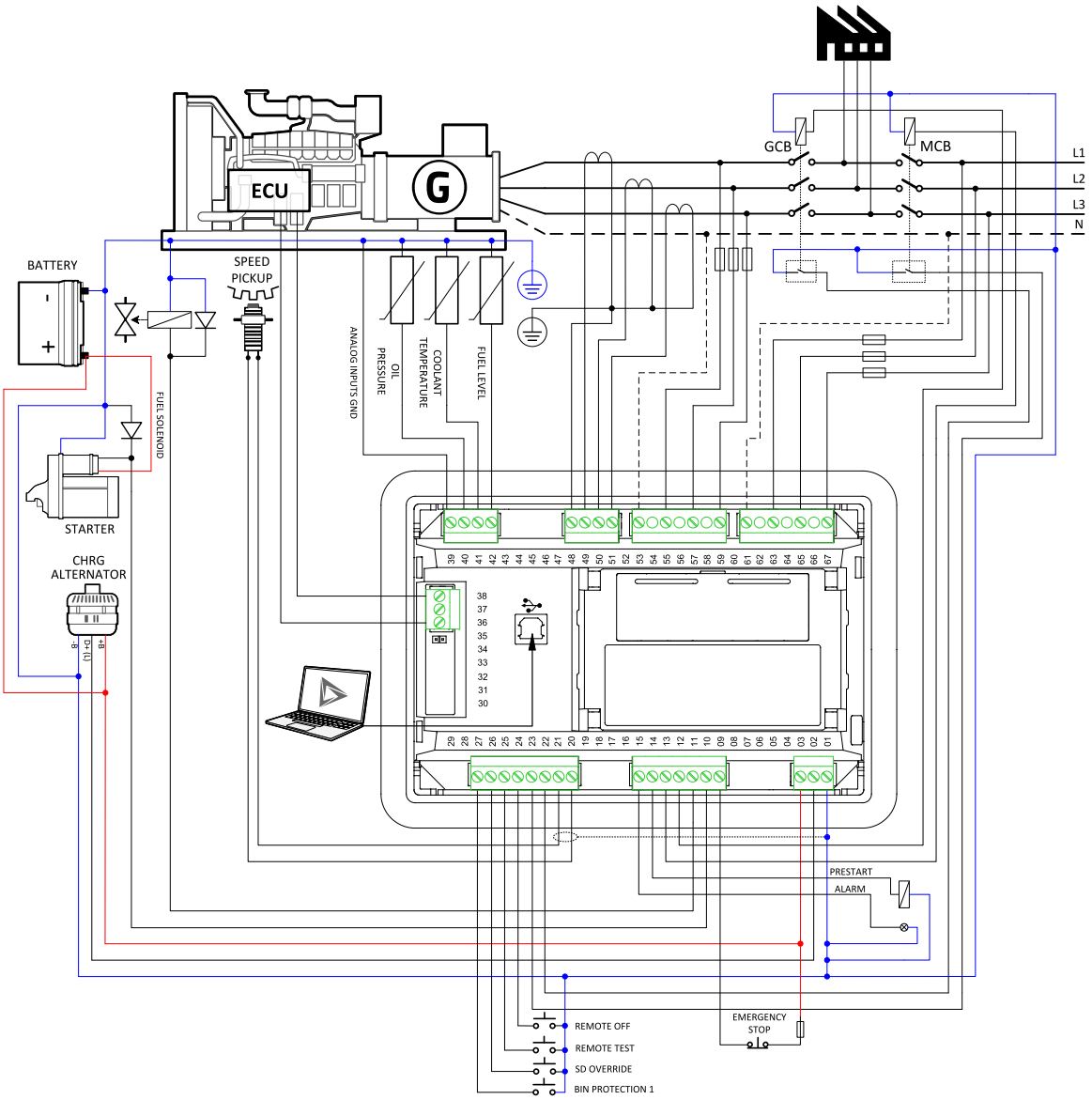
Image 4.51 USB connection

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

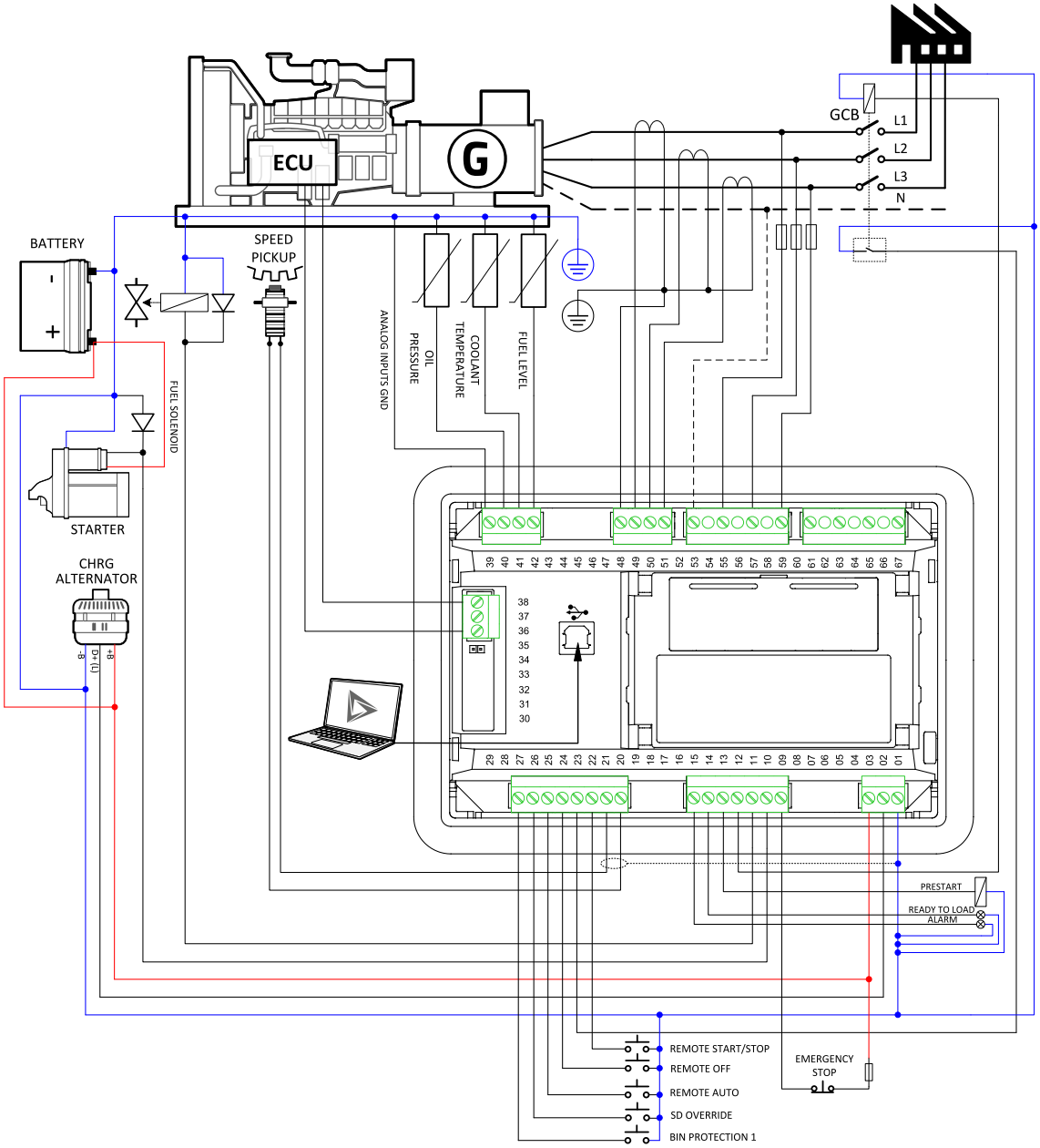
> **IMPORTANT: Power supply by USB is only for service purpose. Binary inputs and outputs are in logical 0. Also plug-in modules are not working.**

[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

4.4.12 Example of AMF Wiring



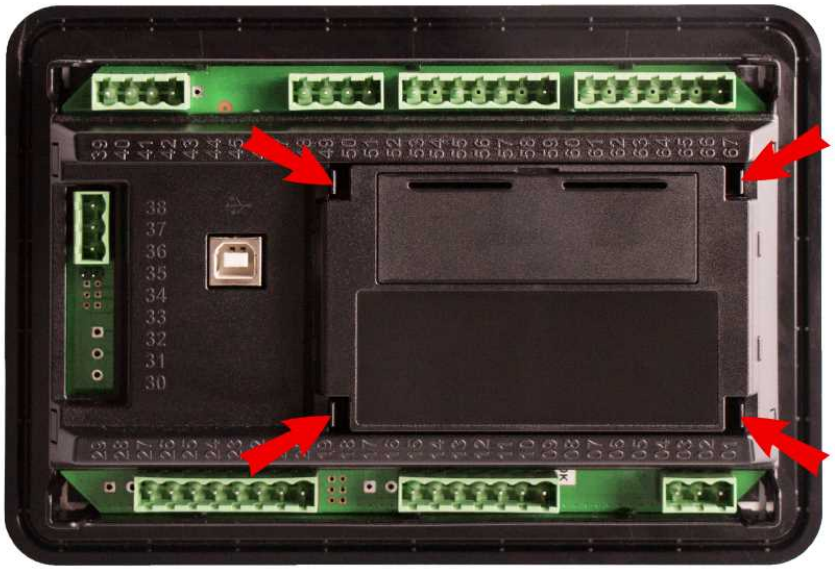
4.4.13 Example of MRS Wiring



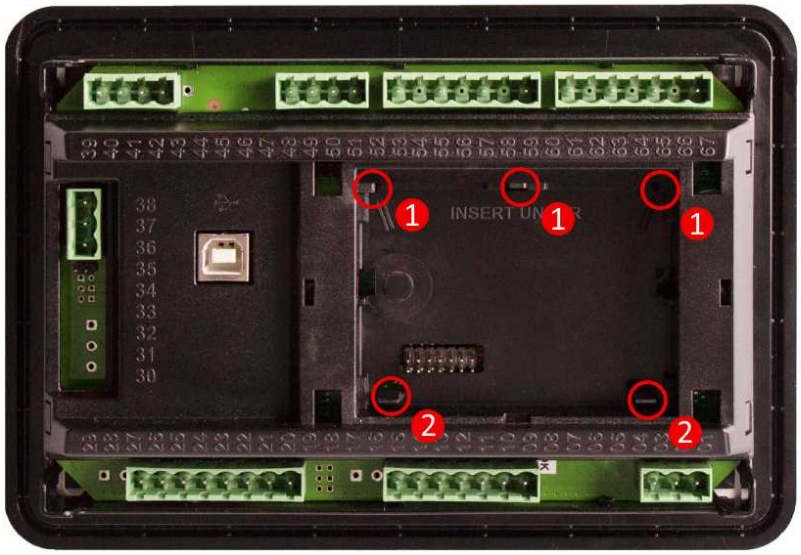
4.5 Plug-in module installation

4.5.1 Installation

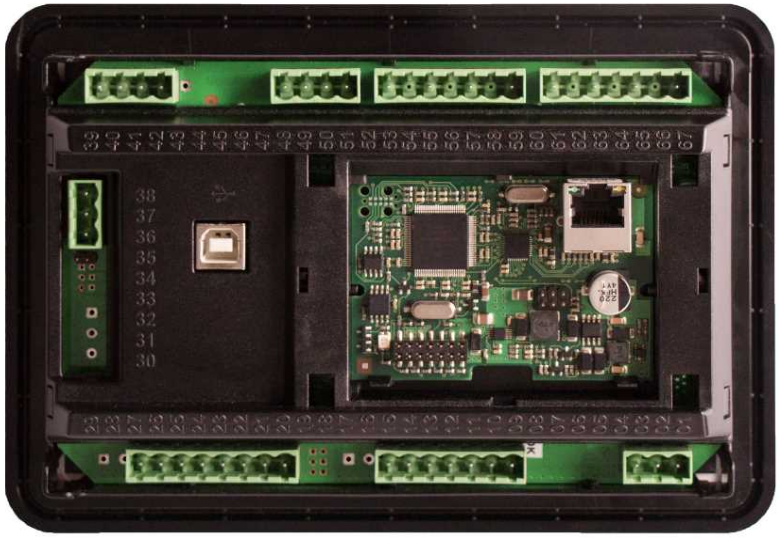
Remove the back cover. To do this, press four holders which are located in corners.



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



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.



back to Installation and wiring

5 Controller setup

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5.2 Controller configuration and PC tools connection 56
5.3 Operator Guide 61
5.4 Remote Display 85
5.5 Functions 89

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5.1 Default configuration

5.1.1 Binary inputs AMF

Number	Description	Configured function
BIN1	Generator circuit breaker feedback	**GCB FEEDBACK (PAGE 321)**
BIN2	Mains circuit breaker feedback	**MCB FEEDBACK (PAGE 323)**
BIN3	Switch controller to OFF mode	**REMOTE OFF (PAGE 325)**
BIN4	Switch controller to TEST mode	**REMOTE TEST (PAGE 327)**
BIN5	Suppression of alarms	**SD OVERRIDE (PAGE 328)**
BIN6	Binary input function used as alarm	**BIN PROTECTION 1 (PAGE 309)**

5.1.2 Binary outputs AMF

Number	Description	Function
BOUT1	Starter motor control	**STARTER (PAGE 361)**
BOUT2	Fuel solenoid valve	**FUEL SOLENOID (PAGE 342)**
BOUT3	Generator circuit breaker control	**GCB CLOSE/OPEN (PAGE 343)**
BOUT4	Mains circuit breaker control	**MCB CLOSE/OPEN (PAGE 351)**
BOUT5	Activation of any devices before start	**PRESTART (PAGE 357)**
BOUT6	Indication of unconfirmed alarm	**ALARM (PAGE 337)**

5.1.3 Binary inputs MRS

Number	Description	Configured function
BIN1	Start and stop the Gen-set in AUTO mode	**REMOTE START/STOP (PAGE 326)**
BIN2	Generator circuit breaker feedback	**GCB FEEDBACK (PAGE 321)**
BIN3	Switch controller to OFF mode	**REMOTE OFF (PAGE 325)**
BIN4	Switch controller to AUTO mode	**REMOTE AUTO (PAGE 325)**
BIN5	Suppression of alarms	**SD OVERRIDE (PAGE 328)**
BIN6	Binary input function used as alarm	**BIN PROTECTION 1 (PAGE 309)**

5.1.4 Binary outputs MRS

Number	Description	Function
BOUT1	Starter motor control	**STARTER (PAGE 361)**
BOUT2	Fuel solenoid valve	**FUEL SOLENOID (PAGE 342)**
BOUT3	Generator circuit breaker control	**GCB CLOSE/OPEN (PAGE 343)**
BOUT4	Activation of any devices before start	**PRESTART (PAGE 357)**
BOUT5	Gen-set can be connected to load	**READY TO LOAD (PAGE 359)**
BOUT6	Indication of unconfirmed alarm	**ALARM (PAGE 337)**

5.1.5 Analog inputs

Number	Configured sensor	Function
AIN1	VDO 10 Bar	**OIL PRESSURE (PAGE 371)**
AIN2	VDO40-120°C	**COOLANT TEMP (PAGE 369)**
AIN3	VDOLevel %	**FUEL LEVEL (PAGE 369)**

5.2 Controller configuration and PC tools connection

5.2.1 USB 56
5.2.2 RS232/RS485 57
5.2.3 Ethernet 59

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

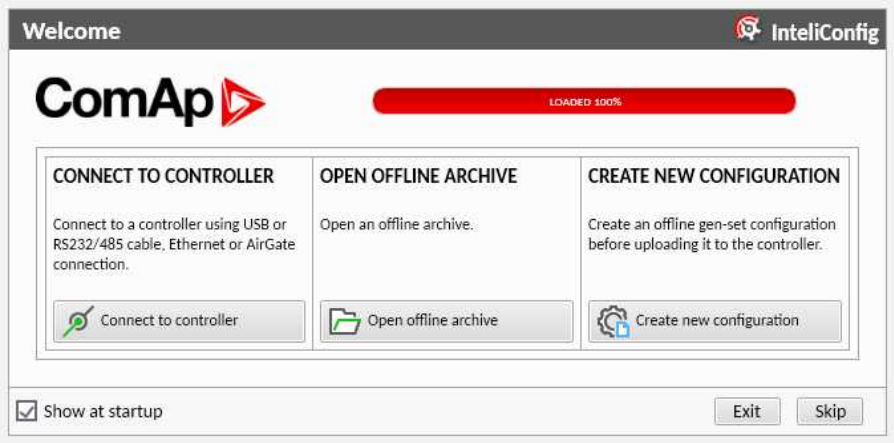

Image 5.1 First screen of InteliConfig – select connect to controller

Image 5.2 Second screen of InteliConfig – select detected controllers

Connection using WinScope

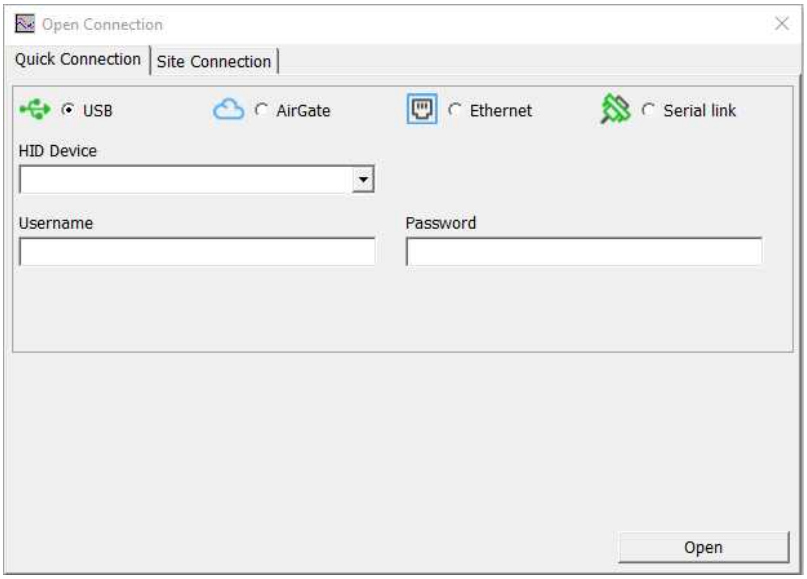

Image 5.3 WinScope screen – select direct connection

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

Connection using InteliConfig

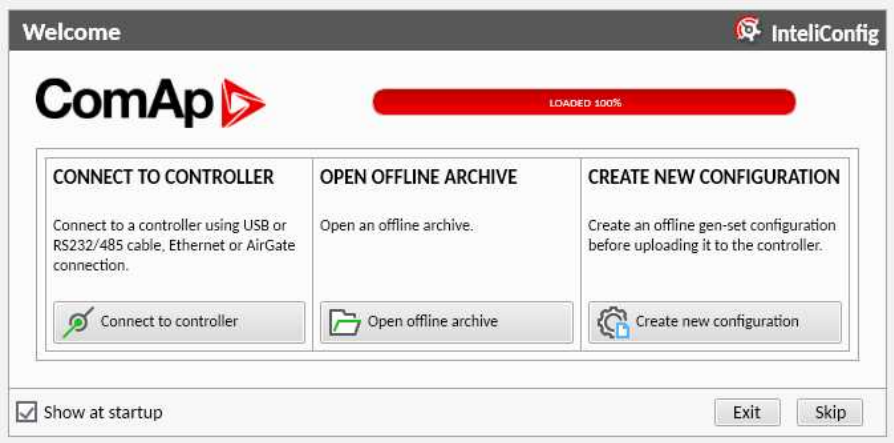

Image 5.4 First screen of InteliConfig – select connect to controller

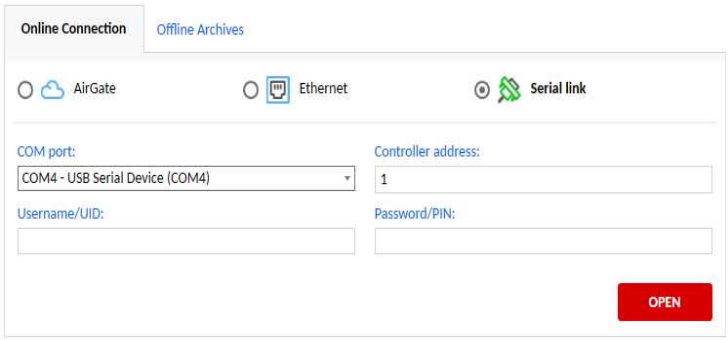

Image 5.5 Second screen of InteliConfig – select Serial link

Connection using WinScope

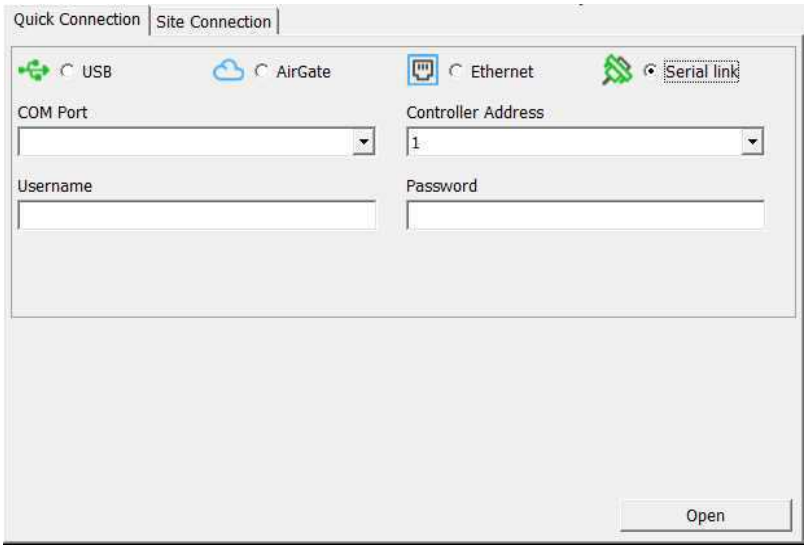

Image 5.6 WinScope screen – select direct connection

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 171)** has to be set to the same value as in the PC tool
- **IP Address Mode (page 253)** can be set to AUTOMATIC when there is DHCP service is available. Otherwise it needs to be set to FIXED
- **IP Address (page 253)** is either set automatically or it can be adjusted to a specific requested value
- **Subnet Mask (page 254)** is either set automatically or it can be adjusted to a specific requested
- **Gateway IP (page 254)** can be set here when it is used

Connection using InteliConfig

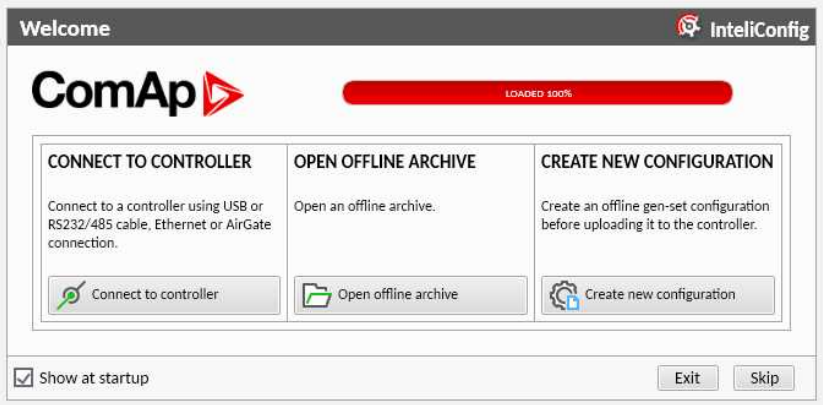

Image 5.7 First screen of InteliConfig – select connect to controller

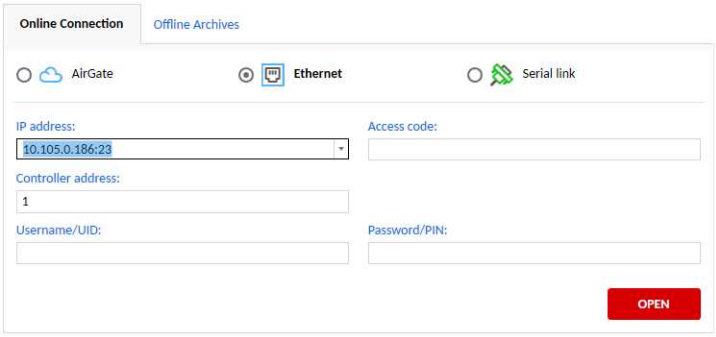

Image 5.8 Second screen of InteliConfig – select Internet / Ethernet

Connection using WinScope

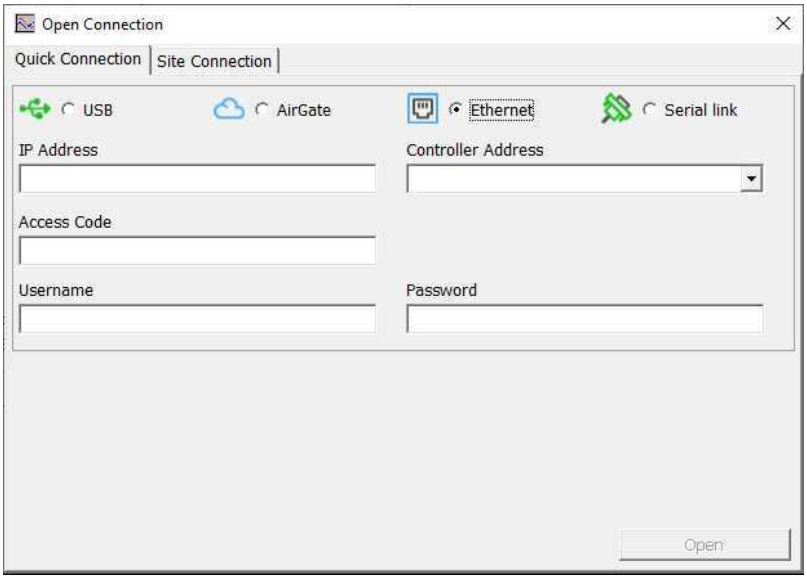

Image 5.9 WinScope screen

5.3 Operator Guide

5.3.1 Front panel elements 61
5.3.2 Display screens and pages structure 63
5.3.3 Browsing alarms 75
5.3.4 Password 76
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5.3.6 Language selection 83
5.3.7 Display contrast adjustment 85

5.3.1 Front panel elements

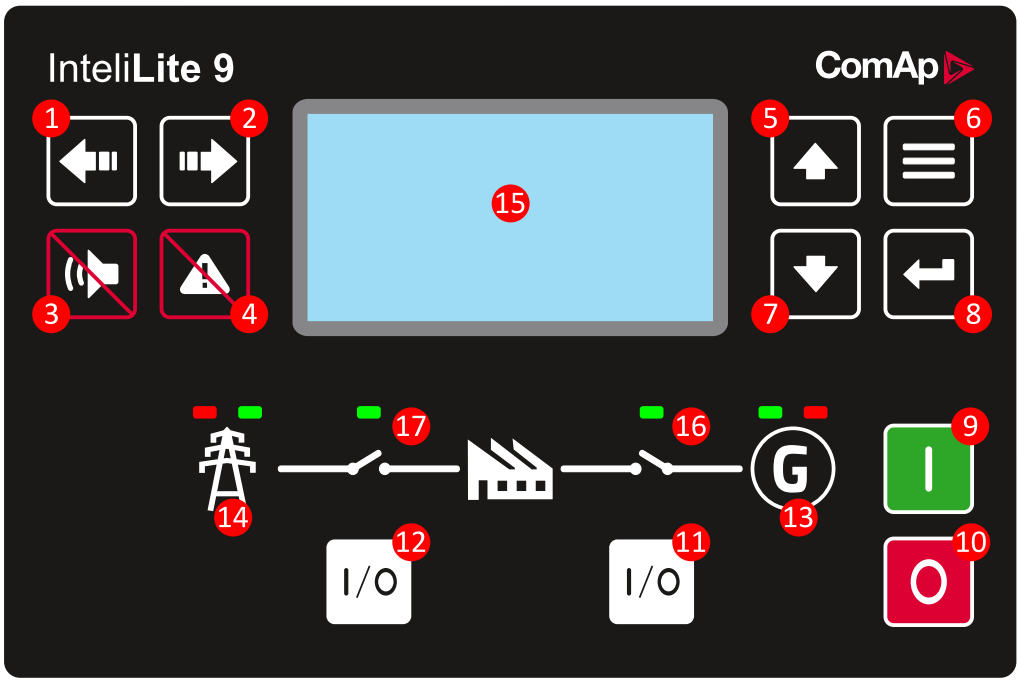


Image 5.10 Operator interface of InteliLite 9

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 mode only. Press this button to open or close the GCB.
12		**MCB** button. Works in MAN mode only. Press this button to open or close the MCB.

Indicators and others	
Position	**Description**
13	**GENERATOR** status indicator. There are two states – Gen-set OK (indicator is green) and Gen-set failure (indicator is red). Green LED is on if the generator voltage and frequency is present and within limits. Red LED starts flashing when Gen-set failure occurs. After FAULT RESET button is pressed, goes to steady light (if an alarm is still active) or is off (if no alarm is active).
14	**MAINS** status indicator. There are two states – Mains OK (indicator is green) and Mains failure (indicator is red). Green LED is on, if mains is present and within limits. Red LED starts blinking when the mains failure is detected and after the Gen-set has started and connected to the load it lights permanently until the mains failure disappears.

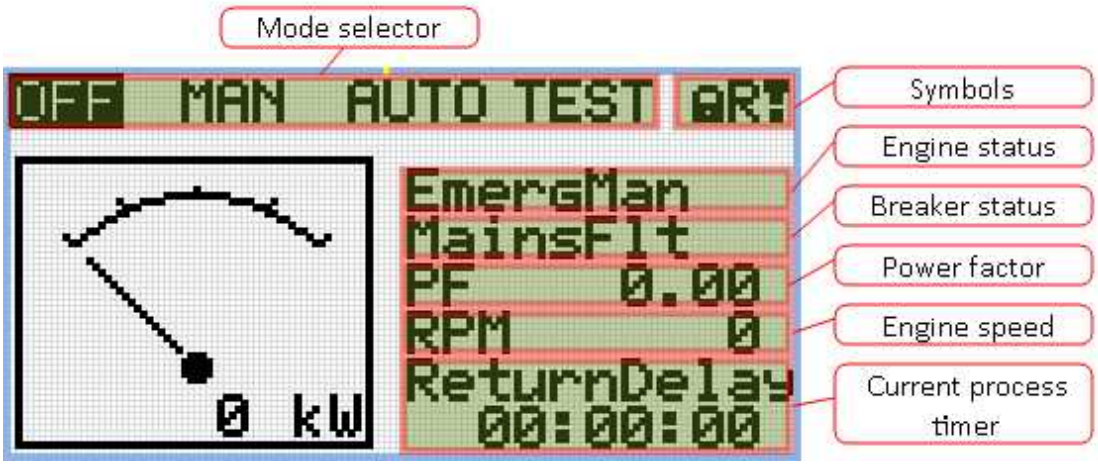
15	Graphic B/W display, 132 × 64 px.
16	**GCB Status**. Green LED is on if GCB is closed. It is driven by GCB CLOSE/OPEN output or by GCB feedback signal.
17	**MCB Status**. Green LED is on if MCB is closed. It is driven by MCB CLOSE/OPEN output or by MCB feedback signal.

5.3.2 Display screens and pages structure

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

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

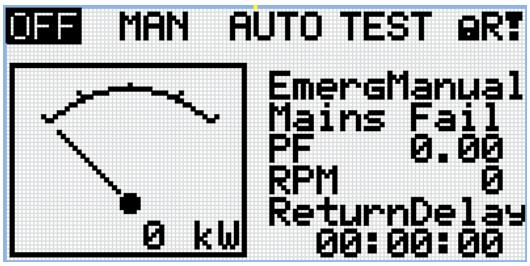
Main Screen

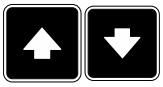


Symbols

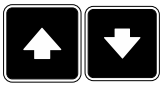
- Padlock – active when LBI ACCESS LOCK is active
- R – active when there is active remote connection to controller
- Exclamation mark – active when there is any alarm in alarmlist

Measurement Screens

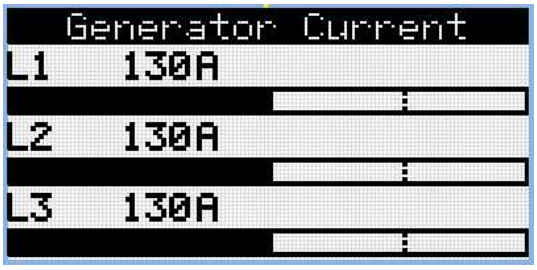


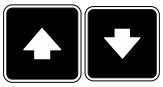


Note: *Use Up and Down button to move between measurement pages.*

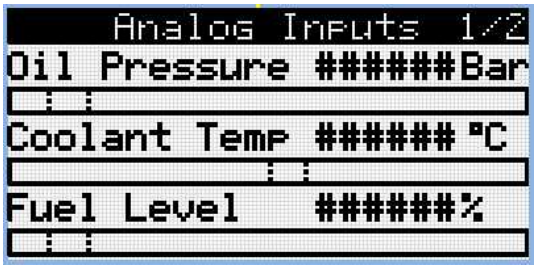


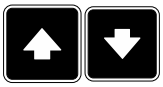
Note: *Use Up and Down button to move between measurement pages.*



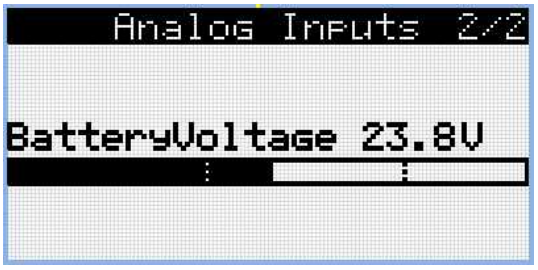


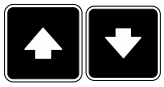
Note: *Use Up and Down button to move between measurement pages.*



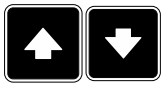


Note: *Use Up and Down button to move between measurement pages.*

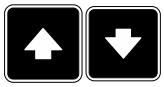




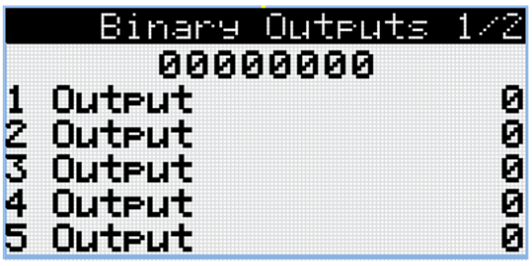
Note: *Use Up and Down button to move between measurement pages.*

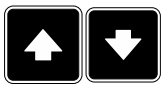


Note: *Use Up and Down button to move between measurement pages.*

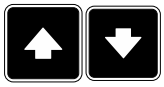


Note: *Use Up and Down button to move between measurement pages.*

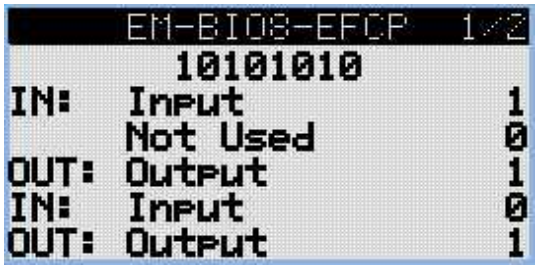


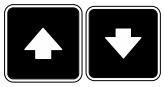


Note: *Use Up and Down button to move between measurement pages.*



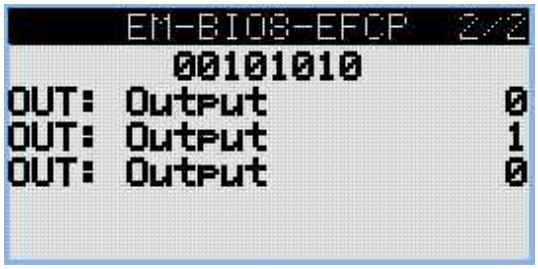
Note: *Use Up and Down button to move between measurement pages.*

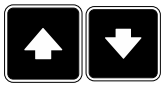




Note: *Use Up and Down button to move between measurement pages.*

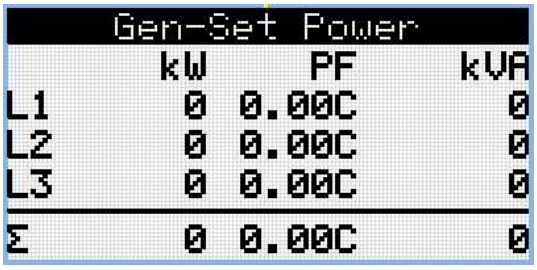
Note: *Available only with plug-in module.*

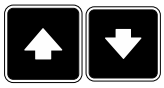




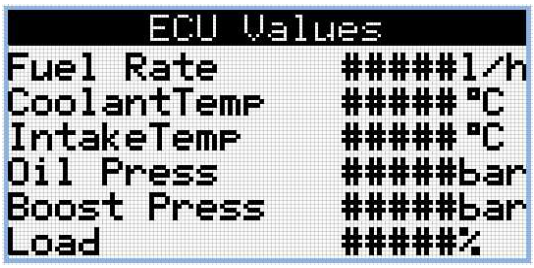
Note: *Use Up and Down button to move between measurement pages.*

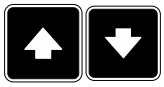
Note: *Available only with plug-in module.*



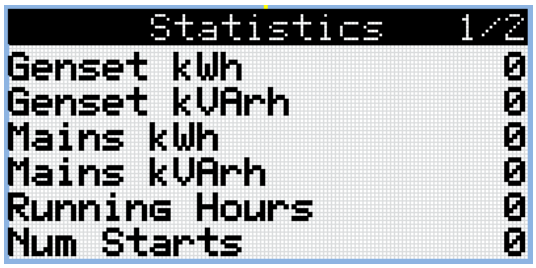


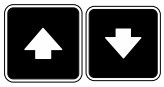
Note: *Use Up and Down button to move between measurement pages.*



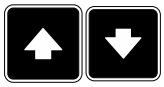


Note: *Use Up and Down button to move between measurement pages.*

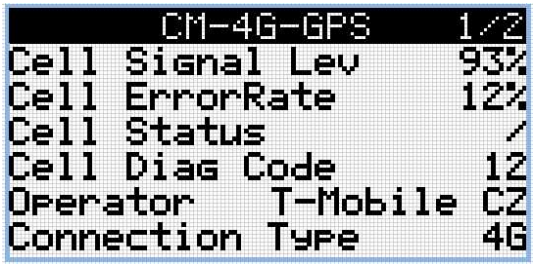


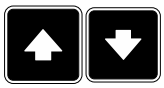


Note: *Use Up and Down button to move between measurement pages.*



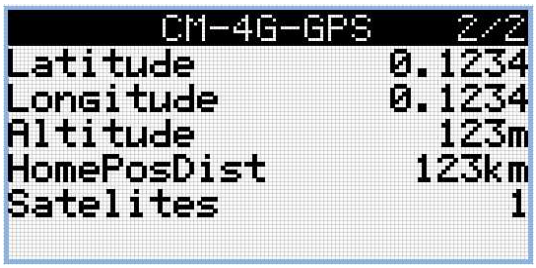
Note: *Use Up and Down button to move between measurement pages.*

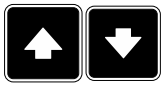




Note: *Use Up and Down button to move between measurement pages.*

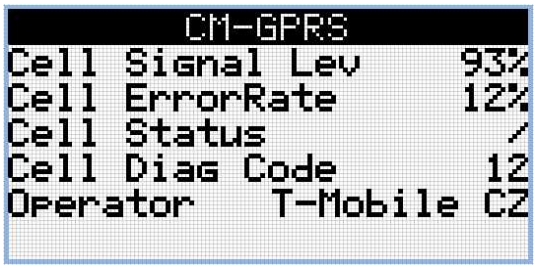
Note: *Available only with plug-in module.*

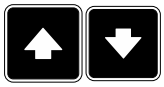




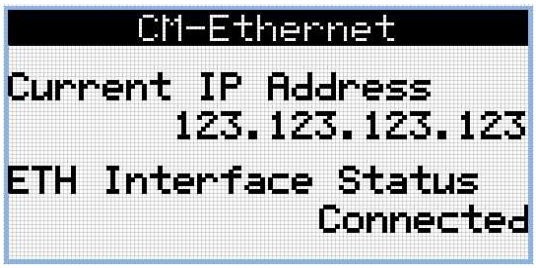
Note: *Use Up and Down button to move between measurement pages.*

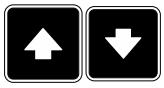
Note: *Available only with plug-in module.*



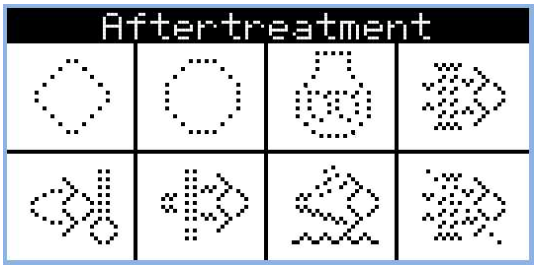


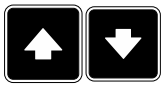
Note: *Use Up and Down button to move between measurement pages.*





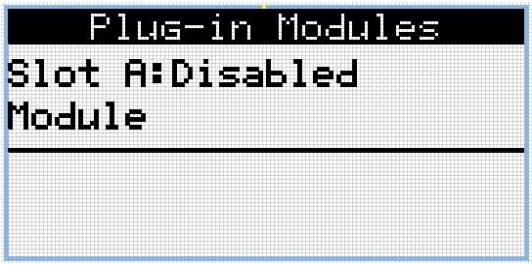
Note: *Use Up and Down button to move between measurement pages.*

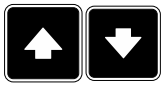




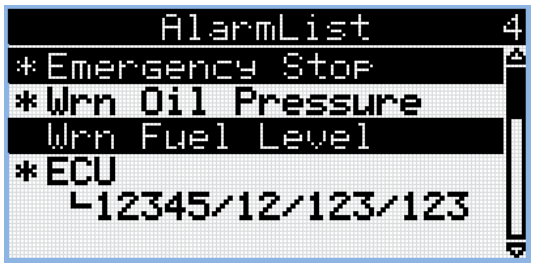
Note: *Use Up and Down button to move between measurement pages.*

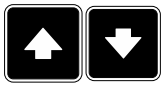
Note: *Available only with ECU supported by TIER4F*





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



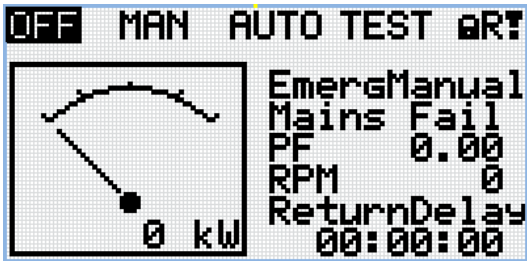


Note: *Use Up and Down button to move between measurement pages.*

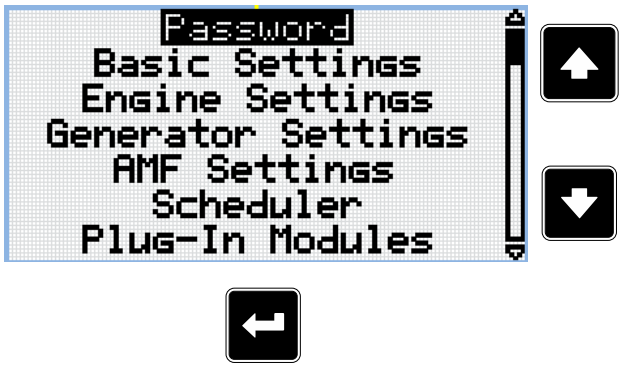
Note: *From all of these pages it is possible to switch seamlessly to the setpoint group page by pressing Page button.*

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

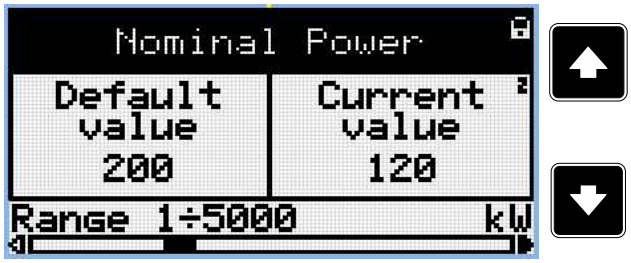


Note: *From all measurement pages we can fluently go to the setpoint group page by pressing Page button.*



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

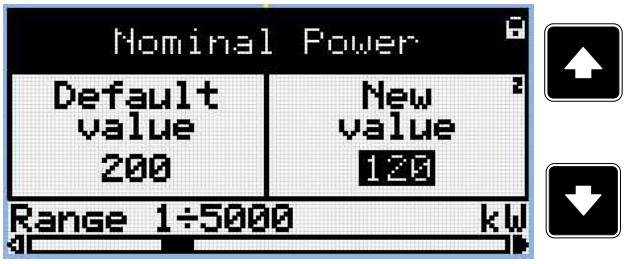
Note: *Use Enter button to enter selected setpoint group.*



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

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

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



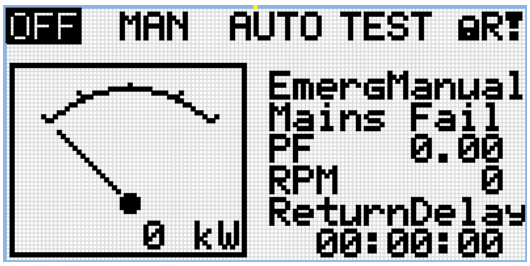
Note: *Use Up and Down button to set required value of selected setpoint.*

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

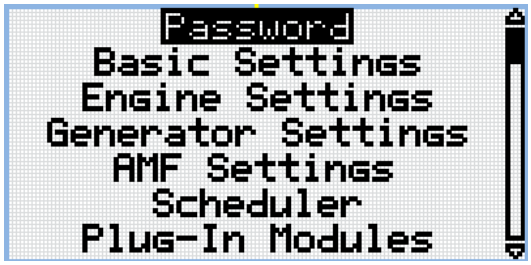
Note: *Use Page button to discard changes, to set setpoint to previous value and to return to the list of setpoints of selected group.*

IMPORTANT: Cannot change setpoint? Setpoints marked with an padlock are password protected. Enter password as described in the chapter Password (page 76).

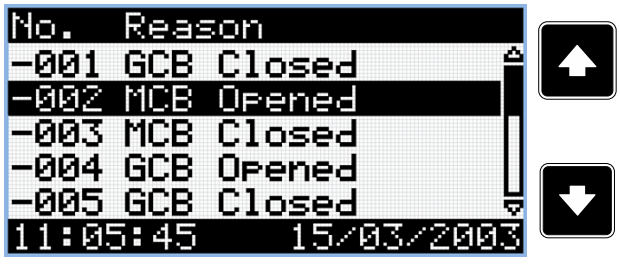
History Log



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

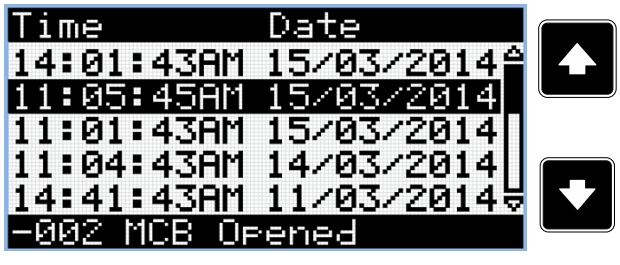


Note: *From setpoint group page we can fluently go to the history log pages by pressing Page button.*



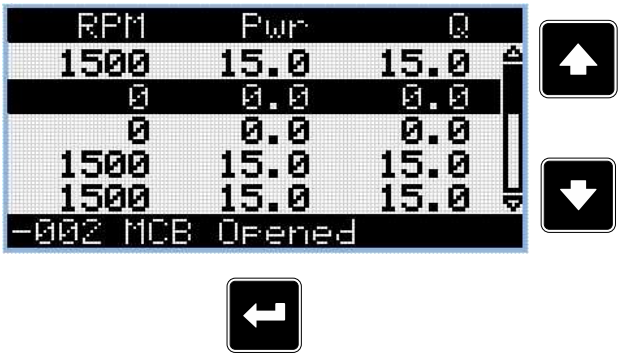
Note: *Use Up and Down button to select required alarm reason.*

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



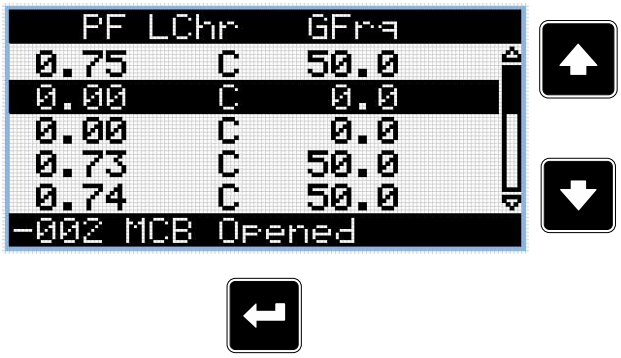
Note: *Use Up and Down button to select required alarm reason.*

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



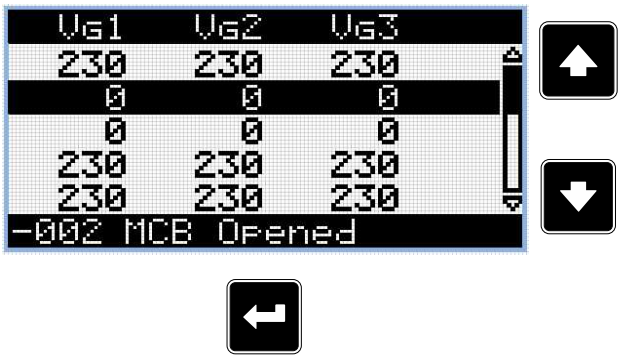
Note: *Use Up and Down button to select required alarm reason.*

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



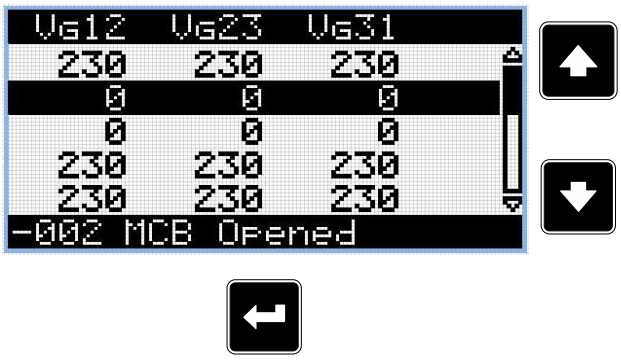
Note: *Use Up and Down button to select required alarm reason.*

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



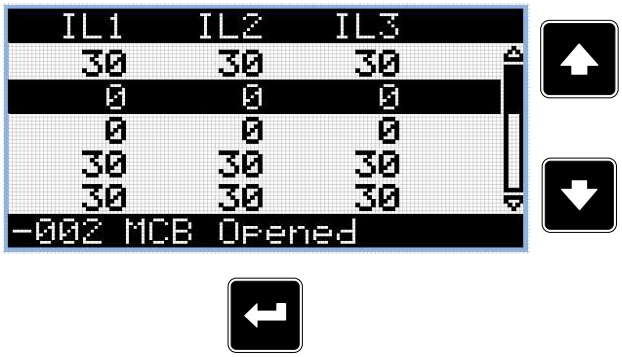
Note: *Use Up and Down button to select required alarm reason.*

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



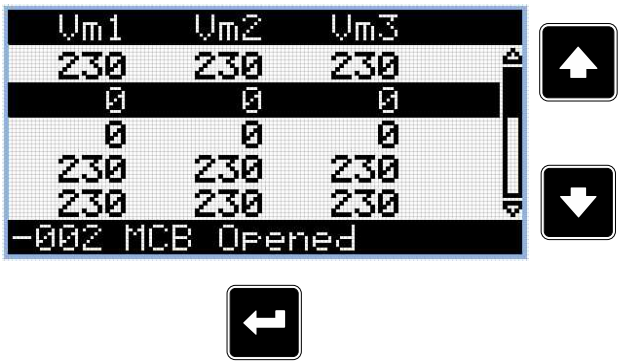
Note: *Use Up and Down button to select required alarm reason.*

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



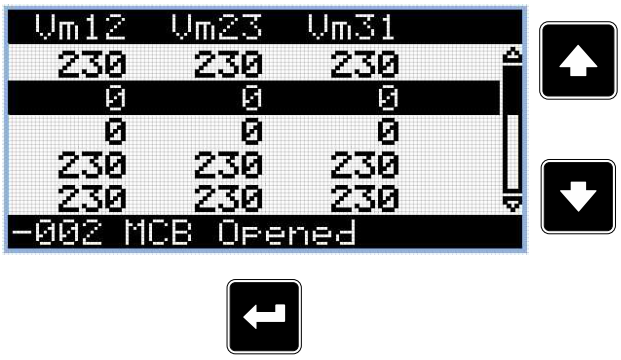
Note: *Use Up and Down button to select required alarm reason.*

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



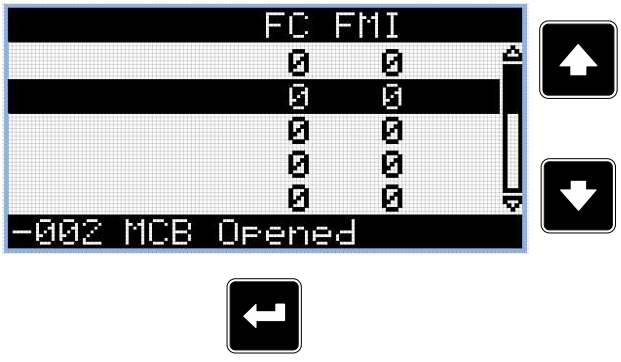
Note: *Use Up and Down button to select required alarm reason.*

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



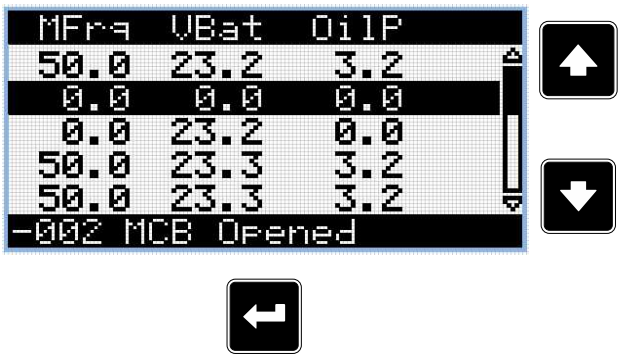
Note: *Use Up and Down button to select required alarm reason.*

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



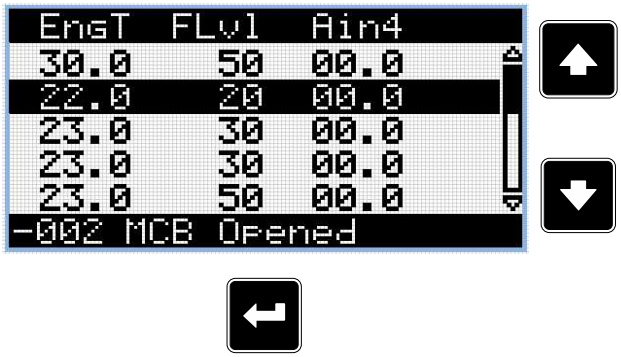
Note: *Use Up and Down button to select required alarm reason.*

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



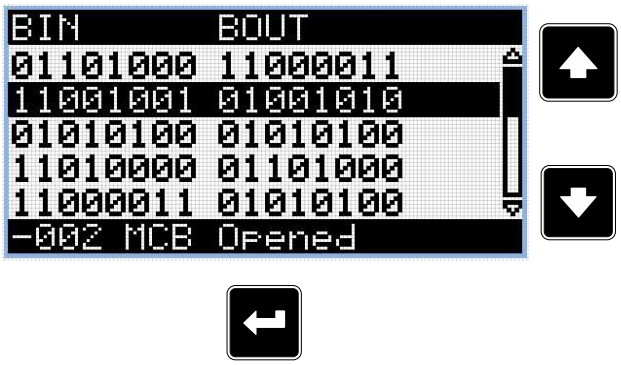
Note: *Use Up and Down button to select required alarm reason.*

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.*

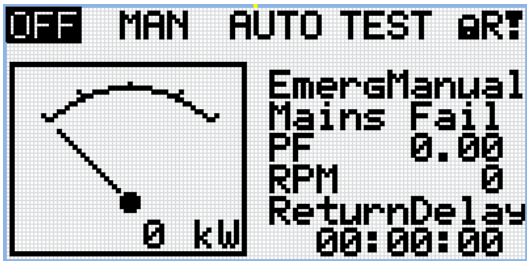
Note: *Use Up and Down button to select required alarm reason.*

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

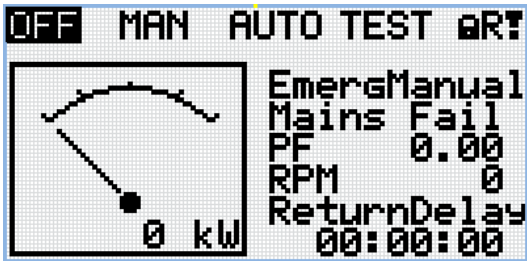


Note: *Use Up button to move to alarmlist from main measurement screen.*

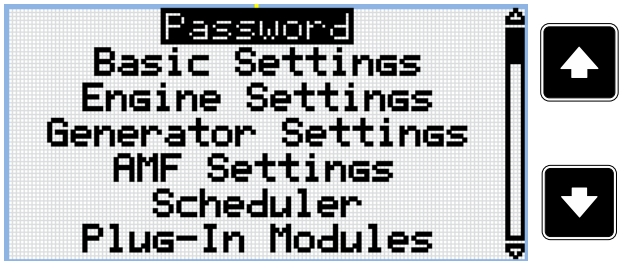
- Active alarms are displayed as white text on black background. It means the alarm is still active, i.e. the appropriate alarm conditions are still present.
- Inactive alarms are displayed as black text on white background. It means the alarm is no more active, i.e. the appropriate alarm conditions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

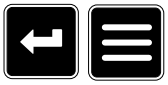
Note: *Use Enter button to enter setpoint group Password.*

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.*

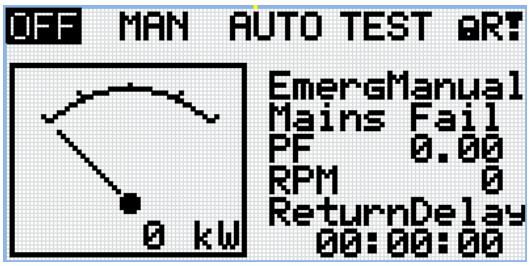
Note: *Use Left and Right button to move between digits.*



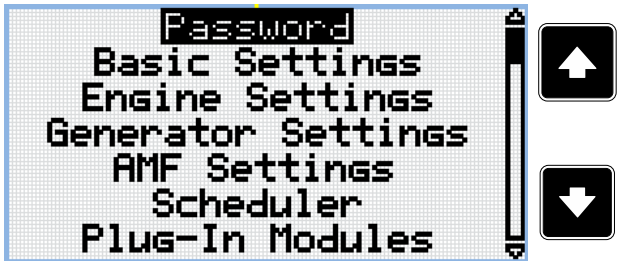
Note: *Use Enter button to confirm the password or Page button to cancel entering the password.*

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.*

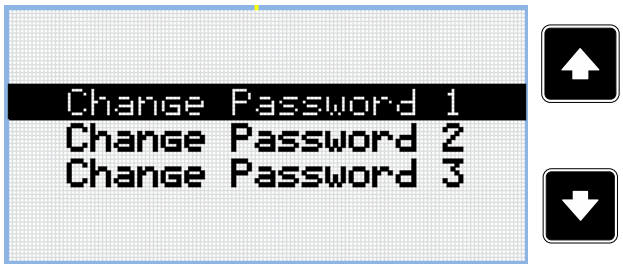


Note: *Use Up and Down button to select setpoint group Password.*

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.*



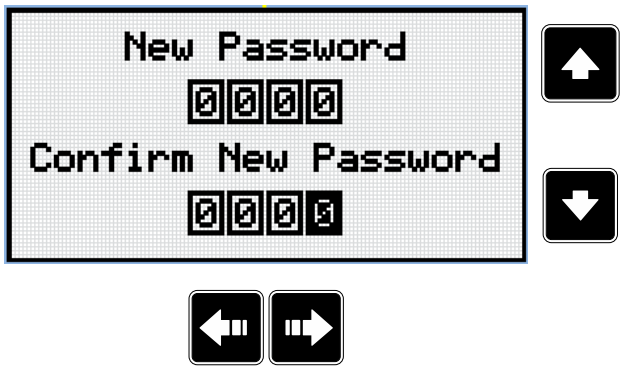
Note: *Use Up and Down button to select required level of password.*

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.*



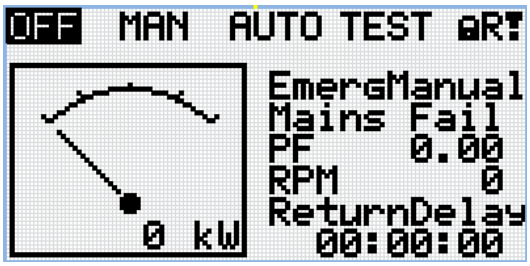
Note: *Use Up and Down button to set required value of password again.*

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

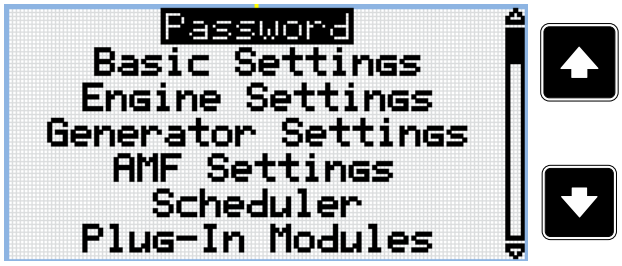
Note: *After setting new password again use Enter button to confirm adjusted password or Page button to discard changes and to cancel changing password.*

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.*

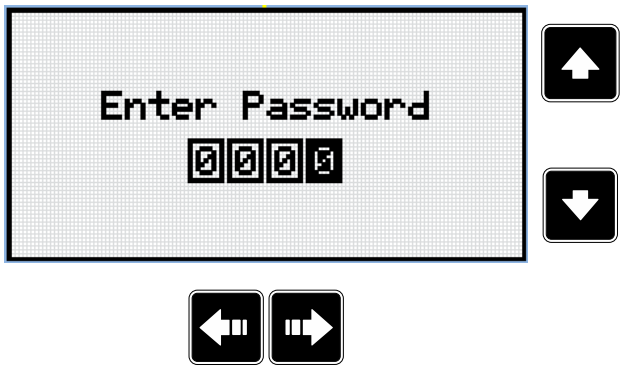


Note: *Use Up and Down button to select setpoint group Password.*

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.*

Password security

Controller will be shipped with default password that is not secure and for that reason it is highly recommended to change it. If the controller will be used with the default password warning **Wrn Default Credentials (page 381)** will appear and will continue being active until a different password is configured.

Wrong archive protection

In case there is an incorrect archive uploaded to the controller it will display: "Waiting for programming of compatible configuration table."

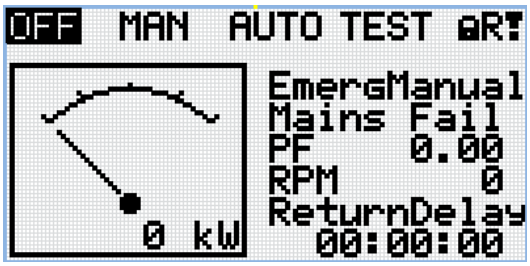
This message will be removed as soon as correct archive is uploaded to the controller.

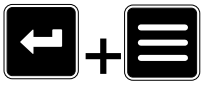
Password break protection

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

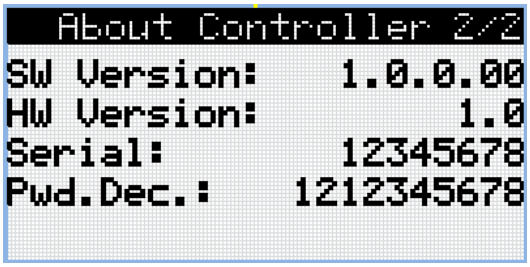




Note: *On Main measurement screen press Enter and Page button together. Enter button has to be pressed first.*

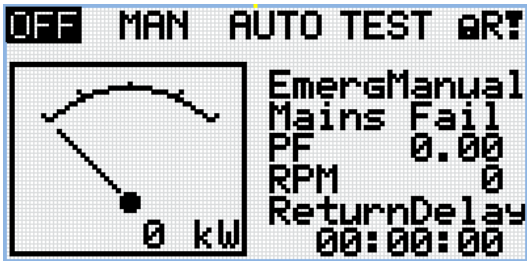
Note: *Use Page button to move to the next page.*

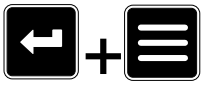
Note: *Use Page button to move to the next page.*



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

5.3.6 Language selection

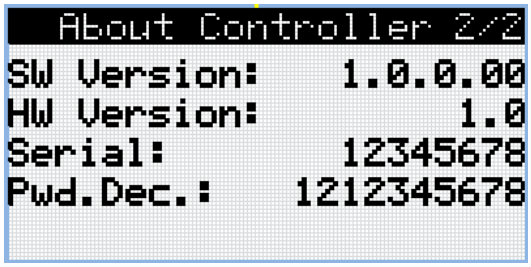




Note: *On Main measurement screen press Enter and Page button together. Enter button has to be pressed first.*

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

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

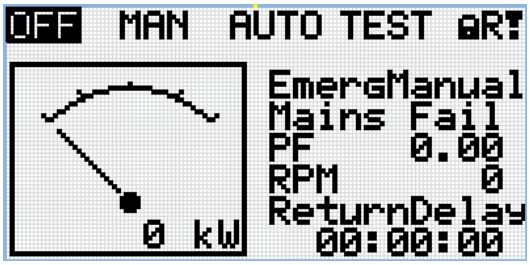


Note: *Use Page button to move to the next page.*

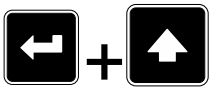
Note: *Use Up and down button to select required language.*

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

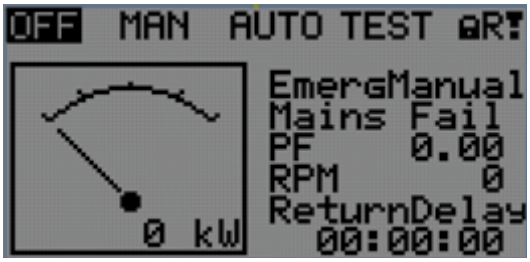
5.3.7 Display contrast adjustment



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



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



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

5.4 Remote Display

This chapter describes Remote display firmware IL3-RD, which is designed as a remote signaling and control software for InteliLite 9 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

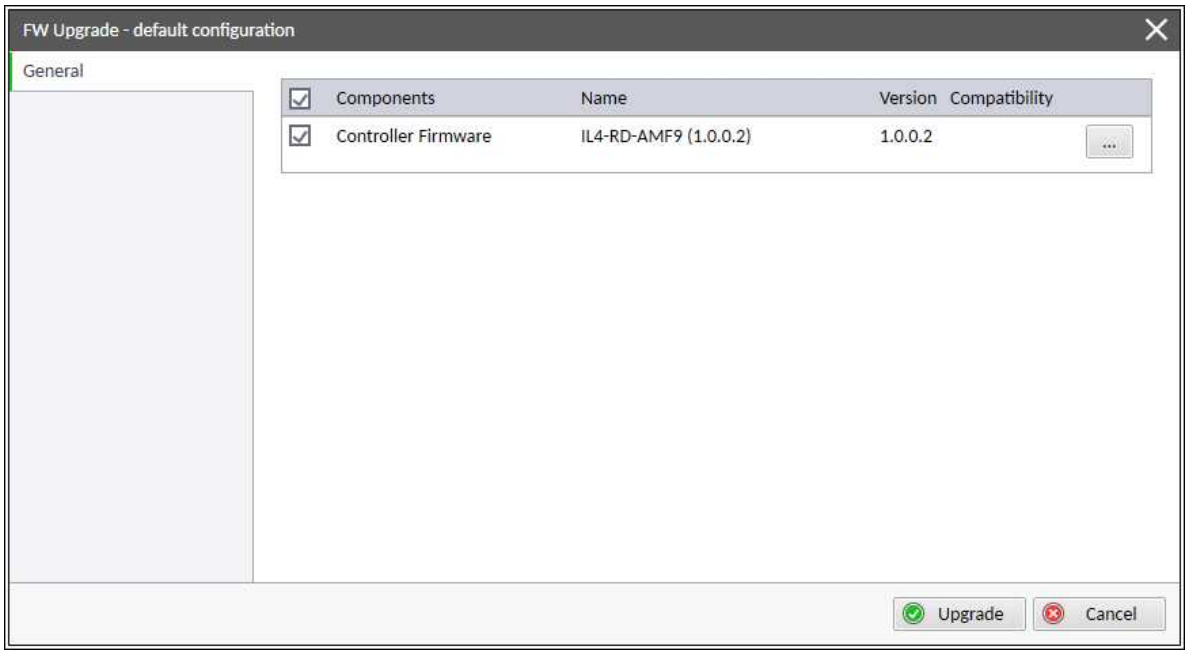
Remote display software works as "remote display and control" for the Master InteliLite 9 family controller. Gen-set can be controlled using Remote display and Master controller simultaneously and independently. All Remote display screens (Measurement screens, Setpoint screens and History Log) displays 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.

Note: *Some settings are not shared between display and control unit (setpoint Backlight Timeout**Backlight Timeout (page 172)**, Controller language and Controller user mode).*

5.4.2 IL3-RD Firmware installation

The IL3-RD Remote display firmware is installed in the same way as any other InteliLite 9 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.*

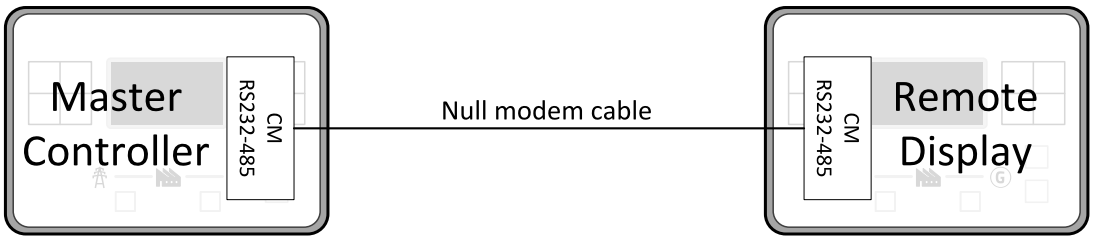
Note: *Please refer to InteliConfig Global Guide for details about firmware uploading to controller.*

5.4.3 Wiring

IL3-RD can be connected to any InteliLite 9 family controller via external RS232 or RS485 communication port 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

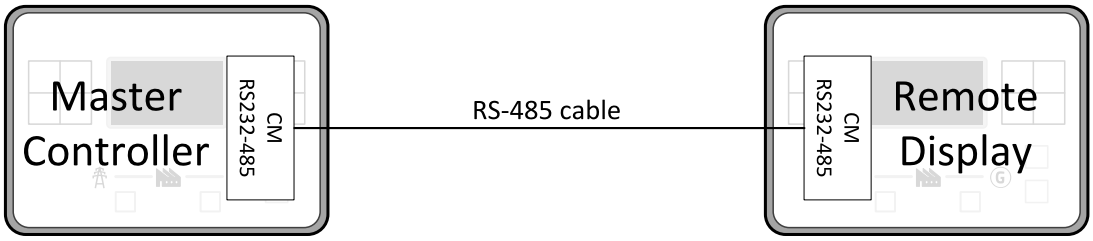


It is necessary to use CM-RS232-485 communication module on both Master controller and Remote display. COM 1 communication channel is used with these settings:

- 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



IL3 can connect as a remote display to any controller in IL3 family. If IG200 controller is connected, onboard RS485 can be used.

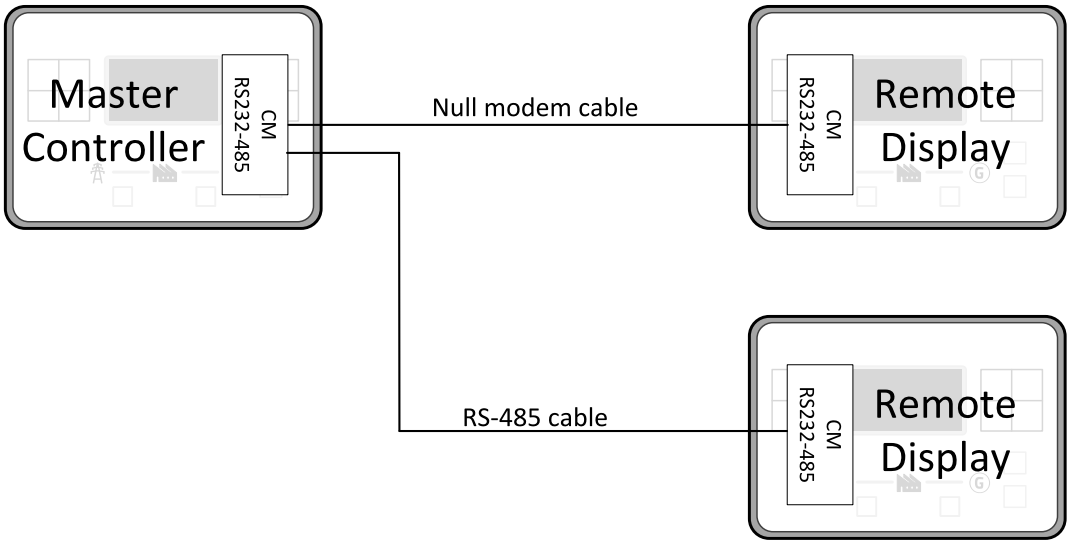
COM 2 communication channel is used with these settings:

- 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 RS485 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 (RS485) using Master controller address 1 – 32 and continues with COM 1 (RS232). 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 9 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

IL3-RD FW is possible to upload into following controllers:

- InteliLite AMF 25
- InteliLite AMF 20
- InteliLite MRS 16
- InteliLite MRS 11
- 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. 1.2.x
	FW ver. 1.7.x	FW ver. 1.3.x	FW ver. 1.3.x
	FW ver. 1.8.x	FW ver. 1.4.x	FW ver. 1.4.x
	FW ver. 1.9.x	FW ver. 1.5.x	FW ver. 1.5.x
	FW ver. 1.10.x	FW ver. 1.6.x	FW ver. 1.6.x
	FW ver. 1.11.x		FW ver. 1.7.x
	FW ver. 1.12.x		FW ver. 1.8.x
	FW ver. 1.13.x		
	FW ver. 1.14.x		
	FW ver. 1.15.x		

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back to Controller setup

5.5.1 Start-stop sequence

State	Condition of the transition	Action	Next state
Ready	Start request	**PRESTART (PAGE 357)** on **Prestart Time (page 177)** counter started	Prestart
	RPM > 2 or Oil pressure > **Starting Oil Pressure (page 178)** or Generator voltage > 10V or D+ voltage is higher than **D+ Threshold (page 184)**		Stop (Stop fail)
	OFF Mode selected or Shutdown alarm active		Not Ready
Not Ready	RPM < 2, Oil pressure not detected, Generator voltage < 10 V, D+ not Active no shutdown alarm active, other than OFF Mode selected		Ready
Prestart	Prestart time elapsed	**FUEL SOLENOID (PAGE 342)** on, **STARTER (PAGE 361)** on, **Maximum Cranking Time (page 176)** counter started	Cranking
Cranking	RPM > Starting RPM	**STARTER (PAGE 361)** off, **PRESTART (PAGE 357)** off	Starting
	D+ input activated or oil pressure detected or Generator voltage > 25% Nominal voltage	**STARTER (PAGE 361)** off, **PRESTART (PAGE 357)** off	Cranking
	Maximum Cranking Time (page 176), 1st attempt	**STARTER (PAGE 361)** off, **FUEL SOLENOID (PAGE 342)** off, **STOP SOLENOID (PAGE 362)** on,	Crank pause

		Cranking Fail Pause (page 176) timer started	
	Maximum Cranking Time (page 176) elapsed, last attempt	**STARTER (PAGE 361)** off, **PRESTART (PAGE 357)** off	Shutdown (Start fail)
	all cranking attempts elapsed	**FUEL SOLENOID (PAGE 342)** off, **STOP SOLENOID (PAGE 362)** on	Shutdown (Start fail)
Crank pause	**Cranking Fail Pause (page 176)** elapsed	**STARTER (PAGE 361)** off, **FUEL SOLENOID (PAGE 342)** on, **STOP SOLENOID (PAGE 362)** off, **Maximum Cranking Time (page 176)** counter started	Cranking
Starting	**Idle Time (page 186)** elapsed	**Minimal Stabilization Time (page 188)** and **Maximal Stabilization Time (page 189)** counter started	Running
	any shutdown condition	**FUEL SOLENOID (PAGE 342)** off, **STOP SOLENOID (PAGE 362)** on	Shutdown
Running	Stop request	**READY TO LOAD (PAGE 359)** off,**Cooling Time (page 190)** counter started	Cooling
	RPM = 0 or any other shutdown condition	**READY TO LOAD (PAGE 359)** off, **FUEL SOLENOID (PAGE 342)** off	Shutdown
	GCB CLOSE/OPEN (PAGE 343) closed		Loaded
Loaded	**GCB CLOSE/OPEN (PAGE 343)** opened		Running
	RPM = 0 or any other shutdown condition	**FUEL SOLENOID (PAGE 342)** off, **STOP SOLENOID (PAGE 362)** on, **READY TO LOAD (PAGE 359)** off,	Shutdown
Cooling	**Cooling Time (page 190)** elapsed	**FUEL SOLENOID (PAGE 342)** off, **STOP SOLENOID (PAGE 362)** on	Stop
	RPM = 0 or any other shutdown condition	**FUEL SOLENOID (PAGE 342)** off, **STOP SOLENOID (PAGE 362)** on	Shutdown
	Start request	**READY TO LOAD (PAGE 359)** on	Running
Stop	RPM = 0, Oil pressure not detected, Generator voltage <10 V, D+ not active		Ready
	If at least one of engine running indication is detected when **Stop Time (page 190)** elapsed.		Stop (Stop fail)

Note: *If all generator parameters are OK and* ***Minimal Stabilization Time (page 188)*** *elapsed, indicates that GCB is possible to close. In AUTO Mode GCB is closed in this moment automatically.*

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

5.5.2 AMF sequence

State	Condition of the transition	Action	Next state
Mains operation	Mains failed or **MCB FEEDBACK (PAGE 323)** dropout, **MCB Opens On (page 223)** = Mains Fail	**MCB CLOSE/OPEN (PAGE 351)**off, **Emergency Start Delay (page 216)** timer started	Mains failure
	Mains failed or **MCB FEEDBACK (PAGE 323)** dropout, **MCB Opens On (page 223)** = Gen Run	**Emergency Start Delay (page 216)** timer started	Mains failure
Mains failure	Mains voltage and frequency OK, **MCB Opens On (page 223)** = Mains Fail	After elapsing **MCB Close Delay (page 218) MCB CLOSE/OPEN (PAGE 351)** on	Mains operation
	Mains voltage and frequency OK, **MCB Opens On (page 223)** = Gen Run	None	Mains operation
	Emergency Start Delay (page 216) elapsed, **MCB Opens On (page 223)** = Mains Fail	Engine start sequence performed, then **GCB CLOSE/OPEN (PAGE 343)** on	Island operation
	Emergency Start Delay (page 216) elapsed, **MCB Opens On (page 223)** = Gen Run	Engine start sequence performed, then **MCB CLOSE/OPEN (PAGE 351)** off, time delay **Transfer Delay (page 217)** performed and **GCB CLOSE/OPEN (PAGE 343)** on	Island operation
Island operation	Mains voltage and frequency OK	**Mains Return Delay (page 216)** timer started	Mains return
Mains return	Mains failed		Island operation
	Mains Return Delay (page 216) elapsed	**GCB CLOSE/OPEN (PAGE 343)** off, then after **Transfer Delay (page 217) MCB CLOSE/OPEN (PAGE 351)** on and then engine stop sequence performed	Mains operation

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

Note: *If during start-up sequence mains returns, then MCB is reclosed with delay **MCB Close Delay (page 218)** (if opened, depending on **MCB Opens On (page 223)** setpoint) and start-up sequence is interrupted.*

Note: *If mains fails during stop procedure (cooling) again, stop sequence is interrupted, MCB opened and GCB re-closed with **Transfer Delay (page 217)**.*

5.5.3 Operating Modes

Selecting the operating mode is done through Left and Right buttons on the front panel or by changing the **Controller Mode (page 169)** 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 325)**
- **Remote TEST (page 327)**
- **Remote MAN (page 325)**
- **Remote AUTO (page 325)**

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 mode – AMF

No start of the Gen-set is possible .Controller stays in Not ready status and cannot be started any way. The MCB is closed permanently (**MCB Opens On (page 223)** = GENRUN) or is open or closed according to whether the mains is present or not (**MCB Opens On (page 223)** = MAINSFAIL). No AMF function will be performed. The buttons MCB, 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 mode – AMF

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

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

AUTO mode – AMF

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

Note: *When the AMF function will start the engine than the engine will be running at least for the time which is defined in **Mains Return Delay (page 216)** setpoint, even if the mains would return in the meantime.*

TEST mode – AMF only

The Gen-set will be started when the controller is put to TEST mode and will remain running unloaded. If a mains failure occurs, the MCB will be opened and after **Transfer Delay (page 217)** the GCB will be closed and the Gen-set will supply the load. After the mains have recovered, the delay **Mains Return Delay (page 216)** will count down and if it elapses and the mains is still OK, the controller will transfer the load back to the mains after **Transfer Delay (page 217)** and the Gen-set will remain running unloaded again until the mode is changed.

Remote test on load

When binary input is active, the controller automatically transfers load from the mains to the Gen-set. See LBI **REM TEST ON LOAD (PAGE 326)**.

OFF mode – MRS

No start of the Gen-set is possible. Controller stays in Not ready status and cannot be started any way. The buttons GCB I/O, Start I and Stop O including the appropriate binary inputs for external buttons are not active.

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

MAN mode – MRS

The engine can be started and stopped manually using the Start I and Stop O buttons (or external buttons wired to the appropriate binary inputs) in MAN mode. When the engine is running, GCB can be closed.

AUTO mode – MRS

The controller does not respond to buttons Start I, Stop O and GCB ON/OFF I/O .Engine start/stop request is given by binary input **Remote Start/Stop (page 326)**.

5.5.4 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 357)** and **GLOW PLUGS (PAGE 348)** are energized for time period given by the setpoints **Prestart Time (page 177)** and **Glow Plugs Time (page 178)**.
- After **Prestart Time (page 177)** and **Glow Plugs Time (page 178)**, the output **FUEL SOLENOID (PAGE 342)** is energized and after **Fuel Solenoid Lead (page 186)** the starter of motor is activated by energizing the output **STARTER (PAGE 361)**.
- 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 177)**, or
  - One of **Additional running engine indications (page 117)** signals is active.
- The controller remains in the Starting phase until the engine speed exceeds the value of **Starting RPM (page 177)**, after that it is considered as started and the Idle period will follow.
- The maximum duration that the output **STARTER (PAGE 361)** is energized is determined by the setpoint **Maximum Cranking Time (page 176)**. If the engine does not start within this period, the output **STARTER**

(PAGE 361) is de-energized and a pause with length determined by **Cranking Fail Pause (page 176)** will follow. PRESTART (PAGE 357) and GLOW PLUGS (PAGE 348) 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 176)**.

- Once the engine is started, the Idle period follows. The binary output IDLE/NOMINAL (PAGE 351) remains inactive (as it was during the start). The idle period duration is adjusted by the setpoint **Idle Time (page 186)**.
- After the idle period has finished, the output IDLE/NOMINAL (PAGE 351) is activated and the start-up sequence is finished. The **Stabilization (page 97)** phase follows.

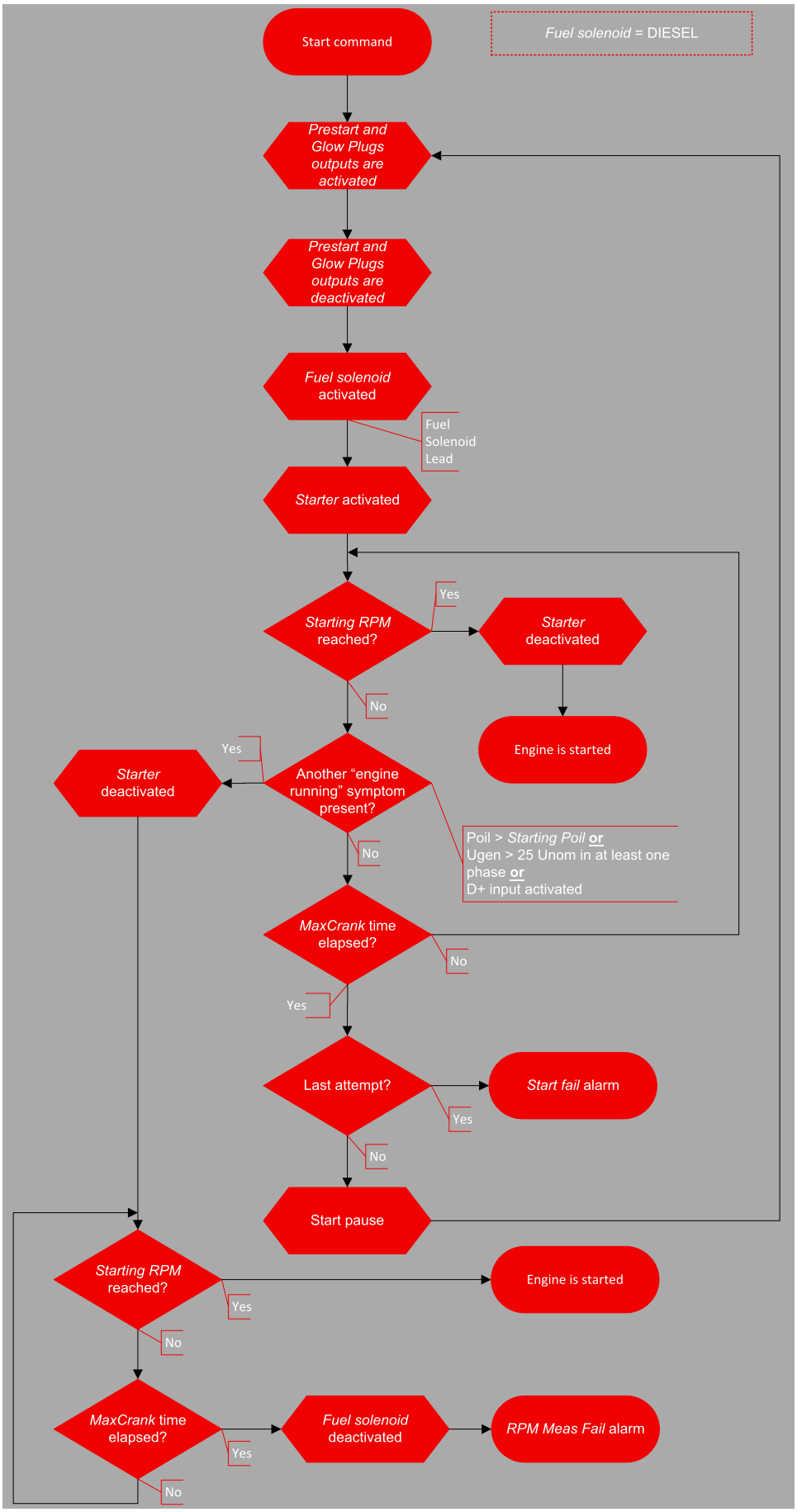


Image 5.11 Flowchart of start of diesel engine

5.5.5 Stabilization

When the **Engine start (page 94)** sequence is finished, the Gen-set goes into the stabilization phase. There are two timers (setpoints) in this phase:

- **Minimal Stabilization Time (page 188)** 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 189)** 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 188)** has already elapsed.

In the event that the generator voltage or frequency are not within limits within the **Maximal Stabilization Time (page 189)** 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 207)**.*

Note: *The value of the **Minimal Stabilization Time (page 188)** setpoint has to be lower than the value of **Maximal Stabilization Time (page 189)** setpoint.*

5.5.6 Connecting to load

When the **Stabilization (page 97)** 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 188)** timer has elapsed.
- The Gen-set voltage and frequency are within limits.

5.5.7 MRS operation

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

The MRS procedure

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

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

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

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

5.5.8 AMF operation

The "AMF function" represents the automatic start in the event that the mains have failed and stop after the mains have been restored. The automatic start can be enabled or disabled by binary inputs **AMF START BLOCK (PAGE 309)** or **MAINS FAIL BLOCK (PAGE 322)**.

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

Mains failure detection

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

- The mains voltage is out of the limits given by the setpoints **Mains Undervoltage (page 219)** and **Mains Overvoltage (page 218)** for a time period longer than **Mains <> Voltage Delay (page 219)**.
- The mains frequency is out of the limits given by the setpoints **Mains Underfrequency (page 220)** and **Mains Overfrequency (page 219)** for a time period longer than **Mains < > Frequency Delay (page 220)**.
- The MCB close command was not successful and the alarm **Wrn MCB Fail (page 389)** was not reset.
- Phase rotation is incorrect.

Healthy mains detection

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

- The mains voltage is within the limits given by the setpoints **Mains Undervoltage (page 219)** and **Mains Overvoltage (page 218)**.
- The mains frequency is within the limits given by the setpoints **Mains Underfrequency (page 220)** and **Mains Overfrequency (page 219)**.
- The alarm **Wrn MCB Fail (page 389)** is not active (if MCB feedback is active). This condition is not required if MCB is open (MCB feedback is inactive).
- Phase rotation is correct.

The AMF procedure

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

- If the setpoint **MCB Opens On (page 223)** is set to Mains Fail, the MCB is opened
- The timer for automatic start of the Gen-set **Emergency Start Delay (page 216)** begins to count down.
- After the timer has elapsed, the Gen-set is started.

Note: *The automatic start of the Gen-set due to AMF function can be disabled by the binary inputs **AMF START BLOCK (PAGE 309)** or **MAINS FAIL BLOCK (PAGE 322)**.*

- If the setpoint **MCB Opens On (page 223)** is set to Gen Run, the MCB is opened once the generator voltage is within limits (after **Minimal Stabilization Time (page 188)** elapses).

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

- After **Transfer Delay (page 217)** elapses, the GCB is closed and the Gen-set begins to supply the load.
- After the mains restored to normal, the timer **Mains Return Delay (page 216)** begins to count down.
- Maximum time between closing of MCB and opening GCB is given by the setpoint **Transfer Delay (page 217)**. After GCB is opened, the Gen-set cools down and a stops.

IMPORTANT: Controller has this behavior only in AUTO mode!

5.5.9 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 190)**.
- 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 190)**.
- 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 342)** is de-energized and **STOP SOLENOID (PAGE 362)** is energized. The engine will stop within the time period determined by the setpoint **Stop Time (page 190)**. If the engine does not stop within this time, the alarm **Wrn Stop Fail (page 390)** will be issued.

The output **STOP SOLENOID (PAGE 362)** is energized until the engine is stopped, but at least for the duration of **Stop Time (page 190)**. If the **Stop Time (page 190)** has elapsed and the engine has still not stopped, the **STOP SOLENOID (PAGE 362)** is de-energized for 5 s and then energized again for **Stop Time (page 190)** 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 117)** signals is active.

5.5.10 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 103)** with fixed alarm types.
- Each alarm is written to the **Alarmlist (page 103)**.
- 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.

Analog input alarm evaluation principle

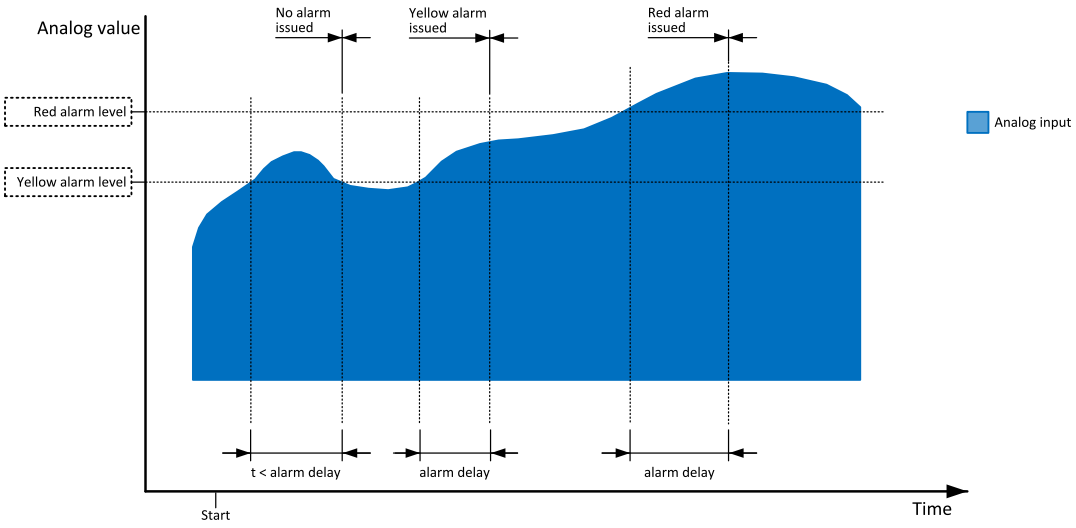


Image 5.12 Analog input alarm evaluation principle

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 189)**.
- 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 189)** 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 320)**, 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 328)** 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 333)** as well as the standard alarm outputs (**HORN (PAGE 350)** and **ALARM (PAGE 337)**).

Alarm indication only (AL Indic)

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 350)** and **ALARM (PAGE 337)**) 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 333)** as well as the standard alarm outputs (**HORN (PAGE 350)** and **ALARM (PAGE 337)**).

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 333)** as well as the standard alarm outputs (**HORN (PAGE 350)** and **ALARM (PAGE 337)**).

> **IMPORTANT: In case there is no feedback from breakers configured Breaker open and cool down will be replaced by shutdown alarm type.**

Note: *When there is no control of breakers, the type of protection is Sd not BOC.*

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 103)**. 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.*

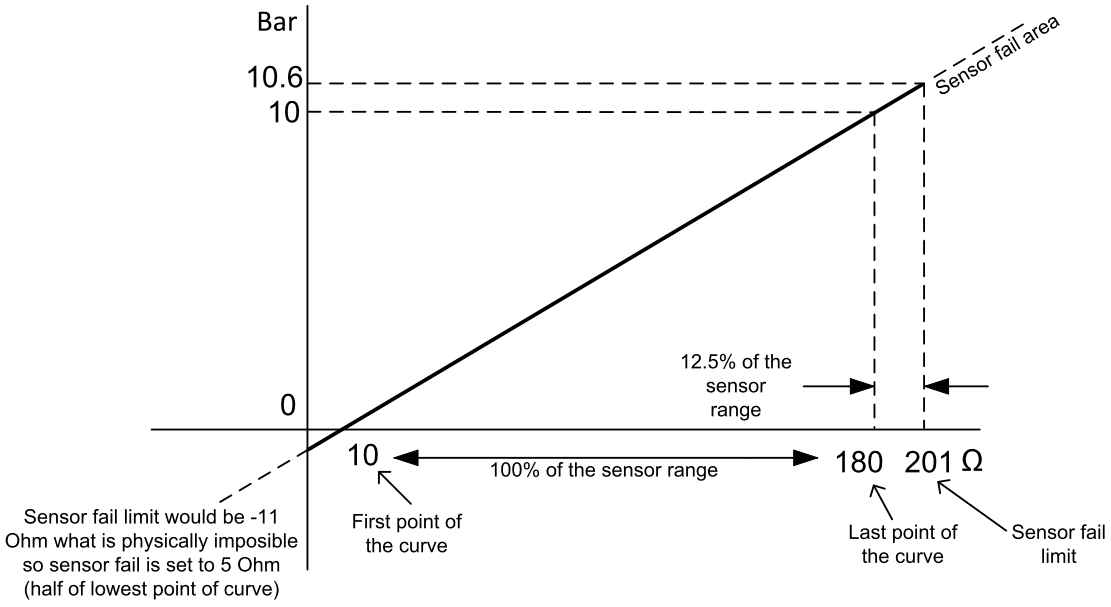


Image 5.14 Sensor fail detection principle

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 103)** or new event is written in **History log (page 105)**. The message will contain a copy of the **Alarmlist (page 103)** or reasons from **History log (page 105)**. To enable this function, adjust setpoints **Event Message (page 249)**, **Wrn Message (page 250)**, **BOC Message (page 250)** and **Sd Messages (page 251)** to ON. Also enter a valid GSM phone number or email address to the setpoints **Telephone Number 1 (page 247)**, **Email Address 1 (page 248)**, .

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 user protection. Then the alarm name follows, which can be adjusted by user during the configuration.

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 223)** setpoint.
Analog Input 1 Sd	SD	Value measured on analog input 1 is </> than **Analog Protection 1 Sd (page 224)** setpoint.
Analog Input 2 Wrn	WRN	Value measured on analog input 2 is </> than **Analog**

Events specification	Protection type	Description
		Protection 2 Wrn (page 225) setpoint.
Analog Input 2 Sd	SD	Value measured on analog input 2 is </> than **Analog Protection 2 Sd (page 225)** setpoint.
Analog Input 3 Wrn	WRN	Value measured on analog input 3 is </> than **Analog Protection 3 Wrn (page 226)** setpoint.
Analog Input 3 Sd	SD	Value measured on analog input 3 is </> than **Analog Protection 3 Sd (page 227)** setpoint.
Wrn Battery Voltage	WRN	Battery voltage is out of limits given by **Battery Undervoltage (page 204)** and **Battery Overvoltage (page 204)** 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 361)** 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 Undervoltage BOC Gen Lx Overvoltage (where x=1,2,3)	SD BOC	The generator voltage is out of limits given by **Generator Undervoltage BOC (page 210)** and **Generator Overvoltage Sd (page 209)** setpoints.
BOC Gen >, <Frequency	BOC	The generator frequency is out of limits given by **Generator Overfrequency BOC (page 211)** and **Generator Underfrequency BOC (page 212)** setpoints.
BOC Overload	BOC	The load is greater than the value given by **Overload BOC (page 207)** setpoint.
Sd Overspeed	SD	The protection comes active if the speed is greater than **Overspeed Sd (page 192)** setpoint.
Sd Underspeed	SD	During starting of the engine when the RPM reach the value of **Starting RPM (page 177)** setpoint the starter is switched off and the speed of the engine can drop under **Starting RPM (page 177)** again. Then the Underspeed protection is active. Protection evaluation starts 5 seconds after reaching **Starting RPM (page 177)**.
Emergency Stop	SD	If the input Emergency Stop is active shutdown is immediately activated.

Events specification	Protection type	Description
GCB Fail	SD	Failure of generator circuit breaker.
MCB Fail	WRN	Failure of mains circuit breaker.
Sd RPM Measurement Fail	SD	Failure of magnetic pick-up sensor for speed measurement. This alarm appears, if starter was disengaged for other reason than over-crossing **Starting RPM (page 177)** (like oil pressure or D+) and at the end of timer **Maximum Cranking Time (page 176)** there are no RPMs > **Starting RPM (page 177)** 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 203)** setpoint. The protection comes if counter reaches zero.
Wrn Maintenance 2	WRN	The period for servicing is set by the **Maintenance Timer 2 (page 203)** setpoint. The protection comes if counter reaches zero.
Wrn Maintenance 3	WRN	The period for servicing is set by the **Maintenance Timer 3 (page 204)** 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 active.
Mains CCW Rot	WRN	Mains voltage phases are not wired correctly. MCB closing is prohibited by controller.
Generator CCW Rot	WRN	Gen-set voltage phases are not wired correctly. GCB closing is prohibited by controller.

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

5.5.11 History log

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

Each record has the same structure and contains:

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

Record structure

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

5.5.12 Breaker control

The following power switches are controlled by the controller:

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

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

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

Breaker control outputs

Close/Open	An output for control of a contactor. Its state represents the breaker position requested by the controller. The breaker must react within 5 seconds to a close or open command, otherwise an alarm is issued.
ON coil	An output giving a 5 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 5 seconds. The output is intended for control of open coils of circuit breakers.
UV coil	The GCB UV coil output is active the whole time the Gen-set is running (not in idle or cooling). The MCB UV coil output is active when the controller is switched on. The output is deactivated for at least 5 seconds in the moment the breaker has to be switched off. The output is intended for control of undervoltage coils of circuit breakers.

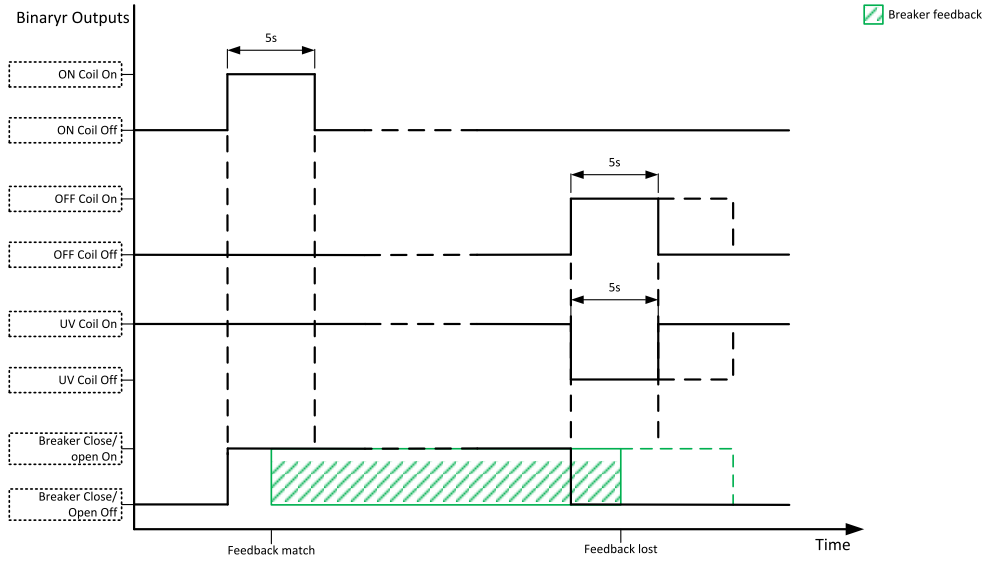


Image 5.15 Breaker control outputs

MCB special requirements

- If a contactor is used on the MCB position, it is recommended that the wiring be provided in such a way that the contactor will be normally closed and will open if the logical binary output **MCB CLOSE/OPEN (PAGE 351)** is activated. This behavior is called "negative logic" and can be adjusted by the setpoint **MCB Logic (page 221)**. The negative logic will prevent accidental opening of the MCB when the controller is switched off.
- If a contactor is used on the MCB position, it will open itself immediately after the mains have failed, because it will lose power for the coil. That is why the following adjustment is necessary to prevent triggering the **Wrn MCB Fail (page 389)** alarm: **MCB Opens On (page 223)** = Mains Fail, **Mains <> Voltage Delay (page 219)** ≤1.
- If a 230 V motor driven circuit breaker is used on the MCB position and an undervoltage coil is not fitted, it is not possible to open the breaker after the mains have failed, because there is no power for the motor drive until the Gen-set is started and providing voltage. Adjusting the setpoint **MCB Opens On (page 223)** = Gen Run will prevent triggering the **Wrn MCB Fail (page 389)** alarm.

Breaker fail detection

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

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

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

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

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

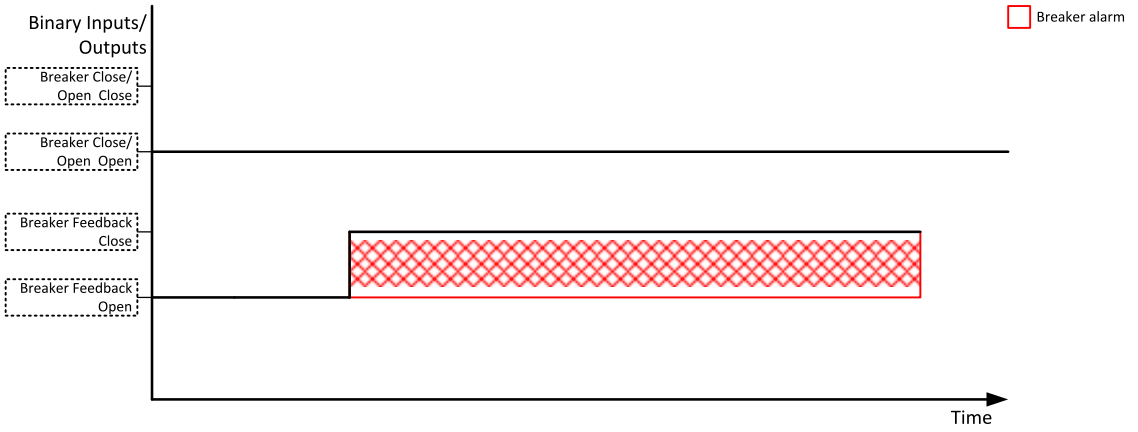


Image 5.16 Breaker fail – breaker close/open in steady position – open

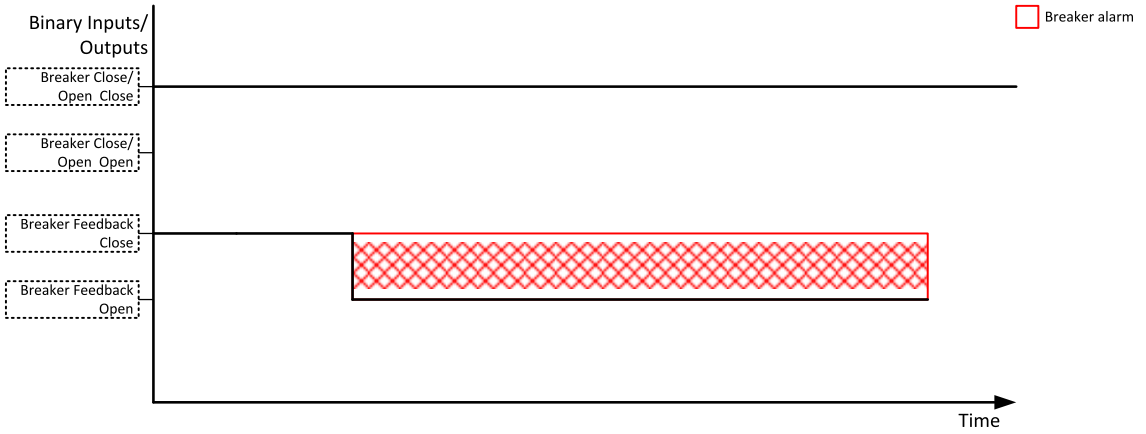


Image 5.17 Breaker fail – breaker close/open in steady position – close

When binary output breaker close/open opens there is 5 sec delay for breaker fail detection.

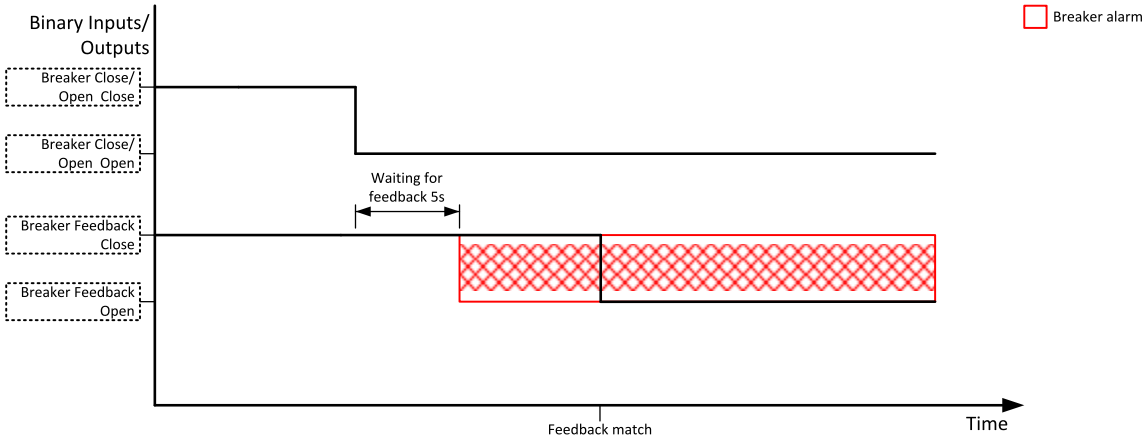


Image 5.18 Breaker fail – breaker close/open opens

When binary output breaker close/open closes there is 5 sec delay for breaker fail detection.

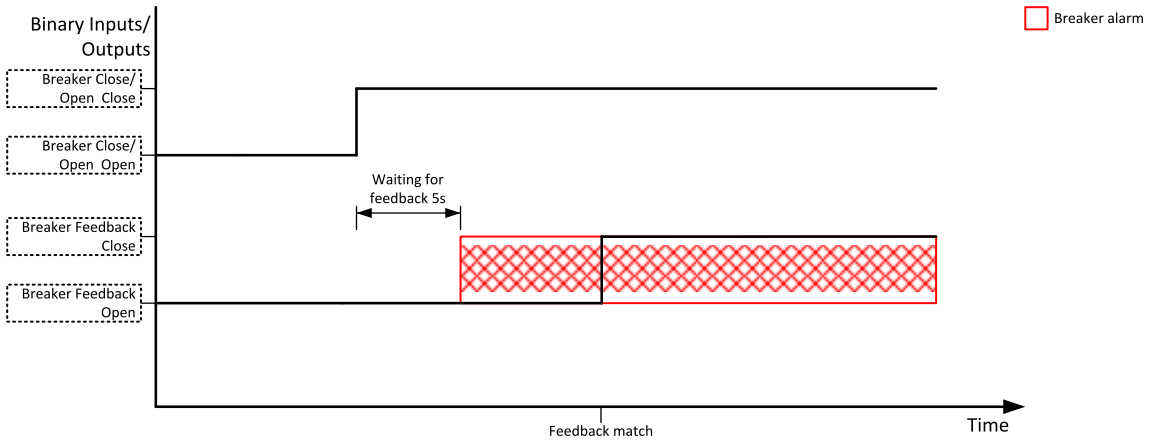


Image 5.19 Breaker fail – breaker close/open closes

5.5.13 Exercise timer

The exercise (general-purpose) timer in controller 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 230)**
- **Timer 1 Repetition (page 231)**
- **Timer 1 First Occur. Date (page 232)**
- **Timer 1 First Occur. Time (page 232)**
- **Timer 1 Duration (page 232)**
- **Timer 1 Repeated (page 233)**
- **Timer 1 Repeat Day (page 236)**
- **Timer 1 Day (page 235)**
- **Timer 1 Repeated Day In Week (page 236)**
- **Timer 1 Repeat Day In Month (page 236)**
- **Timer 1 Repeat Week In Month (page 237)**
- **Timer 1 Refresh Period (page 234)**
- **Timer 1 Weekends (page 235)**

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 230)****.*

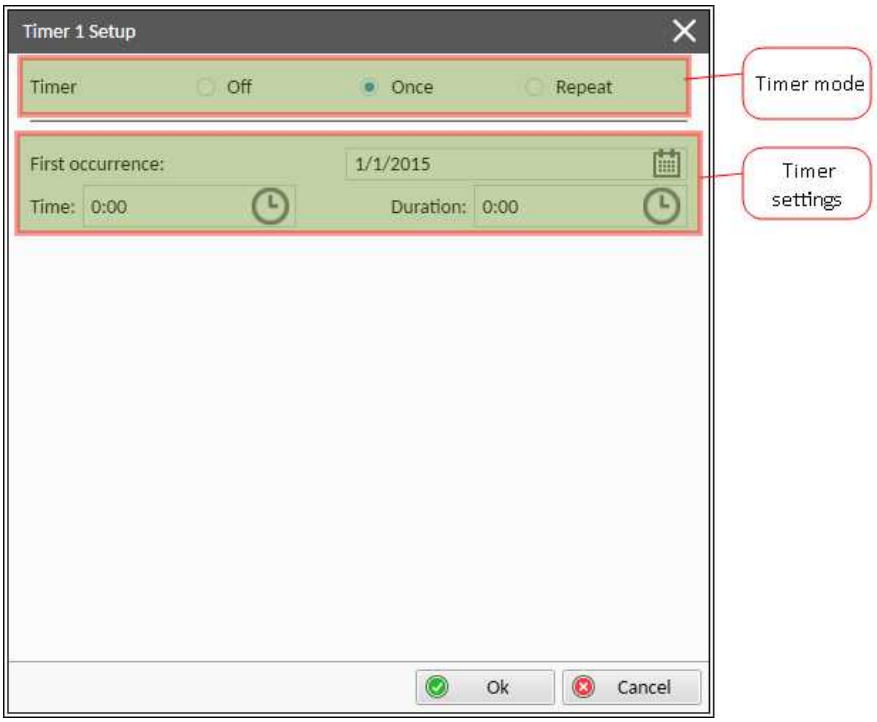


Image 5.20 Once mode – InteliConfig

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 230)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 231)** setpoint select Once mode. Then adjust **Timer 1 First Occur. Date (page 232)**, **Timer 1 First Occur. Time (page 232)** and **Timer 1 Duration (page 232)**.

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 230)****.*

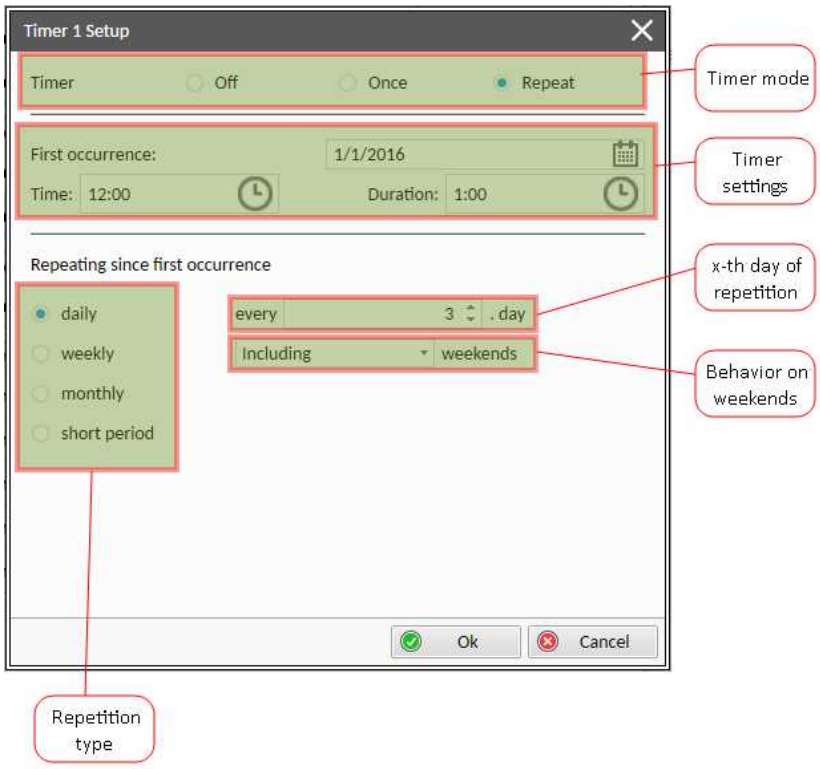


Image 5.21 Daily mode – InteliConfig

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 234)**) and behavior of timer on weekends (**Timer 1 Weekends (page 235)**).

> **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 230)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 231)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 232)**, **Timer 1 First Occur. Time (page 232)** and **Timer 1 Duration (page 232)**. In setpoint **Timer 1 Repeated (page 233)** select Daily and adjust **Timer 1 Refresh Period (page 234)** (x-th day of repetition) and **Timer 1 Weekends (page 235)** (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 230)**.*

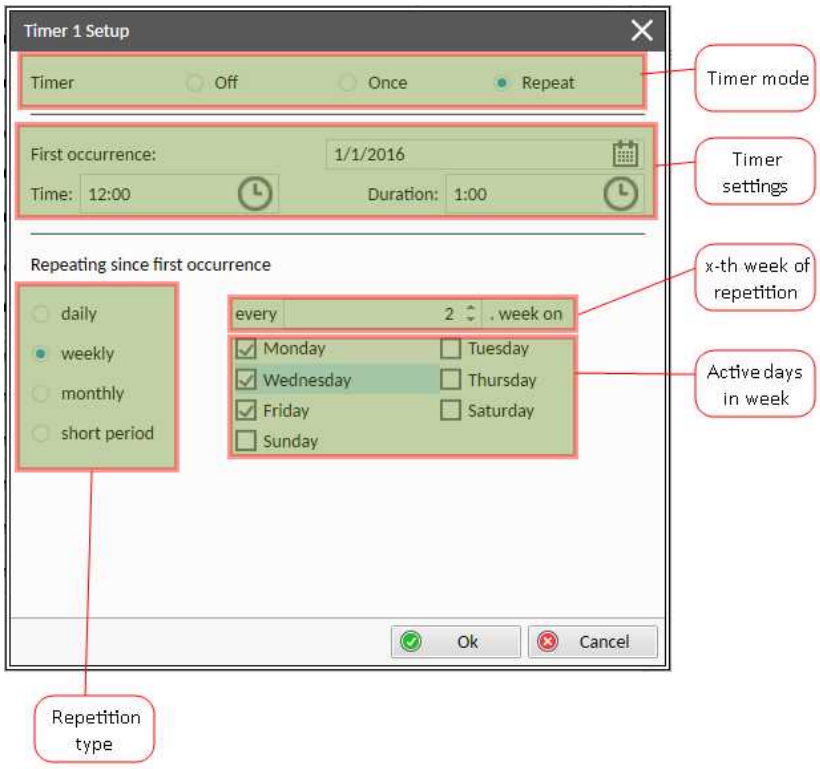


Image 5.22 Weekly mode – InteliConfig

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 234)** and days when timer should be active (**Timer 1 Day (page 235)**.

> **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 230)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 231)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 232)**, **Timer 1 First Occur. Time (page 232)** and **Timer 1 Duration (page 232)**. In setpoint **Timer 1 Repeated (page 233)** select Weekly and adjust **Timer 1 Day (page 235)** (days when timer should be active) and **Timer 1 Refresh Period (page 234)** (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 230)**.*

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

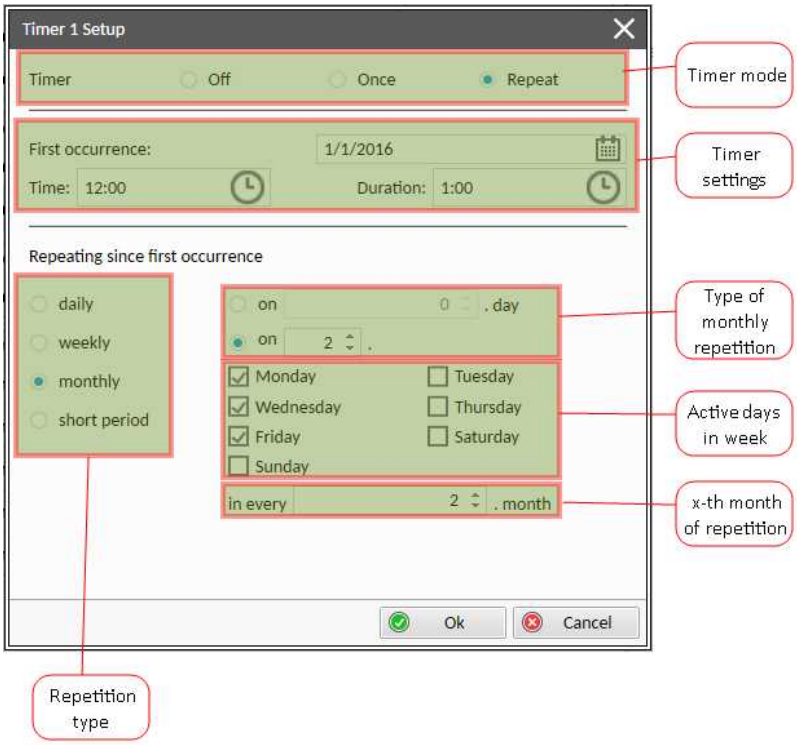


Image 5.23 Monthly mode – InteliConfig

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 236)**). 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.

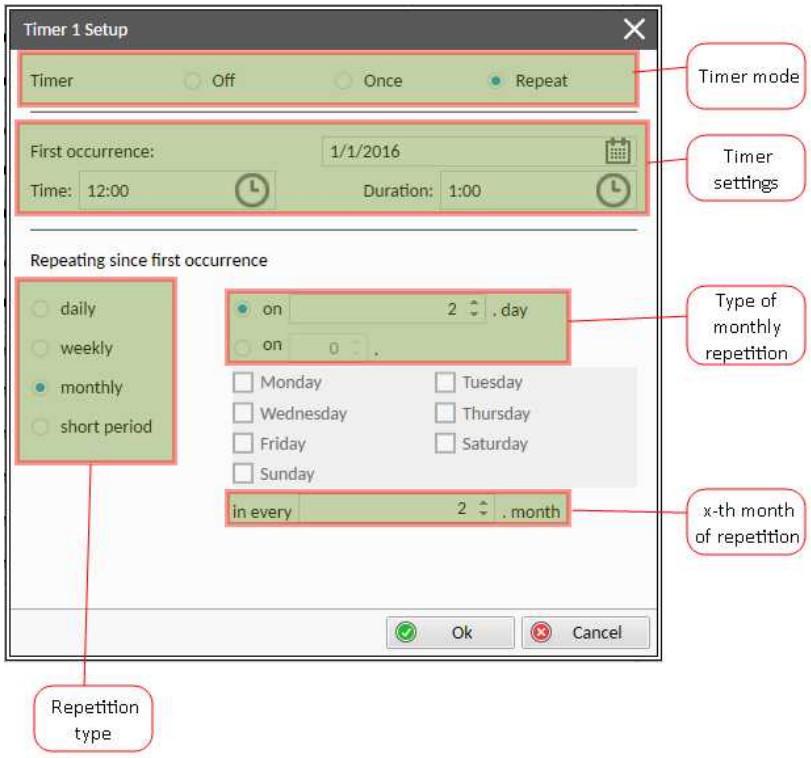


Image 5.24 Monthly mode – InteliConfig

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 230)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 231)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 232)**, **Timer 1 First Occur. Time (page 232)** and **Timer 1 Duration (page 232)**. In setpoint **Timer 1 Repeated (page 233)** select Monthly and adjust type of monthly repetition via **Timer 1 Repeat Day (page 236)**, **Timer 1 Refresh Period (page 234)** (x-th month of repetition) and **Timer 1 Repeat Day In Month (page 236)** (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 230)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 231)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 232)**, **Timer 1 First Occur. Time (page 232)** and **Timer 1 Duration (page 232)**. In setpoint **Timer 1 Repeated (page 233)** select Monthly and adjust type of monthly repetition via **Timer 1 Repeat Day (page 236)**, **Timer 1 Refresh Period (page 234)** (x-th month of repetition), **Timer 1 Repeated Day In Week (page 236)** (days in week when timer is active) and **Timer 1 Repeat Week In Month (page 237)** (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 230)**.*

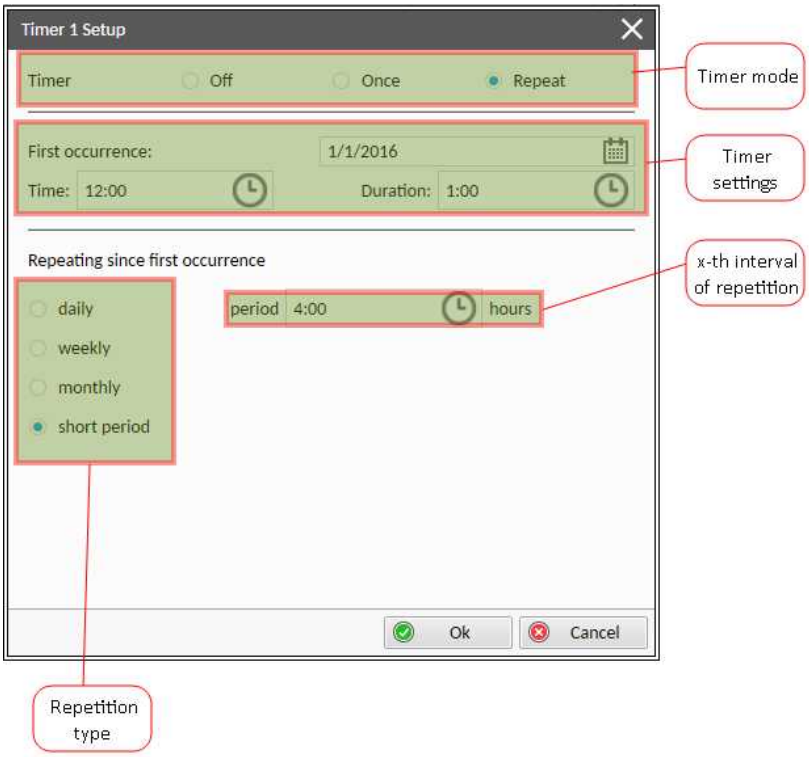


Image 5.25 Short period mode – InteliConfig

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 230)** setpoint. Than go to *Timer 1 Setup* and press enter button. In **Timer 1 Repetition (page 231)** setpoint select Repeated mode. Than adjust **Timer 1 First Occur. Date (page 232)**, **Timer 1 First Occur. Time (page 232)** and **Timer 1 Duration (page 232)**. In setpoint **Timer 1 Repeated (page 233)** select Short Period and adjust **Timer 1 Refresh Period (page 234)** (interval of repetition).

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

5.5.14 Service timers

Running hours counters

Service timers are used as maintenance interval counters. Counters can be set by setpoints – **Maintenance Timer 1 (page 203)**, **Maintenance Timer 2 (page 203)**, **Maintenance Timer 3 (page 204)**. All of them work the same way – their values are decremented every hour when the Gen-set is running.

Actual values of the counters are available as the same setpoints **Maintenance Timer 1 (page 203)**, **Maintenance Timer 2 (page 203)**, **Maintenance Timer 3 (page 204)** or as values **Maintenance 1 (page 290)**, **Maintenance 2 (page 291)** and **Maintenance 3 (page 291)**.

When the value of counter reaches 0, the alarm**Wrn Maintenance 1 (page 388)** or **Wrn Maintenance 2 (page 388)** or **Wrn Maintenance 3 (page 389)** is active until the respective counter reset is done.

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

5.5.15 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+ Threshold (page 184)** of battery voltage. Connect this input to the D+ (L) terminal of the charging alternator and enable the D+ function by the setpoint **D+ Threshold (page 184)** . 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 178)** setpoint. The oil pressure is evaluated from the analog input or from the ECU if an ECU is configured.
- Binary input **OIL PRESSURE (PAGE 324)** 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.

5.5.16 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 390)**
- **Mains CCW Rotation (page 391)**

5.5.17 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 357)** output is active. **Example:** Usually used for preheating or processes executed prior Gen-set start.
Cranking	Engine is cranking, **STARTER (PAGE 361)** output is active.
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 343)** is active.
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.

Engine started conditions

- Engine speed (RPM) > **Starting RPM (page 177)** or
- Oil pressure > **Starting Oil Pressure (page 178)** or
- Binary input **OIL PRESSURE (PAGE 324)** is in logical 0 or
- D+ terminal active (reached **D+ Threshold (page 184)** of supply voltage) for minimum 1 s or
- Generator voltage > 25 % of **Nominal Voltage Ph-N (page 166)** or **Nominal Voltage Ph-Ph (page 167)** (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 177)**.*

Engine running conditions

- Engine speed (RPM) > **Starting RPM (page 177)** or
- Oil pressure > **Starting Oil Pressure (page 178)** or
- Binary input **OIL PRESSURE (PAGE 324)** is in logical 0 or
- Generator voltage > 25 % of **Nominal Voltage Ph-N (page 166)**

Still engine conditions

- Engine speed (RPM) < **Starting RPM (page 177)** and
- Oil pressure < **Starting Oil Pressure (page 178)** and
- Binary input **Oil Pressure (page 324)** is in logical 1 and
- Generator voltage < 50 V (all phases)

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 390)** 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 178)**, Wrn Stop Fail has delay 1 s
- Binary input **Oil Pressure (page 324)** 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 362)** output.

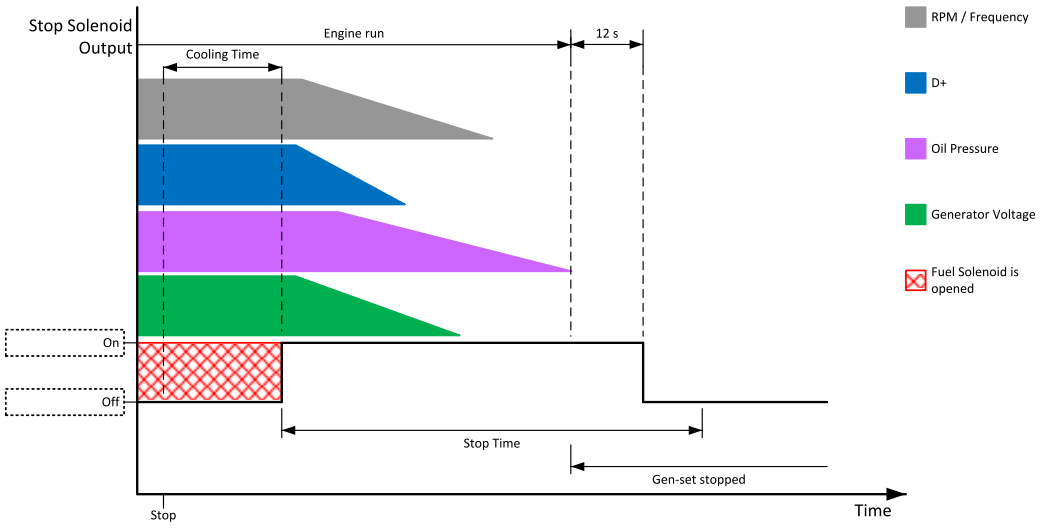


Image 5.26 Engine stops in **Stop Time (page 190)**

When the total time of stopping will exceed setpoint **Stop Time (page 190)** then the **Wrn Stop Fail (page 390)** and binary outputs for stopping are activated. The controller will continuously try to stop the engine.

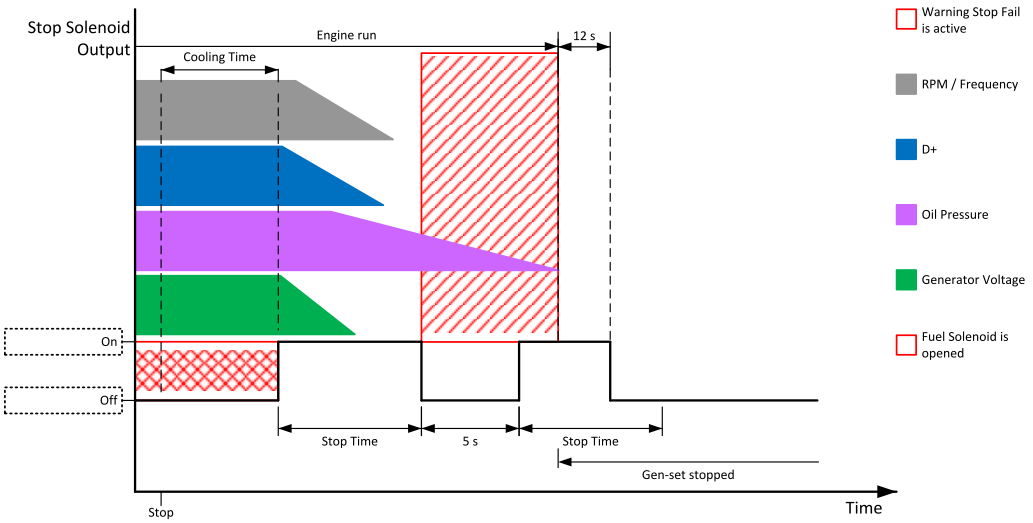


Image 5.27 Engine stops after first **Stop Time (page 190)**

Electric state machine

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

5.5.18 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 [Ω]	Max [Ω]	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	Ω
General line 2	0	1000	Ω
General line 3	0	1000	Ω
General line 4	0	1000	Ω
General line 5	0	1000	Ω

General line 6	0	1000	Ω
General line 7	0	1000	Ω
General line 8	0	1000	Ω
General line 9	0	1000	Ω
General line 10	0	1000	Ω
General line 11	0	1000	Ω
General line 12	0	1000	Ω
General line 13	0	1000	Ω

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

IMPORTANT: For right behavior of function Total Fuel Consumption, curve for analog input FUEL LEVEL (PAGE 369) has to be in percentage.

5.5.19 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 After-treatment 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:

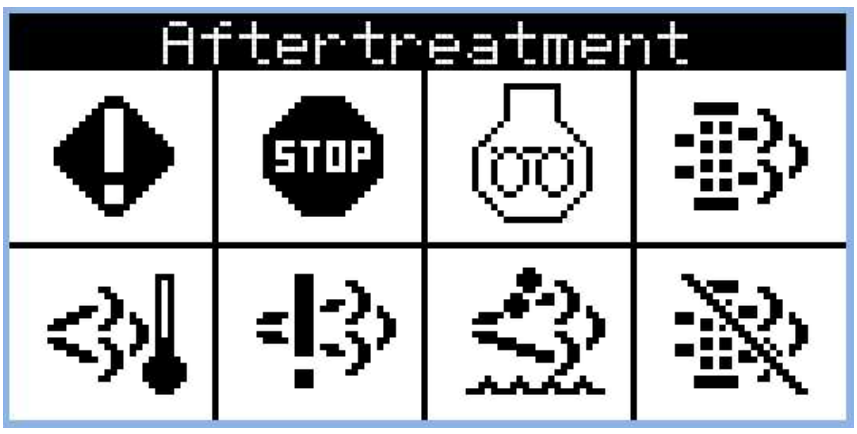


Image 5.28 Example of active Tier 4 Final screen

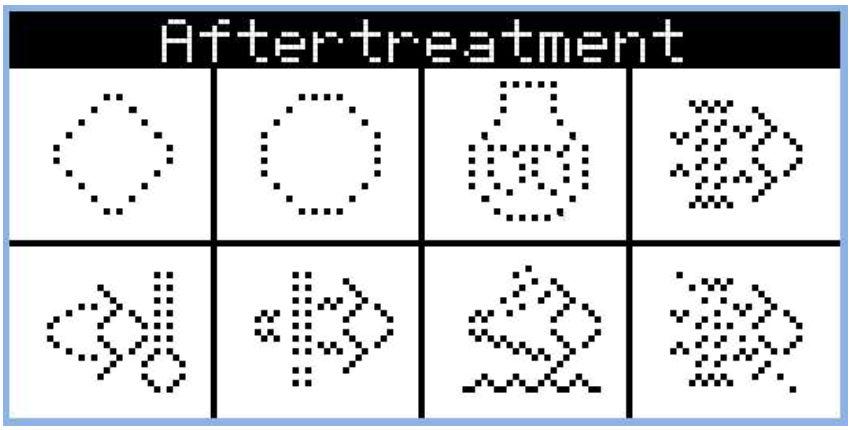


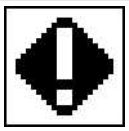
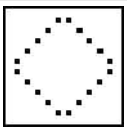
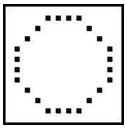
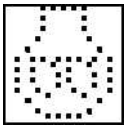
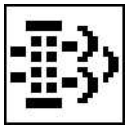
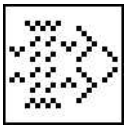
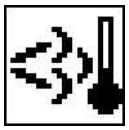
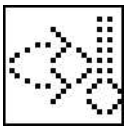
Image 5.29 Example of inactive Tier 4 Final screen

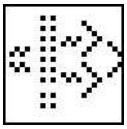
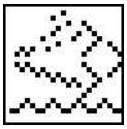
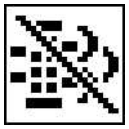
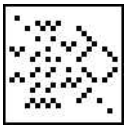
Universal lamps (icons)

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:*** *Indicates the After-Treatment filter needs to be regenerated. This lamp also activates alarm* ***ATT Filter Lamp (page 377)****.*
Exhaust system high temperature lamp			***Note:*** *This lamp also activates alarm* ***After-Treatment (page 374)****.*

Lamp name	Active icon	Inactive icon	Notes
Malfunction indicator lamp			***Note:*** *This value can light or blink on both frequencies. This lamp also activates alarm* ***After-Treatment (page 374)****.*
Fluid tank low level indicator			***Note:*** *This lamp also activates alarm* ***After-Treatment (page 374)****.*
DPF regeneration inhibited			***Note:*** *Indicates the state of diesel particulate filter active regeneration inhibition. This lamp also activates alarm* ***After-Treatment (page 374)****.*

Note: *ECU Yellow Lamp, ECU Red Lamp, ECU Wait To Start Lamp can be disabled during prestart phase. Checkbox: Ignore ECU lamps during prestart is located in InteliConfig -> Controller Configuration -> Modules -> ECU module -> Electronic control unit settings.*

Note: *Aftertreatment support can be disabled. Aftertreatment HMI Screen is hidden and alarms related to aftertreatment are not shown. Use the checkbox: Disable aftertreatment support located in InteliConfig -> Controller Configuration -> Modules -> ECU module -> Electronic control unit settings.*

Analog values

Supported analog values:

- **DPF Ash Load (page 274)**
- **DPF Soot Load (page 274)**
- **DEF Level (page 274)**

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 320)**
- **Regeneration Inhib (page 324)**

5.5.20 Alternate configuration

In controller are 3 sets of configuration.

Configuration set 1	Configuration set 2	Configuration set 3
Nominal Power Split Phase 1 (page 258)	Nominal Power Split Phase 2 (page 262)	Nominal Power Split Phase 3 (page 266)
Nominal Power 1 (page 258)	Nominal Power 2 (page 262)	Nominal Power 3 (page 267)
Nominal RPM 1 (page 256)	Nominal RPM 2 (page 260)	Nominal RPM 3 (page 264)
Nominal Frequency 1 (page 257)	Nominal Frequency 2 (page 261)	Nominal Frequency 3 (page 265)
Nominal Voltage Ph-N 1 (page 257)	Nominal Voltage Ph-N 2 (page 261)	Nominal Voltage Ph-N 3 (page 265)
Nominal Voltage Ph-Ph 1 (page 257)	Nominal Voltage Ph-Ph 2 (page 261)	Nominal Voltage Ph-Ph 3 (page 265)
Nominal Current 1 (page 259)	Nominal Current 2 (page 263)	Nominal Current 3 (page 267)
Connection Type 1 (page 259)	Connection type 2 (page 263)	Connection type 3 (page 267)
ECU Speed Adjustment 1 (page 269)	ECU Speed Adjustment 2 (page 269)	ECU Speed Adjustment 3 (page 270)

Configuration sets can be changed via logical binary inputs **CONFIGURATION 2 (PAGE 317)** and **CONFIGURATION 3 (PAGE 317)**. Configuration set 1 is active when there is no input activated. In case that inputs **CONFIGURATION 2 (PAGE 317)** and **CONFIGURATION 3 (PAGE 317)** are active at the same time, the configuration set 3 is took in account.

CONFIGURATION 2 (PAGE 317)	CONFIGURATION 3 (PAGE 317)	Active configuration set
0	0	1
1	0	2
0	1	3
1	1	3

> **IMPORTANT: If LBO ECU POWER RELAY (PAGE 340) is used, change of alternate configuration can be made only in prestart phase. So prestart has to be set up for enough long time.**

5.5.21 E-Stop

Binary outputs for the control of some essential functions are internally wired as "safe", it means, that their deactivation is directly bind with the dedicated Input E-STOP (not evaluated as the LBI in the controller). This BO are fully configurable and are used e.g. for the Starter and Fuel control.

- The emergency stop circuit must be secured.
- The power supply of the associated binary outputs (BOUT1 and BOUT2) is supplied by the E-STOP input, not by the + battery voltage.

Note: *There is no difference in the way of configuration of all binary outputs. Binary outputs BO1 (Starter), BO2 (Fuel Solenoid) are intended for these functions (not dedicated).*

There is a measuring of E-STOP input voltage analogically and setting the binary value (representing emergency stop input level) based on comparison of the measured voltage to two analog levels, which are derived from the controller supply voltage (battery voltage) perceptually.

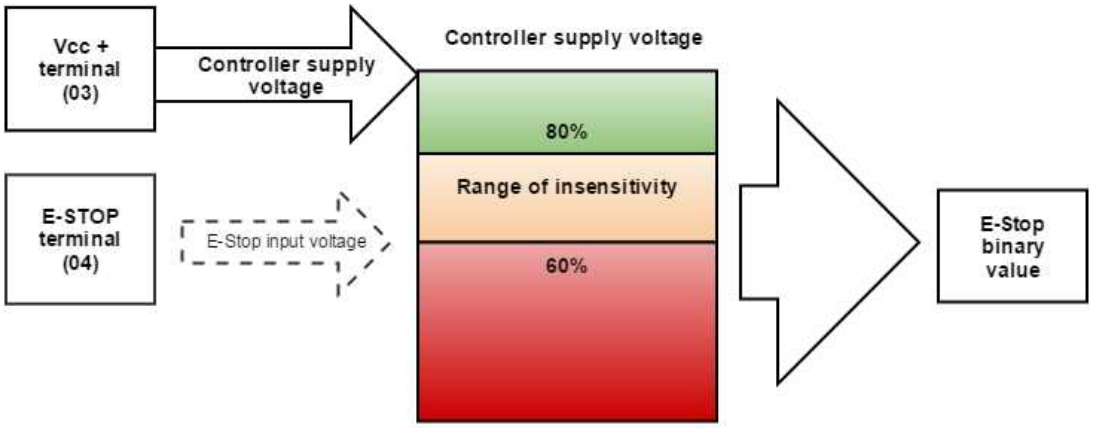


Image 5.30 SW principle of E-STOP

- If the input voltage of E-stop is higher than high comparison level (for ex. higher than 80% of the supply voltage), then E-stop is not activated.
- If the input voltage of E-stop is lower than low comparison level (for ex. lower than 60% of the supply voltage), then E-stop is activated.

If the input voltage of E-stop is located somewhere between low and high comparison levels (for ex. between 60 and 80 %of the supply voltage, then E-stop binary value will stay on its previous state (means E-stop binary value will not change).

Visualization on CU screen

- 1 – E-STOP has voltage – state is OK
- 0 – E-STOP has no voltage – protection is active

For more information about connection **see Emergency stop on page 43**.

5.5.22 ECU Frequency selection

Setpoint *ECU Freq Select* is no longer in use. However **ECU Frequency Select (page 277)** value was kept and the value can be calculated from **Nominal Frequency (page 168)** 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 340)** anyhow.

***Note:** If LBO ECU POWER RELAY (PAGE 340) is used, this change can be made only in prestart phase. So prestart has to be set up for enough long time.*

5.5.23 Cybernetic security

The cybernetic security is formed by:

- 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 / Gen-setoperation*

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

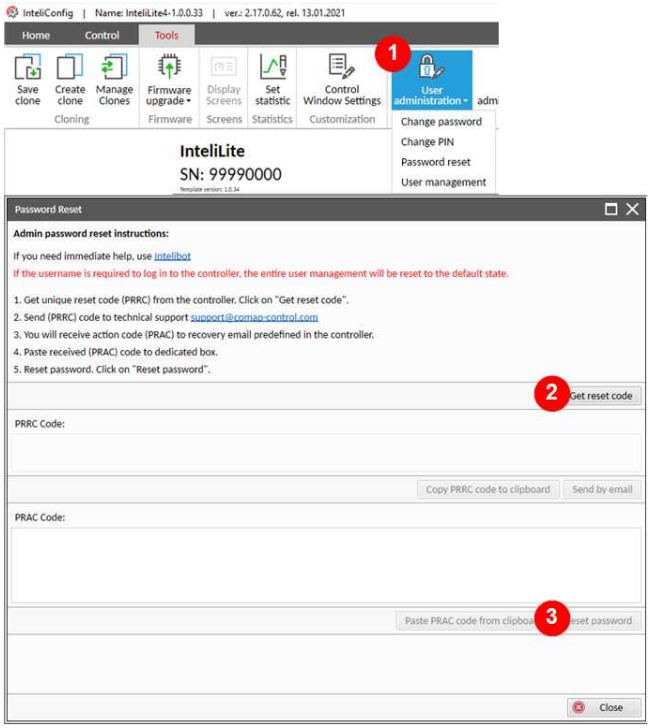
Resetting the administrator password

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,

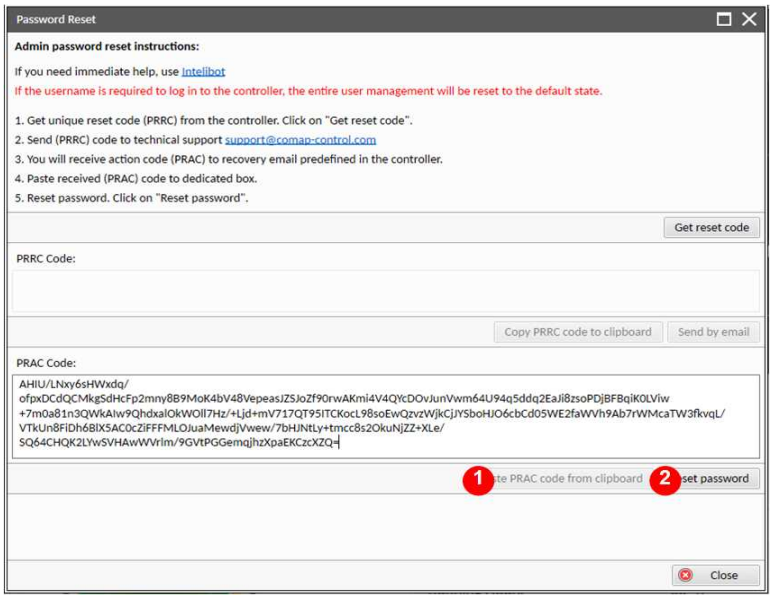
ComAp has received your request for resetting the password in the controller **N/A**, serial n umber **99990000**. Please perform following steps to finish the action.

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:

```
AHIU/LNxy6sHWxdq/ofpxDCdQCMkgSdHcFp2mny8B9MoK4bV48VepeasJZSJoZf90rwA
Kmi4V4QYcDOvJunVwm64U94q5ddq2EaJi8zsoPDjBFBqiK0LViw+7m0a81n3QWkAIw9Q
hdxalOkWOll7Hz/+Ljd+mV717QT95ITCKocL98soEwQzvzWjkCjJYSboHJO6cbCd05WE
2faWVh9Ab7rWMcaTW3fkvqL/VTkUn8FiDh6BlX5AC0cZiFFFMLOJuaMewdjVwew/7bHJ
NtLy+tmcc8s2OkuNjZZ+XLe/SQ64CHQK2LYwSVHAwWVrlm/9GVtPGGemqjhzXpaEKCzc
XZQ=
```

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.**

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6 Communication

6.1 PC 130
6.2 Connection to 3rd party systems 143

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6.1 PC

6.1.1 Direct communication 130
6.1.2 Remote communication 132

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 53**.

RS232 interface uses **COM1 Mode (page 237)** 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.*

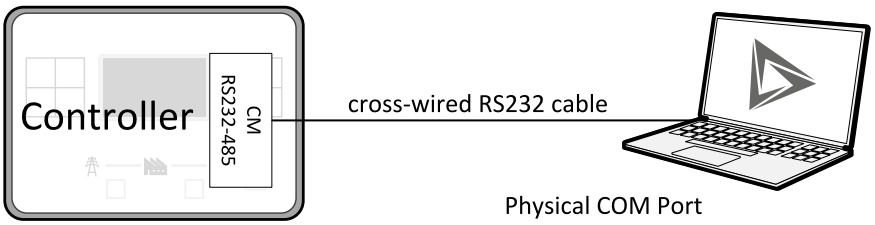


Image 6.1 Cross-wired RS232 cable is used

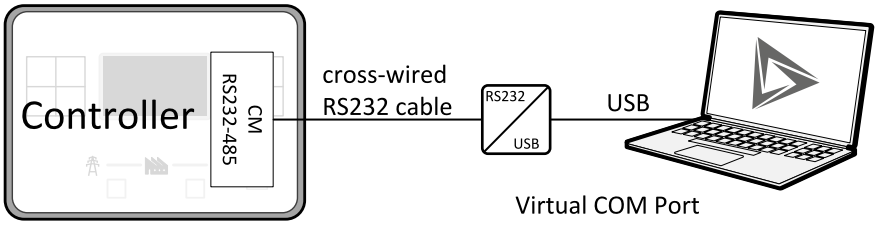


Image 6.2 Cross-wired RS232 cable and USB is used

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 53**.

RS485 interface uses **COM2 Mode (page 239)** port of the controller.

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

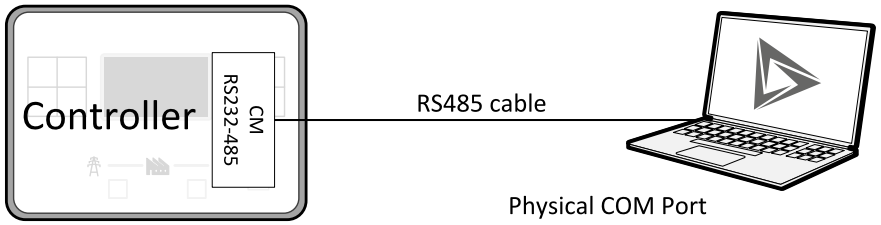


Image 6.3 Plug-in module CM RS232-485 is used

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 53**.

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.

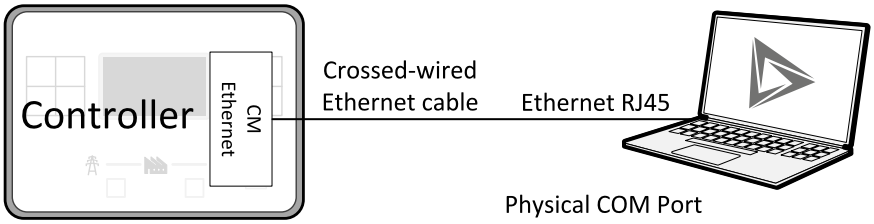


Image 6.4 Ethernet cable is used

Connection via USB

USB interface uses HID profile.

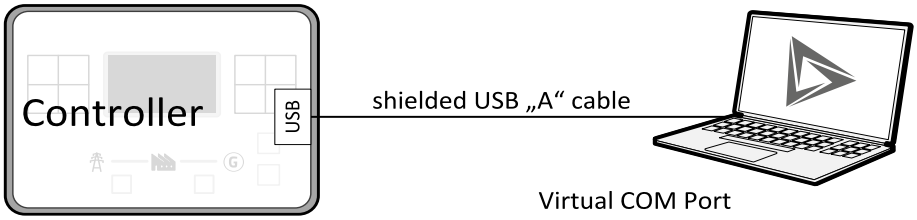


Image 6.5 Shielded USB type A cable is used

6.1.2 Remote communication

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.

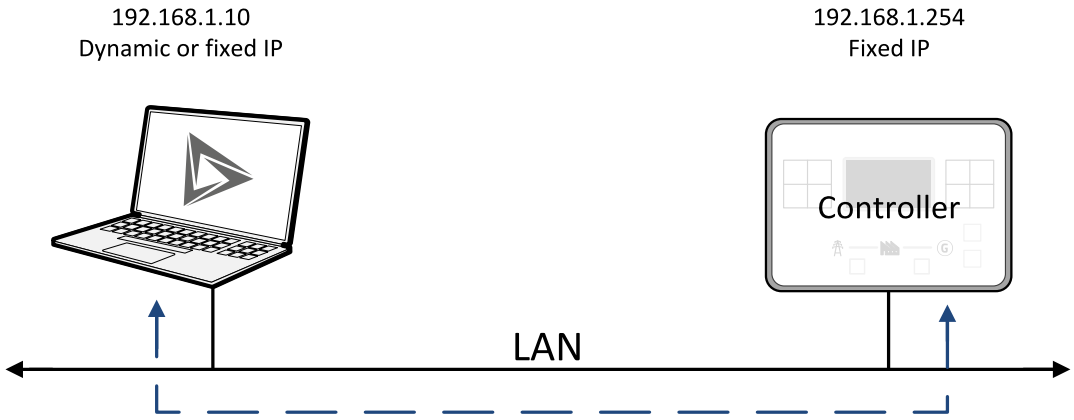


Image 6.6 Ethernet LAN connection

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 253)** to FIXED. In that case all setpoints of IP settings (**IP Address (page 253)**, **Subnet Mask (page 254)**, **Gateway IP (page 254)**, **DNS Mode (page 255)**) 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.*

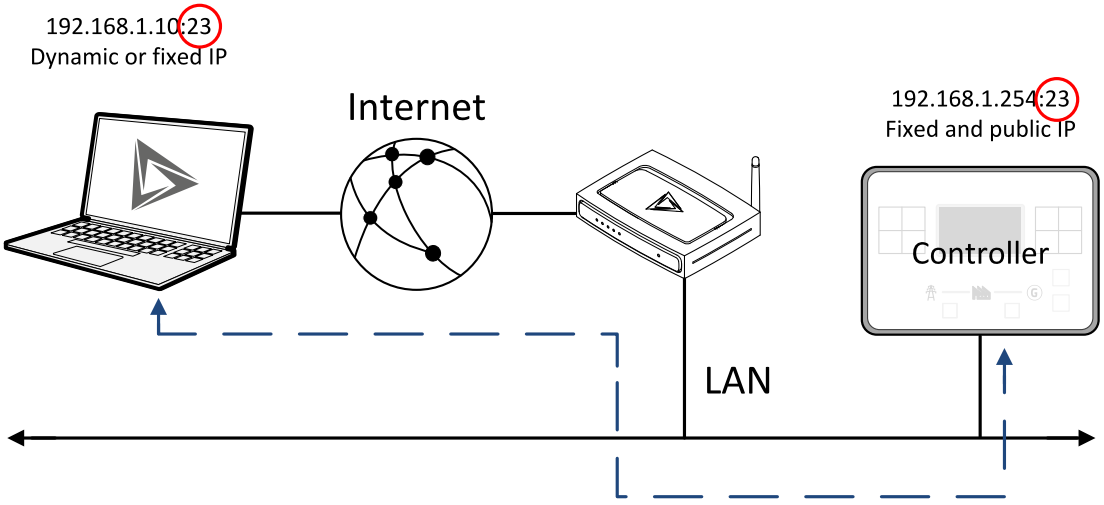
Next way is to switch the CM-Ethernet to automatic IP address mode. Adjust the setpoint **IP Address Mode (page 253)** to AUTOMATIC. In that case all IP settings are assigned by DHCP server. Then configure the DHCP server to assign always the same IP address (i.e. static IP address) to the particular 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 9 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 249)**

Note: *Setpoint **Telephone Number 1 (page 247)** has to be adjusted to enable this function.*

The following events can be received by mobile phone:

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

Message structure:

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

Alarm SMS

The InteliLite 9 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 250)**
- **Sd Messages (page 251)**
- **BOC Message (page 250)**

Note: *Setpoint **Telephone Number 1 (page 247)** has to be adjusted to enable this function.*

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 9 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. Where the "#" mark means the controller access code, "xxxx" means the Command 1, "yyyy" is Command 2, "zzzz" is Command 3, etc.

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

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

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

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

Example: When the controller, in AUTO mode, with a controller name of "InteliLite 9-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 9-Test: <OK>,<OK>,<OK>, <OK>,<OK>, <OK>
The value <OK> or <ERROR> means if the command has been performed successfully or not.

Emails

Event Email

The InteliLite 9 controller equipped with the CM-Ethernet communication module is able to send Event Email according to the setting of setpoint:

- **Event Message (page 249)**

Note: *Setpoints **Email Address 1 (page 248)** and **SMTP Sender Address (page 252)** (for CM-Ethernet) have to be adjusted to enable this function.*

Note: ***Summer Time Mode (page 229)** and **Time Zone (page 249)** 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 9 controller equipped with the CM-Ethernet communication module is able to send Alarm Emails according to the setting of setpoints:

- **Wrn Message (page 250)**
- **Sd Messages (page 251)**
- **BOC Message (page 250)**

Note: *Setpoints **Email Address 1 (page 248)** and **SMTP Sender Address (page 252)** (for CM-Ethernet) have to be adjusted to enable this function.*

Note: ***Summer Time Mode (page 229)** and **Time Zone (page 249)** have to be adjusted for correct time in emails.*

Message structure:

Controller

Name: XXX

Serial number: XXX

SW branch: XXX

SW version: XXX

Application: XXX

Appl. version: XXX

Date: dd/mm/yyyy

Time: hh:mm:ss

Alarm list

Alarm 1

Alarm 2

Alarm 3

History events

---

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

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

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

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

Web Server

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

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

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

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

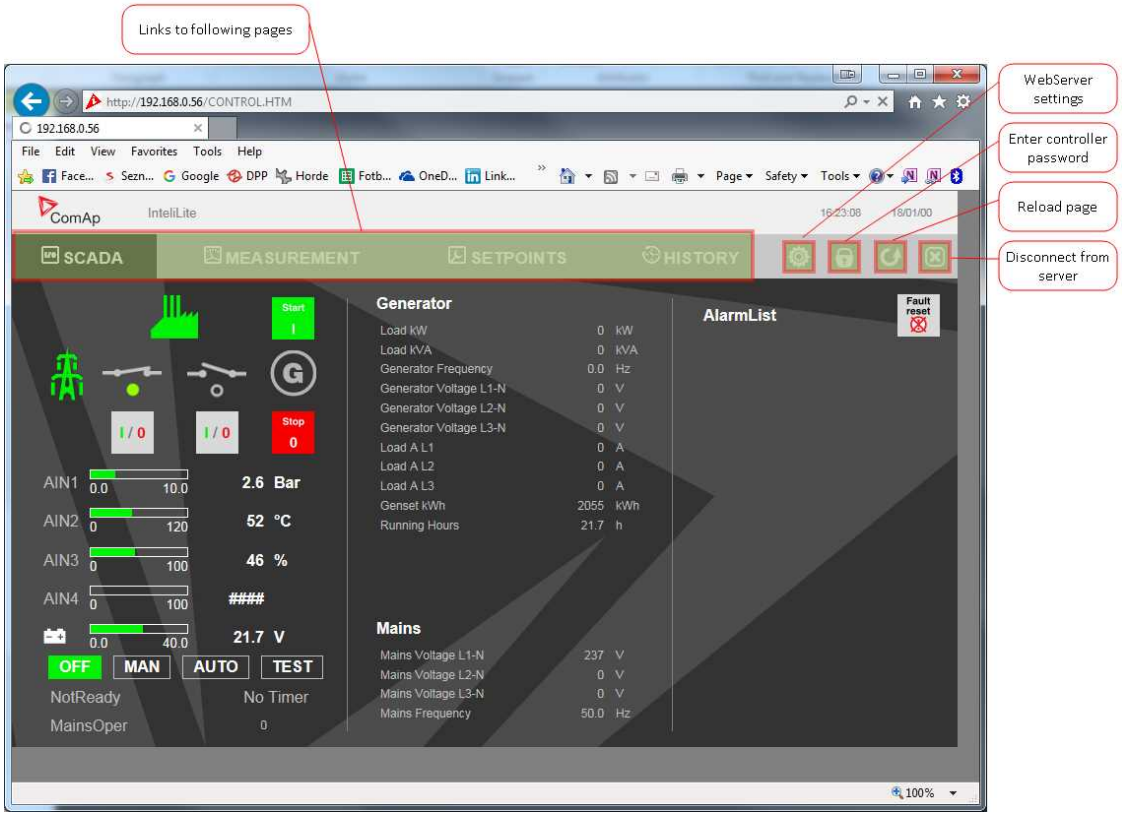


Image 6.7 Web Server main screen

SCADA

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

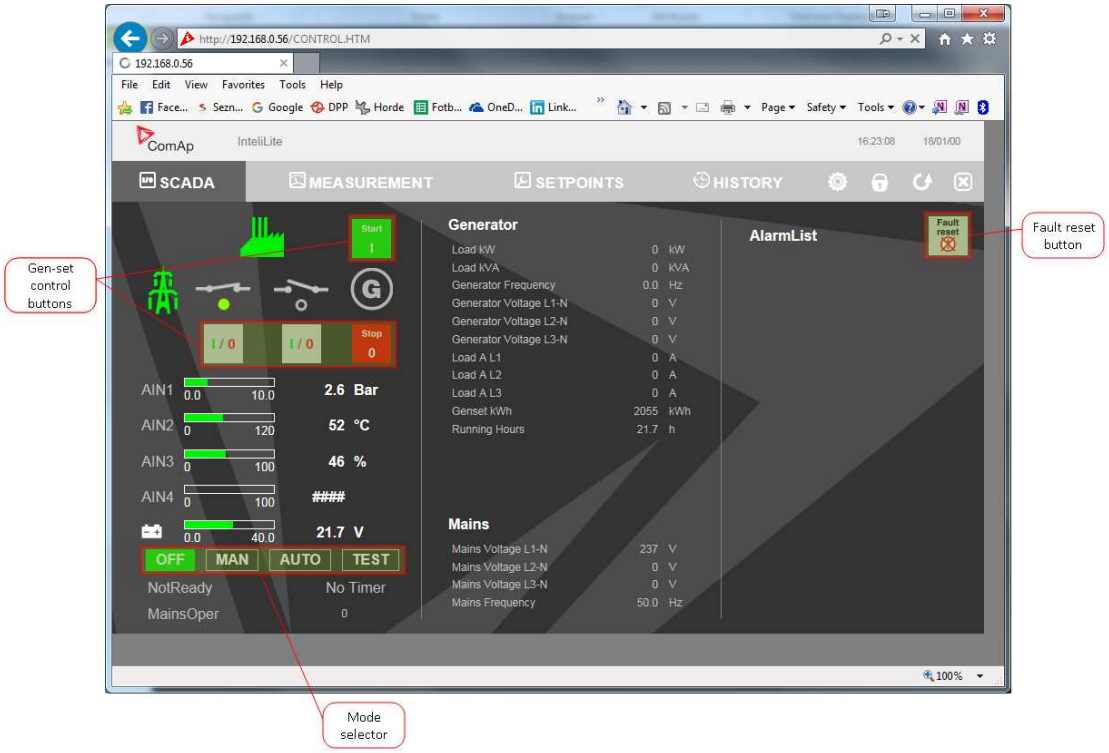


Image 6.8 Web Server – SCADA screen

Measurement

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

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

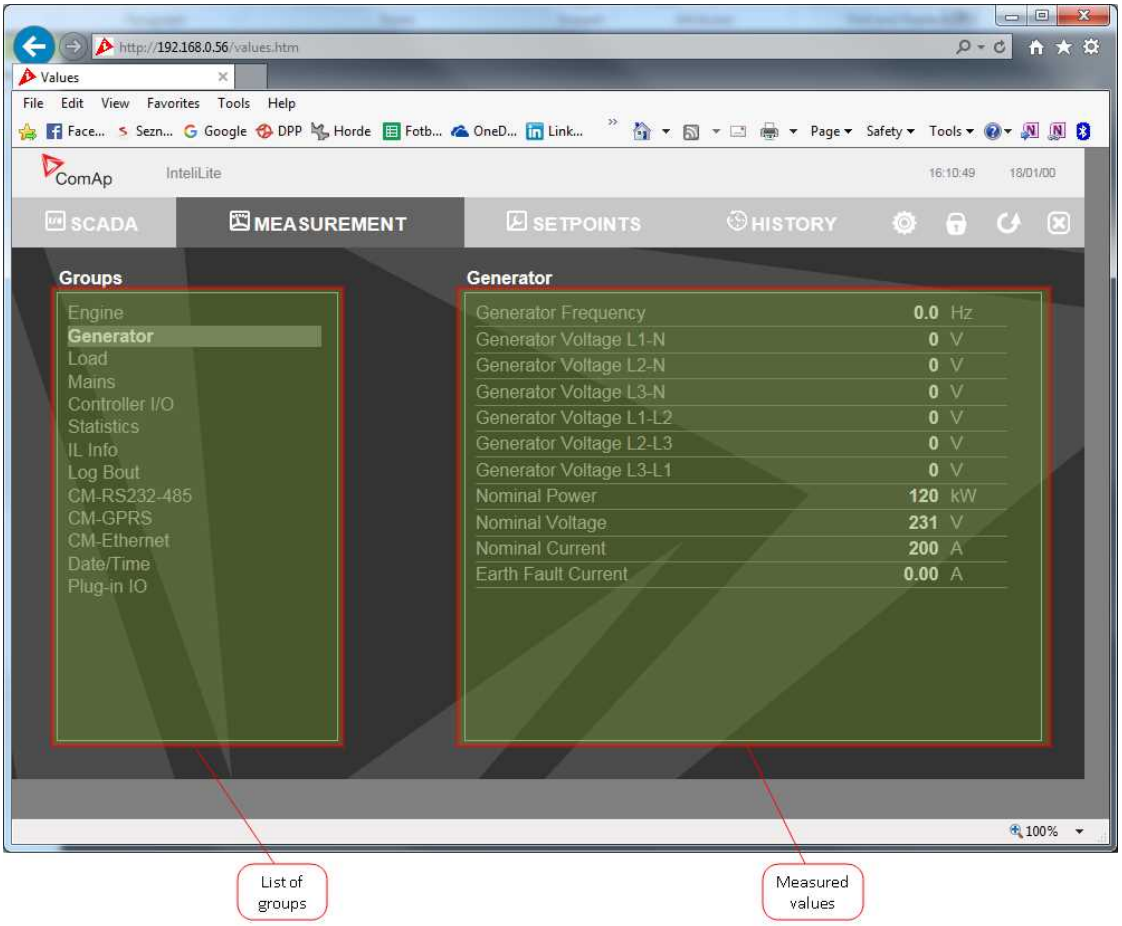


Image 6.9 Web Server – measurement screen

Setpoints

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

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

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

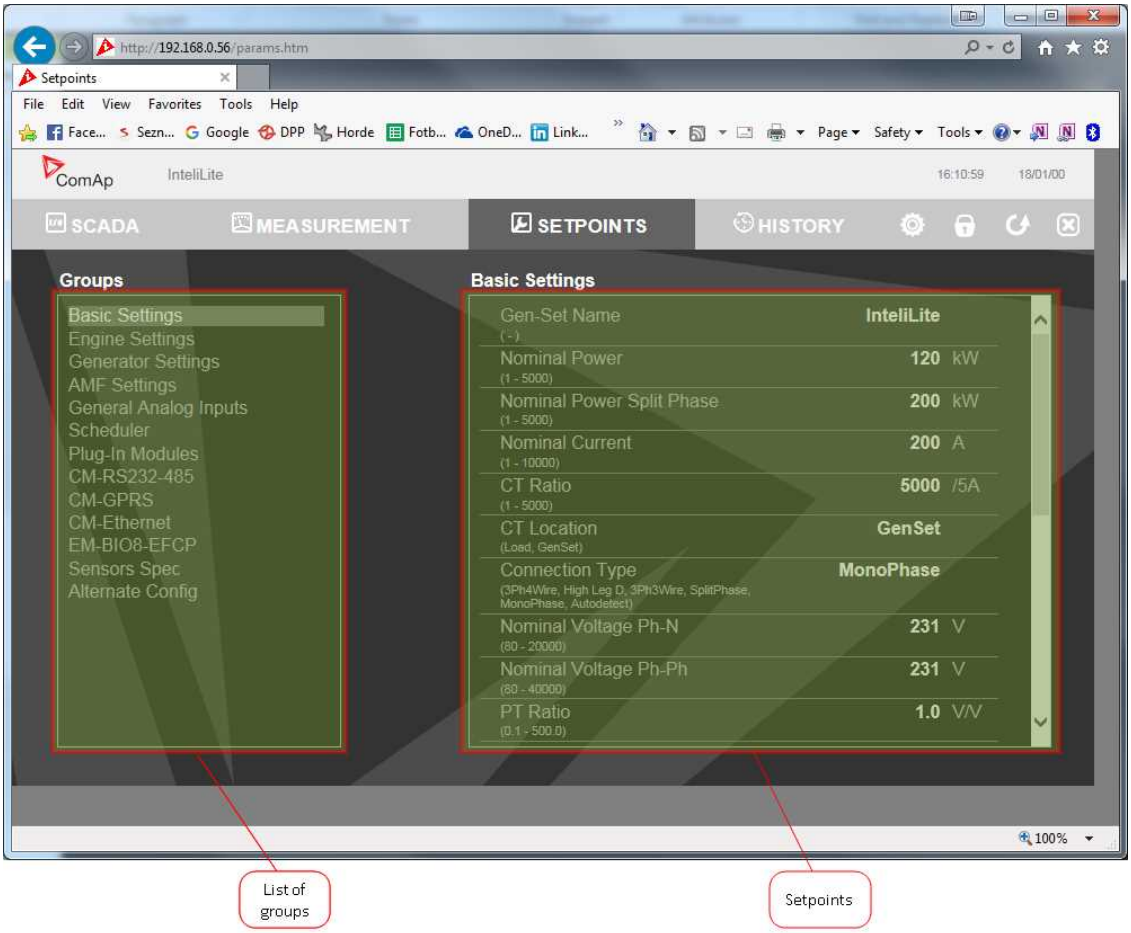


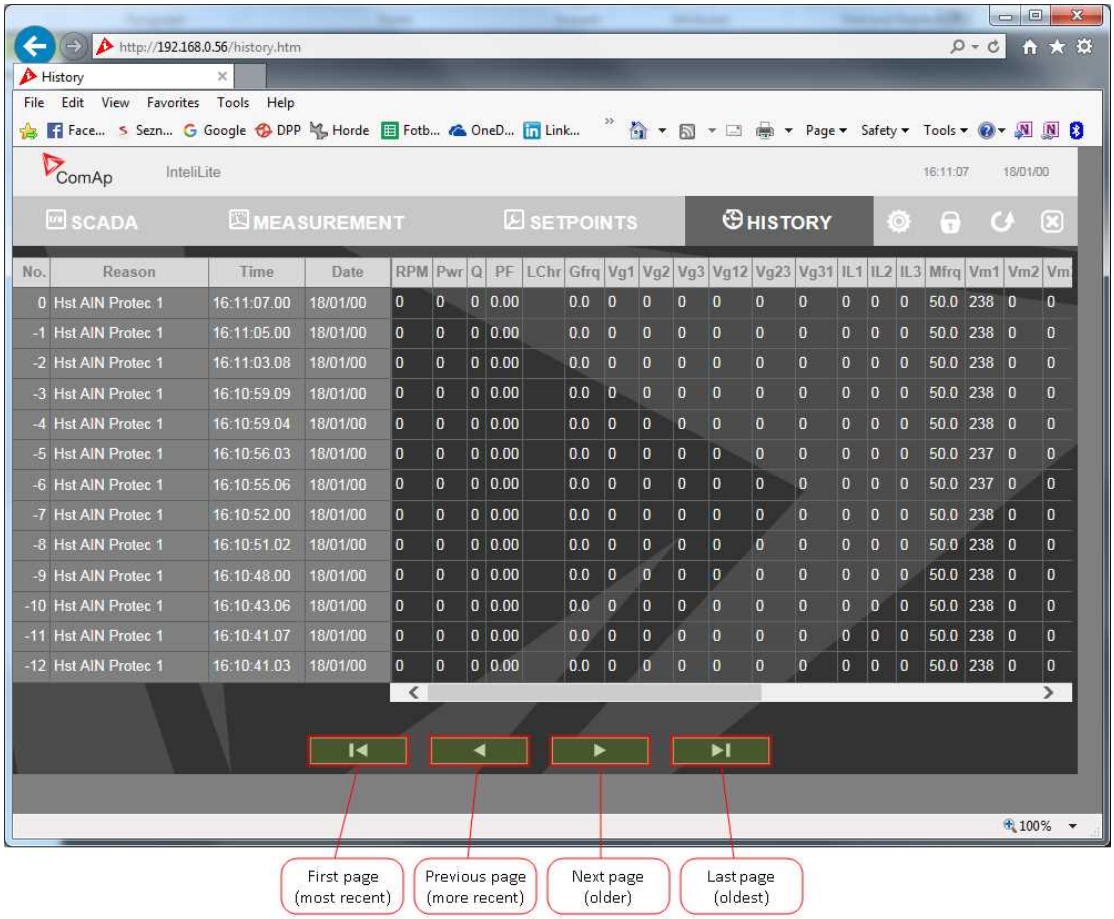
Image 6.10 Web Server – Setpoints screen

History

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

Use the control buttons to move within the history file.

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



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

Image 6.11 Web Server – History screen

Web Server Adjustment

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

Select the controller language the web pages will appear in.

Select the rate of automatic refresh of the SCADA page.

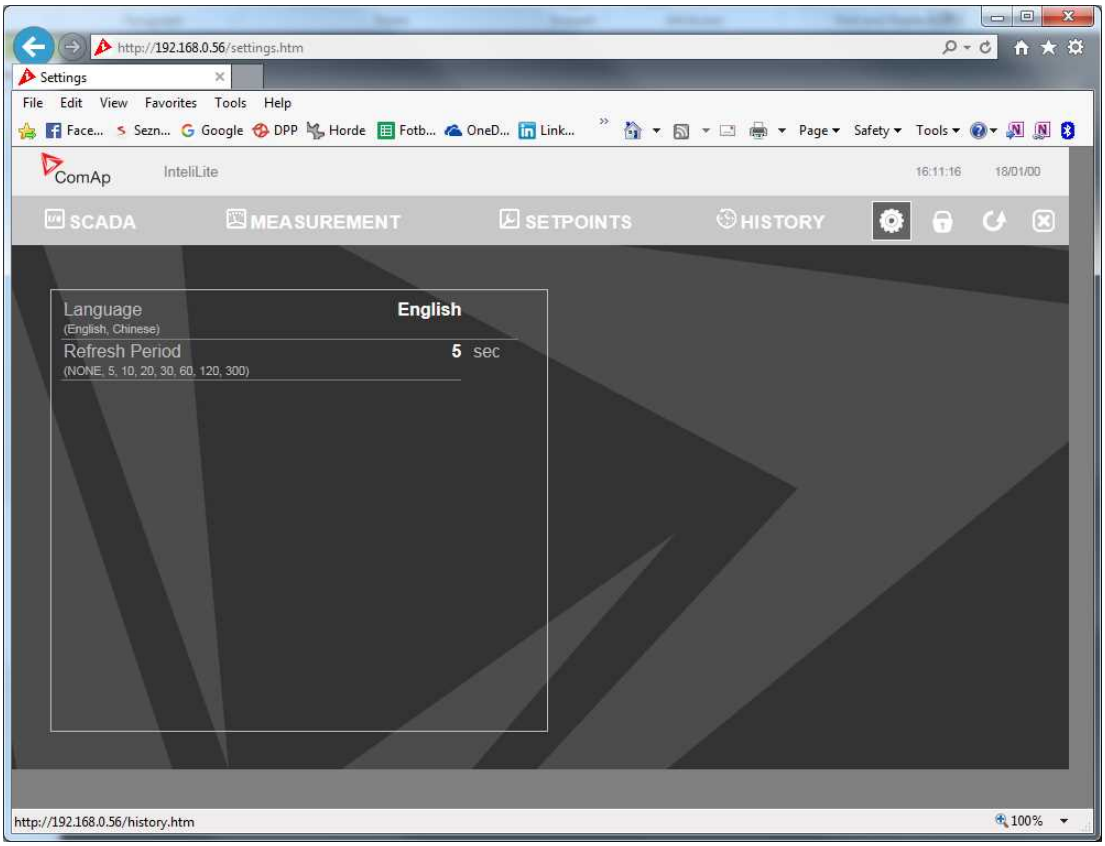


Image 6.12 Web Server – Adjustment screen

6.2 Connection to 3rd party systems

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 237)** or **COM2 Mode (page 239)** into the Modbus position. The serial speed for MODBUS-RTU communication is to be adjusted by the setpoint **COM1 MODBUS Communication Speed (page 238)** or **COM2 MODBUS Communication Speed (page 240)**.
- 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 256)**.

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

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

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

Address space

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

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

Mapping data types to registers

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

Data type	Meaning	Number of registers	Data maping
Integer8	1-byte signed integer	1	MSB = sign extension LSB = value
Unsigned8	1-byte unsigned integer	1	MSB = 0 LSB = value
Integer16	2-byte signed integer	1	MSB = value, MSB LSB = value, LSB
Unsigned16	2-byte unsigned integer	1	MSB = value, MSB LSB = value, LSB
Integer32	4-byte signed integer	2	MSB1 = value, byte 3 (MSB) LSB1 = value, byte 2 MSB2 = value, byte 1 LSB2 = value, byte 0 (LSB)
Unsigned32	4-byte unsigned integer	2	MSB1 = value, byte 3 (MSB)

Data type	Meaning	Number of registers	Data maping
			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 …

Note:
**) 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 successfully.

The controller responds with the error codes in as follows:

- 01 – Illegal 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

Note: **)*
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 instead 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 read data is 01, it means this binary input is active.

Note: *You can use Modbus function 2 instead 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 146)**

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 147)**

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 146)**

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 146**	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	

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 Communication

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
Power terminal fusing	Max. 3 A
Max. Power Dissipation	3.5 W

Operating conditions

Protection degree (front panel)	IP 65
Operating temperature	-20 ˚C to +70 ˚C
Storage temperature	-30 ˚C to +80 ˚C
Operating humidity	95 % w/o condensation (EN 60068-2-30)
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	

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 AC / 480 V AC (EU) 346 V AC / 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

Display

Display	Build-in monochromatic 3.2"
Resolution	132 × 64 px

Communications

USB port	B-connector, 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 V DC close contact >6 V DC open contact

Binary outputs

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

Analog inputs

Number	3 resistive, non-isolated
Resolution	0.1 Ω
Range	0-2500 Ω
Input impedance	800 Ω
Accuracy	±2 % from value in range above ±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 to 5 kHz 10 Vpk-pk to 50 Vpk-pk in range 5 to 10 kHz
Frequency input range	4 Hz to 10 kHz
Frequency measurement tolerance	0.2 % from range 10 kHz

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8.1 Controller objects

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8.1.2 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 76)** 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.**

For full list of setpoints go to the chapter **List of setpoints (page 159)**.

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Group: Basic settings

Subgroup: Name

Gen-set Name

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	0 .. 15 characters [-]		
Default value	InteliLite	**Alternative config**	NO
Step	[-]		
Comm object	8637	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

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

Note: *If the Gen-set Name is "TurboRunHours", the running hours will be counted faster – 1 minute in real will represent 1 hour.*

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Subgroup: Power settings

Nominal Power Split Phase

Setpoint group	Basic settings	**Related FW**	1.6.0
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 165)**		
Description			

Nominal power of the Gen-set for detected split-phase or mono phase connection. Generator **Overload BOC (page 207)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 165)** 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 258)**, **Nominal Power Split Phase 2 (page 262)** and **Nominal Power Split Phase 3 (page 266)**.*

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Nominal Power

Setpoint group	Basic settings	**Related FW**	1.6.0
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 207)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 165)** 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: *To lock this setpoint against editing you also have to lock setpoint **Nominal Power 1 (page 258)**, **Nominal Power 2 (page 262)** and **Nominal Power 3 (page 267)**.*

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.*

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Subgroup: Current settings

Nominal Current

Setpoint group	Basic settings	**Related FW**	1.6.0
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 165)**.		
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 259)**, **Nominal Current 2 (page 263)** and **Nominal Current 3 (page 267)**.*

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CT Ratio

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	1 .. 5000 [A/5A]		
Default value	2000 A/5A	**Alternative config**	NO
Step	1 A/5A		
Comm object	8274	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Current transformers ratio of Gen-set .

> ***Note:*** *Generator currents and power measurement is suppressed if current level is below 1% of CT range.*

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CT Location

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	Load / Gen-set / None [-]		
Default value	Gen-set	**Alternative config**	NO
Step	[-]		
Comm object	11625	**Related applications**	AMF
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts position of current measurement.

Load	Current CT's are physically placed on Load (typically between GCB and MCB).
Gen-set	Current CT's are physically placed on Gen-set (typically before GCB).
None	There are no current CT's.

When option None is selected, following objects are hidden/changed:

- Current screen is hidden
- Generator Power screen is hidden
- Statistics screens – values Gen-set kWh, Gen-set kVArh, Mains kWh and Mains kWArh are hidden
- Mains screen – kW meter is replaced by generator voltage meter
  - Generator L1-N voltage is displayed for Monopahse, Splitphase and High Leg delta connection types
  - Generator L1-L2 voltage is displayed for 3ph3w and 3ph4w connection types
- Group Load is hidden
- Group Statistics – values Gen-set kWh, Gen-set kVArh, Mains kWh and Mains kWArh are hidden

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Subgroup: Voltage settings

Connection type

Setpoint group	Basic settings	**Related FW**	1.6.0
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
Setpoint visibility	Always		
Description			

Connection type:

Mono Phase	Single phase voltage measurement L1-N 1x 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)
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)
3Ph4Wire	Grounded Star (Grounded Wye) connection – 3PY Three phase voltage measurement L1,L2,L3 with 120° phase shift 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 >=100 V; L1 <=140 V L2 >=140 V L3 >=100 V; L3 <=140 V
		3Ph3Wire or 3Ph4Wire	L1 >=100 V L2 >=100 V L3 >=100 V
		SplPhL1L3	L1 >=100 V L2 <= 20 V L3 >=100 V
		SplPhL1L2	L1 >=100 V L2 >= 100 V L3 <= 20 V
		Mono Phase	L1 >=100 V L2 <= 20 V L3 <= 20 V
		Voltage Autodetect shutdown	

Note: *To lock this setpoint against editing you also have to lock setpoint* ***Connection Type 1 (page 259)****,* ***Connection type 2 (page 263)*** *and* ***Connection type 3 (page 267)****.*

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Nominal Voltage Ph-N

Setpoint group	Basic settings	**Related FW**	1.6.0
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 165)**.		
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 257)****,* ***Nominal Voltage Ph-N 2 (page 261)*** *and* ***Nominal Voltage Ph-N 3 (page 265)****.*

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Nominal Voltage Ph-Ph

Setpoint group	Basic settings	**Related FW**	1.6.0
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 165)**.		
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 257)***, ***Nominal Voltage Ph-Ph 2 (page 261)*** *and* ***Nominal Voltage Ph-Ph 3 (page 265)***.			

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PT Ratio

Setpoint group	Basic settings	**Related FW**	1.6.0
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 this setpoint to 1.			

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Vm PT Ratio

Setpoint group	Basic settings	**Related FW**	1.6.0
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, MRS
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 170)**		
Description			
Mains voltage potential transformers ratio. If no PTs are used, adjust the setpoint to 1.			

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Subgroup: Frequency settings

Nominal Frequency

Setpoint group	Basic settings	**Related FW**	1.6.0
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 257)***, ***Nominal Frequency 2 (page 261)*** *and* ***Nominal Frequency 3 (page 265)****.*

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Gear Teeth

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	FGen->RPM / 1 .. 500 [-]		
Default value	FGen->RPM	**Alternative config**	NO
Step	1		
Comm object	8252	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

Number of teeth on the engine flywheel where the pick-up is installed. Set to zero if no pick-up is used and the Engine speed will be counted from the generator frequency.

Note: *If no pickup is used, the D+ or W terminal should be used to prevent possible overcranking, which can occur if at least 25% of nominal generator voltage is not present immediately after exceeding firing speed.*

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Nominal RPM

Setpoint group	Basic settings	**Related FW**	1.6.0
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 256)****,* ***Nominal RPM 2 (page 260)*** *and* ***Nominal RPM 3 (page 264)****.*			

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Subgroup: Controller settings

Controller Mode

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	OFF / MAN / AUTO / TEST [-]		
Default value	OFF	**Alternative config**	NO
Step	[-]		
Comm object	8315	**Related applications**	AMF, MRS
Config level	Advanced		
Description			
This setpoint can be used for changing the Controller mode remotely, e.g. via Modbus. Use the mode selector on the main screen for changing the mode from the front panel. Use mode selector in the control window for changing the mode from InteliConfig.			

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Power On Mode

Setpoint group	Basic settings	**Related FW**	1.6.0
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, controller is switched to last mode before power off.
OFF	When controller is power on, controller is switched to OFF Mode.

Note: *Remote modes – In case that some LBI remote mode is activated during power on of controller than this LBI has higher priority than this setpoint – controller mode is forced into mode selected via LBI. After deactivation of LBI, controller is switched into value selected via setpoint Power On Mode*

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Operation Mode

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	AMF / MRS [-]		
Default value	AMF	**Alternative config**	NO
Step	[-]		
Comm object	12157	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint defines the controller application.

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 326)** binary input.

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Controller Address

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	1 .. 32 [-]		
Default value	1	**Alternative config**	NO
Step	1		
Comm object	24537	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Controller identification number. It is possible to set controller address different from the default value (1) so that more IL controllers can be interconnected (via RS485) and accessed e.g. from MODBUS terminal.

> ***Note:*** *When opening connection to the controller it's address has to correspond with the setting in PC tool.*

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

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Reset To Manual

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	Disabled / Enabled [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	9983	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

If this function is enabled, the controller will switch automatically to MAN mode when there is a red alarm in the alarm list and fault reset button is pressed. This is a safety function that prevents the gen-set starting again automatically in specific cases when fault reset button is pressed.

> **Example:** Controller is in AUTO mode and there is red inactive unconfirmed alarm and fault reset button is pressed, controller will start automatically.

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Backlight Timeout

Setpoint group	Basic settings	**Related FW**	1.6.0
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**	1.6.0
Range [units]	Disabled / 1 .. 599 s / Horn Reset [-]		
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 350)** binary output. The **HORN (PAGE 350)** output is active when this timeout elapsed.
Horn reset	LBO **HORN (PAGE 350)** is deactivated by Fault reset button or by Horn reset button.

Note: *Horn timeout starts again from the beginning if a new alarm appears before previous Horn timeout has elapsed.*

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Zero Power Mode

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	Disabled / 1 .. 360 [min]		
Default value	Disabled	**Alternative config**	NO
Step	1 min		
Comm object	8548	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 170)**		
Description			

The controller is switched to Zero Power Mode when there is no user interaction with the controller for the preset time period. 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.

> **IMPORTANT: This only works if Operation Mode is set to MRS.**

Note: *Power consumption of controller in Zero Power Mode is 0 mA. Controller is internally disconnected from power supply.*

Note: *While there is USB power present (USB cable plagued) the controller is able to turn off when there is no user interaction but wake up is not possible. USB power has to be cut off (USB cable un-pluged).*

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RunHoursSource

Setpoint group	Basic settings	**Related FW**	1.6.0
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 is applied immediately.*

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GCB Mode

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	Normal / Manual / No Button [-]		
Default value	Normal	**Alternative config**	YES
Step	[-]		
Comm object	11771	**Related applications**	MRS
Config level	Advanced		
Description			

Mode of Generator Circuit Breaker behavior.

Normal	In this mode GCB is always controlled by Gen-set controller using relevant GCB control binary outputs (**GCB Close/Open (page 343)**), **GCB OFF Coil (page 345)**, **GCB ON Coil (page 346)** or **GCB UV Coil (page 346)**). GCB alarms are issued as usual. In MAN mode GCB is controlled manually by GCB button. In AUT mode GCB is controlled automatically.
Manual	In this mode, the GCB is always manually operated (by operator not by controller). GCB feedback signal can be wired up to the controller. (However this isn't mandatory.) The GCB button on the controller is inactive.
No Button	In this mode GCB button is inactive. In MAN mode GCB is operated automatically. It is closed and opened .at the same time and under same conditions as in AUT mode. **GCB Feedback (page 321)** is evaluated if configured. There is no change in AUT mode compared to Normal GCB mode.

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Screen Filter

Setpoint group	Basic settings	**Related FW**	1.6.0
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			

Every analog value showed on CU screen is filtered when setpoint is enabled.
List of values which are filtered when filter is ON.

- Generator Voltage L1-L2
- Generator Voltage L2-L3
- Generator Voltage L3-L1
- Generator Voltage L1-N
- Generator Voltage L2-N
- Generator Voltage L3-N
- Generator Frequency

- Load kVA
- Load kVA L1
- Load kVA L2
- Load kVA L3
- Load kVAr
- Load kVAr L1
- Load kVAr L2
- Load kVAr L3
- Load kW
- Load kW L1
- Load kW L2
- Load kW L3

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Subgroup: HMI Settings

Main Screen Line 1

Setpoint group	Basic settings	**Related FW**	1.6.0
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 Main screen.			

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Main Screen Line 2

Setpoint group	Basic settings	**Related FW**	1.6.0
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 Main screen.			

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Group: Engine settings

Subgroup: Starting

Cranking Attempts

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	1 .. 10 [-]		
Default value	3	**Alternative config**	NO
Step	1		
Comm object	8255	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Maximal number of cranking attempts.			

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Cranking Fail Pause

Setpoint group	Engine settings	**Related FW**	1.6.0
Fix value	8 s		
Description			
Pause between **Cranking Attempts (page 176)**. **PRESTART (PAGE 357)** output is active in this pause until Cranking Fail Pause elapses.			

> **IMPORTANT: This is a fixed parameter, it isn't possible to adjust it in any manner. This parameter isn't visible either in controller or in PC tools.**

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Maximum Cranking Time

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	1 .. 255 [s]		
Default value	5 s	**Alternative config**	NO
Step	1 s		
Comm object	8256	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
Maximum time limit of cranking time.			

> **IMPORTANT: There is a protection against broken pinion on starter. In case that there are no RPM after 5 seconds of starting, cranking is interrupted and cranking fail pause follows.**

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Prestart Time

Setpoint group	Engine settings	**Related FW**	1.6.0
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 357)** output prior to the engine start. Set to zero if you want to leave the output **PRESTART (PAGE 357)** open.

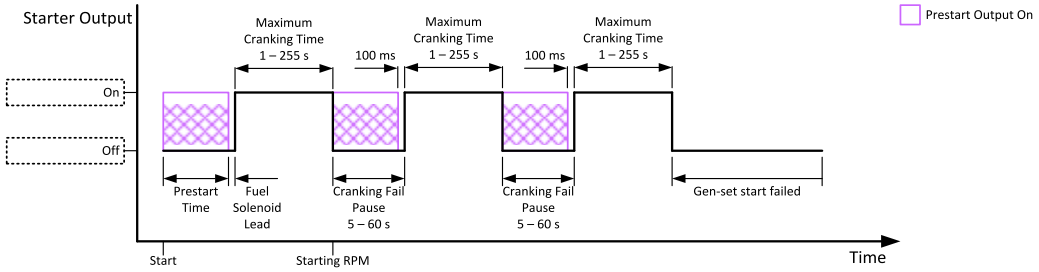

Image 8.1 Prestart Time

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Starting RPM

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	5 .. 50 [%]		
Default value	25%	**Alternative config**	NO
Step	1 % of **Nominal RPM (page 169)**		
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 169)**. If this level is exceeded the engine is considered as started.

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Starting Oil Pressure

Setpoint group	Engine settings	**Related FW**	1.6.0
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 361)** goes OFF) if the oil pressure rises above this limit.

Option Disabled – when this option is selected, Oil Pressure value (value from CU analog Oil Pressure, value from ECU analog Oil pressure and state of binary input Oil Pressure) is not used for disengagement of starter and for engine running evaluation.

> **IMPORTANT: Value from analog input has higher priority than value from ECU.**

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Glow Plugs Time

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	0.0 .. **Prestart Time (page 177)** [s]		
Default value	0.1 s	**Alternative config**	NO
Step	1.0 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 348)** will be active.

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Idle RPM

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	100 .. 4000 [RPM]		
Default value	900 RPM	**Alternative config**	NO
Step	1 RPM		
Comm object	9946	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts idle speed of engine.

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Subgroup: Choke

Choke Function

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	Disabled /Fixed Time / Temp Based [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	15717	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Only when LBO **CHOKE (PAGE 338)** is configured.		
Description			

This setpoint defines choke function behavior.

Disabled	Choke function is disabled and logical binary output **CHOKE (PAGE 338)** is activated under no circumstances.
Fixed Time	Choke time is fixedly defined by **Choke Time (page 179)** setpoint.
Temp Based	Choke time is calculated using actual engine (coolant) temperature. Setpoints **Choke Start Temp (page 180)** and **Choke Increment (page 181)** are taken into consideration.

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Choke Time

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	0 .. 3600 [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	13011	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Only when LBO **CHOKE (PAGE 338)** is configured and setpoint **Choke Function (page 179)** = Fixed Time.		
Description			

Defines time logical binary output **CHOKE (PAGE 338)** is activated for when fixed time is used. When setpoint **Choke Function (page 179)** is set to *Temp Based* value, *Choke Time* value have no effect.

> ***Note:*** *If setpoint **Choke Lead (page 183)** is set to nonzero value, total time the CHOKE output is activated still matches value set by Choke Time setpoint. This mean Choke Timeshould be longer than Choke Leadto ensure expected Choke behavior.*

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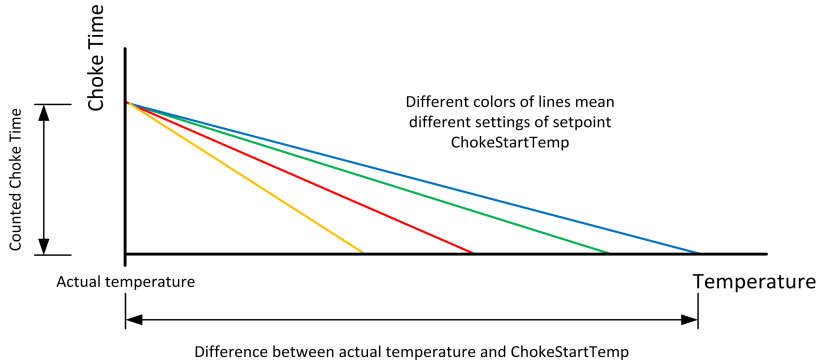
Choke Start Temp

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	-20.0 .. 80.0 [°C]		
Default value	0.0 °C	**Alternative config**	NO
Step	0.1 °C		
Comm object	15716	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Only when LBO **CHOKE (PAGE 338)** is configured and setpoint **Choke Function (page 179)** = 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 181)**. When setpoint **Choke Function (page 179)** is set to *Fixed Time* value, setpoint *Choke Start Temp* has no effect.



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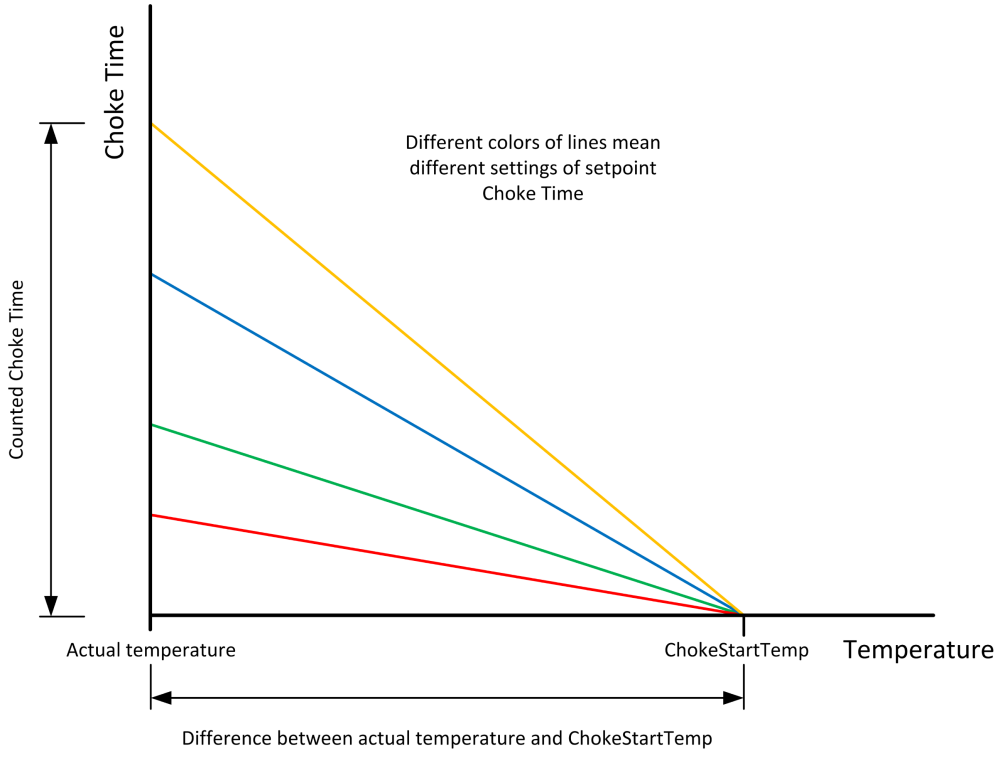
Choke Increment

Setpoint group	Engine settings	**Related FW**	1.6.0
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**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Only when LBO **CHOKE (PAGE 338)** is configured and setpoint **Choke Function (page 179)** = Temp Based.		

Description

This setpoint adjust the maximal time of activation of binary output **CHOKE (PAGE 338)**. Calculated time depends on engine (coolant) temperature. Setpoint adjust curve which is used for calculating actual Choke Time. When setpoint **Choke Function (page 179)** is set to *Fixed Time* value, setpoint *Choke Increment* has no effect.



***Note:** If setpoint **Choke Lead (page 183)** 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 180)**) This mean that adjusted parameters should ensure that calculated Choke Time will be longer than Choke Leadto ensure expected Choke behavior.*

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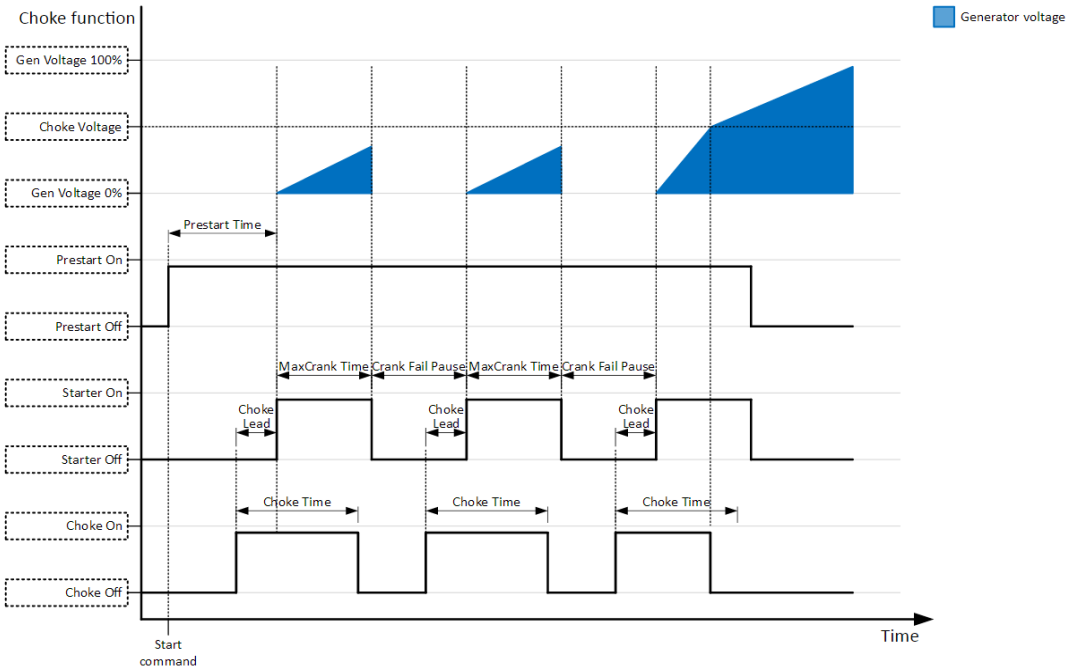
Choke Voltage

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	Disabled / 1 .. 100 [%]		
Default value	Disabled	**Alternative config**	NO
Step	1 %		
Comm object	15718	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Only when LBO **CHOKE (PAGE 338)** is configured.		
Description			

This setpoint adjust threshold level for deactivation of **CHOKE (PAGE 338)** binary output. When generator voltage is higher than this level, then logical binary output CHOKE is deactivated. In multiphase system it is sufficient to deactivate CHOKE LBO when at least one voltage crosses this threshold. In case setpoint *Choke Voltage* is set to *Disabled* value, no voltage is taken into account and CHOKE LBO isn't deactivated on the voltage basis.



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Choke Lead

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	0 .. Prestart Time [s]		
Default value	0 s	**Alternative config**	NO
Step	1 s		
Comm object	15774	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Only when LBO **CHOKE (PAGE 338)** is configured.		
Description			

This setpoint adjust the lead of logical binary output CHOKE. **CHOKE (PAGE 338)** is activated before logical binary output **STARTER (PAGE 361)**.

> ***Note:*** *In case Choke Lead is longer than 8 s (cranking fail pause), Choke Lead will be limited to 8 s (cranking fail pause time). This limitation is applied only for cranking fail pause, Choke Lead in Prestart stays unchanged.*

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Subgroup: D+ Function

D+ Function

Setpoint group	Engine settings	**Related FW**	1.6.0
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.

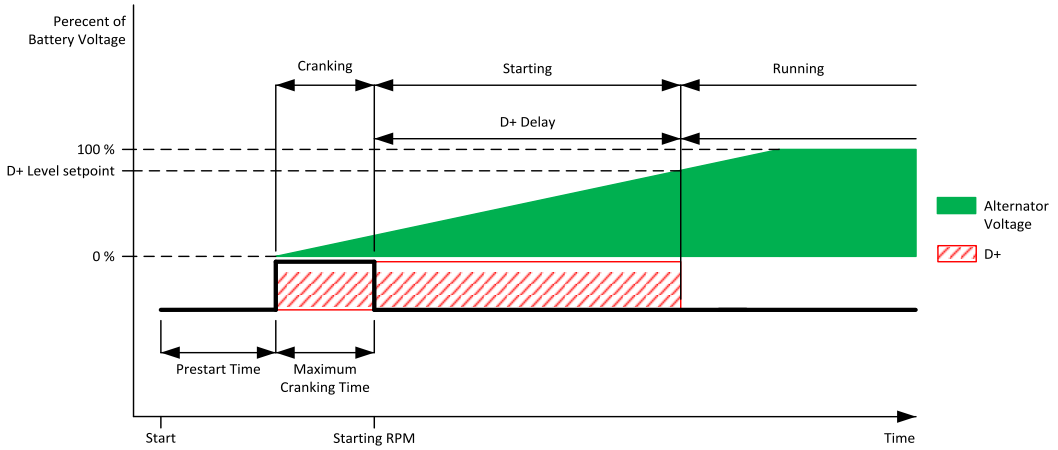

Image 8.2 D+ Function 1

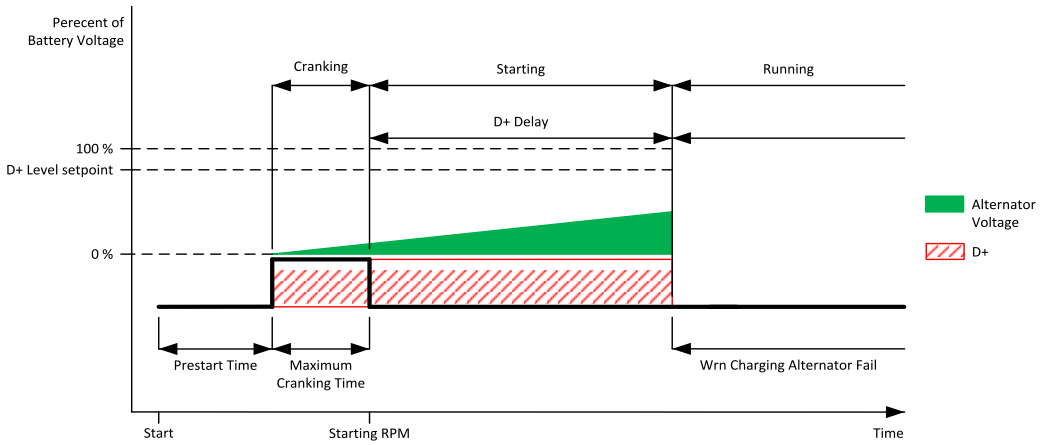

Image 8.3 D+ Function 2

***Note:** Delay of this function is adjusted via **D+ Delay (page 185)** setpoint, threshold of this function is adjusted via D+ Level setpoint.*

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D+ Threshold

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	0 .. 100 [%]		
Default value	80 %	**Alternative config**	NO
Step	1 %		
Comm object	14959	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Only if setpoint **D+ Function (page 183)** is not set to *Disabled* value.		
Description			
This setpoint adjusts threshold level for **D+ Function (page 183)**.			

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D+ Delay

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	1 .. 255 [s]		
Default value	1 s	**Alternative config**	NO
Step	1 s		
Comm object	14960	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Only if setpoint **D+ Function (page 183)** is not set to *Disabled* value.		
Description			
This setpoint adjusts delay for **D+ Function (page 183)**. This delay is used for: › Alarm **Wrn Charging Alternator Fail (page 387)**. › For engine running condition – disengagement of starter			

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D+ Alarm Type

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	No Protec / Wrn / Sd [-]		
Default value	Wrn	**Alternative config**	NO
Step	[-]		
Comm object	15751	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Only if setpoint **D+ Function (page 183)** is not set to *Disabled* value.		
Description			
This setpoint adjusts type of alarm **Wrn Charging Alternator Fail (page 387)**.			

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Subgroup: Starting Timers

Fuel Solenoid Lead

Setpoint group	Engine settings	**Related FW**	1.6.0
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 342)** and **STARTER (PAGE 361)** logical binary outputs.**FUEL SOLENOID (PAGE 342)** is active before **STARTER (PAGE 361)**. Lead time is adjusted via this setpoint.

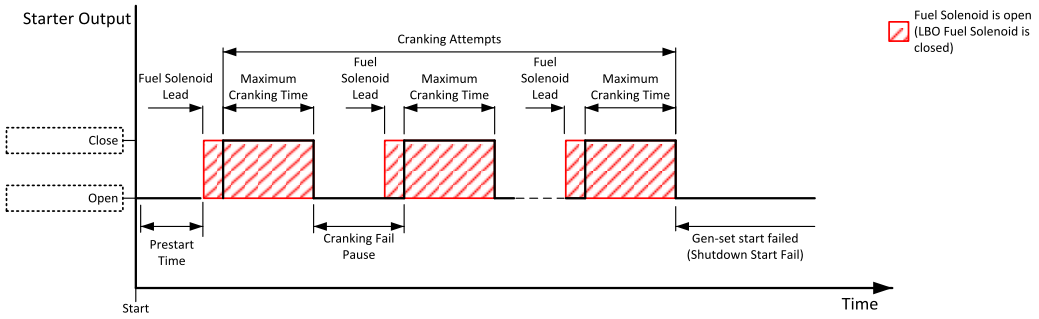

Image 8.4 Fuel Solenoid Lead

Note: *LBO **PRESTART (PAGE 357)** goes to logical zero when Fuel Solenoid Lead goes to logical one.*

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Idle Time

Setpoint group	Engine settings	**Related FW**	1.6.0
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 177)**. Start fail is detected when during Idle state RPM decreases below 2 RPM.
The output **IDLE/NOMINAL (PAGE 351)** 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.

Note: *When controller is in the MAN mode, it is possible to finish the Idle Time count down by pushing the Start button.*

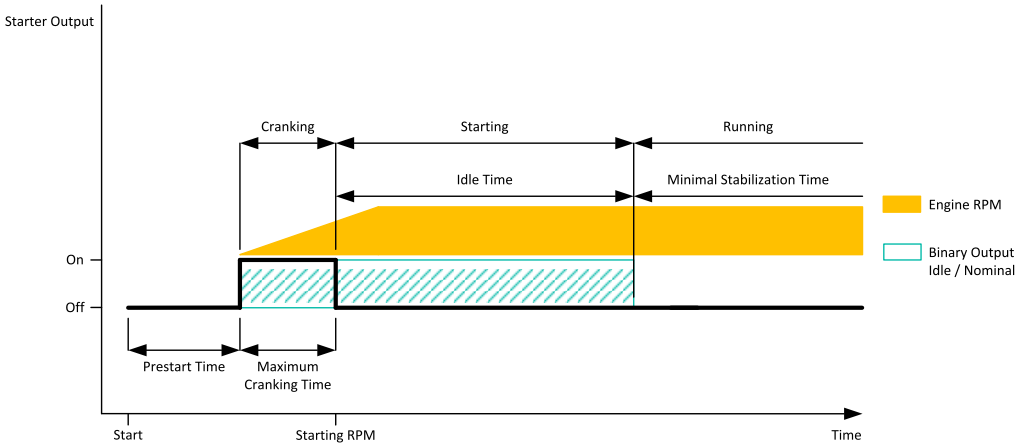

Image 8.5 Idle Time 1

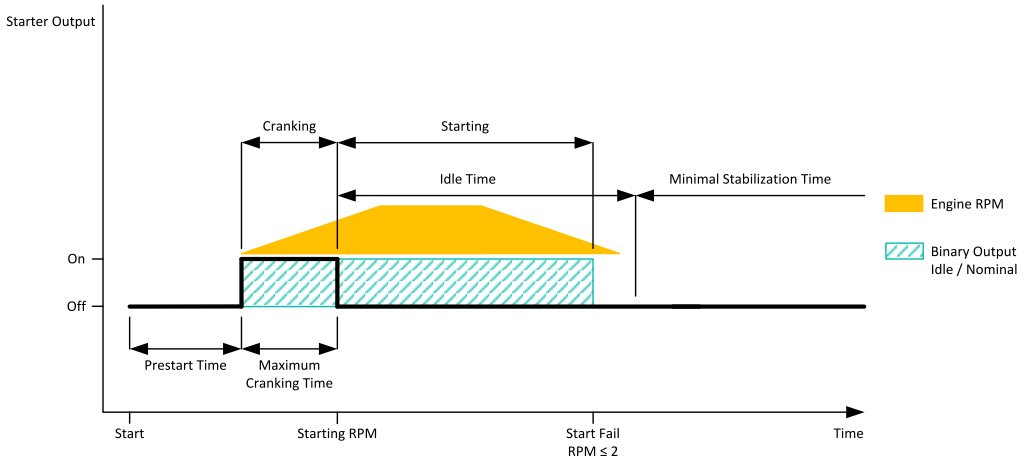

Image 8.6 Idle Time 2

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Minimal Stabilization Time

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	1 .. **Maximal Stabilization Time (page 189)** [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.

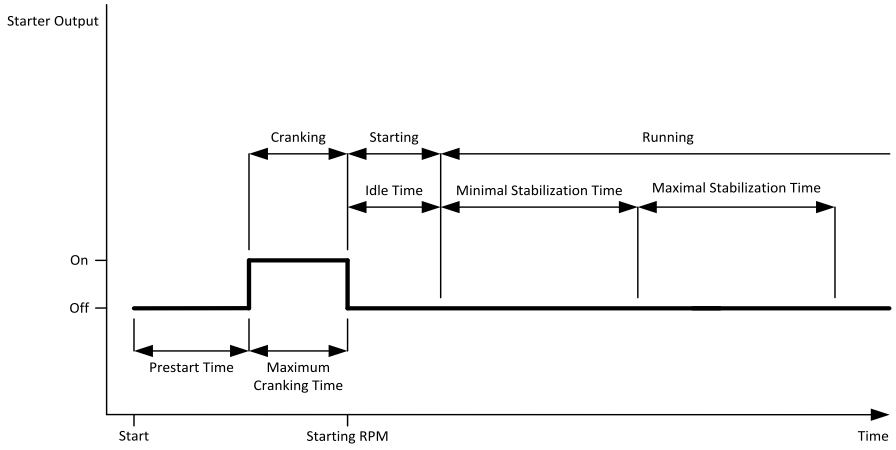

Image 8.7 Minimal Stabilization Time

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Maximal Stabilization Time

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	**Minimal Stabilization Time (page 188)** .. 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.

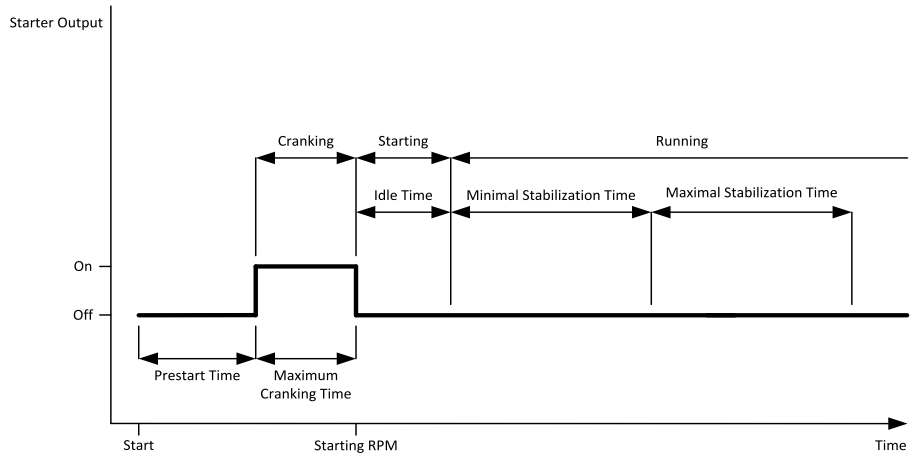

Image 8.8 Maximal Stabilization Time

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Protection Hold Off

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	0.0 .. 300.0 [s]		
Default value	5.0 s	**Alternative config**	YES
Step	0.1 s		
Comm object	10023	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

During the start of the Gen-set, some engine protections have to be blocked (e.g. Oil pressure). The protections are unblocked after the Protect Hold Off. The time starts after reaching Starting RPM.

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Subgroup: Stopping

Cooling Speed

Setpoint group	Engine settings	**Related FW**	1.6.0
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 351)** 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 351)** must be configured and connected to speed governor. Engine Idle speed must be adjusted on speed governor.*

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Subgroup: Stopping Timers

Cooling Time

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	0 .. 3 600 [s]		
Default value	30 s	**Alternative config**	NO
Step	1 s		
Comm object	8258	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Runtime of the unloaded Gen-set to cool the engine before stop.

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Stop Time

Setpoint group	Engine settings	**Related FW**	1.6.0
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 342)** has been de-energized and the **STOP SOLENOID (PAGE 362)** energized. The Stop Solenoid output is deactivated 12 s after last running engine indication went off.

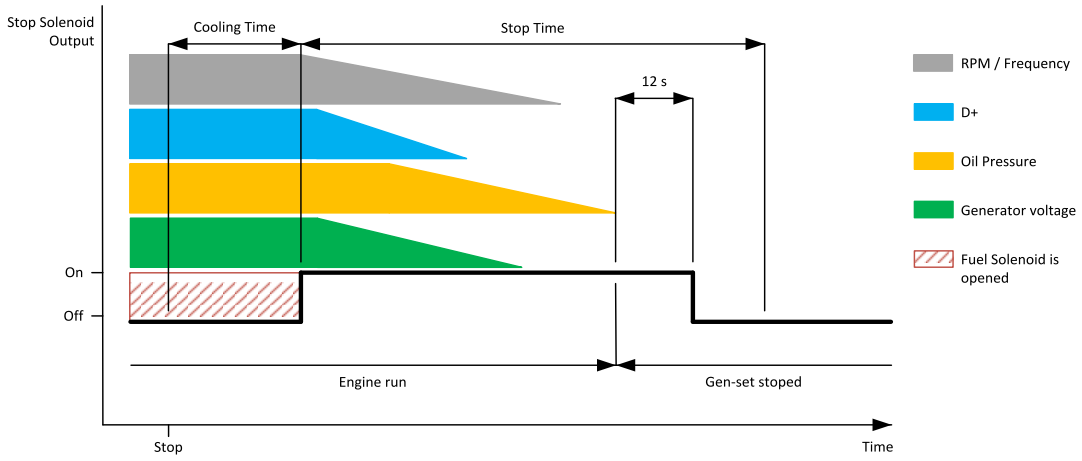

Image 8.9 Stop Time 1

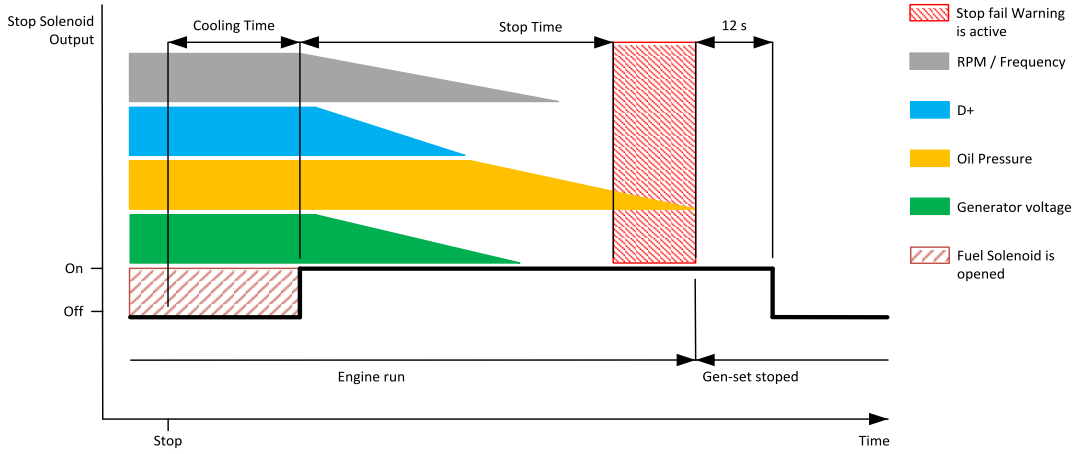

Image 8.10 Stop Time 2

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After Cooling Time

Setpoint group	Engine settings	**Related FW**	1.6.0
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 (PAGE 339)** is active when the engine starts deactivates after timer set in this setpoint elapses (timer starts counting down as soon as engine switches to stop phase).			

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Subgroup: Engine Protections

Overspeed Sd

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	**Underspeed Sd (page 192)** .. 200 [%]		
Default value	115%	**Alternative config**	NO
Step	1 % of **Nominal RPM (page 169)**		
Comm object	8263	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for over speed protection. Relative to the nominal speed.			

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Underspeed Sd

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	0 .. **Overspeed Sd (page 192)** [%]		
Default value	25%	**Alternative config**	NO
Step	1 % of **Nominal RPM (page 169)**		
Comm object	8260	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for underspeed protection. Relative to the nominal speed.			

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Overspeed Overshot

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	0 .. 50 [%]		
Default value	20%	**Alternative config**	NO
Step	1 % of **Nominal RPM (page 169)**		
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 193)**. In this time the upper limit of protection is **Overspeed Sd (page 192)** + Overspeed Overshoot.			

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Overspeed Overshot Period

Setpoint group	Engine settings	**Related FW**	1.6.0
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 193)**		
Description			
Time for which is **Overspeed Overshot (page 193)** active. The timer starts in the same time when starter starts. ***Note:*** *The setpoint is visible only, if **Overspeed Overshot (page 193)** is greater than 0.*			

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Oil Pressure Wrn

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	the range is defined by an analog sensor curve		
Default value	the value is defined by an analog sensor curve	**Alternative config**	NO
Step	the step is defined by an 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 371)** is configured		
Description			
Warning or history threshold level for **OIL PRESSURE (PAGE 371)**.			

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Oil Pressure Sd

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	the range is defined by an analog sensor curve		
Default value	the value is defined by an analog sensor curve	**Alternative config**	NO
Step	the step is defined by an 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 371)** is configured		
Description			
Shutdown threshold level for **OIL PRESSURE (PAGE 371)**.			

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Oil Pressure Delay

Setpoint group	Engine settings	**Related FW**	1.6.0
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 371)** is configured		
Description			
Delay for **OIL PRESSURE (PAGE 371)**.			

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ECU Oil Pressure Wrn

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	the range is defined by an ECU sensor curve		
Default value	the value is defined by an an ECU sensor curve	**Alternative config**	YES
Step	the step is defined by an ECU sensor curve		
Comm object	14426	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Warning threshold level for Oil pressure which is send from ECU.			

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ECU Oil Pressure Sd

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	the range is defined by an ECU sensor curve		
Default value	the value is defined by an an ECU sensor curve	**Alternative config**	NO
Step	the step is defined by an ECU sensor curve		
Comm object	14425	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Shutdown threshold level for Oil pressure which is send from ECU.			

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ECU Oil Pressure Delay

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	0 .. 900 [s]		
Default value	3 s	**Alternative config**	NO
Step	1 s		
Comm object	14427	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Delay for Oil pressure which is send from ECU.			

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Coolant Temperature Wrn

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	the range is defined by an analog sensor curve		
Default value	the value is defined by an analog sensor curve	**Alternative config**	NO
Step	the step is defined by an 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 369)** is configured		
Description			
Warning or history threshold level for **COOLANT TEMP (PAGE 369)**.			

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Coolant Temperature BOC

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	the range is defined by an analog sensor curve		
Default value	the value is defined by an analog sensor curve	**Alternative config**	NO
Step	the step is defined by an 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 369)** is configured		
Description			
Shutdown or BOC threshold level for **COOLANT TEMP (PAGE 369)**.			

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Coolant Temperature Delay

Setpoint group	Engine settings	**Related FW**	1.6.0
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 369)** is configured		
Description			
Delay for **COOLANT TEMP (PAGE 369)**.			

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ECU Coolant Temperature Wrn

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	the range is defined by an ECU sensor curve		
Default value	the value is defined by an an ECU sensor curve	**Alternative config**	NO
Step	the step is defined by an ECU sensor curve		
Comm object	14429	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Warning threshold level for Coolant temperature which is send from ECU.			

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ECU Coolant Temperature BOC

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	the range is defined by an ECU sensor curve		
Default value	the value is defined by an an ECU sensor curve	**Alternative config**	NO
Step	the step is defined by an ECU sensor curve		
Comm object	14428	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Shutdown or BOC threshold level for Coolant temperature which is send from ECU.			

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ECU Coolant Temperature Delay

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	0 .. 900 [s]		
Default value	5 s	**Alternative config**	NO
Step	1 s		
Comm object	14430	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Delay for Coolant temperature which is send from ECU.			

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Coolant Temperature Low Wrn

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	the range is defined by an analog sensor curve		
Default value	the value is defined by an analog sensor curve	**Alternative config**	YES
Step	the step is defined by an 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 369)** is configured		
Description			
Threshold level for lower limit of **COOLANT TEMP (PAGE 369)**.			

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Coolant Temperature Low Delay

Setpoint group	Engine settings	**Related FW**	1.6.0
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 369)** is configured		
Description			
Delay for **Coolant Temperature Low Wrn (page 197)**.			

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Fuel Level Wrn

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	the range is defined by an analog sensor curve		
Default value	the value is defined by an analog sensor curve	**Alternative config**	NO
Step	the step is defined by an 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 369)** is configured		
Description			
Warning or history threshold level for **FUEL LEVEL (PAGE 369)**.			

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Fuel Level Sd

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	the range is defined by an analog sensor curve		
Default value	the value is defined by an analog sensor curve	**Alternative config**	NO
Step	the step is defined by an 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 369)** is configured		
Description			
Shutdown or BOC threshold level for **FUEL LEVEL (PAGE 369)**.			

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Fuel Level Delay

Setpoint group	Engine settings	**Related FW**	1.6.0
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 369)** is configured		
Description			
Delay for **FUEL LEVEL (PAGE 369)**.			

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ECU Fuel Level Wrn

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	the range is defined by an ECU sensor curve		
Default value	the value is defined by an an ECU sensor curve	**Alternative config**	NO
Step	the step is defined by an ECU sensor curve		
Comm object	14432	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Warning threshold level for Fuel level which is send from ECU.			

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ECU Fuel Level BOC

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	the range is defined by an ECU sensor curve		
Default value	the value is defined by an an ECU sensor curve	**Alternative config**	NO
Step	the step is defined by an ECU sensor curve		
Comm object	14431	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if ECU is configured		
Description			
Shutdown or BOC threshold level for Fuel level which is send from ECU.			

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ECU Fuel Level Delay

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	0 .. 900 [s]		
Default value	10 s	**Alternative config**	NO
Step	1 s		
Comm object	14433	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Visible only if ECU is configuredd		
Description			
Delay for Fuel level which is send from ECU.			

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Transfer Wrn Delay

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	Disabled / 1 .. 60 [s]		
Default value	30 s	**Alternative config**	YES
Step	1 s		
Comm object	10685	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Visible only if the logical binary output **FUEL PUMP (PAGE 342)** is configured		
Description			
If the controller does not see the fuel increase during fuel transfer within this time alarm **Wrn Fuel Transfer Failed (page 381)** will be displayed and the **FUEL PUMP (PAGE 342)** will be turned off. Alarm **Wrn Fuel Transfer Failed (page 381)** will be displayed but this alarm becomes immediately inactive and it will be possible to delete this message by the Fault reset button. If the fault is deleted the controller will initiate the transfer again.			

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Fuel Pump On

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	0 .. **Fuel Pump Off (page 202)** [%]		
Default value	20 %	**Alternative config**	YES
Step	1 %		
Comm object	10100	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Visible only if the logical binary output **FUEL PUMP (PAGE 342)** is configured and logical binary input **FUEL PUMP ON/OFF (PAGE 320)** isn't configured		

Description

Threshold level for switching the binary output **FUEL PUMP (PAGE 342)** on.

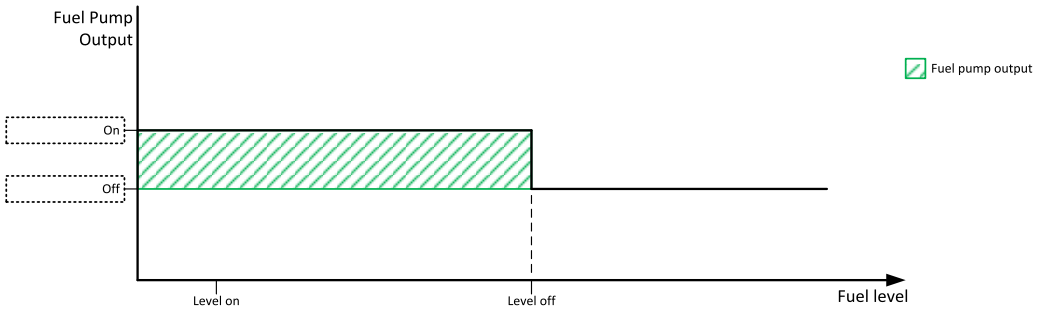

Image 8.11 Fuel Pump On

> **IMPORTANT: When binary input FUEL PUMP ON/OFF (PAGE 320) is configured then binary output FUEL PUMP (PAGE 342) is control by this binary input. Setpoints Fuel Pump On and Fuel Pump Off (page 202) are not evaluated!**

Note: *Value from analog input has higher priority than ECU.*

Note: *This setpoint is visible only if the logical binary output **FUEL PUMP (PAGE 342)** is configured.*

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Fuel Pump Off

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	**Fuel Pump On (page 201)** .. 100 [%]		
Default value	90 %	**Alternative config**	YES
Step	1 %		
Comm object	10101	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Visible only if the logical binary output **FUEL PUMP (PAGE 342)** is configured and logical binary input **FUEL PUMP ON/OFF (PAGE 320)** isn't configured		

Description

Threshold level for switching the binary output **FUEL PUMP (PAGE 342)** off.

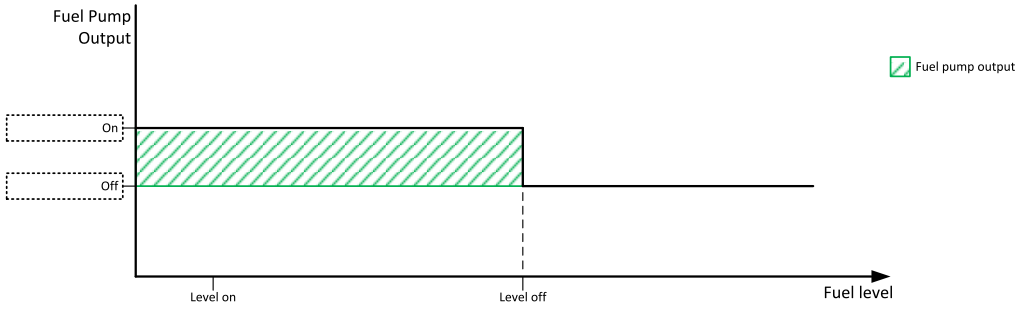

Image 8.12 Fuel Pump Off

> **IMPORTANT: When binary input FUEL PUMP ON/OFF (PAGE 320) is configured then binary output FUEL PUMP (PAGE 342) is control by this binary input. Setpoints Fuel Pump On (page 201) and Fuel Pump Off are not evaluated!**

Note: *Value from analog input has higher priority than ECU.*

Note: *This setpoint is visible only if the logical binary output **FUEL PUMP (PAGE 342)** is configured.*

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Subgroup: Maintenance

Maintenance Timer 1

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	-10 000 .. 9 999 [h] / Disabled		
Default value	1 000 h	**Alternative config**	NO
Step	1 h		
Comm object	11616	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Maintenance timer 1 counts down when engine is running. If reaches zero, an alarm appears, but the timer still counting down into negative values. When the value 10000 is set, than the Maintenance function is disabled and counter does not count. Counter value disappear from controllers statistics.			

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Maintenance Timer 2

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	-10 000 .. 9 999 [h] / Disabled		
Default value	1 000 h	**Alternative config**	NO
Step	1 h		
Comm object	11617	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Maintenance timer 2 counts down when engine is running. If reaches zero, an alarm appears, but the timer still counting down into negative values. When the value 10000 is set, than the Maintenance function is disabled and counter does not count. Counter value disappear from controllers statistics.			

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Maintenance Timer 3

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	-10 000 .. 9 999 [h] / Disabled		
Default value	1 000 h	**Alternative config**	NO
Step	1 h		
Comm object	11618	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Maintenance timer 3 counts down when engine is running. If reaches zero, an alarm appears, but the timer still counting down into negative values. When the value 10000 is set, than the Maintenance function is disabled and counter does not count. Counter value disappear from controllers statistics.			

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Subgroup: Battery Protections

Battery Undervoltage

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	8.0 V .. **Battery Overvoltage (page 204)** [V]		
Default value	18.0 V	**Alternative config**	NO
Step	0.1 V		
Comm object	8387	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning threshold for low battery voltage.			

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Battery Overvoltage

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	**Battery Undervoltage (page 204)** .. 40.0 [V]		
Default value	36.0 V	**Alternative config**	NO
Step	0.1 V		
Comm object	9587	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Warning threshold for high battery voltage.			

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Battery <> Voltage Delay

Setpoint group	Engine settings	**Related FW**	1.6.0
Fix value	5 s		
Description			

Delay for **Battery Undervoltage (page 204)** and **Battery Overvoltage (page 204)** protection.

> **IMPORTANT: This is a fixed parameter, it isn't possible to adjust it in any manner. This parameter isn't visible either in controller or in PC tools.**

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Low Battery Charging Cycle

Setpoint group	Engine settings	**Related FW**	1.6.0
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 AUTO 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 AUTO mode.**

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

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Subgroup: ECU Settings

ECU Speed Adjustment

Setpoint group	Engine settings	**Related FW**	1.6.0
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 269)****,* ***ECU Speed Adjustment 2 (page 269)*** *and* ***ECU Speed Adjustment 3 (page 270)****.*			

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Subgroup: Ventilation

Ventilation Pulse Time

Setpoint group	Engine settings	**Related FW**	1.6.0
Range [units]	0 .. 3600 [s]		
Default value	30 s	**Alternative config**	NO
Step	1 s		
Comm object	15767	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Only when logical binary output **VENTILATION ON PULSE (PAGE 363)** or **VENTILATION OFF PULSE (PAGE 364)** is configured.		
Description			
This setpoint defines duration of pulse generated on logical binary outputs **VENTILATION ON PULSE (PAGE 363)** or **VENTILATION OFF PULSE (PAGE 364)** at the moment when logical binary output **VENTILATION (PAGE 363)** is activated or deactivated respectively.			

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Group: Generator settings

Subgroup: Overload Protection

Overload BOC

Setpoint group	Generator settings	**Related FW**	1.6.0
Range [units]	**Overload Wrn (page 207)** .. 200 [%]		
Default value	120 %	**Alternative config**	NO
Step	1 % of **Nominal Power (page 163)**		
Comm object	8280	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold level for overload of generator (in % of Nominal power) protection. Protection is BOC (Breaker Open and Gen-set Cooldown). ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

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Overload Wrn

Setpoint group	Generator settings	**Related FW**	1.6.0
Range [units]	0 .. **Overload BOC (page 207)** [%]		
Default value	120 %	**Alternative config**	NO
Step	1 % of **Nominal Power (page 163)**		
Comm object	9685	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold level for overload of generator (in % of **Nominal Power (page 163)**) protection. This is only warning.			

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Overload Delay

Setpoint group	Generator settings	**Related FW**	1.6.0
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 protections **Overload BOC (page 207)** and **Overload Wrn (page 207)**.			

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Subgroup: Current Protection

Short Circuit BOC

Setpoint group	Generator settings	**Related FW**	1.6.0
Range [units]	100 .. 500 [%]		
Default value	250 %	**Alternative config**	NO
Step	1 % of **Nominal Current (page 163)**		
Comm object	8282	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Protection occurs when generator current reaches this preset threshold. Type of the protection is BOC. ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

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Short Circuit BOC Delay

Setpoint group	Generator settings	**Related FW**	1.6.0
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 208)** protection.			

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Subgroup: Voltage Protection

Generator Overvoltage Sd

Setpoint group	Generator settings	**Related FW**	1.6.0
Range [units]	**Generator Overvoltage Wrn (page 209)** .. 200 [%]		
Default value	110 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 166)** or **Nominal Voltage Ph-Ph (page 167)**		
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.*

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Generator Overvoltage Wrn

Setpoint group	Generator settings	**Related FW**	1.6.0
Range [units]	**Generator Undervoltage Wrn (page 210)** .. **Generator Overvoltage Sd (page 209)** [%]		
Default value	110 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 166)** or **Nominal Voltage Ph-Ph (page 167)**		
Comm object	9686	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Threshold for generator overvoltage protection. All three phases are checked. Maximum out of three is used.

Note: *Phase to phase and phase to neutral voltages are used for this protection.*

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Generator Undervoltage BOC

Setpoint group	Generator settings	**Related FW**	1.6.0
Range [units]	0 .. **Generator Undervoltage Wrn (page 210)** [%]		
Default value	70 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 166)** or **Nominal Voltage Ph-Ph (page 167)**		
Comm object	8293	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Threshold for generator undervoltage protection. All three phases are checked. Minimum out of three is used.

Note: *Phase to phase and phase to neutral voltages are used for this protection.*

Note: *When there is no control of breakers, the type of protection is Sd not BOC.*

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Generator Undervoltage Wrn

Setpoint group	Generator settings	**Related FW**	1.6.0
Range [units]	**Generator Undervoltage BOC (page 210)** .. **Generator Overvoltage Wrn (page 209)** [%]		
Default value	70 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 166)** or **Nominal Voltage Ph-Ph (page 167)**		
Comm object	9687	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Threshold for generator undervoltage protection. All three phases are checked. Minimum out of three is used.

Note: *Phase to phase and phase to neutral voltages are used for this protection.*

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Generator <> Voltage Delay

Setpoint group	Generator settings	**Related FW**	1.6.0
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 209)**, **Generator Overvoltage Wrn (page 209)**, **Generator Undervoltage BOC (page 210)** and **Generator Undervoltage Wrn (page 210)** protection.			

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Subgroup: Frequency Protection

Generator Overfrequency BOC

Setpoint group	Generator settings	**Related FW**	1.6.0
Range [units]	**Generator Overfrequency Wrn (page 211)** .. 200.0 [%]		
Default value	110.0 %	**Alternative config**	NO
Step	0.1 % of **Nominal Frequency (page 168)**		
Comm object	8296	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator phase L1 overfrequency. ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

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Generator Overfrequency Wrn

Setpoint group	Generator settings	**Related FW**	1.6.0
Range [units]	**Generator Underfrequency Wrn (page 212)** .. **Generator Overfrequency BOC (page 211)** [%]		
Default value	110.0 %	**Alternative config**	NO
Step	0.1 % of **Nominal Frequency (page 168)**		
Comm object	9688	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator phase L1 overfrequency.			

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Generator Underfrequency BOC

Setpoint group	Generator settings	**Related FW**	1.6.0
Range [units]	0.0 .. **Generator Underfrequency Wrn (page 212)** [%]		
Default value	85.0 %	**Alternative config**	NO
Step	0.1 % of **Nominal Frequency (page 168)**		
Comm object	8298	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator phase L1 underfrequency. ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

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Generator Underfrequency Wrn

Setpoint group	Generator settings	**Related FW**	1.6.0
Range [units]	**Generator Underfrequency BOC (page 212)** .. **Generator Overfrequency Wrn (page 211)** [%]		
Default value	85.0 %	**Alternative config**	NO
Step	0.1 % of **Nominal Frequency (page 168)**		
Comm object	9689	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator phase L1 underfrequency.			

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Generator <> Frequency Delay

Setpoint group	Generator settings	**Related FW**	1.6.0
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 211)**, **Generator Overfrequency Wrn (page 211)**, **Generator Underfrequency Wrn (page 212)** and **Generator Underfrequency BOC (page 212)** protection.			

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Group: Protections

Subgroup: Overload Protection

Overload Protection

Setpoint group	Protections	**Related FW**	1.6.0
Range [units]	Enabled / Disabled / By LBI [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15664	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator Overload protection.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoints **Overload BOC (page 207)**, **Overload Wrn (page 207)** and **Overload Delay (page 207)**.
Disabled:	Protection is disabled.
By LBI:	Protection is enabled or disabled by the state of LBI **PROTECTION ENABLE (PAGE 324)**.

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Subgroup: Current Protection

Short Circuit Protection

Setpoint group	Protections	**Related FW**	1.6.0
Range [units]	Enabled / Disabled / By LBI [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15665	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator Short Circuit protection.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoints **Short Circuit BOC (page 208)** and **Short Circuit BOC Delay (page 208)**.
Disabled:	Protection is disabled.
By LBI:	Protection is enabled or disabled by the state of LBI **PROTECTION ENABLE (PAGE 324)**.

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Subgroup: Voltage Protection

Generator <> Voltage Protection

Setpoint group	Protections	**Related FW**	1.6.0
Range [units]	Enabled / Disabled / By LBI [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15668	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator Generator <> Voltage protection. GCB closing is blocked, if the protection is disabled!

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoints **Generator Overvoltage Sd (page 209)**, **Generator Overvoltage Wrn (page 209)**, **Generator Undervoltage BOC (page 210)**, **Generator Undervoltage Wrn (page 210)** and **Generator <> Voltage Delay (page 211)**.
Disabled:	Protection is disabled.
By LBI:	Protection is enabled or disabled by the state of LBI **PROTECTION ENABLE (PAGE 324)**.

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Subgroup: Frequency Protection

Generator Frequency Protection

Setpoint group	Protections	**Related FW**	1.6.0
Range [units]	Enabled / Disabled / By LBI [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15670	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of Generator Frequency protection. GCB closing is blocked, if the protection is disabled!.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoints **Generator Overfrequency BOC (page 211)**, **Generator Overfrequency Wrn (page 211)**, **Generator Underfrequency BOC (page 212)**, **Generator Underfrequency Wrn (page 212)**, and **Generator <> Frequency Delay (page 212)**.
Disabled:	Protection is disabled.
By LBI:	Protection is enabled or disabled by the state of LBI **PROTECTION ENABLE (PAGE 324)**.

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Subgroup: Speed Protection

Underspeed Protection

Setpoint group	Protections	**Related FW**	1.6.0
Range [units]	Enabled / Disabled / By LBI [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15671	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator Underspeed protection.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoint **Underspeed Sd (page 192)**.
Disabled:	Protection is disabled.
By LBI:	Protection is enabled or disabled by the state of LBI **PROTECTION ENABLE (PAGE 324)**.

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Overspeed Protection

Setpoint group	Protections	**Related FW**	1.6.0
Range [units]	Enabled / Disabled / By LBI [-]		
Default value	Enabled	**Alternative config**	NO
Step	[-]		
Comm object	15672	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

This setpoint adjusts the behavior of generator Overspeed protection.

Enabled:	Protection is enabled. Behavior of protection is adjusted via setpoint **Overspeed Sd (page 192)**.
Disabled:	Protection is disabled.
By LBI:	Protection is enabled or disabled by the state of LBI **PROTECTION ENABLE (PAGE 324)**.

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Group: AMF settings

Subgroup: AMF Timers

Emergency Start Delay

Setpoint group	AMF settings	**Related FW**	1.6.0
Range [units]	0 .. 6 000 [s]		
Default value	5 s	**Alternative config**	NO
Step	1 s		
Comm object	8301	**Related applications**	AMF
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 170)**		
Description			
Delay after the mains failure to the start command of the Gen-set.			

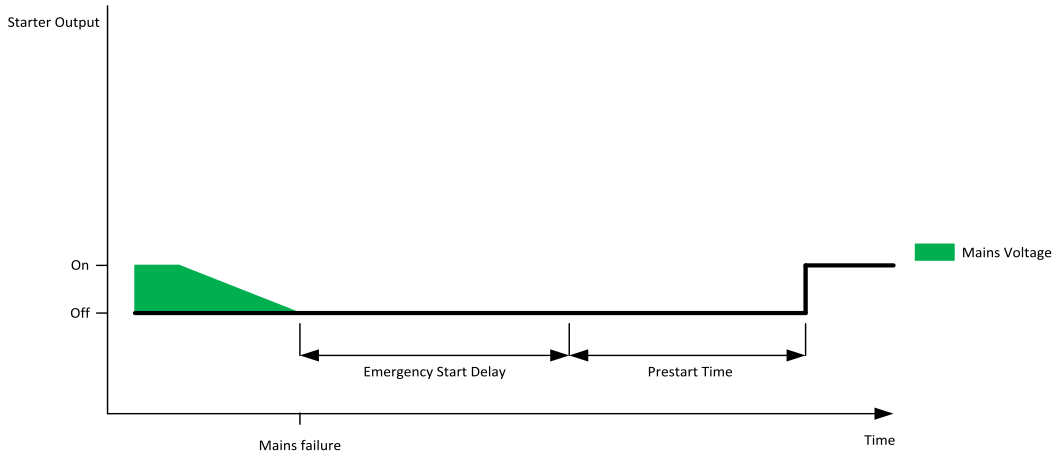

Image 8.13 Emergency Start Delay

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Mains Return Delay

Setpoint group	AMF settings	**Related FW**	1.6.0
Range [units]	1 .. 3 600 [s]		
Default value	20 s	**Alternative config**	NO
Step	1 s		
Comm object	8302	**Related applications**	AMF
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 170)**		
Description			
This setpoint adjust the delay, how long mains has to be returned after mains fail to start load transfer to mains.			

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Transfer Delay

Setpoint group	AMF settings	**Related FW**	1.6.0
Range [units]	0.0 .. 600.0 [s]		
Default value	1.0 s	**Alternative config**	NO
Step	0.1 s		
Comm object	8303	**Related applications**	AMF
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 170)**		
Description			

Transition Delay between power sources.

Delay after GCB opening to MCB closing during the return procedure. Delay after MCB opening to GCB closing if the setpoint **MCB Opens On (page 223)** is set to GENRUN.

The time charts bellow show recommended setting of Transfer Delay setpoint.

If the Transfer Delay setpoint is set shorter than the time required for opening of the circuit breaker, the controller closes **GCB CLOSE/OPEN (PAGE 343)** output straight away (100 ms) after the **MCB FEEDBACK (PAGE 323)** input deactivates.

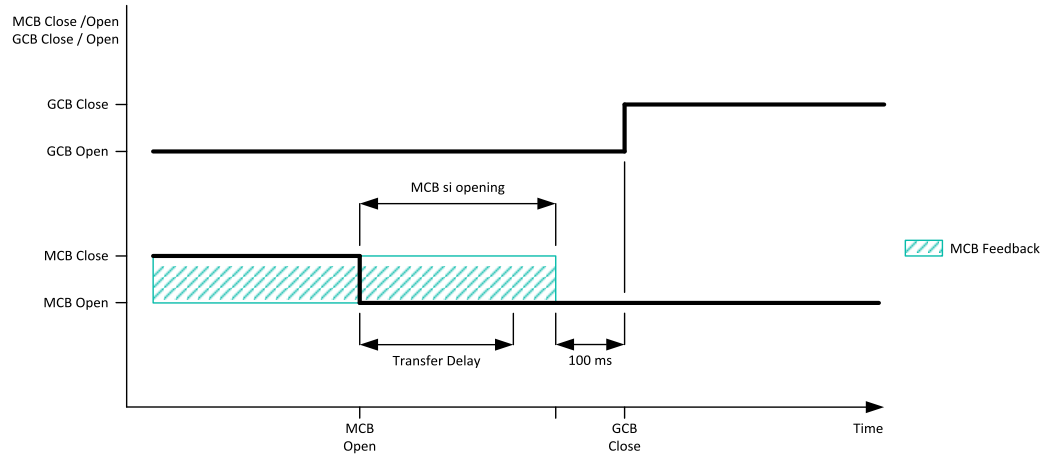

Image 8.14 Transfer Delay 1

If some delay between **MCB FEEDBACK (PAGE 323)** deactivation and closing of **GCB CLOSE/OPEN (PAGE 343)** output is required, then the Transfer Delay must be set to sum of "MCB opening" + "Delay" time.

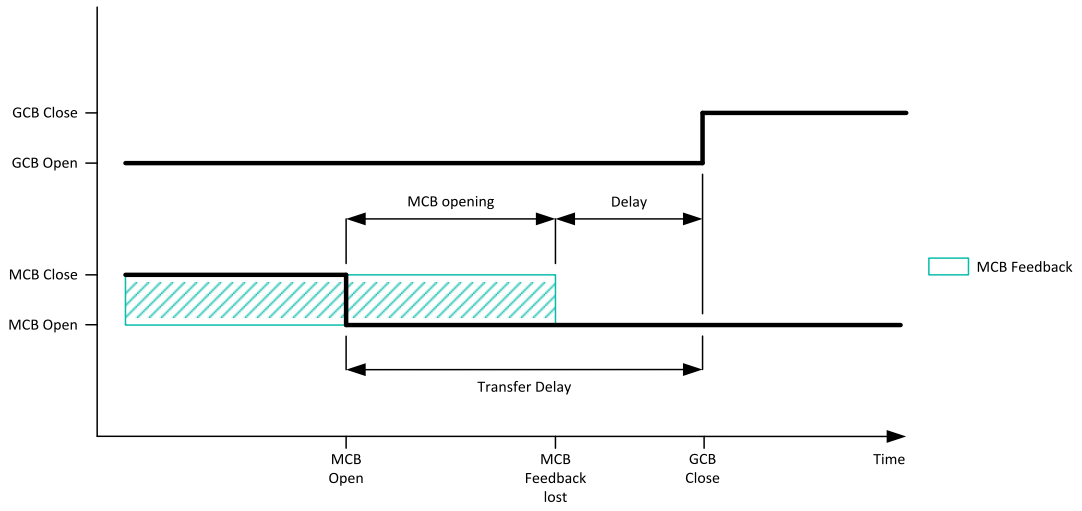

Image 8.15 Transfer Delay 2

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MCB Close Delay

Setpoint group	AMF settings	**Related FW**	1.6.0
Fix value	1.0 s		
Description			
Delay after mains returns to MCB closing, if the Gen-set is not running (e.g. is in start-up procedure).			

> **IMPORTANT: This is a fixed parameter, it isn't possible to adjust it in any manner. This parameter isn't visible either in controller or in PC tools.**

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Subgroup: AMF Voltage Conditions

Mains Overvoltage

Setpoint group	AMF settings	**Related FW**	1.6.0
Range [units]	**Mains Undervoltage (page 219)** .. 150 [%]		
Default value	110 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-Ph (page 167)**		
Comm object	8305	**Related applications**	AMF
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 170)**		
Description			
Threshold for Mains overvoltage. All three phases are checked. Maximum out of three is used.			

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Mains Undervoltage

Setpoint group	AMF settings	**Related FW**	1.6.0
Range [units]	50 .. **Mains Overvoltage (page 218)** [%]		
Default value	60 %	**Alternative config**	YES
Step	1 % of **Nominal Voltage Ph-Ph (page 167)**		
Comm object	8307	**Related applications**	AMF
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 170)**		
Description			
Threshold for Mains undervoltage. All three phases are checked. Minimum voltage out of three phases is used.			

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Mains <> Voltage Delay

Setpoint group	AMF settings	**Related FW**	1.6.0
Range [units]	0.0 .. 600.0 [s]		
Default value	2.0 s	**Alternative config**	YES
Step	0.1 s		
Comm object	8306	**Related applications**	AMF
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 170)**		
Description			
Delay for **Mains Undervoltage (page 219)** and **Mains Overvoltage (page 218)** protection.			

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Subgroup: AMF Frequency Conditions

Mains Overfrequency

Setpoint group	AMF settings	**Related FW**	1.6.0
Range [units]	**Mains Underfrequency (page 220)** .. 150 [%]		
Default value	102.0 %	**Alternative config**	NO
Step	1.0 % of **Nominal Frequency (page 168)**		
Comm object	8310	**Related applications**	AMF
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 170)**		
Description			
Threshold for Mains overfrequency.			

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Mains Underfrequency

Setpoint group	AMF settings	**Related FW**	1.6.0
Range [units]	50 .. **Mains Overfrequency (page 219)** [%]		
Default value	98.0 %	**Alternative config**	NO
Step	1.0 % of **Nominal Frequency (page 168)**		
Comm object	8312	**Related applications**	AMF
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 170)**		
Description			
Threshold for Mains underfrequency.			

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Mains < > Frequency Delay

Setpoint group	AMF settings	**Related FW**	1.6.0
Range [units]	0.0 .. 600.0 [s]		
Default value	0.5 s	**Alternative config**	NO
Step	0.1 s		
Comm object	8311	**Related applications**	AMF
Config level	Standard		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 170)**		
Description			
Delay for **Mains Underfrequency (page 220)** and **Mains Overfrequency (page 219)** protection.			

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Subgroup: AMF Settings

Return From Island

Setpoint group	AMF settings	**Related FW**	1.6.0
Fix value	Auto	**Alternative config**	NO
Comm object	9590	**Related applications**	AMF
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 170)**		
Description			

Setpoint adjust the behavior of closing MCB when the mains returns.

Manual	Controller remains in AUT mode and the manual return to Mains is done via MCB button. **Manual Restore (page 391)** message is displayed in alarmlist to notify operator – it will disappear automatically after MCB close button is pushed. ***Note:*** *Select MANUAL in case you need to manually control the moment when the load is transferred back to the mains.*
Auto	MCB is closed automatically after the timer **Mains Return Delay (page 216)** elapses.

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MCB Logic

Setpoint group	AMF settings	**Related FW**	1.6.0
Range [units]	Close On / Close Off [-]		
Default value	Close Off	**Alternative config**	NO
Step	[-]		
Comm object	8444	**Related applications**	AMF
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 170)**		
Description			

The setpoint influences the behavior of the output **MCB CLOSE/OPEN (PAGE 351)**.

Close On When the output **MCB CLOSE/OPEN (PAGE 351)** is active – MCB should be closed.

Close Off When the output **MCB CLOSE/OPEN (PAGE 351)** is active – MCB should be opened.

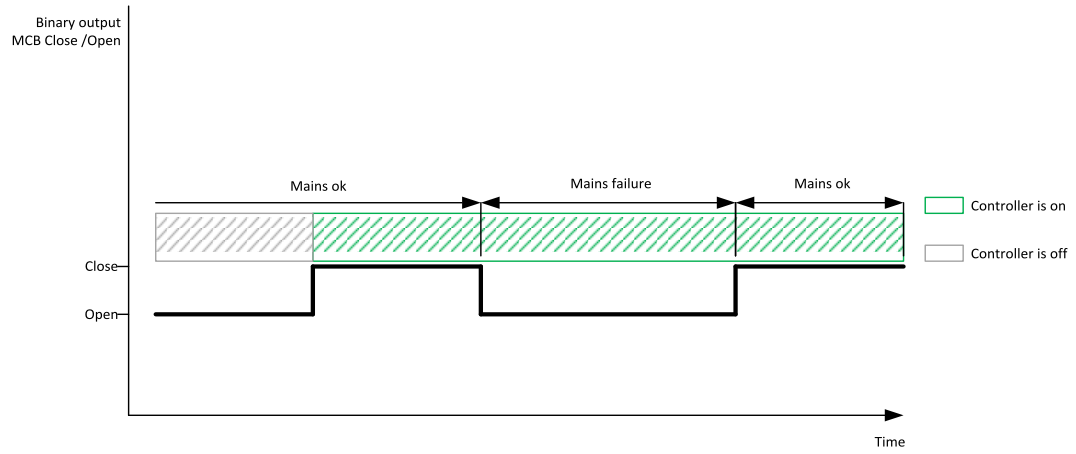

Image 8.16 MCB Logic 1

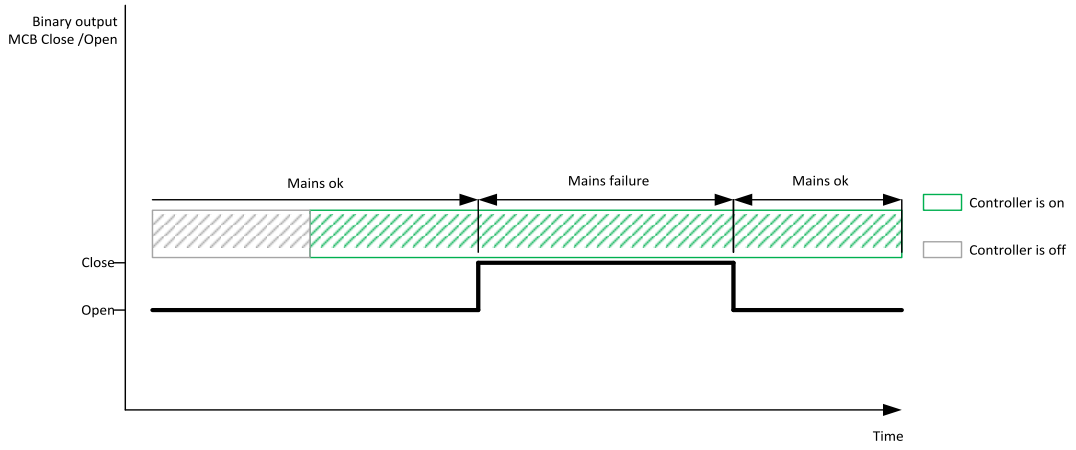

Image 8.17 MCB Logic 2

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MCB Opens On

Setpoint group	AMF settings	**Related FW**	1.6.0
Range [units]	Mains Fail / Gen Run [-]		
Default value	Gen Run	**Alternative config**	NO
Step	[-]		
Comm object	9850	**Related applications**	AMF
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Operation Mode (page 170)**		
Description			

Setpoint adjust the behavior of opening MCB in AUTO mode when there is mains fail.

Mains Fail	The command to open the MCB is given immediately after mains fail condition is evaluated. If the mains will return into parameters after MCB was opened and before GCB is closed, timer **MCB Close Delay (page 218)** is applied before MCB closing.
Gen Run	MCB will be opened when engine will be running and it will be possible to transfer load from Mains to Gen-set (after stabilization phase). ***Note:*** *This option should be used for MCBs using 230V control and not equipped with the undervoltage coil.*

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Group: General Analog Inputs

Subgroup: General Analog Inputs 1

Analog Protection 1 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.6.0
Range [units]	the range is defined by an analog sensor curve		
Default value	the value is defined by an analog sensor curve	**Alternative config**	NO
Step	the step is defined by an 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 366)** is configured		
Description			

Warning or history threshold level for **AIN PROT01 (PAGE 366)**.

Note: *These setpoints are used only if LAI **AIN PROT01 (PAGE 366)** is adjusted to required protection type. Otherwise these setpoints are useless.*

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Analog Protection 1 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.6.0
Range [units]	the range is defined by an analog sensor curve		
Default value	the value is defined by an analog sensor curve	**Alternative config**	NO
Step	the step is defined by an 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 366)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT01 (PAGE 366)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT01 (PAGE 366)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 1 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.6.0
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 366)** is configured		
Description			
Delay for **AIN PROT01 (PAGE 366)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT01 (PAGE 366)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Subgroup: General Analog Inputs 2

Analog Protection 2 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.6.0
Range [units]	the range is defined by an analog sensor curve		
Default value	the value is defined by an analog sensor curve	**Alternative config**	NO
Step	the step is defined by an 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 367)** is configured		
Description			
Warning or history threshold level for **AIN PROT02 (PAGE 367)**. These setpoints are used only if LAI **AIN PROT02 (PAGE 367)** is adjusted to required protection type. Otherwise these setpoints are useless.			

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Analog Protection 2 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.6.0
Range [units]	the range is defined by an analog sensor curve		
Default value	the value is defined by an analog sensor curve	**Alternative config**	NO
Step	the step is defined by an 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 367)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT02 (PAGE 367)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT02 (PAGE 367)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 2 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.6.0
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 367)** is configured		
Description			
Delay for **AIN PROT02 (PAGE 367)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT02 (PAGE 367)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Subgroup: General Analog Inputs 3

Analog Protection 3 Wrn

Setpoint group	General Analog Inputs	**Related FW**	1.6.0
Range [units]	the range is defined by an analog sensor curve		
Default value	the value is defined by an analog sensor curve	**Alternative config**	NO
Step	the step is defined by an 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 368)** is configured		
Description			
Warning or history threshold level for **AIN PROT03 (PAGE 368)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT03 (PAGE 368)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 3 Sd

Setpoint group	General Analog Inputs	**Related FW**	1.6.0
Range [units]	the range is defined by an analog sensor curve		
Default value	the value is defined by an analog sensor curve	**Alternative config**	NO
Step	the step is defined by an 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 368)** is configured		
Description			
Shutdown or BOC threshold level for **AIN PROT03 (PAGE 368)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT03 (PAGE 368)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Analog Protection 3 Delay

Setpoint group	General Analog Inputs	**Related FW**	1.6.0
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 368)** is configured		
Description			
Delay for **AIN PROT03 (PAGE 368)**. ***Note:*** *These setpoints are used only if LAI **AIN PROT03 (PAGE 368)** is adjusted to required protection type. Otherwise these setpoints are useless.*			

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Group: Scheduler

Subgroup: Time & Date

Time

Setpoint group	Scheduler	**Related FW**	1.6.0
Range [units]	HH:MM:SS [-]		
Default value	00:00:00	**Alternative config**	NO
Step	[-]		
Comm object	24554	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Real time clock adjustment. ***Note:*** *RTC has no backup battery. This setpoint needs to be set-up after connection of +/- terminal.*			

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Date

Setpoint group	Scheduler	**Related FW**	1.6.0
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. ***Note:*** *RTC has no backup battery. This setpoint needs to be set-up after connection of +/- terminal.*			

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Time Stamp Period

Setpoint group	Scheduler	**Related FW**	1.6.0
Range [units]	0 .. 240 [min]		
Default value	60 min	**Alternative config**	NO
Step	1 min		
Comm object	8979	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

Time interval for periodic history records.

Note: *History record is made only when engine is running.*

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Summer Time Mode

Setpoint group	Scheduler	**Related FW**	1.6.0
Range [units]	Disabled / Winter / Summer / Winter - S / Summer - S [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	8727	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			

Behavior of switching between winter and summer time.

Disable	Automatic switching between summer and wintertime is disabled.
Winter (Summer)	Automatic switching between summer and wintertime is enabled and it is set to winter (summer) season.
Winter - S (Summer - S)	Modification for southern hemisphere.

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Subgroup: Timer 1

Timer 1 Function

Setpoint group	Scheduler	**Related FW**	1.6.0
Range [units]	Disable / No Func / TEST / MFail Blk / Test OnLd / 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 341)** 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.
Mode OFF	When this option is chosen then the binary output of timer is internally connected to the Remote OFF binary input.
TEST	When this option is chosen then the binary output of timer is internally connected to the binary input Remote TEST.
MFail Blk	When this option is chosen then the binary output of timer is internally connected to the Mains Fail Block binary input.
TEST OnLd	When this option is chosen then the binary output of timer is internally connected to the Remote TEST On Load binary input.

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Timer 1 Setup

Setpoint group	Scheduler	**Related FW**	1.6.0
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 230)**
- **Timer 1 Repetition (page 231)**
- **Timer 1 First Occur. Date (page 232)**
- **Timer 1 First Occur. Time (page 232)**
- **Timer 1 Duration (page 232)**
- **Timer 1 Repeated (page 233)**
- **Timer 1 Repeat Day (page 236)**
- **Timer 1 Day (page 235)**
- **Timer 1 Repeated Day In Week (page 236)**
- **Timer 1 Repeat Day In Month (page 236)**
- **Timer 1 Repeat Week In Month (page 237)**
- **Timer 1 Refresh Period (page 234)**
- **Timer 1 Weekends (page 235)**

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Timer 1 Repetition

Setpoint group	Scheduler	**Related FW**	1.6.0
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 230)**		
Description			

Defines repetition of **Timer 1 Function (page 230)**.

Off	**Timer 1 Function (page 230)** will not be activated.
Once	**Timer 1 Function (page 230)** will be activated only one time.
Repeated	**Timer 1 Function (page 230)** will be repeatedly activated.

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Timer 1 First Occur. Date

Setpoint group	Scheduler	**Related FW**	1.6.0
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 230)**		
Description			
Date of first occurrence of **Timer 1 Function (page 230)**.			

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Timer 1 First Occur. Time

Setpoint group	Scheduler	**Related FW**	1.6.0
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 230)**		
Description			
Time of first occurrence of **Timer 1 Function (page 230)**.			

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Timer 1 Duration

Setpoint group	Scheduler	**Related FW**	1.6.0
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 230)**		
Description			
Timer 1 Function (page 230) duration time.			

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Timer 1 Repeated

Setpoint group	Scheduler	**Related FW**	1.6.0
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 230)**		
Description			

Repeated interval of **Timer 1 Function (page 230)**.

Daily	**Timer 1 Function (page 230)** is repeated every day.
Weekly	**Timer 1 Function (page 230)** is repeated every week in chosen days.
Monthly	**Timer 1 Function (page 230)** is repeated in chosen day every month or in chosen days of chosen week of month
Short Period	**Timer 1 Function (page 230)** is repeated in adjusted period.

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Timer 1 Refresh Period

Setpoint group	Scheduler	**Related FW**	1.6.0
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 230)**		
Description			

Refresh period of **Timer 1 Function (page 230)**. Meaning of this setpoint depends on type of repetition adjusted in **Timer 1 Repeated (page 233)**.

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 230)**, the **Timer 1 Function (page 230)** 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 230)**, the **Timer 1 Function (page 230)** will be activated in selected days adjusted by **Timer 1 Day (page 235)**.
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 230)**, the **Timer 1 Function (page 230)** will be activated in selected day of month adjusted by **Timer 1 Repeat Day In Month (page 236)** or in selected days of week of month adjusted by **Timer 1 Day (page 235)** and **Timer 1 Repeat Week In Month (page 237)**.
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 230)**, the **Timer 1 Function (page 230)** will be activated.

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Timer 1 Weekends

Setpoint group	Scheduler	**Related FW**	1.6.0
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 230)**		
Description			

Behavior of **Timer 1 Function (page 230)** on weekends.

Including	**Timer 1 Function (page 230)** counter is running on the weekends and **Timer 1 Function (page 230)** can be active.
Skip	**Timer 1 Function (page 230)** counter is running on the weekends but **Timer 1 Function (page 230)** isn't active.
Postpone	**Timer 1 Function (page 230)** counter isn't running on the weekends and **Timer 1 Function (page 230)** isn't active. If the activation of timer is counted on the weekend, than timer will be activated after weekend. Another activation of timer is counted from original date of first occurrence date.

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Timer 1 Day

Setpoint group	Scheduler	**Related FW**	1.6.0
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 230)**		
Description			

Use this setpoint to include or exclude individual days of week. To select the day use Up and Down buttons. To change the value of day use Enter button.

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Timer 1 Repeat Day

Setpoint group	Scheduler	**Related FW**	1.6.0
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 230)**		
Description			

Use this setpoint to adjust behavior of monthly repetition of the **Timer 1 Function (page 230)**.

Repeated Day	Chose one day in month when **Timer 1 Function (page 230)** will be activated.
Repeated Day In Week	Chose days in one week when **Timer 1 Function (page 230)** will be activated.

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Timer 1 Repeated Day In Week

Setpoint group	Scheduler	**Related FW**	1.6.0
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 230)**		
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.*

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Timer 1 Repeat Day In Month

Setpoint group	Scheduler	**Related FW**	1.6.0
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 230)**		
Description			

Use this setpoint to chose the day in month when the **Timer 1 Function (page 230)** will be activated.

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Timer 1 Repeat Week In Month

Setpoint group	Scheduler	**Related FW**	1.6.0
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 230)**		
Description			
This setpoint adjust the week of month in which the **Timer 1 Function (page 230)** will be activated.			

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Group: Plug-In Modules

Slot A

Setpoint group	Plug-In Modules	**Related FW**	1.6.0
Range [units]	ENABLED / DISABLED [-]		
Default value	ENABLED	**Alternative config**	NO
Step	[-]		
Comm object	24280	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
This setpoint enable or disable module in slot A.			

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Group: CM-RS232-485

COM1 Mode

Setpoint group	CM-RS232-485	**Related FW**	1.6.0
Range [units]	Direct / MODBUS [-]		
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.

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COM1 Communication Speed

Setpoint group	CM-RS232-485	**Related FW**	1.6.0
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 237)**		
Description			
If the direct mode is selected on COM1 channel, the direct communication speed of controller part of line can be adjusted here. Speed of second part of line has to be adjusted to the same value. ***Note:*** *WinScope supports only 19200, 38400, 57600 speeds.*			

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COM1 MODBUS Communication Speed

Setpoint group	CM-RS232-485	**Related FW**	1.6.0
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 237)**		
Description			
If the MODBUS mode is selected on COM1 channel, the MODBUS communication speed can be adjusted here.			

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COM2 Mode

Setpoint group	CM-RS232-485	**Related FW**	1.6.0
Range [units]	Direct / MODBUS [-]		
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.

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COM2 Communication Speed

Setpoint group	CM-RS232-485	**Related FW**	1.6.0
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 239)**		
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.*

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COM2 MODBUS Communication Speed

Setpoint group	CM-RS232-485	**Related FW**	1.6.0
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 239)**		
Description			
If the MODBUS mode is selected on COM2 channel, the MODBUS communication speed can be adjusted here.			

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Group: CM-GPRS

Message Language

Setpoint group	CM-GPRS CM-4G-GPS CM-Ethernet	**Related FW**	1.6.0
Range [units]	Depends on CU languages [-]		
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* ***Language selection (page 83)*** *for more information.*

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

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Time Zone

Setpoint group	CM-GPRS CM-4G-GPS CM-Ethernet	**Related FW**	1.6.0
Range [units]	GMT-12:00 .. GMT+13:00 [hours]		
Default value	GMT+1:00 hour	**Alternative config**	NO
Step	[-]		
Comm object	24366	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint is used to select the time zone where the controller is located. See your computer time zone setting (click on the time indicator located in the rightmost position of the Windows task bar) if you are not sure about your time zone.

Note: *If the time zone is not selected properly the active e-mails may contain incorrect information about sending time, which may result in confusion when the respective problem actually occurred.*

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

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Event Message

Setpoint group	CM-GPRS CM-4G-GPS CM-Ethernet	**Related FW**	1.6.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	10926	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint enables or disables Event Messages.

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

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Wrn Message

Setpoint group	CM-GPRS CM-4G-GPS CM-Ethernet	**Related FW**	1.6.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	8482	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Wrn Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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BOC Message

Setpoint group	CM-GPRS CM-4G-GPS CM-Ethernet	**Related FW**	1.6.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	10566	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables BOC Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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Sd Messages

Setpoint group	CM-GPRS CM-4G-GPS CM-Ethernet	**Related FW**	1.6.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	8484	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Sd Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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Telephone Number 1

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.6.0
Range [units]	0 .. 31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24296	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

Enter in this setpoint either a valid GSM phone number where the alarm messages shall be sent. For GSM numbers use either the national format (i.e. the number you would dial if you wanted to make a local call) or the full international format beginning with a "+" character followed by the country prefix.

> **IMPORTANT: Telephone number has to be entered without spaces.**

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Group: CM-4G-GPS

Required Connection Type

Setpoint group	CM-4G-GPS	**Related FW**	1.6.0
Range [units]	2G / 3G / 4G / Automatic [-]		
Default value	Automatic	**Alternative config**	NO
Step	[-]		
Comm object	24132	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint adjusts preferred connection type of CM-4G-GPS module.			

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Message Language

Setpoint group	CM-GPRS CM-4G-GPS CM-Ethernet	**Related FW**	1.6.0
Range [units]	Depends on CU languages [-]		
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* ***Language selection (page 83)*** *for more information.*

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

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Time Zone

Setpoint group	CM-GPRS CM-4G-GPS CM-Ethernet	**Related FW**	1.6.0
Range [units]	GMT-12:00 .. GMT+13:00 [hours]		
Default value	GMT+1:00 hour	**Alternative config**	NO
Step	[-]		
Comm object	24366	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint is used to select the time zone where the controller is located. See your computer time zone setting (click on the time indicator located in the rightmost position of the Windows task bar) if you are not sure about your time zone.

Note: *If the time zone is not selected properly the active e-mails may contain incorrect information about sending time, which may result in confusion when the respective problem actually occurred.*

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

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Event Message

Setpoint group	CM-GPRS CM-4G-GPS CM-Ethernet	**Related FW**	1.6.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	10926	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint enables or disables Event Messages.

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

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Wrn Message

Setpoint group	CM-GPRS CM-4G-GPS CM-Ethernet	**Related FW**	1.6.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	8482	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Wrn Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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BOC Message

Setpoint group	CM-GPRS CM-4G-GPS CM-Ethernet	**Related FW**	1.6.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	10566	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables BOC Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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Sd Messages

Setpoint group	CM-GPRS CM-4G-GPS CM-Ethernet	**Related FW**	1.6.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	8484	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Sd Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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Telephone Number 1

Setpoint group	CM-GPRS; CM-4G-GPS	**Related FW**	1.6.0
Range [units]	0 .. 31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24296	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

Enter in this setpoint either a valid GSM phone number where the alarm messages shall be sent. For GSM numbers use either the national format (i.e. the number you would dial if you wanted to make a local call) or the full international format beginning with a "+" character followed by the country prefix.

> **IMPORTANT: Telephone number has to be entered without spaces.**

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Group: CM-Ethernet

Email Address 1

Setpoint group	CM-GPRS CM-4G-GPS CM-Ethernet	**Related FW**	1.6.0
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. Leave this setpoint blank if alarm and event email should not be send.			

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E-mail/SMS Language

Setpoint group	CM-GPRS; CM-4G-GPS; CM-Ethernet	**Related FW**	1.6.0
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 83)*** *more information.*

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

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Time Zone

Setpoint group	CM-GPRS CM-4G-GPS CM-Ethernet	**Related FW**	1.6.0
Range [units]	GMT-12:00 .. GMT+13:00 [hours]		
Default value	GMT+1:00 hour	**Alternative config**	NO
Step	[-]		
Comm object	24366	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint is used to select the time zone where the controller is located. See your computer time zone setting (click on the time indicator located in the rightmost position of the Windows task bar) if you are not sure about your time zone.

> ***Note:*** *If the time zone is not selected properly the active e-mails may contain incorrect information about sending time, which may result in confusion when the respective problem actually occurred.*

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

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Event Message

Setpoint group	CM-GPRS CM-4G-GPS CM-Ethernet	**Related FW**	1.6.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	10926	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

This setpoint enables or disables Event Messages.

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

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Wrn Message

Setpoint group	CM-GPRS CM-4G-GPS CM-Ethernet	**Related FW**	1.6.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	8482	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Wrn Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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BOC Message

Setpoint group	CM-GPRS CM-4G-GPS CM-Ethernet	**Related FW**	1.6.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	10566	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables BOC Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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Sd Messages

Setpoint group	CM-GPRS CM-4G-GPS CM-Ethernet	**Related FW**	1.6.0
Range [units]	ON / OFF [-]		
Default value	ON	**Alternative config**	NO
Step	[-]		
Comm object	8484	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
This setpoint enables or disables Sd Messages. This setpoint is common for CM-Ethernet, CM-GPRS and CM-4G-GPS modules.			

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SMTP UserName

Setpoint group	CM-Ethernet	**Related FW**	1.6.0
Range [units]	0 .. 31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24370	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Use this setpoint to enter the username for the SMTP server. Leave the setpoint blank if the SMTP server does not require authentication.			

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SMTP User Password

Setpoint group	CM-Ethernet	**Related FW**	1.6.0
Range [units]	0 .. 15 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24369	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Use this setpoint to enter the password for the SMTP server. Leave the setpoint blank if the SMTP server does not require authentication.			

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SMTP Server Address

Setpoint group	CM-Ethernet	**Related FW**	1.6.0
Range [units]	0 .. 31 characters [-]		
Default value	airgate.comap.cz:9925	**Alternative config**	NO
Step	[-]		
Comm object	24537	**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.			

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SMTP Sender Address

Setpoint group	CM-Ethernet	**Related FW**	1.6.0
Range [units]	0 .. 31 characters [-]		
Default value	[-]	**Alternative config**	NO
Step	[-]		
Comm object	24367	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			

Enter an existing email address into this setpoint. This address will be used as sender address in active e-mails that will be sent from the controller.

> ***Note:*** *It is not needed to enter an existing email address, nevertheless valid email format needs to be followed.*

> **IMPORTANT: This item is obligatory when emails are configured.**

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IP Address Mode

Setpoint group	CM-Ethernet	**Related FW**	1.6.0
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.

FIXED	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).
AUTOMATIC	The Ethernet connection setting is obtained **automatically from the DHCP server**. The obtained settings are then copied to the related setpoints. If the process of obtaining the settings from the DHCP server is not successful, the value *000.000.000.000* is copied to the setpoint IP address and the module continues to try to obtain the settings.

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IP Address

Setpoint group	CM-Ethernet	**Related FW**	1.6.0
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 253)**		
Description			

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

If **IP Address Mode (page 253)** 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 253)** is AUTOMATIC this setpoint is inactive. The IP address is assigned by the DHCP server.

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Subnet Mask

Setpoint group	CM-Ethernet	**Related FW**	1.6.0
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 253)**		
Description			
The setpoint is used to select the method how the Subnet Mask is adjusted. If **IP Address Mode (page 253)** 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 253)** is AUTOMATIC this setpoint is inactive. The Subnet Mask is assigned by the DHCP server.			

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Gateway IP

Setpoint group	CM-Ethernet	**Related FW**	1.6.0
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 253)**		
Description			
The setpoint is used to select the method how the Gateway IP is adjusted. If **IP Address Mode (page 253)** 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 253)** is ENABLED this setpoint is used to display the gateway IP address which has been assigned by the DHCP server. A gateway is a device which connects the respective segment with the other segments and/or Internet.			

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DNS Mode

Setpoint group	CM-Ethernet	**Related FW**	1.6.0
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 253)** 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 253)** is AUTOMATIC this setpoint is inactive. The DNS server IP address is assigned by the DHCP server.

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DNS Mode

Setpoint group	CM-Ethernet	**Related FW**	1.6.0
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 253)** 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 253)** is AUTOMATIC this setpoint is inactive. The DNS server IP address is assigned by the DHCP server.

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MODBUS Server

Setpoint group	CM-Ethernet	**Related FW**	1.6.0
Range [units]	DISABLED / ENABLED [-]		
Default value	Disabled	**Alternative config**	NO
Step	[-]		
Comm object	24337	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Only if relevant module is installed		
Description			
Enable or disable Modbus communication via ethernet interface.			

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Web Interface

Setpoint group	CM-Ethernet	**Related FW**	1.6.0
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 253)**		
Description			
The setpoint is used to enable/disable WebServer function.			

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Group: Alternate Config

Subgroup: Basic settings

Nominal RPM 1

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	100 .. 4000 [RPM]		
Default value	1 500 RPM	**Alternative config**	YES
Step	1 RPM		
Comm object	9915	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
Nominal engine speed (RPM revolutions per minute). ***Note:*** *This value is used when any other alternate configuration is not active.*			

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Nominal Frequency 1

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	45 .. 65 [Hz]		
Default value	50 Hz	**Alternative config**	YES
Step	1 Hz		
Comm object	9913	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Nominal system frequency (usually 50 or 60 Hz). ***Note:*** *This value is used when any other alternate configuration is not active.*			

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Nominal Voltage Ph-N 1

Setpoint group	Basic settings	**Related FW**	1.6.0
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 (page 165)**.		
Description			
Nominal system voltage (phase to neutral). ***Note:*** *This value is used when any other alternate configuration is not active.*			

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Nominal Voltage Ph-Ph 1

Setpoint group	Basic settings	**Related FW**	1.6.0
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 259)**.		
Description			
Nominal system voltage (phase to phase). ***Note:*** *This value is used when any other alternate configuration is not active.*			

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Nominal Power 1

Setpoint group	Basic settings	**Related FW**	1.6.0
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 207)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 165)** 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.*

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.*

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Nominal Power Split Phase 1

Setpoint group	Basic settings	**Related FW**	1.6.0
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 165)**		
Description			

Nominal power of the Gen-set for detected split-phase or mono phase connection. Generator **Overload BOC (page 207)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type (page 165)** is adjusted to Autodetect and Autodetect detects connection type as Monophase or Splitphase.*

Note: *This value is used when any other alternate configuration is not active.*

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Nominal Current 1

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	1 .. 10 000 [A]		
Default value	350 A	**Alternative config**	YES
Step	1 A		
Comm object	12049	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

It is current limit for generator current protections and means maximal continuous generator current. Nominal Current can be different from generator rated current value.

> ***Note:*** *This value is used when any other alternate configuration is not active.*

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Connection Type 1

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	Mono Phase / SplPh / 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)
3Ph4Wire	Grounded Star (Grounded Wye) connection – 3PY Three phase voltage measurement L1,L2,L3 with 120° phase shift 3x CT (Current Transformer)
3Ph3Wire	Ungrounded Delta connection Open Delta Ungrounded Wye Corner-Grounded Delta Split Phase Delta Three phase voltage measurement L1,L2,L3 with 120° phase shift

	No neutral is available 3x CT (Current Transformer)
High Leg D	High Leg Delta connection Three phase voltage measurement L1,L2,L3 3x CT (Current Transformer)
Autodetect	High Leg Delta L1 >=100V; L1 <=140V L2 >=140V L3 >=100V; L3 <=140V or 3PH3Wire or 3Ph4Wire L1 >=100V L2 >=100V L3 >=100V or SplPhL1L2 L1 >=100V L2 >=100V L3 <= 20V or SplPhL1L3 L1 >=100V L2 <= 20V L3 >=100V or Mono Phase L1 >=100V L2 <= 20V L3 <= 20V or ***Voltage Autodetect*** shutdown

Note: *This value is used when binary input* ***CONFIGURATION 2 (PAGE 317)*** *is active.*

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Nominal RPM 2

Setpoint group	Basic settings	**Related FW**	1.6.0
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* ***CONFIGURATION 2 (PAGE 317)*** *is active.*			

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Nominal Frequency 2

Setpoint group	Basic settings	**Related FW**	1.6.0
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* ***CONFIGURATION 2 (PAGE 317)*** *is active.*			

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Nominal Voltage Ph-N 2

Setpoint group	Basic settings	**Related FW**	1.6.0
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 263)**.		
Description			
Nominal system voltage (phase to neutral). ***Note:*** *This value is used when binary input* ***CONFIGURATION 2 (PAGE 317)*** *is active.*			

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Nominal Voltage Ph-Ph 2

Setpoint group	Basic settings	**Related FW**	1.6.0
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 263)**.		
Description			
Nominal system voltage (phase to phase). ***Note:*** *This value is used when binary input* ***CONFIGURATION 2 (PAGE 317)*** *is active.*			

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Nominal Power 2

Setpoint group	Basic settings	**Related FW**	1.6.0
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 207)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint* ***Connection type 2 (page 263)*** *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* ***CONFIGURATION 2 (PAGE 317)*** *is active.*

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.*

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Nominal Power Split Phase 2

Setpoint group	Basic settings	**Related FW**	1.6.0
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 2 (page 263)**		
Description			

Nominal power of the Gen-set for detected split-phase or mono phase connection. Generator **Overload BOC (page 207)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint* ***Connection type 2 (page 263)*** *is adjusted to Autodetect and Autodetect detects connection type as Monophase or Splitphase.*

Note: *This value is used when binary input* ***CONFIGURATION 2 (PAGE 317)*** *is active.*

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Nominal Current 2

Setpoint group	Basic settings	**Related FW**	1.6.0
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* ***CONFIGURATION 2*** *(****PAGE 317****) is active.*

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Connection type 2

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	Mono Phase / SplPh / 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)
3Ph4Wire	Grounded Star (Grounded Wye) connection – 3PY Three phase voltage measurement L1,L2,L3 with 120° phase shift 3x CT (Current Transformer)
3Ph3Wire	Ungrounded Delta connection Open Delta Ungrounded Wye Corner-Grounded Delta Split Phase Delta Three phase voltage measurement L1,L2,L3 with 120° phase shift

	No neutral is available 3x CT (Current Transformer)
High Leg D	High Leg Delta connection Three phase voltage measurement L1,L2,L3 3x CT (Current Transformer)
Autodetect	

High Leg Delta or	L1 >=100V; L1 <=140V L2 >=140V L3 >=100V; L3 <=140V
3PH3Wire or 3Ph4Wire or	L1 >=100V L2 >=100V L3 >=100V
SplPhL1L2 or	L1 >=100V L2 >=100V L3 <= 20V
SplPhL1L3 or	L1 >=100V L2 <= 20V L3 >=100V
Mono Phase or	L1 >=100V L2 <= 20V L3 <= 20V
Voltage Autodetect shutdown	

Note: *This value is used when binary input* ***CONFIGURATION 2*** *(PAGE 317) is active.*

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Nominal RPM 3

Setpoint group	Basic settings	**Related FW**	1.6.0
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* ***CONFIGURATION 3*** *(PAGE 317) is active.*

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Nominal Frequency 3

Setpoint group	Basic settings	**Related FW**	1.6.0
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* ***CONFIGURATION 3 (PAGE 317)*** *is active.*			

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Nominal Voltage Ph-N 3

Setpoint group	Basic settings	**Related FW**	1.6.0
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 267)**.		
Description			
Nominal system voltage (phase to neutral). ***Note:*** *This value is used when binary input* ***CONFIGURATION 3 (PAGE 317)*** *is active.*			

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Nominal Voltage Ph-Ph 3

Setpoint group	Basic settings	**Related FW**	1.6.0
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 267)**.		
Description			
Nominal system voltage (phase to phase). ***Note:*** *This value is used when binary input* ***CONFIGURATION 3 (PAGE 317)*** *is active.*			

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Nominal Power 3

Setpoint group	Basic settings	**Related FW**	1.6.0
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 207)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type 3 (page 267)** 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 **CONFIGURATION 3 (PAGE 317)** is active.*

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.*

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Nominal Power Split Phase 3

Setpoint group	Basic settings	**Related FW**	1.6.0
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 3 (page 267)**		
Description			

Nominal power of the Gen-set for detected split-phase or mono phase connection. Generator **Overload BOC (page 207)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type 3 (page 267)** is adjusted to Autodetect and Autodetect detects connection type as Monophase or Splitphase.*

Note: *This value is used when binary input **CONFIGURATION 3 (PAGE 317)** is active.*

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Nominal Power 3

Setpoint group	Basic settings	**Related FW**	1.6.0
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 207)** protection is based on this setpoint.

Note: *This setpoint is used when setpoint **Connection type 3 (page 267)** 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 **CONFIGURATION 3 (PAGE 317)** is active.*

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.*

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Nominal Current 3

Setpoint group	Basic settings	**Related FW**	1.6.0
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 **CONFIGURATION 3 (PAGE 317)** is active.*

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Connection type 3

Setpoint group	Basic settings	**Related FW**	1.6.0
Range [units]	Mono Phase / SplPh / 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)	
3Ph4Wire	Grounded Star (Grounded Wye) connection – 3PY Three phase voltage measurement L1,L2,L3 with 120° phase shift 3x CT (Current Transformer)	
3Ph3Wire	Ungrounded Delta connection Open Delta Ungrounded Wye Corner-Grounded Delta Split Phase Delta Three phase voltage measurement L1,L2,L3 with 120° phase shift No neutral is available 3x CT (Current Transformer)	
High Leg D	High Leg Delta connection Three phase voltage measurement L1,L2,L3 3x CT (Current Transformer)	
Autodetect	High Leg Delta	L1 >=100V; L1 <=140V L2 >=140V L3 >=100V; L3 <=140V
	or	
	3PH3Wire or 3Ph4Wire	L1 >=100V L2 >=100V L3 >=100V
	or	
	SplPhL1L2	L1 >=100V L2 >=100V L3 <= 20V
	or	
	SplPhL1L3	L1 >=100V L2 <= 20V L3 >=100V
	or	
	Mono Phase	L1 >=100V L2 <= 20V L3 <= 20V
	or	

	Voltage Autodetect shutdown

Note: *This value is used when binary input* ***CONFIGURATION 3*** *(****PAGE 317****) is active.*

back to List of setpoints

Subgroup: Engine settings

ECU Speed Adjustment 1

Setpoint group	Engine settings	**Related FW**	1.6.0
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**	1.6.0
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* ***CONFIGURATION 2*** *(****PAGE 317****) is active.*

back to List of setpoints

ECU Speed Adjustment 3

Setpoint group	Engine settings	**Related FW**	1.6.0
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* ***CONFIGURATION 3 (PAGE 317)*** *is active.*			

back to List of setpoints

8.1.3 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.

For full list of values go to the chapter **List of values (page 272)**.

Invalid flag

If valid data is not available for a particular value, the invalid flag is set to it. This situation may be due to the following:

- The value is not being evaluated in the scope of the current application and configuration.
- Sensor fail has been detected on an analog input.
- The configured ECU or extension module does not provide the particular value.
- The communication with the ECU or extension module is interrupted.

A value containing the invalid flag is displayed as "####" in InteliConfig and on the controller screen. If such a value is read out via MODBUS, it will contain the data 32768 in the case of signed values and 65535 in the case of unsigned values.

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Group: Engine

DEF Level

Value group	Engine	**Related FW**	1.6.0
Units	%		
Comm object	14522	**Related applications**	AMF, MRS
Description			
The level of diesel exhaust fluid tank.			

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DPF Ash Load

Value group	Engine	**Related FW**	1.6.0
Units	%		
Comm object	12483	**Related applications**	AMF, MRS
Description			
Indicates the ash load percentage of diesel particulate filter (DPF).			

back to List of values

DPF Soot Load

Value group	Engine	**Related FW**	1.6.0
Units	%		
Comm object	12484	**Related applications**	AMF, MRS
Description			
Indicates the soot load percentage of diesel particulate filter (DPF).			

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ECU AIN 1

Value group	Engine	**Related FW**	1.6.0
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.*			

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ECU AIN 2

Value group	Engine	Related FW	1.6.0
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.*			

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ECU AIN 3

Value group	Engine	Related FW	1.6.0
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.*			

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ECU AIN 4

Value group	Engine	Related FW	1.6.0
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.*			

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ECU AIN 5

Value group	Engine	Related FW	1.6.0
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.*			

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ECU AIN 6

Value group	Engine	Related FW	1.6.0
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.*			

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ECU AIN 7

Value group	Engine	Related FW	1.6.0
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.*			

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ECU AIN 8

Value group	Engine	Related FW	1.6.0
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.*			

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ECU AIN 9

Value group	Engine	Related FW	1.6.0
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.*			

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ECU-AIN-EXT-1

Value group	Engine	Related FW	1.6.0
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.*			

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ECU Frequency Select

Value group	Engine	Related FW	1.6.0
Units	-		
Comm object	12926	Related applications	AMF, MRS
Description			
Shows selected frequency of ECU. The value is calculated from setpoint **Nominal Frequency (page 168)**. › If is **Nominal Frequency (page 168)** 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 168)** in range from 55 Hz to 65 Hz, is considered as 60 Hz application. The value is set to 1.			

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ECU State

Value group	Engine	Related FW	1.6.0
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			

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RPM

Value group	Engine	Related FW	1.6.0
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

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Speed Request

Value group	Engine	Related FW	1.6.0
Units	%		
Comm object	10137	Related applications	AMF
Description			

This value contains the speed control signal expressed in %.

Speed request	Requested speed	Accelerator pedal position
0%	1350 RPM	0%
50%	1500 RPM	50%
100%	1650 RPM	100%

Note: *Accelerator pedal position will be 0 if the engine is not running or loaded.*

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Speed Requied RPM

Value group	Engine	Related FW	1.6.0
Units	RPM		
Comm object	10006	Related applications	AMF, MRS
Description			

This value contains the speed which is currently requested by the controller from the attached ECU.

This value is used for digital interfacing (via a communication bus) with ECUs that require the requested speed directly in RPM.

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Group: Generator

Generator Frequency

Value group	Generator	**Related FW**	1.6.0
Units	Hz		
Comm object	8210	**Related applications**	AMF, MRS
Description			
Frequency of generator.			

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Generator Voltage L1-L2

Value group	Generator	**Related FW**	1.6.0
Units	V		
Comm object	9628	**Related applications**	AMF, MRS
Description			
Generator phase to phase voltage between L1 and L2 phases.			

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Generator Voltage L1-N

Value group	Generator	**Related FW**	1.6.0
Units	V		
Comm object	8192	**Related applications**	AMF, MRS
Description			
Generator voltage on phase 1.			

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Generator Voltage L2-L3

Value group	Generator	**Related FW**	1.6.0
Units	V		
Comm object	9629	**Related applications**	AMF, MRS
Description			
Generator phase to phase voltage between L2 and L3 phases.			

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Generator Voltage L2-N

Value group	Generator	**Related FW**	1.6.0
Units	V		
Comm object	8193	**Related applications**	AMF, MRS
Description			
Generator voltage on phase 2.			

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Generator Voltage L3-L1

Value group	Generator	**Related FW**	1.6.0
Units	V		
Comm object	9630	**Related applications**	AMF, MRS
Description			
Generator phase to phase voltage between L3 and L1 phases.			

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Generator Voltage L3-N

Value group	Generator	**Related FW**	1.6.0
Units	V		
Comm object	8194	**Related applications**	AMF, MRS
Description			
Generator voltage on phase 3.			

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Nominal Current

Value group	Generator	**Related FW**	1.6.0
Units	A		
Comm object	9978	**Related applications**	AMF, MRS
Description			
Generator nominal current.			

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Nominal Power

Value group	Generator	**Related FW**	1.6.0
Units	V		
Comm object	9018	**Related applications**	AMF, MRS
Description			
Generator nominal power.			

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Nominal Voltage

Value group	Generator	**Related FW**	1.6.0
Units	V		
Comm object	9917	**Related applications**	AMF, MRS
Description			
Generator nominal voltage.			

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Group: Load

Load A L1

Value group	Load	Related FW	1.6.0
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.*			

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Load A L2

Value group	Load	Related FW	1.6.0
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.*			

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Load A L3

Value group	Load	Related FW	1.6.0
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.*			

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Load Characteristic

Value group	Load	Related FW	1.6.0
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).			

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Load Characteristic L1

Value group	Load	Related FW	1.6.0
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).			

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Load Characteristic L2

Value group	Load	Related FW	1.6.0
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).			

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Load Characteristic L3

Value group	Load	Related FW	1.6.0
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).			

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Load kVA

Value group	Load	Related FW	1.6.0
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.*			

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Load kVA L1

Value group	Load	Related FW	1.6.0
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.*			

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Load kVA L2

Value group	Load	Related FW	1.6.0
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.*			

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Load kVA L3

Value group	Load	Related FW	1.6.0
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.*			

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Load kVAr

Value group	Load	Related FW	1.6.0
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.*			

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Load kVAr L1

Value group	Load	Related FW	1.6.0
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.*			

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Load kVAr L2

Value group	Load	Related FW	1.6.0
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	1.6.0
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.*			

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Load kW

Value group	Load	Related FW	1.6.0
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.*			

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Load kW L1

Value group	Load	Related FW	1.6.0
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.*			

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Load kW L2

Value group	Load	Related FW	1.6.0
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.*			

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Load kW L3

Value group	Load	Related FW	1.6.0
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.*			

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Load Power Factor

Load	Load	Related FW	1.6.0
Units	[-]		
Comm object	8204	Related applications	AMF, MRS
Description			
Generator power factor.			

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Load Power Factor L1

Load	Load	**Related FW**	1.6.0
Units	[-]		
Comm object	8533	**Related applications**	AMF, MRS
Description			
Generator power factor in phase L1.			

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Load Power Factor L2

Load	Load	**Related FW**	1.6.0
Units	[-]		
Comm object	8534	**Related applications**	AMF, MRS
Description			
Generator power factor in phase L2.			

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Load Power Factor L3

Load	Load	**Related FW**	1.6.0
Units	[-]		
Comm object	8535	**Related applications**	AMF, MRS
Description			
Generator power factor in phase L3.			

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Group: Mains

Mains Frequency

Value group	Mains	**Related FW**	1.6.0
Units	Hz		
Comm object	8211	**Related applications**	AMF
Description			
Frequency of Mains.			

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Mains Voltage L1-L2

Value group	Mains	**Related FW**	1.6.0
Units	V		
Comm object	9631	**Related applications**	AMF
Description			
Mains phase to phase voltage between L1 and L2 phases.			

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Mains Voltage L1-N

Value group	Mains	Related FW	1.6.0
Units	V		
Comm object	8195	Related applications	AMF
Description			
Mains voltage on phase 1.			

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Mains Voltage L2-L3

Value group	Mains	Related FW	1.6.0
Units	V		
Comm object	9632	Related applications	AMF
Description			
Mains phase to phase voltage between L2 and L3 phases.			

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Mains Voltage L2-N

Value group	Mains	Related FW	1.6.0
Units	V		
Comm object	8196	Related applications	AMF
Description			
Mains voltage on phase 2.			

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Mains Voltage L3-L1

Value group	Mains	Related FW	1.6.0
Units	V		
Comm object	9633	Related applications	AMF
Description			
Mains phase to phase voltage between L3 and L1 phases.			

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Mains Voltage L3-N

Value group	Mains	Related FW	1.6.0
Units	V		
Comm object	8197	Related applications	AMF
Description			
Mains voltage on phase 3.			

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Group: Controler I/O

Analog Input 1

Value group	Controler I/O	**Related FW**	1.6.0
Units	Configurable		
Comm object	9151	**Related applications**	AMF, MRS
Description			
This is the value of the analog input 1 of the controller.			

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Analog Input 2

Value group	Controler I/O	**Related FW**	1.6.0
Units	Configurable		
Comm object	9152	**Related applications**	AMF, MRS
Description			
This is the value of the analog input 2 of the controller.			

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Analog Input 3

Value group	Controler I/O	**Related FW**	1.6.0
Units	Configurable		
Comm object	9153	**Related applications**	AMF, MRS
Description			
This is the value of the analog input 3 of the controller.			

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Battery Volts

Value group	Controler I/O	**Related FW**	1.6.0
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**	1.6.0
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	1.6.0
Units	[-]		
Comm object	8239	**Related applications**	AMF, MRS
Description			
State of the binary outputs of the controller.			

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D+

Value group	Controler I/O	Related FW	1.6.0
Units	V		
Comm object	10603	**Related applications**	AMF, MRS
Description			
D+ terminal voltage.			

back to List of values

E-Stop

Value group	Controler I/O	Related FW	1.6.0
Units	%		
Comm object	15780	**Related applications**	AMF, MRS
Description			
Shows number of E-STOP input – the same principle of visualization like binary inputs. Principle of value (principle of normally close binary input): › 1 – E-STOP has voltage – state is OK › 0 – E-STOP has no voltage – protection is active			

back to List of values

Group: Statistics

Genset kWh

Value group	Statistics	Related FW	1.6.0
Units	kWh		
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	1.6.0
Units	kWh		
Comm object	8205	**Related applications**	AMF, MRS
Description			
Counter of Gen-set active power. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Mains kVArh

Value group	Statistics	Related FW	1.6.0
Units	kVArh		
Comm object	11026	**Related applications**	AMF
Description			
Counter of mains reactive power. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Mains kWh

Value group	Statistics	Related FW	1.6.0
Units	kWh		
Comm object	11025	**Related applications**	AMF
Description			
Counter of mains active power. ***Note:*** *This value can be also switch into one decimal power format (via InteliConfig PC tool). In this case the range of value is decrease 10 times.*			

back to List of values

Maintenance 1

Value group	Statistics	Related FW	1.6.0
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 203)**.			

back to List of values

Maintenance 2

Value group	Statistics	Related FW	1.6.0
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 203)**.			

back to List of values

Maintenance 3

Value group	Statistics	Related FW	1.6.0
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 204)**.			

back to List of values

Num E-Stops

Value group	Statistics	Related FW	1.6.0
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	1.6.0
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

Running Hours

Value group	Statistics	Related FW	1.6.0
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	1.6.0
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	1.6.0
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	1.6.0
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	1.6.0
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 165)**.			

back to List of values

Engine State

Value group	IL Info	Related FW	1.6.0
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	1.6.0
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	1.6.0
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	1.6.0
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

SPI Module A

Value group	IL Info	Related FW	1.6.0
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	1.6.0
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	1.6.0
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	1.6.0
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	1.6.0
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	1.6.0
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	1.6.0
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	1.6.0
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	1.6.0
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	1.6.0
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	1.6.0
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	1.6.0
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	1.6.0
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	1.6.0
Units	[-]		
Comm object	11898	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	**Related FW**	1.6.0
Units	[-]		
Comm object	24146	**Related applications**	AMF, MRS
Description			
The type of data connection.			

back to List of values

Cell Error Rate

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.6.0
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 Diag Codes

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.6.0
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 Signal Lev

Value group	CM-GPRS; CM-4G-GPS	**Related FW**	1.6.0
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	**Related FW**	1.6.0
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	**Related FW**	1.6.0
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	**Related FW**	1.6.0
Units	[-]		
Comm object	24146	**Related applications**	AMF, MRS
Description			
The type of data connection.			

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Cell Diag Codes

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.6.0
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 Error Rate

Value group	CM-GPRS; CM-4G-GPS (4G part)	**Related FW**	1.6.0
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	**Related FW**	1.6.0
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	**Related FW**	1.6.0
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	**Related FW**	1.6.0
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**	1.6.0
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**	1.6.0
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	1.6.0
Units	[-]		
Comm object	24182	**Related applications**	AMF, MRS
Description			
Current gateway address.			

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Current IP Address

Value group	CM-Ethernet	Related FW	1.6.0
Units	[-]		
Comm object	24184	**Related applications**	AMF, MRS
Description			
Current IP address of the controller.			

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Last Email Results

Value group	CM-Ethernet	Related FW	1.6.0
Units	[-]		
Comm object	24332	**Related applications**	AMF, MRS
Description			

Result of last email, which was sent by controller.

Code	Description
0	Email was successfully sent.
2	It is not possible to establish connection with SMTP server.
3	SMTP server is not ready for communication.
8	HELO command was refused.
9	EHLO command was refused.
11	AUTH LOGIN command was refused.
12	Wrong user name.
13	Wrong password.
14	MAIL FROM command was refused.
15	RCPT TO command was refused.
16	DATA command was refused.
17	Sending of email failed.
20	QUIT command was refused.
25	It is impossible to create data for command DATA.
26	It is impossible to read data for command DATA.
27	Email address can’t be read.
30	SMTP server address translation error (from DNS server).
31	Error reading email content data (24327).

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MAC Address

Value group	CM-Ethernet	Related FW	1.6.0
Units	[-]		
Comm object	24333	**Related applications**	AMF, MRS
Description			

Current MAC address of the controller ethernet interface.

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Current Subnet Mask

Value group	CM-Ethernet	Related FW	1.6.0
Units	[-]		
Comm object	24183	Related applications	AMF, MRS
Description			
Current subnet mask.			

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Group: Date/Time

Time

Value group	Date/Time	Related FW	1.6.0
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	1.6.0
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	1.6.0
Units	[-]		
Comm object	14291	Related applications	AMF, MRS
Description			
Binary inputs from extension module in slot A.			

back to List of values

8.1.4 Logical binary inputs

What Logical binary inputs are:

Logical binary inputs are inputs for binary values and functions.

Alphabetical groups of Logical binary inputs

LBI: A 309
LBI: B 309
LBI: C 317
LBI: D 319
LBI: E 319
LBI: F 320
LBI: G 321
LBI: H 321
LBI: M 322
LBI: N 323
LBI: O 324
LBI: P 324
LBI: R 324
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For full list of Logical binary inputs go to the chapter **Logical binary inputs alphabetically (page 308)**.

Logical binary inputs alphabetically

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AMF Start Block 309
BIN Protection 1 309
BIN Protection 02 310
BIN Protection 03 310
BIN Protection 04 311
BIN Protection 05 311
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BIN Protection 10 314
BIN Protection 11 314
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Configuration 2 317
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Choke Inhibit 318
Dark Mode 319
ECU Key Switch 319
Emergency Stop 319
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MCB Feedback 323
Not Used 323
Oil Pressure 324
Protection Enable 324
Regeneration Inhib 324
Remote AUTO 325
Remote MAN 325
Remote OFF 325
Remote Start/Stop 326
Rem TEST On Load 326
Remote TEST 327
Sd Override 328

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LBI: A

AMF Function

Related FW	1.6.0	Related applications	AMF
Comm object	692		
Description			
This binary input can switch controller function between AMF and MRS. ***Note:*** *Binary input "AMF function" has higher priority than the setpoint* ***Operation Mode (page 170)*** *in Basic settings.*			

back to Logical binary inputs alphabetically

AMF Start Block

Related FW	1.6.0	Related applications	AMF
Comm object	211		
Description			
This binary input can allow or block the AMF start. In case of running Gen-set in AUTO mode Gen-set goes to cooling procedure and stops.			

back to Logical binary inputs alphabetically

LBI: B

BIN Protection 1

Related FW	1.6.0	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	1.6.0	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	1.6.0	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	1.6.0	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	1.6.0	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	1.6.0	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	1.6.0	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	1.6.0	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	1.6.0	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	1.6.0	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	1.6.0	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	1.6.0	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	1.6.0	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	1.6.0	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	1.6.0	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	1.6.0	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

LBI: C

Configuration 2

Related FW	1.6.0	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 340) 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

Configuration 3

Related FW	1.6.0	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 340) is used, change of alternate configuration can be made only in prestart phase. So prestart has to be set up for enough long time.**

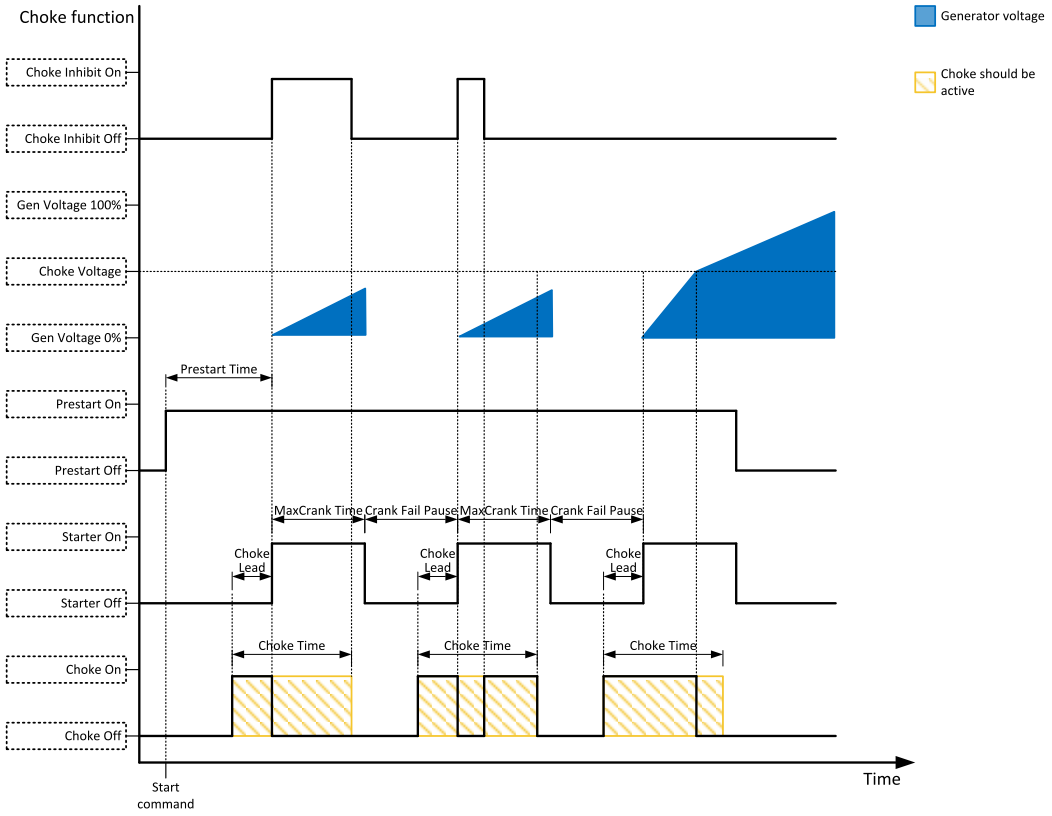
back to Logical binary inputs alphabetically

Choke Inhibit

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	946		

Description

Logical binary input CHOKE INHIBIT prevent Choke functionality when logical binary output **CHOKE (PAGE 338)** 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

LBI: D

Dark Mode

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	930		
Description			

This binary input activates function of dark mode. It means that backlight of display is turn off (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 then 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	1.6.0	Related applications	AMF, MRS
Comm object	951		
Description			

This binary input is used to switch on **ECU Power Relay (page 340)**, 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 340)** is active too.

When this binary input is inactive, function of **ECU Power Relay (page 340)** is not affected.

back to Logical binary inputs alphabetically

Emergency Stop

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	40		
Description			

The shutdown procedure will start immediately when this input is activated. Input is inverted (NC = normally 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	1.6.0	**Related applications**	AMF, MRS
Comm object	191		
Description			
Binary input has the same function as Fault Reset button on the InteliLite 9 front panel.			

back to Logical binary inputs alphabetically

Force Regeneration

Related FW	1.6.0	**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 Pump On/Off

Related FW	1.6.0	**Related applications**	AMF, MRS
Comm object	694		
Description			
This binary input is used for manual control of binary output **FUEL PUMP (PAGE 342)**. The output is deactivated automatically as soon as fuel level reaches 100 %. ***Note:*** *This binary input is basically designed for ON and OFF switch (switch with arrestment in these positions) because controller reacts to rising and falling edge of signal in this input.* **IMPORTANT: When binary input FUEL PUMP ON/OFF (PAGE 320) is configured then binary output FUEL PUMP (PAGE 342) is control by this binary input.** **IMPORTANT: It is necessary to configure analog input FUEL LEVEL (PAGE 369) for proper function of this binary input.**			

back to Logical binary inputs alphabetically

LBI: G

GCB Feedback

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	63		
Description			

Use this input for indication whether the generator circuit breaker is open or closed.

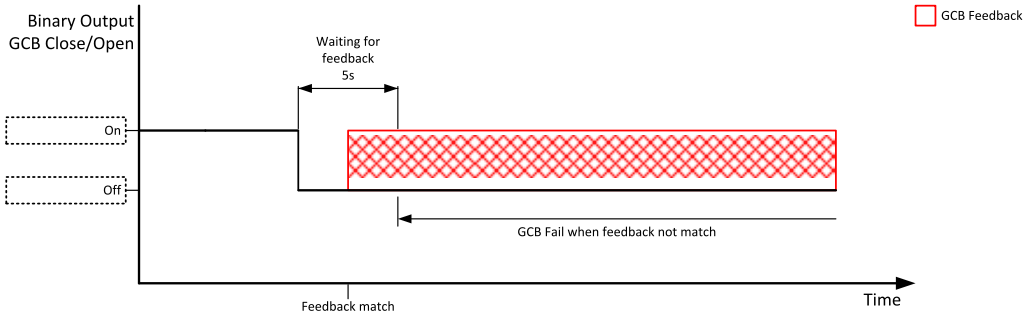


Image 8.18 GCB Feedback 1

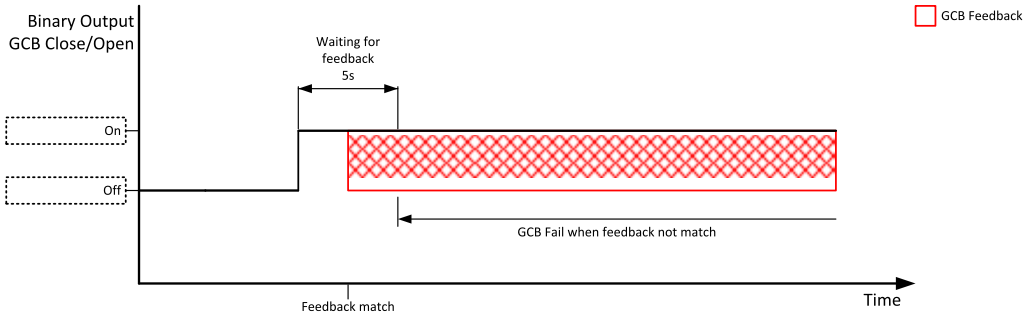


Image 8.19 GCB Feedback 2

Note: *InteliLite 9 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	1.6.0	Related applications	AMF, MRS
Comm object	192		
Description			

Binary input has the same function as Horn reset button on the InteliLite 9 front panel.

back to Logical binary inputs alphabetically

LBI: M

Mains Fail Block

Related FW	1.6.0	**Related applications**	AMF
Comm object	622		
Description			

If the input is active, the automatic start of the Gen-set at Mains failure is blocked. In case of running Gen-set in AUTO mode, timer **Mains Return Delay (page 216)** is started and when it elapses GCB is opened, Gen-set goes to cooling procedure and stops. When GCB is opened after **Transfer Delay (page 217)** the MCB is closed.

Note: *This input simulates healthy Mains.*

back to Logical binary inputs alphabetically

MCB Feedback

Related FW	1.6.0	Related applications	AMF
Comm object	65		
Description			

Use this input for indication whether the mains circuit breaker is open or closed.

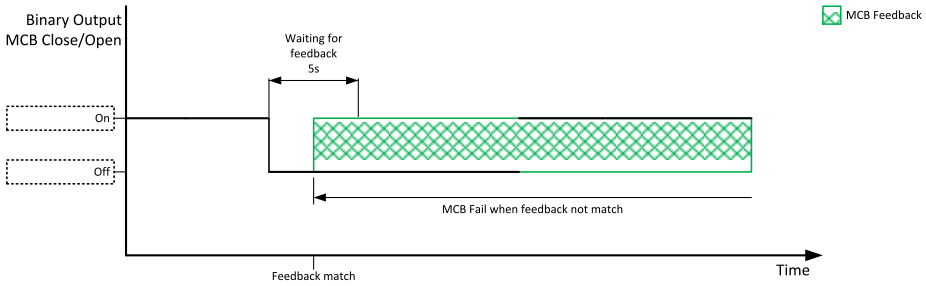


Image 8.20 MCB Feedback 1

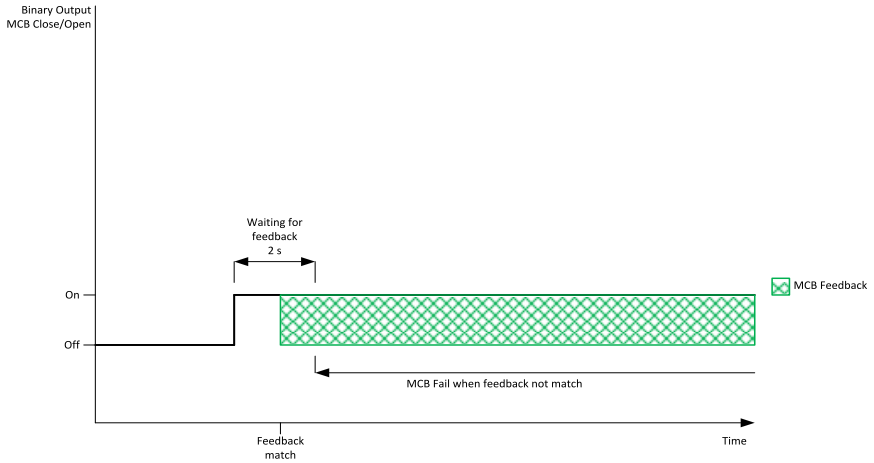


Image 8.21 MCB Feedback 2

Note: *InteliLite 9 controller can work even without breaker feedbacks, in this case do not configure the feedback to binary inputs.*

back to Logical binary inputs alphabetically

LBI: N

Not Used

Related FW	1.6.0	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	1.6.0	Related applications	AMF, MRS
Comm object	43		
Description			

Binary input for **OIL PRESSURE (PAGE 371)** 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 active then oil pressure is OK and is higher than starting oil pressure.

Note: *In case that you want to use this binary input of oil pressure sensor just for protection please use one of the* ***BIN PROTECTION 1 (PAGE 309)****.*

back to Logical binary inputs alphabetically

LBI: P

Protection Enable

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	920		
Description			

This logic binary input enables or disables protections adjusted as LBI Enable.

back to Logical binary inputs alphabetically

LBI: R

Regeneration Inhib

Related FW	1.6.0	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	1.6.0	Related applications	AMF, MRS
Comm object	620		
Description			
The controller is switched to the AUTO mode (there are fourthree modes OFF / MAN / AUTO / TEST) when this binary input is active. 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 MAN

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	618		
Description			
The controller is switched to the MAN mode (there are fourthree modes OFF / MAN / AUTO / TEST) when this binary input is active. 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	1.6.0	Related applications	AMF, MRS
Comm object	617		
Description			
The controller is switched to the OFF mode (there are fourthree modes OFF / MAN / AUTO / TEST) when this binary input is active. 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	1.6.0	Related applications	AMF, MRS
Comm object	38		

Description

Use this input to start and stop the Gen-set in AUTO mode.

Note: *If the binary input Remote Start/Stop is active and engine is running and mains failure occurs, the MCB breaker opens, after* ***Transfer Delay (page 217)*** *the GCB breaker is closed. Once the mains is OK, the* ***Mains Return Delay (page 216)*** *elapses and the GCB breaker is opened. Then after* ***Transfer Delay (page 217)*** *is MCB breaker closed. Gen-set remains running as long as binary input Rem Start/Stop is active. For more details see timing diagram below.*

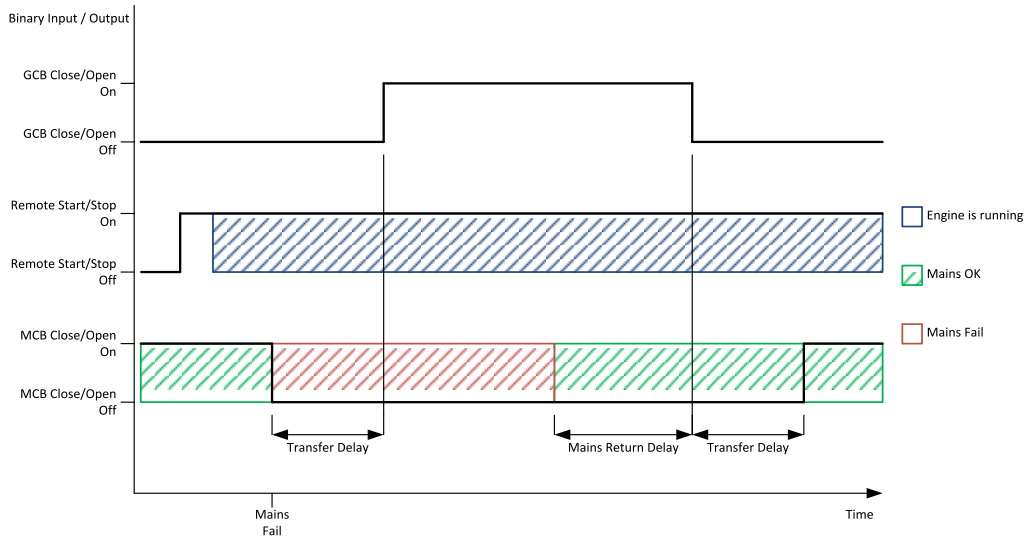


Image 8.22 Remote Start/Stop

Taken action in AMF application (AUTO Mode)	
Active	› Start the Gen-set and stay running with opened GCB if Mains OK. › Go to Island if Mains fails (due to AMF function). › If Mains is not OK the AMF function starts the Gen-set to Island anyway.
Inactive	› Stop the Gen-set if Mains is OK › If Mains not OK the Gen-set stays running due to AMF function anyway.

Taken action in MRS application (AUTO Mode)	
Active	› Starts the Gen-set – No delay › Close GCB
Inactive	› Open GCB › Stop the Gen-set – No delay

back to Logical binary inputs alphabetically

Rem TEST On Load

Related FW	1.6.0	Related applications	AMF

Comm object	61
Description	

Closing of the GCB in MRS or transferring of the load from the mains to Gen-set in AMF.

Application	TEST	Remote TEST On Load
MRS	Gen-set started and running until the TEST mode deactivated.	**Active:** Gen-set is put to TEST mode. On the top of it the GCB is closed. The same behavior like the **REMOTE START/STOP (PAGE 326)**. **Inactive:** Gen-set comes back to the original mode and behaves accordingly to this mode and other conditions.
AMF	Gen-set started and running until the TEST mode deactivated.	**Active:** Gen-set is put to TEST mode. On the top of it the load is transferred to the Gen-set. The open load transfer is performed. **Inactive:** Gen-set comes back to the original mode and behaves accordingly to this mode and other conditions. (the load can be transferred back to the mains (OFF, AUTO) or stay on the Gen-set (MAN).

back to Logical binary inputs alphabetically

Remote TEST

Related FW	1.6.0	Related applications	AMF
Comm object	621		
Description			

The controller is switched to the TEST mode (there are four modes OFF / MAN / AUTO / TEST) when this binary input is active. When opens controller is switched back to previous mode.

Remote control priority:

- Remote OFF (Highest priority)
- Remote TEST
- Remote MAN
- Remote AUTO (Lowest Priority)

back to Logical binary inputs alphabetically

LBI: S

Sd Override

Related FW	1.6.0	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 328) 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!**

> ***Note:*** *User protection Sd Override is not blocked*

back to Logical binary inputs alphabetically

8.1.5 Logical binary outputs

What Logical binary outputs are:

Logical binary outputs are outputs for binary values and functions.

Alphabetical groups of Logical binary outputs

LBO: A 331
LBO: C 338
LBO: E 339
LBO: F 342
LBO: G 343
LBO: H 350
LBO: I 351
LBO: M 351
LBO: N 357
LBO: P 357
LBO: R 359
LBO: S 361
LBO: V 363

For full list of Logical binary inputs go to the chapter **Logical binary outputs alphabetically (page 330)**.

Logical binary outputs alphabetically

AL AIN 1 Sd+BOC 331
AL AIN 1 Wrn 331
AL AIN 2 Sd+BOC 331
AL AIN 2 Wrn 331
AL AIN 3 Sd+BOC 331
AL AIN 3 Wrn 332
AL Battery Flat 332
AL Battery Overvoltage .. 332
AL Battery Undervoltage .332
AL Battery Voltage 332
AL Common BOC 333
AL Common Fls 333
AL Common Sd 333
AL Common Wrn 333
AL CoolantTemp Low 334
AL CoolantTemp Sd 334
AL CoolantTemp Wrn 334
AL D+ Fail 334
AL Fuel Level Sd 334
AL Fuel Level Wrn 335
AL Mains Fail 335
AL Maintenance 1 335
AL Maintenance 2 335
AL Maintenance 3 335
AL Oil Press Sd 336
AL Oil Press Wrn 336
AL Overcurrent 336
AL Overload BOC 336
AL Overload Wrn 336
AL Overspeed 337
AL Underspeed 337
Alarm 337
ATT DEF Level Lamp 337
ATT Filter Lamp 337
ATT HEST Lamp 338
ATT Inhibited Lamp 338
ATT SCR Error Lamp 338
Choke 338
Cooling Pump 339
ECU Communic Error 339
ECU Communic OK 339
ECU Power Relay 340
ECU Red Lamp 340
ECU Run Stop 341
ECU Wait To Start 341
ECU Yellow Lamp 341
Exercise Timer 1 341
Fault Reset 342
Frequency Select 342
Fuel Pump 342
Fuel Solenoid 342
GCB Close/Open 343
GCB OFF Coil 345
GCB ON Coil 346
GCB UV Coil 346
Generator Healthy 348
Glow Plugs 348
Horn 350
Idle/Nominal 351
Mains Healthy 351
MCB Close/Open 351
MCB OFF Coil 353
MCB ON Coil 354
MCB UV Coil 355
Mode AUTO 356
Mode MAN 357
Mode OFF 357
Mode TEST 357
Not In AUTO 357
Not Used 357
Prestart 357
Ready To AMF 359
Ready To Load 359
Ready 360
360
Running 360
Starter 361
Stop Pulse 362
Stop Solenoid 362
Ventilation 363
Ventilation On Pulse 363
Ventilation Off Pulse 364

back to Controller objects

LBO: A

AL AIN 1 Sd+BOC

Related FW	1.6.0	**Related applications**	AMF, MRS
Comm object	1386		
Description			
The output is active 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	1.6.0	**Related applications**	AMF, MRS
Comm object	1382		
Description			
the output is active 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	1.6.0	**Related applications**	AMF, MRS
Comm object	1387		
Description			
the output is active when there is the shutdown or BOC alarm from the analog input 2 of the controller present in the alarmlist or isn't confirmed.			

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AL AIN 2 Wrn

Related FW	1.6.0	**Related applications**	AMF, MRS
Comm object	1383		
Description			
the output is active 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	1.6.0	**Related applications**	AMF, MRS
Comm object	1388		
Description			
the output is active 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	1.6.0	Related applications	AMF, MRS
Comm object	1384		
Description			
the output is active 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	1.6.0	Related applications	AMF, MRS
Comm object	1292		
Description			
This output is active when the **Sd Battery Flat (page 398)** or **Wrn Battery Undervoltage (page 391)** alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Battery Overvoltage

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	1995		
Description			
This output is active when the **Wrn Battery Overvoltage (page 391)** alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Battery Undervoltage

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	1994		
Description			
This output is active when the **Wrn Battery Undervoltage (page 391)** alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Battery Voltage

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	1293		
Description			
This output is active when the **Wrn Battery Overvoltage (page 391)** or **Wrn Battery Undervoltage (page 391)** alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Common BOC

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	9		
Description			
Output is activated when any BOC alarm appears. The output opens, if: › No BOC alarm is active and › Fault reset button is pressed			

back to Logical binary outputs alphabetically

AL Common FIs

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	6		
Description			
Output is activated 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	1.6.0	Related applications	AMF, MRS
Comm object	4		
Description			
Output is activated 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	1.6.0	Related applications	AMF, MRS
Comm object	3		
Description			
Output is activated 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	1.6.0	Related applications	AMF, MRS
Comm object	1295		
Description			
the output is active when there is the Wrn Coolant Temperature Low (page 387) alarm from the COOLANT TEMP (PAGE 369) in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL CoolantTemp Sd

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	1421		
Description			
the output is active when there is the shutdown or BOC alarm from the COOLANT TEMP (PAGE 369) in the alarmlist or isn't confirmed.			

Logical binary outputs alphabetically (page 330)

AL CoolantTemp Wrn

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	1420		
Description			
the output is active when there is the warning alarm from the COOLANT TEMP (PAGE 369) in the alarmlist or isn't confirmed. ***Note:*** *Binary output is also active if protection type is set to HistRecOnl and threshold level for history record is reach.*			

back to Logical binary outputs alphabetically

AL D+ Fail

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	1260		
Description			
This output is active when the Wrn Charging Alternator Fail (page 387) alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Fuel Level Sd

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	1423		
Description			
the output is active when there is the shutdown or BOC alarm from the FUEL LEVEL (PAGE 369) in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL Fuel Level Wrn

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	1422		
Description			
The output is active when there is the warning alarm from the **FUEL LEVEL (PAGE 369)** 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 Mains Fail

Related FW	1.6.0	Related applications	AMF
Comm object	197		
Description			
Output for signaling Mains Failure. This output is active when at least one mains frequency BOC or Sd alarm or at least one mains voltage BOC or Sd alarm is present in alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL Maintenance 1

Related FW	1.6.0	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	1.6.0	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	1.6.0	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	1.6.0	Related applications	AMF, MRS
Comm object	1419		
Description			
the output is active when there is the shutdown alarm from the **OIL PRESSURE (PAGE 371)** in the alarmlist or isn't confirmed.			

back to Logical binary outputs alphabetically

AL Oil Press Wrn

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	1418		
Description			
the output is active when there is the warning alarm from the **OIL PRESSURE (PAGE 371)** in the alarmlist or isn't confirmed. ***Note:*** *Binary output is also active if protection type is set to HistRecOnl and threshold level for history record is reach.*			

back to Logical binary outputs alphabetically

AL Overcurrent

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	109		
Description			
This output is active when the **BOC Short Circuit (page 394)** alarm is present in alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Overload BOC

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	1268		
Description			
This output is active when the **Sd Overload (page 398)** alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Overload Wrn

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	1269		
Description			
This output is active when the **Wrn Overload (page 387)** alarm is present in alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Overspeed

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	779		
Description			
This output is active when the Sd Overspeed (page 399) alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

AL Underspeed

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	1296		
Description			
This output is active when the Sd Underspeed (page 400) alarm is present in the alarmlist or isn't confirm.			

back to Logical binary outputs alphabetically

Alarm

Related FW	1.6.0	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	1.6.0	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	1.6.0	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	1.6.0	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	1.6.0	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	1.6.0	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: C

Choke

Related FW	1.6.0	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 361)** 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	1.6.0	Related applications	AMF, MRS
Comm object	40		
Description			

This output is dedicated for coolant pump control. It is activated in the moment the Gen-set is started and remains active until the Gen-set is stopped and **After Cooling Time (page 192)** elapses or the cranking pause or the Emergency Stop occurs or the controller is switched to OFF mode.

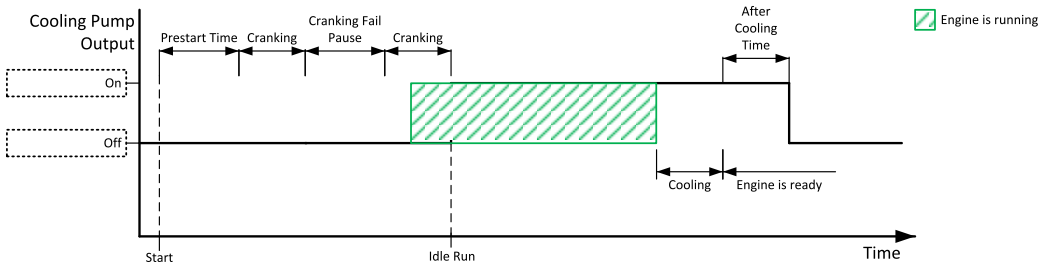


Image 8.23 Cooling Pump

back to Logical binary outputs alphabetically

LBO: E

ECU Communic Error

Related FW	1.6.0	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 340) is not configured, output is evaluated all the time. If ECU POWER RELAY (PAGE 340) is configured, output is evaluated only when engine is not stop (ECU POWER RELAY (PAGE 340) is active).*

back to Logical binary outputs alphabetically

ECU Communic OK

Related FW	1.6.0	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 340) is not configured, output is evaluated all the time. If ECU POWER RELAY (PAGE 340) is configured, output is evaluated only when engine is not stop (ECU POWER RELAY (PAGE 340) is active).*

back to Logical binary outputs alphabetically

ECU Power Relay

Related FW	1.6.0	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 is activated together with **PRESTART (PAGE 357)** and remains active for the entire duration that the engine is running. It is deactivated at the moment that the engine comes to a stop (i.e. together with the **FUEL SOLENOID (PAGE 342)**).

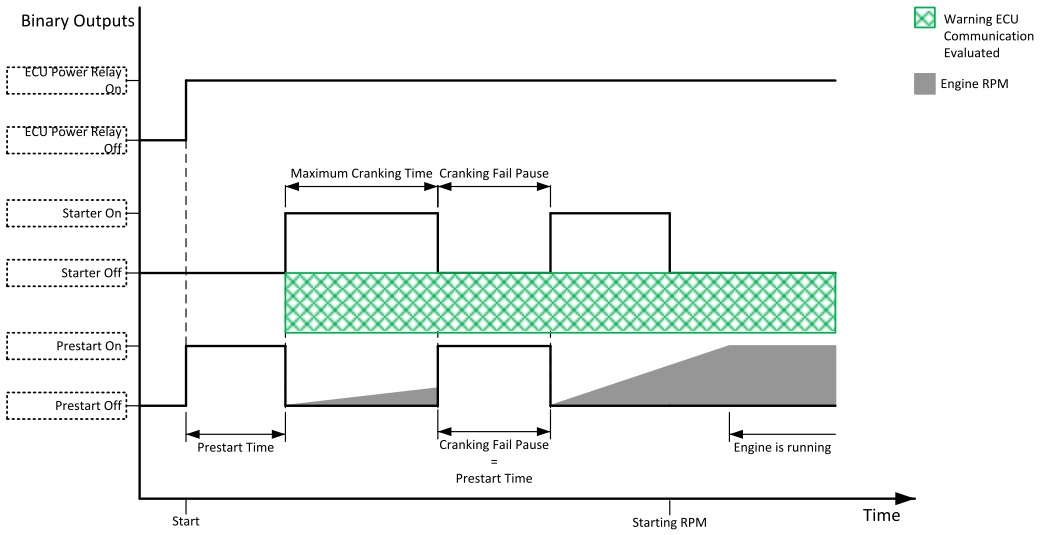


Image 8.24 ECU Power Relay

> **IMPORTANT: This LBO also affects evaluation of Sd ECU Communication Fail (page 394) or Wrn ECU Communication Fail (page 381) 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	1.6.0	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	1.6.0	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	1.6.0	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	1.6.0	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	1.6.0	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 230)** subgroup. This output is active when Timer 1 is active.			

back to Logical binary outputs alphabetically

LBO: F

Fault Reset

Related FW	1.6.0	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 (page 320)** is activated.			

back to Logical binary outputs alphabetically

Frequency Select

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	1815		
Description			
The Frequency select output is active when Nominal Frequency (Frequency Settings) is equal to 50 Hz and is deactivated when Nominal Frequency (Frequency Settings) is equal to 60 Hz.			

back to Logical binary outputs alphabetically

Fuel Pump

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	1253		
Description			
Output is activated when the value of Fuel Level lies under the value of setpoint **Fuel Pump On (page 201)** and is deactivated when value of **Fuel Pump Off (page 202)** is reached. This output also can be activated by binary input **Fuel Pump On/Off (page 320)**. In this case the binary output is active until the binary input **Fuel Pump On/Off (page 320)** is active or until the value of Fuel Level reaches 100 % or the time set by setpoint **Transfer Wrn Delay (page 200)** elapsed.			

back to Logical binary outputs alphabetically

Fuel Solenoid

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	22		
Description			
This output controls the fuel solenoid valve.			

The output is activated before binary output **STARTER (PAGE 361)**.The lead time is adjusted by setpoint **Fuel Solenoid Lead (page 186)**.

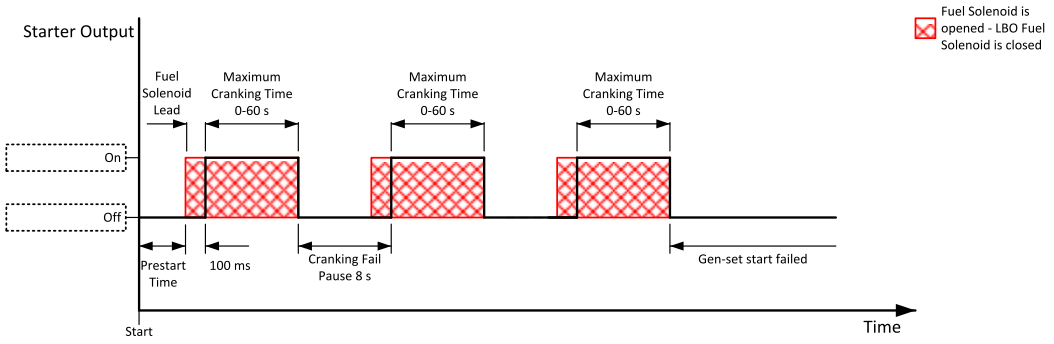


Image 8.25 Fuel Solenoid 1

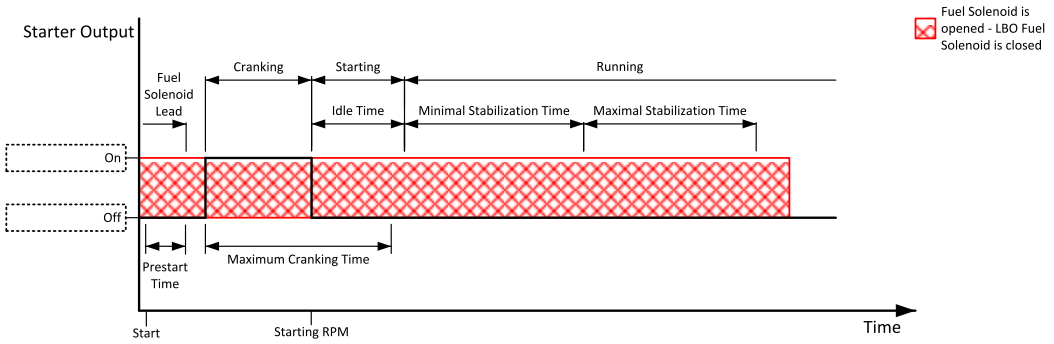


Image 8.26 Fuel Solenoid 2

The output is deactivated 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	1.6.0	**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 9 controllers can work even without breaker feedbacks, in this case do not configure the feedback to binary inputs.*

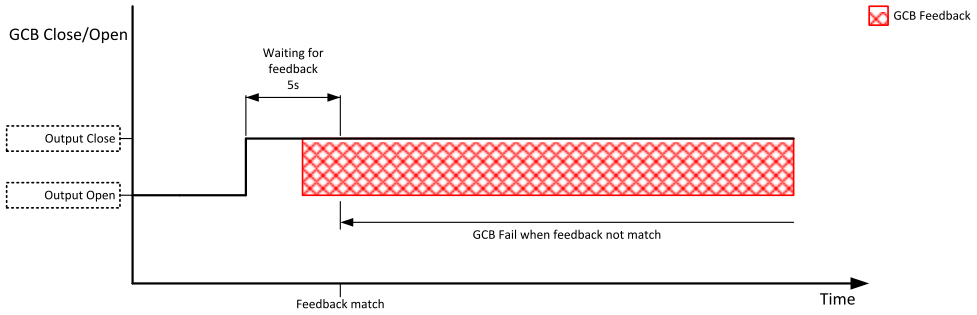


Image 8.27 GCB Close command

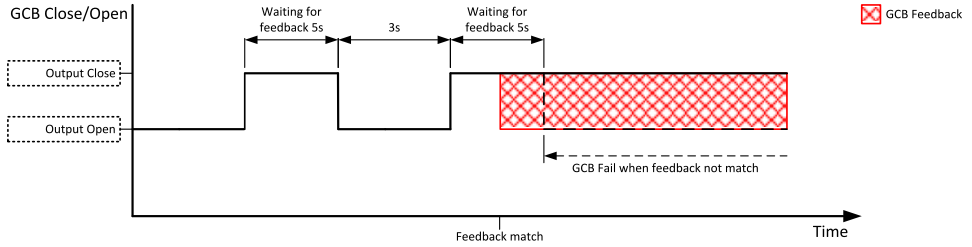


Image 8.28 Repeated GCB Close command

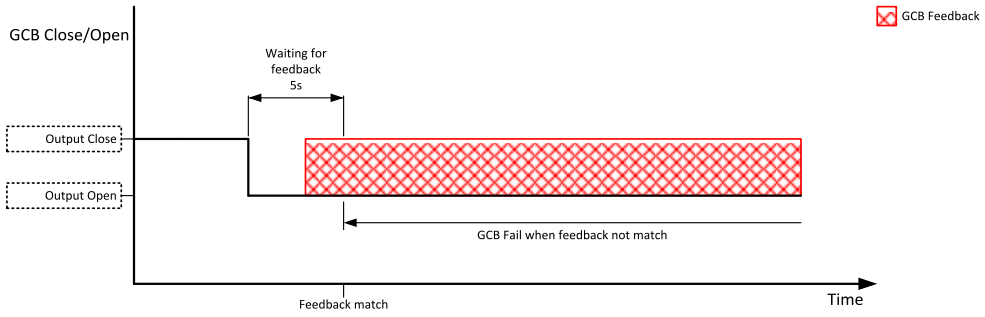


Image 8.29 GCB Open command

back to Logical binary outputs alphabetically

GCB OFF Coil

Related FW	1.6.0	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.

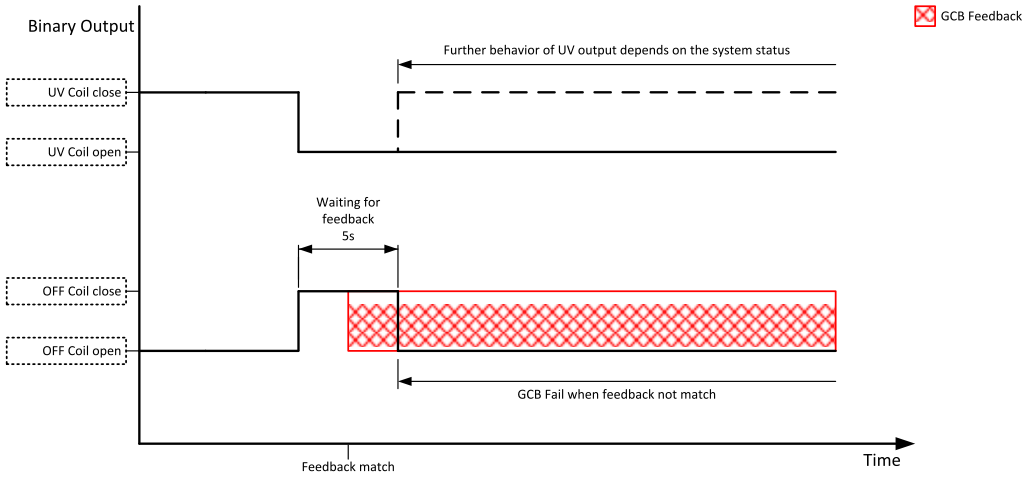


Image 8.30 GCB OFF Coil command

back to Logical binary outputs alphabetically

GCB ON Coil

Related FW	1.6.0	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.			

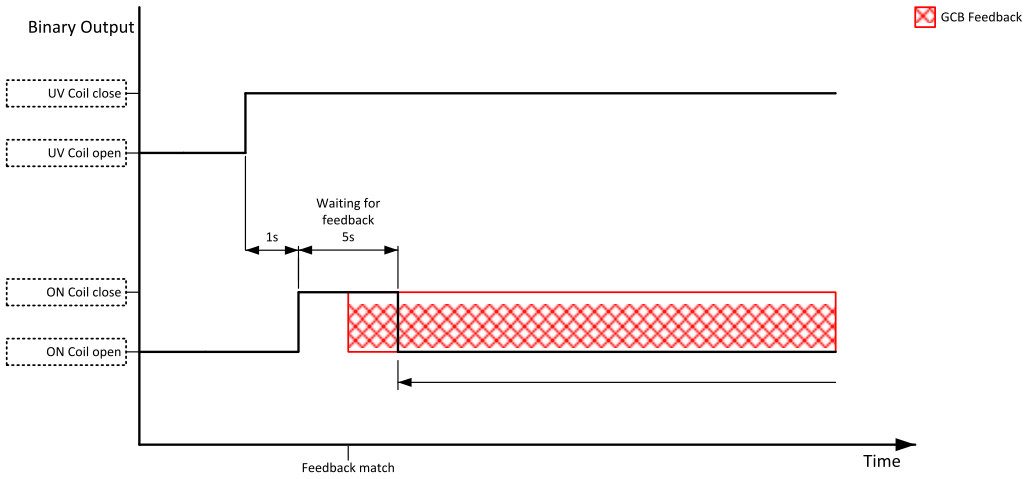


Image 8.31 GCB ON Coil close command

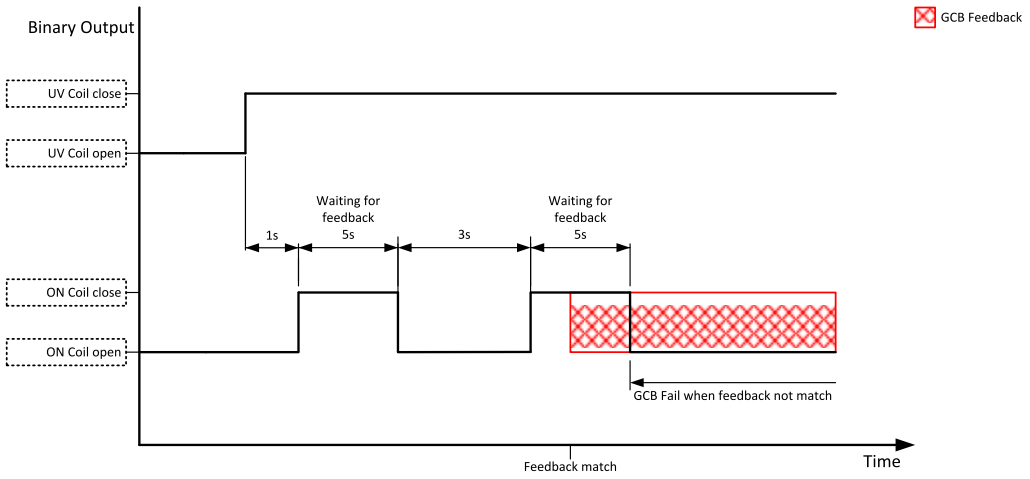


Image 8.32 Repeated GCB ON coil close command

back to Logical binary outputs alphabetically

GCB UV Coil

Related FW	1.6.0	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.

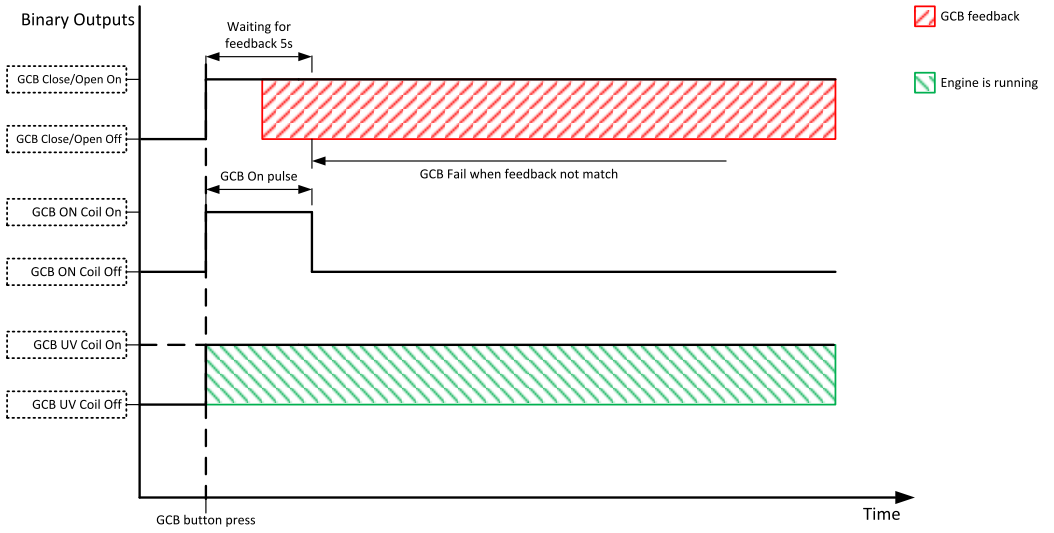


Image 8.33 GCB UV Coil close command

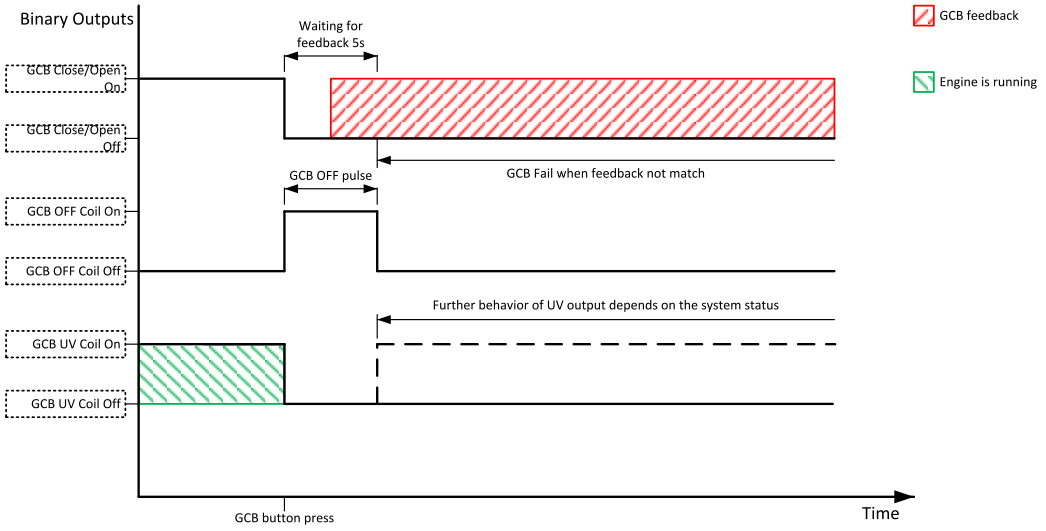


Image 8.34 GCB UV Coil open command

back to Logical binary outputs alphabetically

Generator Healthy

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	77		
Description			

This output is active when the generator voltage and frequency is within limits. It is deactivated:

- immediately when the voltage/frequency gets out of limits (when GCB is not closed)

  or

- with an appropriate delay after the voltage/frequency has got out of limits (when GCB is closed)

back to Logical binary outputs alphabetically

Glow Plugs

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	1252		
Description			

This output is dedicated for diesel engine only. This output will be active for exact time pre-set by setpoint **Glow Plugs Time (page 178)** before every starting attempt. The output is deactivated at the same time as the **STARTER (PAGE 361)** output is activated (100 ms after **PRESTART (PAGE 357)** output is deactivated).

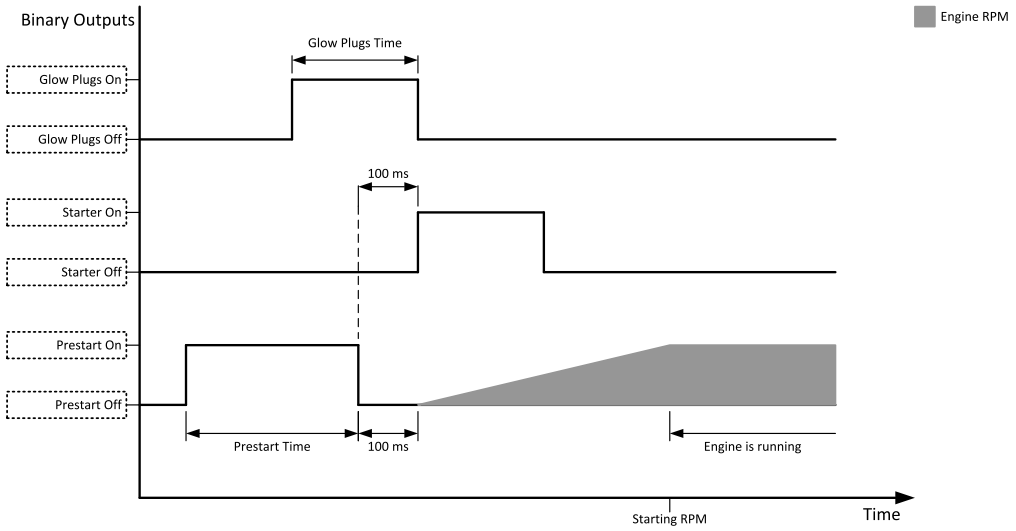


Image 8.35 Glow Plugs

When the **Glow Plugs Time (page 178)** is longer than **Cranking Fail Pause (page 176)** then the **Glow Plugs Time (page 178)** in **Cranking Fail Pause (page 176)** is long as **Cranking Fail Pause (page 176)**.

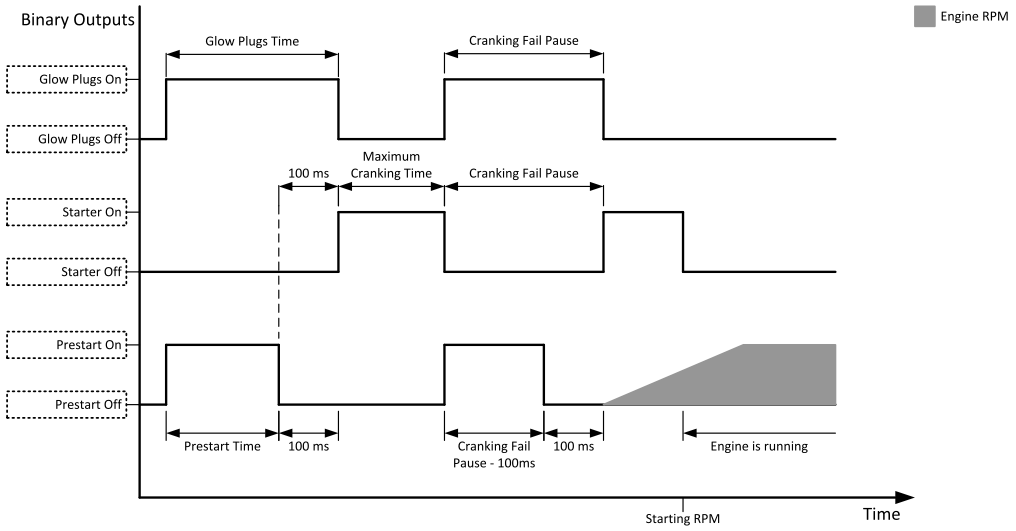


Image 8.36 Glow Plugs in Cranking Fail Pause 1

When the **Glow Plugs Time (page 178)** is shorter than **Cranking Fail Pause (page 176)** then the **Glow Plugs Time (page 178)** in **Cranking Fail Pause (page 176)** is long as normal **Glow Plugs Time (page 178)**.

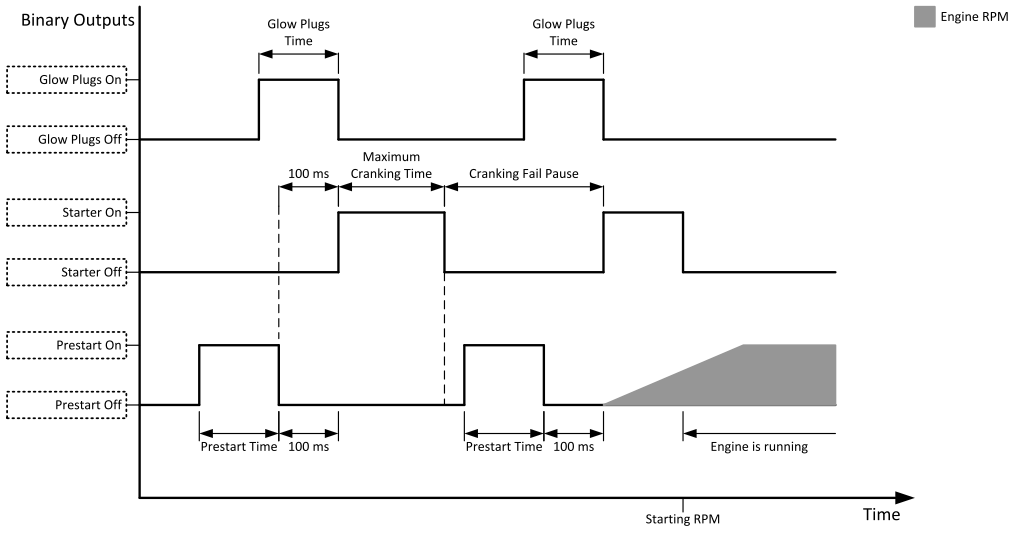


Image 8.37 Glow Plugs in Cranking Fail Pause 2

back to Logical binary outputs alphabetically

LBO: H

Horn

Related FW	1.6.0	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 172)** has elapsed			

back to Logical binary outputs alphabetically

LBO: I

Idle/Nominal

Related FW	1.6.0	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 is activated after the timer **Idle Time (page 186)** elapses. The **Idle Time (page 186)** starts to countdown when **Starting RPM (page 177)** reached. The underspeed protection is not evaluated during fixed 5 seconds period after reaching **Starting RPM (page 177)**. A Start Fail protection occurs if the RPM drop below 2RPM during idle.

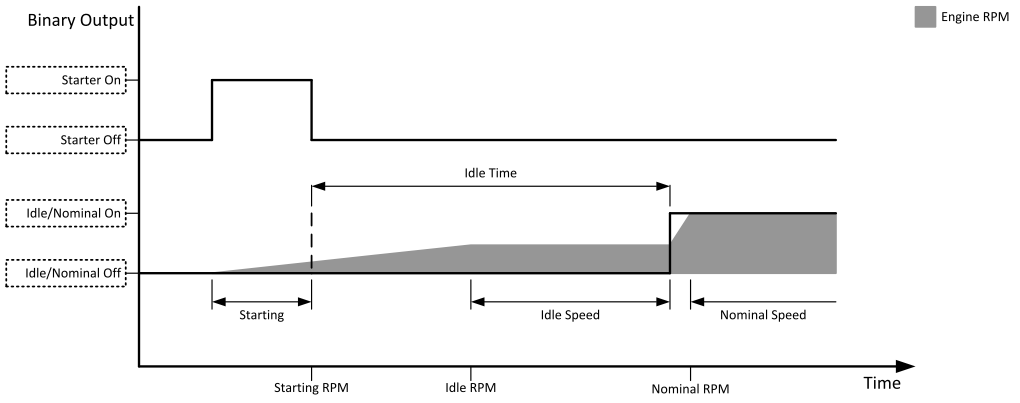


Image 8.38 Idle/Nominal

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

LBO: M

Mains Healthy

Related FW	1.6.0	Related applications	AMF
Comm object	78		
Description			

This output is active while Mains failure is not detected and Mains voltage and frequency is within limits.

back to Logical binary outputs alphabetically

MCB Close/Open

Related FW	1.6.0	Related applications	AMF

Comm object	45

Description

The output controls the mains circuit breaker. Its state represents the breaker position requested by the controller. The breaker must react within 5 seconds to a close or open command, otherwise an alarm is issued.

> ***Note:*** *InteliLite 9 controllers can work even without breaker feedbacks, in this case do not configure the feedback to binary inputs.*

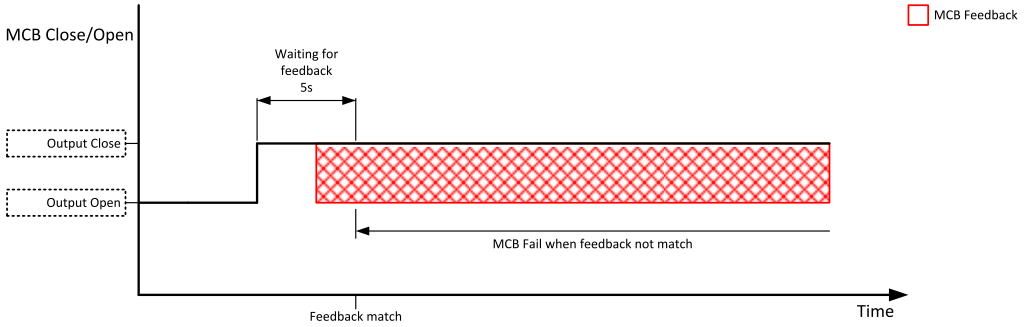


Image 8.39 MCB Close command

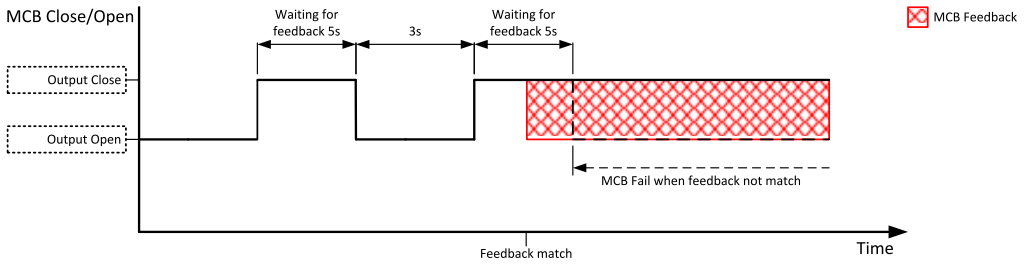


Image 8.40 Repeated MCB Close command

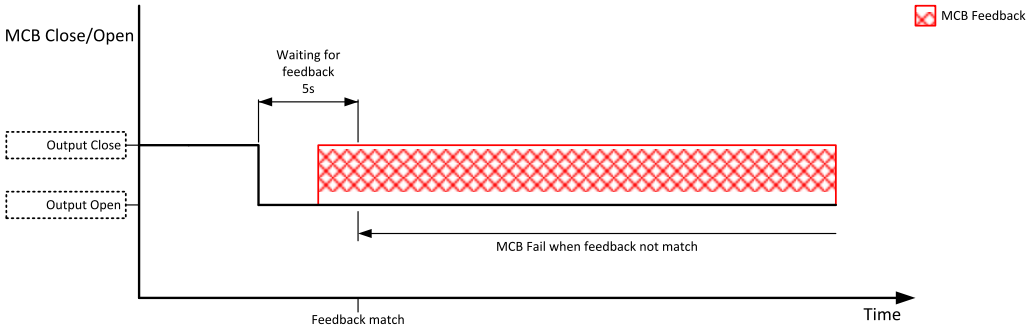


Image 8.41 MCB Open command

back to Logical binary outputs alphabetically

MCB OFF Coil

Related FW	1.6.0	Related applications	AMF
Comm object	47		

Description

The output is intended for control of open coil of mains circuit breaker. The output gives a pulse in the moment the breaker has to be opened. The pulse lasts until the feedback deactivates, but at least for 5 seconds.

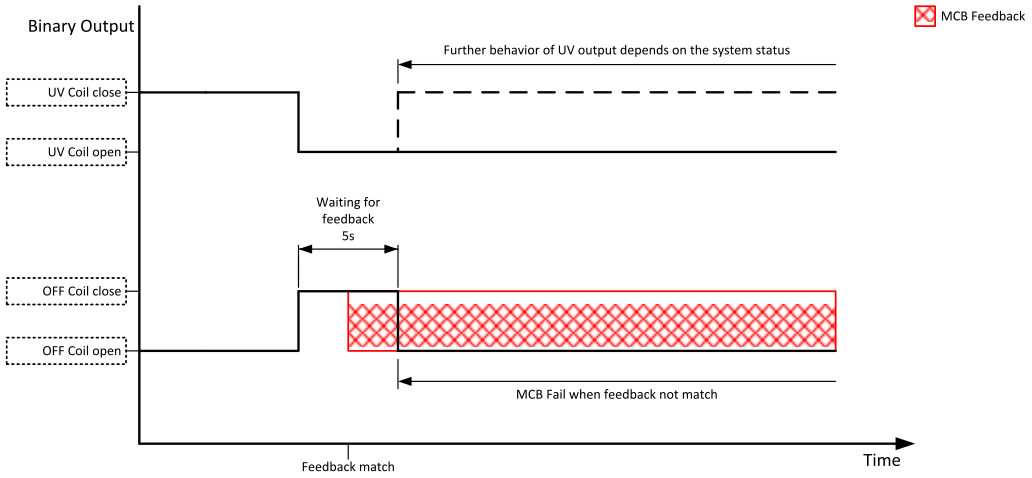


Image 8.42 MCB OFF Coil command

back to Logical binary outputs alphabetically

MCB ON Coil

Related FW	1.6.0	Related applications	AMF
Comm object	46		

Description

The output is intended for control of close coil of mains circuit breaker. The output gives at least 5 second pulse in the moment the breaker has to be closed.

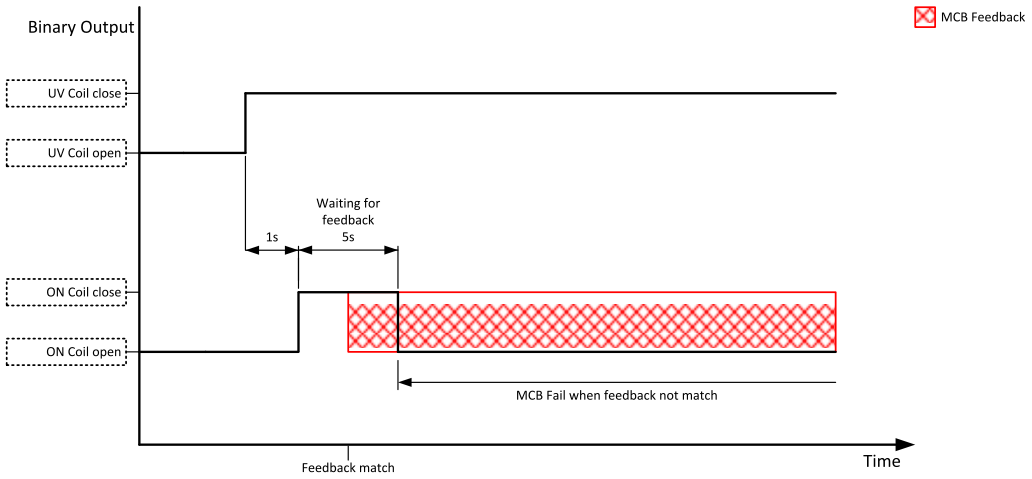


Image 8.43 MCB ON Coil close command

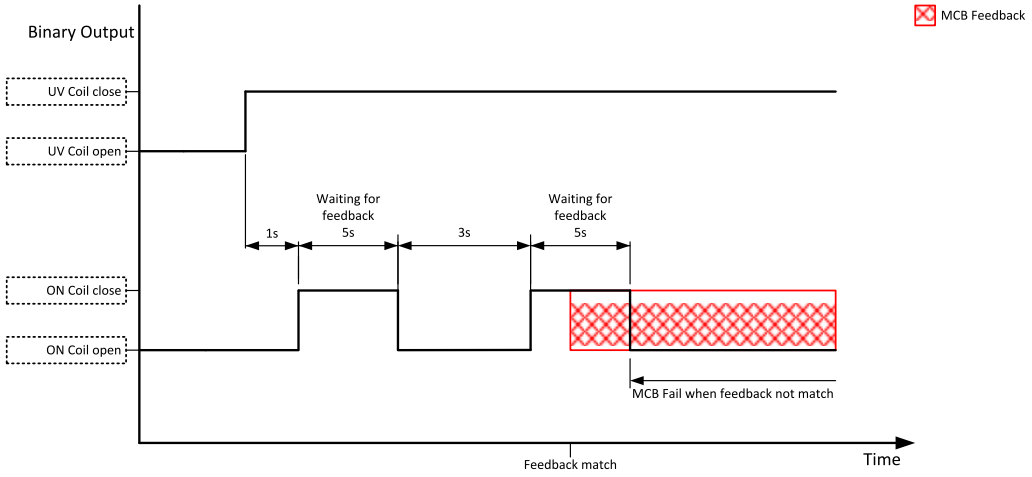


Image 8.44 Repeated MCB ON coil close command

back to Logical binary outputs alphabetically

MCB UV Coil

Related FW	1.6.0	Related applications	AMF
Comm object	48		

Description

The output is intended for control of undervoltage coil of mains circuit breaker. The output is active the whole time when the controller is switched on. The output is deactivated for at least 5 seconds in the moment the breaker has to be switched off.

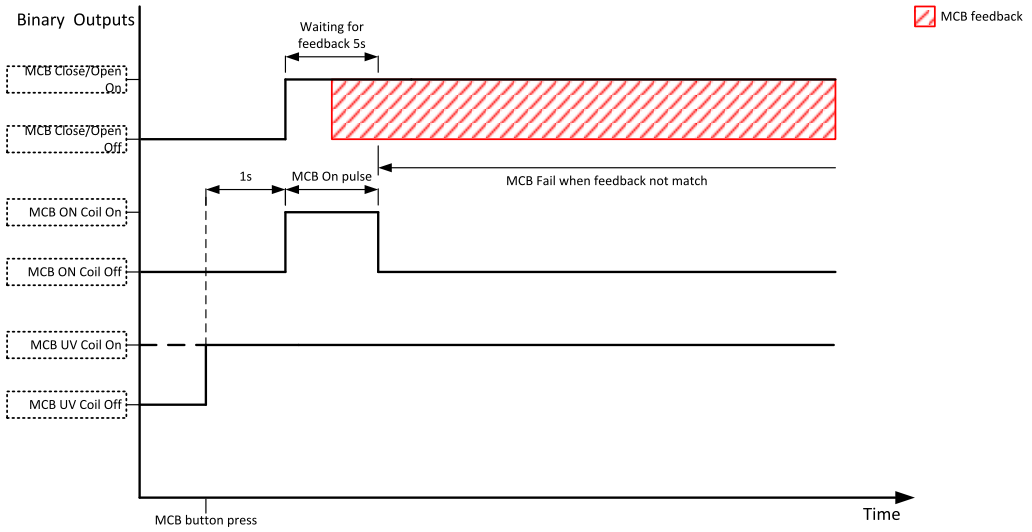


Image 8.45 MCB UV Coil close command

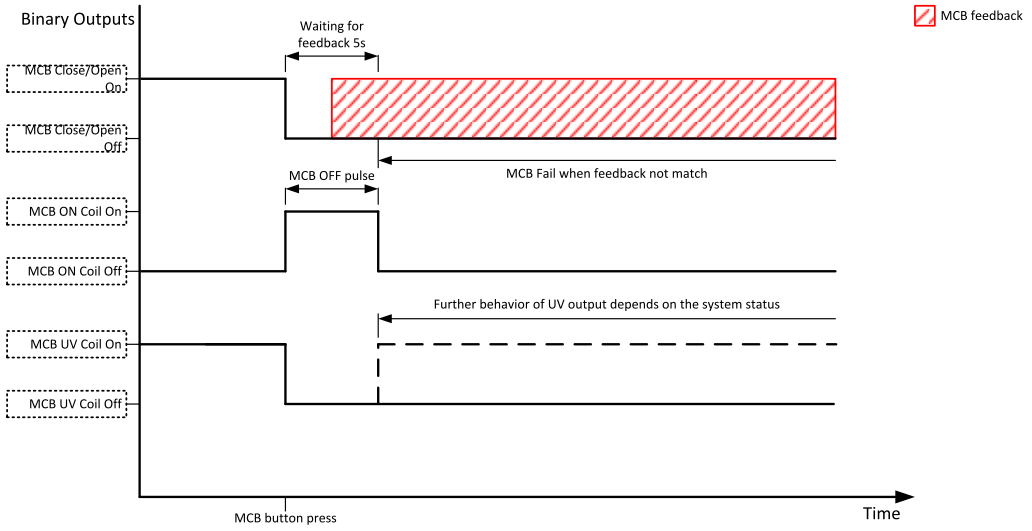


Image 8.46 MCB UV Coil open command

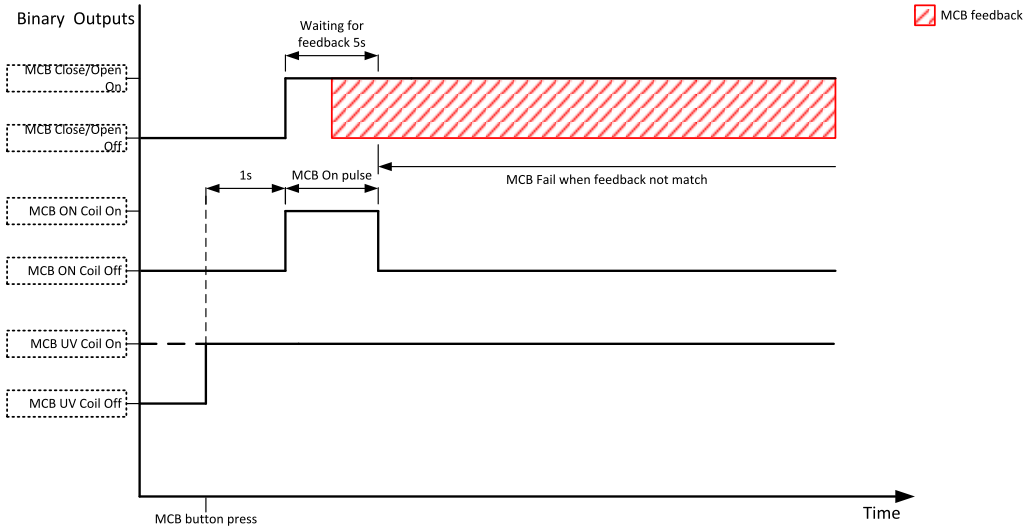


Image 8.47 MCB UV Coil close command

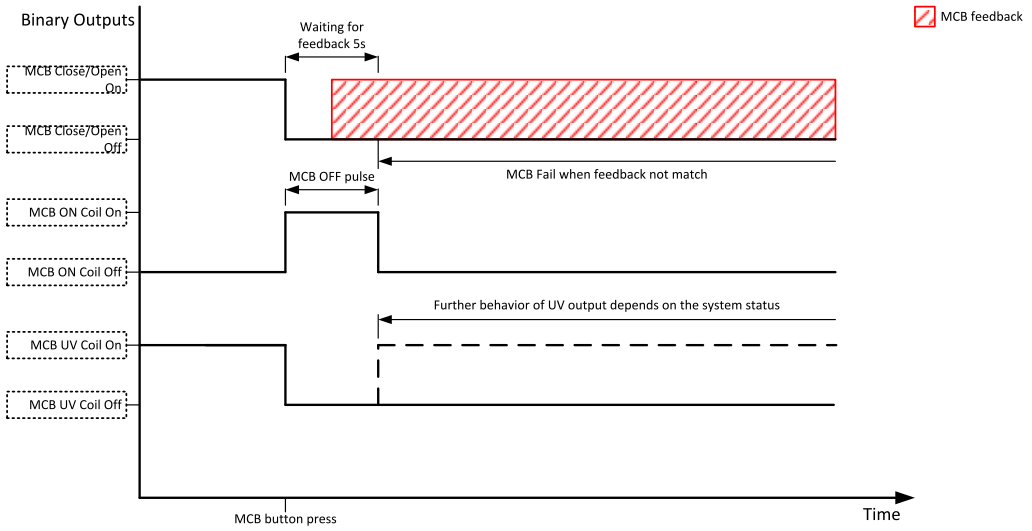


Image 8.48 MCB UV Coil close command

back to Logical binary outputs alphabetically

Mode AUTO

Related FW	1.6.0	**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	1.6.0	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	1.6.0	Related applications	AMF, MRS
Comm object	17		
Description			
This output is active whenever the controller is in OFF mode.			

back to Logical binary outputs alphabetically

Mode TEST

Related FW	1.6.0	Related applications	AMF
Comm object	20		
Description			
This output is active whenever the controller is in TEST mode.			

back to Logical binary outputs alphabetically

LBO: N

Not In AUTO

Related FW	1.6.0	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	1.6.0	Related applications	AMF, MRS
Comm object	286		
Description			
Output has no function.			

back to Logical binary outputs alphabetically

LBO: P

Prestart

Related FW	1.6.0	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 active for time period of **Prestart Time (page 177)**. The output is deactivated 100 ms before the **STARTER (PAGE 361)** output is activated.

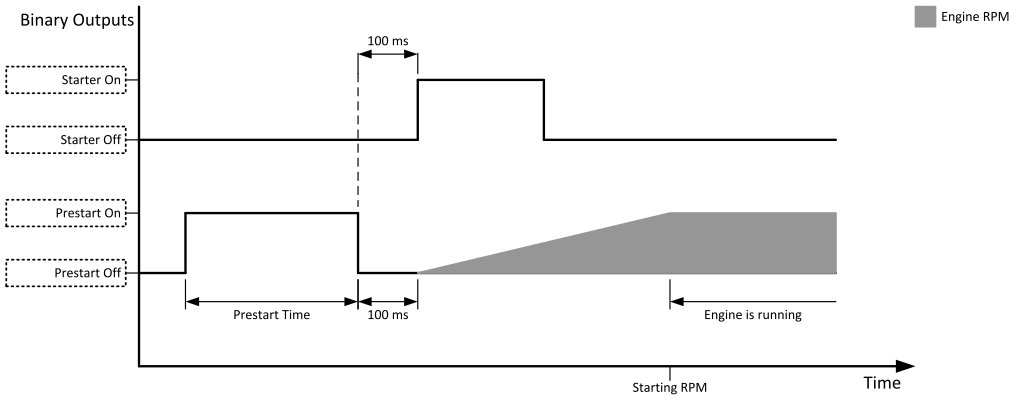


Image 8.49 Engine start

When the **Prestart Time (page 177)** is longer than **Cranking Fail Pause (page 176)** then the **Prestart Time (page 177)** in **Cranking Fail Pause (page 176)** is long as **Cranking Fail Pause (page 176)** minus 100 ms.

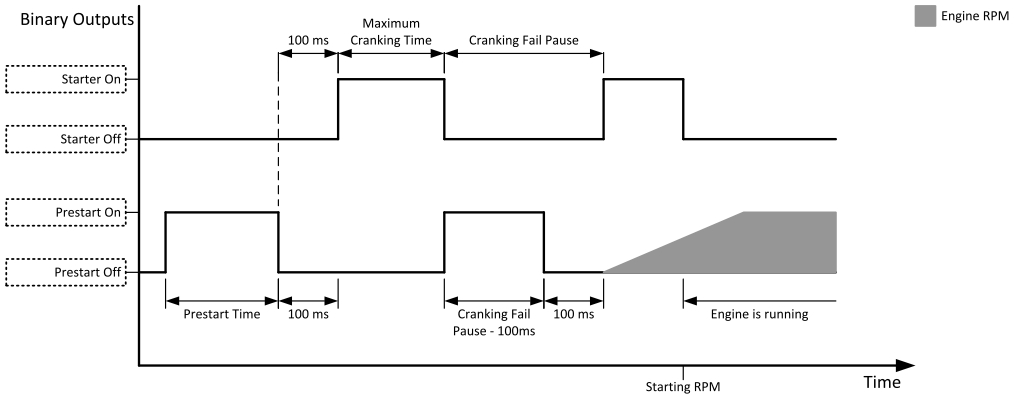


Image 8.50 Prestart in Cranking Fail Pause 1

When the **Prestart Time (page 177)** is shorter than **Cranking Fail Pause (page 176)** then the **Prestart Time (page 177)** in **Cranking Fail Pause (page 176)** is long as normal **Prestart Time (page 177)**.

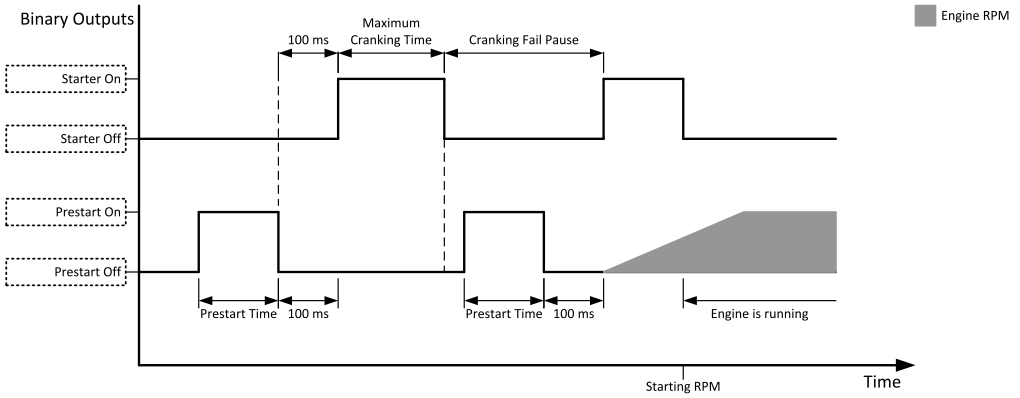


Image 8.51 Prestart in Cranking Fail Pause 2

back to Logical binary outputs alphabetically

LBO: R

Ready To AMF

Related FW	1.6.0	**Related applications**	AMF
Comm object	324		
Description			

the output is active if the Gen-set is ready to start automatically and take the load if the mains fails, i.e.:

- the controller is in AMF operating mode
- the controller is in AUTO controller mode and
- no red alarm is present in the alarmlist
- when the red alarm is confirmed during Stop Valve and other requirements are fulfilled then the LBO is still inactive until the state ready

back to Logical binary outputs alphabetically

Ready To Load

Related FW	1.6.0	**Related applications**	AMF, MRS
Comm object	58		
Description			

the output is active 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 188)** 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 active.

back to Logical binary outputs alphabetically

Ready

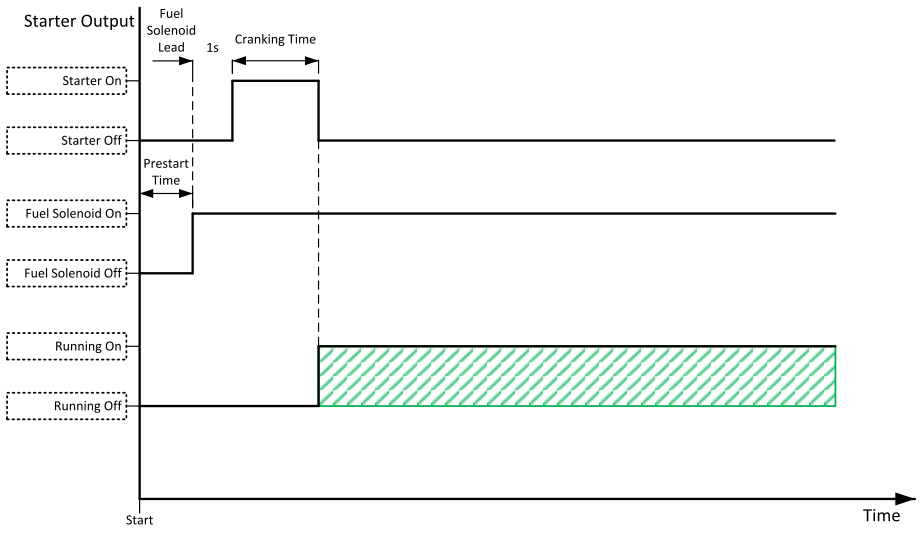
Related FW	1.6.0	Related applications	AMF, MRS
Comm object	62		
Description			
The binary output is active when the engine is stopped and it is possible to start it i.e. no red alarm is activated or **SD OVERRIDE (PAGE 328)** is active. The binary output is switch on when the Ready state occurs. The 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

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	1372		
Description			
This output is active when DPF lamp from ECU is active.			

back to Logical binary outputs alphabetically

Running

Related FW	1.6.0	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 is activated if **FUEL SOLENOID (PAGE 342)** is active and **STARTER (PAGE 361)** and **PRESTART (PAGE 357)** are deactivated. The out remains active until engine stop and cooling period elapses.  Image 8.52 Running			

back to Logical binary outputs alphabetically

LBO: S

Starter

Related FW	1.6.0	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 176)** in Engine Settings group. Cranking fail pause is adjusted by setpoint **Cranking Fail Pause (page 176)**.

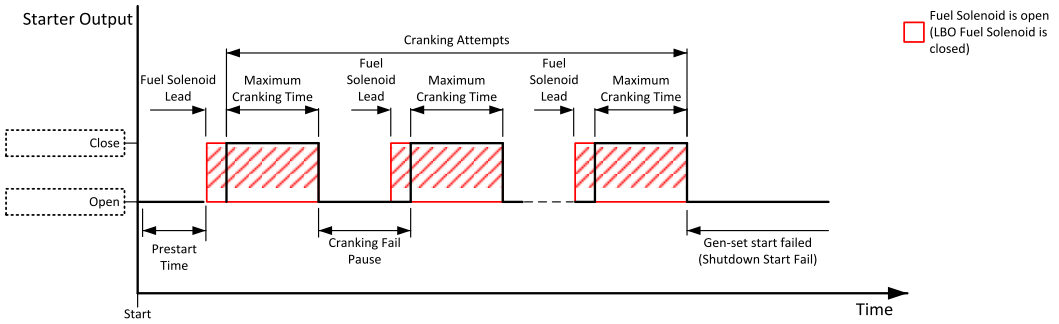


Image 8.53 Starter

The starter output opens when:

- the "firing" speed is reached (gas engines only)
- maximum time of cranking is exceeded
- request to stop comes up
- D+ value is higher than **D+ Threshold (page 184)**
- Oil pressure value is higher than **Starting Oil Pressure (page 178)**
- Generator voltage >25 % of **Nominal Voltage Ph-N (page 166)** or **Nominal Voltage Ph-Ph (page 167)** (any phase)

back to Logical binary outputs alphabetically

Stop Pulse

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	25		
Description			

Output is active for 1 second after **STOP SOLENOID (PAGE 362)** output activation. This signal is sent to ECU in case of engine stop request.

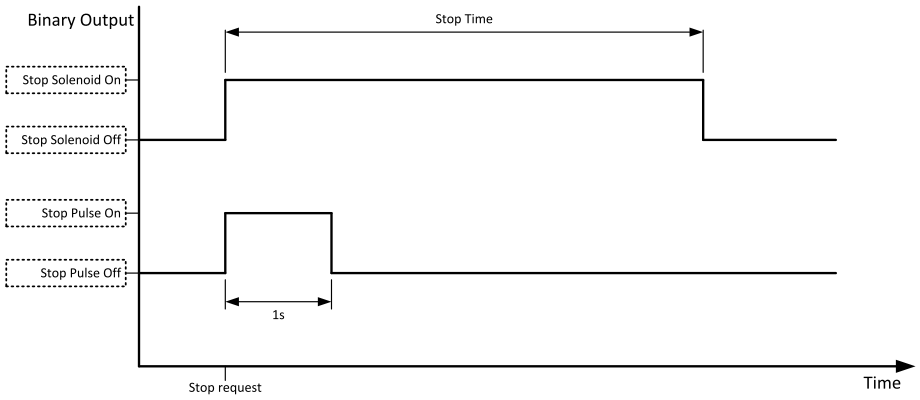


Image 8.54 Stop Pulse

back to Logical binary outputs alphabetically

Stop Solenoid

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	23		
Description			

This output is dedicated to control the stop solenoid (valve). The output is activated when an engine stop command is received and is deactivated 12 s after last running engine indication went off, i.e. engine is stopped.

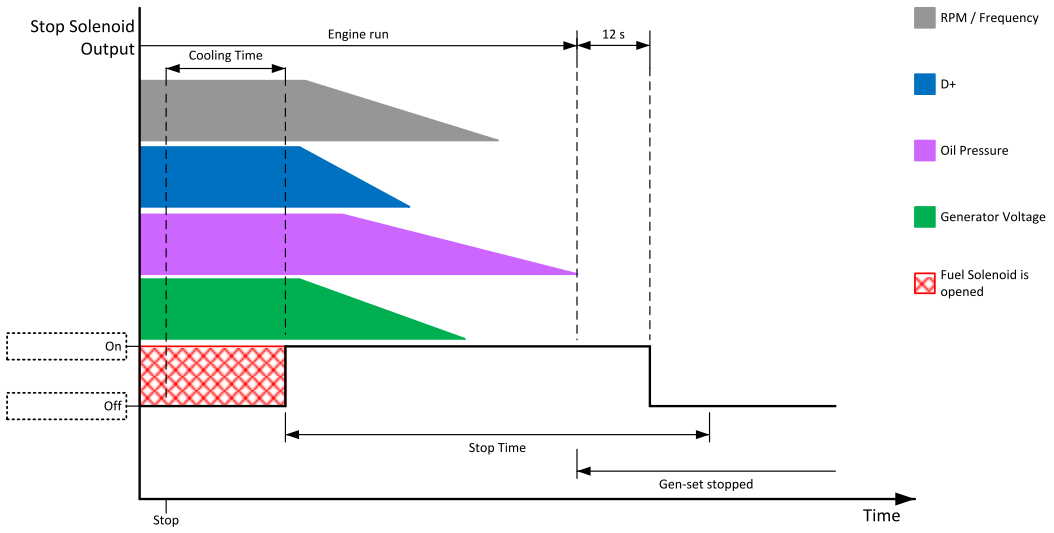


Image 8.55 Stop Solenoid 1

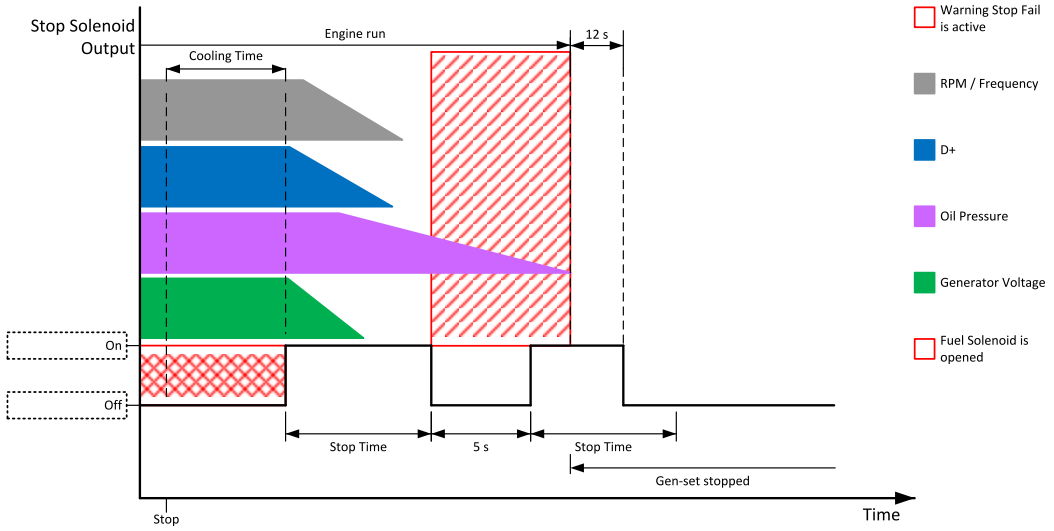


Image 8.56 Stop Solenoid 2

Note: *If **Additional running engine indications (page 117)** went off during 5 s pause than Stop Solenoid is not activated again otherwise stop solenoid is activated again.*

back to Logical binary outputs alphabetically

LBO: V

Ventilation

Related FW	1.6.0	**Related applications**	AMF, MRS
Comm object	38		
Description			

This logical binary output is activated at the beginning of start procedure together with **PRESTART (PAGE 357)** LBO. Ventilation output is deactivated when engine stops revolving.

Ventilation LBO is also deactivated immediately when **EMERGENCY STOP (PAGE 319)** (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 On Pulse

Related FW	1.6.0	**Related applications**	AMF, MRS
Comm object	2089		
Description			

This logical binary output is activated on rising edge of **VENTILATION (PAGE 363)** LBO (at the begining of prestart period). The pulse duration is adjusted by **Ventilation Pulse Time (page 206)** 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 Off Pulse

Related FW	1.6.0	Related applications	AMF, MRS
Comm object	2090		
Description			
This logical binary output is activated on falling edge of **VENTILATION (PAGE 363)** LBO (when engine stops). The pulse duration is adjusted by **Ventilation Pulse Time (page 206)** 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

8.1.6 Logical analog inputs

What Logical analog inputs are:

Logical analog inputs are inputs for analog values.

Alphabetical groups of Logical analog inputs

LAI: A 366
LAI: C 369
LAI: F 369
LAI: N 371
LAI: O 371

For full list of Logical analog inputs go to the chapter **Logical analog inputs alphabetically (page 365)**.

Logical analog inputs alphabetically

AIN Prot01 366
AIN Prot02 367
AIN Prot03 368
Coolant Temp 369
Fuel Level 369
Not Used 371
Oil Pressure 371

back to Controller objects

LAI: A

AIN Prot01

Related FW	1.6.0	**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 44**. Limits for this protection are adjusted by setpoints **Analog Protection 1 Wrn (page 223)** and **Analog Protection 1 Sd (page 224)**. Delay is adjusted by setpoint **Analog Protection 1 Delay (page 224)**.

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	1.6.0	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 44**. Limits for this protection are adjusted by setpoints **Analog Protection 2 Wrn (page 225)** and **Analog Protection 2 Sd (page 225)**. Delay is adjusted by setpoint **Analog Protection 2 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 Prot03

Related FW	1.6.0	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 44**. Limits for this protection are adjusted by setpoints **Analog Protection 3 Wrn (page 226)** and **Analog Protection 3 Sd (page 227)**. Delay is adjusted by setpoint **Analog Protection 3 Delay (page 227)**.

Protection types

Monitoring	Analog value is only measured and displayed on the LCD screen but not used for protection.
HistRecOnl	Analog value is only measured and displayed on the LCD screen but not used for protection. History record is made if value is out of the limits.
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	1.6.0	**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 44**. Limits for this protection are adjusted by setpoints **Coolant Temperature Wrn (page 195)** and **Coolant Temperature BOC (page 196)**. Delay is adjusted by setpoint **Coolant Temperature Delay (page 196)**.

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: Value from analog input has higher priority than value from ECU.

back to Logical analog inputs alphabetically

LAI: F

Fuel Level

Related FW	1.6.0	**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 44**. Limits for this protection are adjusted by setpoints **Fuel Level Wrn (page 198)** and **Fuel Level Sd (page 198)**. Delay is adjusted by setpoint **Fuel Level Delay (page 199)**.

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.

IMPORTANT: Value from analog input has higher priority than value from ECU.

back to Logical analog inputs alphabetically

LAI: N

Not Used

Related FW	1.6.0	**Related applications**	AMF, MRS
Comm object	230		
Description			
Input has no function.			

back to Logical analog inputs alphabetically

LAI: O

Oil Pressure

Related FW	1.6.0	**Related applications**	AMF, MRS
Comm object	9		
Description			

Logical analog input designed for oil pressure value received from analog sensor. Limits for this protection are adjusted by setpoints **Oil Pressure Wrn (page 193)** and **Oil Pressure Sd (page 194)**. Delay is adjusted by setpoint **Oil Pressure 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 + 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.*

IMPORTANT: Value from analog input has higher priority than value from ECU.

back to Logical analog inputs alphabetically

8.2 Alarms

What alarms are:

The controller evaluates two levels of alarms. For more information **see Alarm management on page 99**.

8.2.1 Alarm levels in the controller

8.2.2 Alarms level 1 372
8.2.3 Alarms level 2 392
8.2.4 Fail sensor and other types 401

8.2.2 Alarms level 1

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.

List of alarms level 1

After-Treatment 374
AI/Hist.msg. 1 374
AI/Hist.msg. 2 374
AI/Hist.msg. 3 374
AI/Hist.msg. 4 374
AI/Hist.msg. 5 374
AI/Hist.msg. 6 375
AI/Hist.msg. 7 375
AI/Hist.msg. 8 375
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AI/Hist.msg. 12 376
AI/Hist.msg. 13 376
AI/Hist.msg. 14 376
AI/Hist.msg. 15 376
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Alarm SMS 1 Fail 377
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ATT Filter Lamp 377
ATT HEST Lamp 378
ATT Inhibited Lamp 378
ATT SCR Error Lamp 378
ECU Red Lamp 378
ECU Wait To Start 378
ECU Yellow Lamp 379
ECUDiagBlocked 379
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EM(A) - configuration mistake 379
EM(A) - insufficient 380
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Event Email 1 Fail 380
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Wrn Generator L1 Undervoltage 382
Wrn Generator L1L2 Overvoltage 382
Wrn Generator L1L2 Undervoltage 382
Wrn Generator L2 Overvoltage 382
Wrn Generator L2 Undervoltage 383
Wrn Generator L2L3 Overvoltage 383
Wrn Generator L2L3 Undervoltage 383
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Wrn Charging Alternator Fail 387
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Wrn Mains Voltage Detected 388
Wrn Maintenance 1 388
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Wrn Stop Fail 390
Wrong Config 390
Generator CCW Rotation 390
Manual Restore 391
Wrn Battery Overvoltage 391
Wrn Battery Undervoltage 391
Mains CCW Rotation 391

back to Alarms

After-Treatment

Alarm Type	ALI
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 fail sensor

AI/Hist.msg. 1

Alarm Type	WRN
Alarmlist message	AI/Hist.msg. 1
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued when history event 1 will trigger.

back to List of alarms level 1

AI/Hist.msg. 2

Alarm Type	WRN
Alarmlist message	AI/Hist.msg. 2
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued when history event 2 will trigger.

back to List of alarms level 1

AI/Hist.msg. 3

Alarm Type	WRN
Alarmlist message	AI/Hist.msg. 3
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued when history event 3 will trigger.

back to List of alarms level 1

AI/Hist.msg. 4

Alarm Type	WRN
Alarmlist message	AI/Hist.msg. 4
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued when history event 4 will trigger.

back to List of alarms level 1

AI/Hist.msg. 5

Alarm Type	WRN

Alarmlist message	AI/Hist.msg. 5
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued when history event 5 will trigger.

back to List of alarms level 1

AI/Hist.msg. 6

Alarm Type	WRN
Alarmlist message	AI/Hist.msg. 6
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued when history event 6 will trigger.

back to List of alarms level 1

AI/Hist.msg. 7

Alarm Type	WRN
Alarmlist message	AI/Hist.msg. 7
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued when history event 7 will trigger.

back to List of alarms level 1

AI/Hist.msg. 8

Alarm Type	WRN
Alarmlist message	AI/Hist.msg. 8
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued when history event 8 will trigger.

back to List of alarms level 1

AI/Hist.msg. 9

Alarm Type	WRN
Alarmlist message	AI/Hist.msg. 9
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued when history event 9 will trigger.

back to List of alarms level 1

AI/Hist.msg. 10

Alarm Type	WRN
Alarmlist message	AI/Hist.msg. 10
Alarm evaluated	All the time
Related applications	AMF, MRS

Description	This alarm is issued when history event 10 will trigger.

back to List of alarms level 1

AI/Hist.msg. 11

Alarm Type	WRN
Alarmlist message	AI/Hist.msg. 11
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued when history event 11 will trigger.

back to List of alarms level 1

AI/Hist.msg. 12

Alarm Type	WRN
Alarmlist message	AI/Hist.msg. 12
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued when history event 12 will trigger.

back to List of alarms level 1

AI/Hist.msg. 13

Alarm Type	WRN
Alarmlist message	AI/Hist.msg. 13
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued when history event 13 will trigger.

back to List of alarms level 1

AI/Hist.msg. 14

Alarm Type	WRN
Alarmlist message	AI/Hist.msg. 14
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued when history event 14 will trigger.

back to List of alarms level 1

AI/Hist.msg. 15

Alarm Type	WRN
Alarmlist message	AI/Hist.msg. 1
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued when history event 15 will trigger.

back to List of alarms level 1

AI/Hist.msg. 16

Alarm Type	WRN
Alarmlist message	AI/Hist.msg. 16
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued when history event 16 will trigger.

back to List of alarms level 1

Alarm Email 1 Fail

Alarm Type	WRN
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 248)** and email wasn't send.

back to List of alarms level 1

Alarm SMS 1 Fail

Alarm Type	WRN
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 247)** and SMS wasn't sent.

back to List of alarms level 1

ATT DEF Level Lamp

Alarm Type	AHI
Alarmlist message	ATT DEF Level Lamp
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued to indicate DEF Level lamp.

back to List of alarms level 1

ATT Filter Lamp

Alarm Type	AHI
Alarmlist message	ATT Filter Lamp
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued to indicate the ATT Filter lamp.

back to List of alarms level 1

ATT HEST Lamp

Alarm Type	AHI
Alarmlist message	ATT HEST Lamp
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued to indicate HEST Lamp.

back to List of alarms level 1

ATT Inhibited Lamp

Alarm Type	AHI
Alarmlist message	ATT Inhibited Lamp
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued to indicate Inhibited Lamp.

back to List of alarms level 1

ATT SCR Error Lamp

Alarm Type	AHI
Alarmlist message	ATT SCR Error Lamp
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued to indicate SCR error lamp.

back to List of alarms level 1

ECU Red Lamp

Alarm Type	AHI
Alarmlist message	ECU Red Lamp
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm occurs when an red ECU alarm is logged in Alarm List. ***Note:*** *This lamp can be ignored during prestart phase. Use InteliConfig to enable this function.*

back to List of alarms level 1

ECU Wait To Start

Alarm Type	AHI
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 337)** is not activated, after deactivation of lamp, alarm automatically disappears.

back to List of alarms level 1

ECU Yellow Lamp

Alarm Type	AHI
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 337)** is not activated, after deactivation of lamp, alarm automatically disappears.

back to List of alarms level 1

ECUDiagBlocked

Alarm Type	ALI
Alarmlist message	ECUDiagBlocked
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	LBO **ALARM (PAGE 337)** is not activated, after deactivation of lamp, alarm automatically disappears.

back to List of alarms level 1

EM(A) - a message lost

Alarm Type	WRN
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	WRN
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	WRN
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	WRN
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

Event Email 1 Fail

Alarm Type	WRN
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 248)** and email wasn't send.

back to List of alarms level 1

Event SMS 1 Fail

Alarm Type	WRN
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 247)** and SMS wasn't send.

back to List of alarms level 1

Fuel Transfer Failed

Alarm Type	ALI
Alarmlist message	Fuel Transfer Failed
Alarm evaluated	All the time
Related applications	AMF, MRS

Description	

back to List of alarms level 1

Wrn Default Credentials

Alarm Type	WRN
Alarmlist message	Wrn Default Credentials
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	The alarm is issued if the factory default password and/or access code are used. Factory default password and access code are "0".

back to List of alarms level 1

Wrn ECU Communication Fail

Alarm Type	WRN
Alarmlist message	Wrn ECU Communication Fail
Alarm evaluated	With configured LBO **ECU Power Relay (page 340)** - only when this LBO is active Without configured LBO **ECU Power Relay (page 340)** - 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 Transfer Failed

Alarm Type	Warning
Alarmlist message	Wrn Fuel Transfer Failed
Alarm evaluated	When **Fuel Pump (page 342)** is active
Related applications	AMF, MRS
Description	This alarm will occur when there is no increase of fuel level when **Fuel Pump (page 342)** is active.

back to List of alarms level 1

Wrn Generator L1 Overvoltage

Alarm Type	WRN
Alarmlist message	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 209)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 1

Wrn Generator L1 Undervoltage

Alarm Type	WRN
Alarmlist message	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 210)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 1

Wrn Generator L1L2 Overvoltage

Alarm Type	WRN
Alarmlist message	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 209)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 1

Wrn Generator L1L2 Undervoltage

Alarm Type	WRN
Alarmlist message	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 210)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 1

Wrn Generator L2 Overvoltage

Alarm Type	WRN
Alarmlist message	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 209)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 1

Wrn Generator L2 Undervoltage

Alarm Type	WRN
Alarmlist message	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 210)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 1

Wrn Generator L2L3 Overvoltage

Alarm Type	WRN
Alarmlist message	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 209)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 1

Wrn Generator L2L3 Undervoltage

Alarm Type	WRN
Alarmlist message	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 210)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 1

Wrn Generator L3 Overvoltage

Alarm Type	WRN
Alarmlist message	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 209)**

	› **Generator <> Voltage Delay (page 211)**

back to List of alarms level 1

Wrn Generator L3 Undervoltage

Alarm Type	WRN
Alarmlist message	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 210)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 1

Wrn Generator L3L1 Overvoltage

Alarm Type	WRN
Alarmlist message	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 209)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 1

Wrn Generator L3L1 Undervoltage

Alarm Type	WRN
Alarmlist message	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 210)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 1

Wrn Generator Overfrequency

Alarm Type	WRN
Alarmlist message	Generator > Frequency
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator overfrequency in the phase L1. The following setpoints are related to it:

	› **Generator Overfrequency Wrn (page 211)** › **Generator <> Frequency Delay (page 212)**

back to List of alarms level 1

Wrn Generator Uderfrequency

Alarm Type	WRN
Alarmlist message	Generator < Frequency
Alarm evaluated	Generator excited only
Related applications	AMF, MRS
Description	This alarm evaluates the generator underfrequency in the phase L1. The following setpoints are related to it: › **Generator Underfrequency Wrn (page 212)** › **Generator <> Frequency Delay (page 212)**

back to List of alarms level 1

Mains Overfrequency

Alarm Type	MP
Alarmlist message	Mains Overfrequency
Alarm evaluated	All the time
Related applications	AMF
Description	This alarm is active when Mains frequency is above the setpoint **Mains Overfrequency (page 219)** for the period longer than **Mains < > Frequency Delay (page 220)**.

back to List of alarms level 1

Mains Underfrequency

Alarm Type	MP
Alarmlist message	Mains Underfrequency
Alarm evaluated	All the time
Related applications	AMF
Description	This alarm is active when Mains frequency is bellow the setpoint **Mains Underfrequency (page 220)** for the period longer than **Mains < > Frequency Delay (page 220)**.

back to List of alarms level 1

Module(slotA) - comm. outage

Alarm Type	WRN
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	WRN
Alarmlist message	Module(slotA) - fake module
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that false module is inserted in slot.

back to List of alarms level 1

Module(slotA) - unattended

Alarm Type	WRN
Alarmlist message	Module(slotA) - unattended
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm indicates that two same communication modules are inserted in slots and one of them will be inactive.

back to List of alarms level 1

Module(slotA) - unexpected

Alarm Type	WRN
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	WRN
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

Wrn Overload

Alarm Type	WRN
Alarmlist message	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 207)** adjusts the overload limit. › **Overload BOC (page 207)** Overload Del adjusts the delay.

back to List of alarms level 1

PasswEnterBlock

Alarm Type	WRN
Alarmlist message	PasswEnterBlock
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued to indicate that user will not be able to type in password for set amount of time. ***Note:*** *This is cause by too many invalid attempts.*

back to List of alarms level 1

Transferring Fuel

Alarm Type	ALI
Alarmlist message	Transferring Fuel
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued if **FUEL PUMP (PAGE 342)** is active.

back to List of alarms level 1

Wrn Charging Alternator Fail

Alarm Type	SD
Alarmlist message	Sd 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+ Threshold (page 184)** 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 2

Wrn Coolant Temperature Low

Alarm Type	WRN

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 197)** setpoint.

back to List of alarms level 1

Wrn Mains Voltage Detected

Alarm Type	WRN
Alarmlist message	Wrn Mains Voltage Detected
Alarm evaluated	Gen-set is running
Related applications	AMF
Description	This alarm occurs when setpoint **Operation Mode (page 170)** is adjusted to MRS and voltage is detected on mains.

back to List of alarms level 1

Wrn Maintenance 1

Alarm Type	WRN
Alarmlist message	Wrn Maintenance 1
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	Adjust the setpoint **Maintenance Timer 1 (page 203)** 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	WRN
Alarmlist message	Wrn Maintenance 2
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	Adjust the setpoint **Maintenance Timer 2 (page 203)** 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	WRN
Alarmlist message	Wrn Maintenance 3
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	Adjust the setpoint **Maintenance Timer 3 (page 204)** to the interval of the next maintenance check. The value of the setpoint will count down while the engine is running and if reaches zero, this alarm will be issued. The alarm message will remain in the alarm list (even if the controller is switched off and on again) until the setpoint is re-adjusted to a positive value.

back to List of alarms level 1

Wrn MCB Fail

Alarm Type	WRN
Alarmlist message	Wrn MCB Fail
Alarm evaluated	All the time
Related applications	AMF
Description	This alarm will occur when the **MCB Feedback (page 323)** input does not match the expected position given by the **MCB Close/Open (page 351)** output. It stays active until the mismatch between the output and feedback disappears. › If there was no command issued by the controller and the breaker (feedback) changes suddenly the position itself, the alarm will be issued immediately. › Self-opening of the breaker is not considered a fault and if all mains values are within limits, the command to reclose the breaker is issued after delay given by the setpoint **Mains Return Delay (page 216)** has elapsed. › The alarm will be also issued, if the breaker does not respond to the close command within 2 seconds. After this period has elapsed the output MCB Close/Open is deactivated again and the next attempt to close the breaker will occur first after the alarm is reset. › The alarm will be also issued if the breaker does not respond to the open command within 2 seconds. The output MCB Close/Open will stay deactivated. Closing of GCB is blocked until this alarm becomes inactive.

back to List of alarms level 1

Wrn Oil Pressure

Alarm Type	Warning
Alarmlist message	Wrn Oil Pressure
Alarm evaluated	Gen-set is running
Related applications	AMF, MRS
Description	This alarm indicates that the oil pressure is lower than the pressure set in **Oil Pressure Wrn (page 193)** setpoint.

back to List of alarms level 1

Wrn Override All Sd

Alarm Type	WRN
Alarmlist message	Override All Sd
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm occurs when binary input **SD OVERRIDE (PAGE 328)** is activated.

back to List of alarms level 1

Wrn Stop Fail

Alarm Type	WRN
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 342)** has been switched off and time delay **Stop Time (page 190)** has elapsed and lasts for the entire time the **FUEL SOLENOID (PAGE 342)** or **STARTER (PAGE 361)** are off.

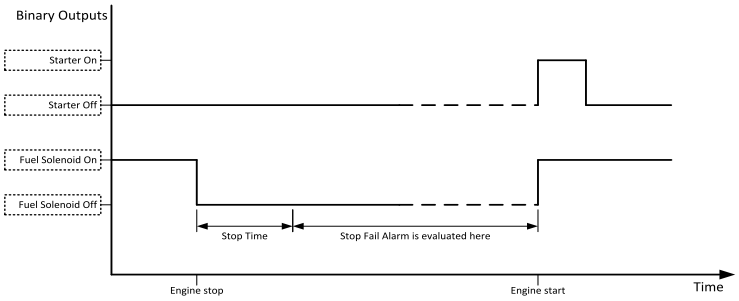

Image 8.57 Stop Fail

Note: *Gen-set cannot be started until this alarm is inactive and reset.*

back to List of alarms level 1

Wrong Config

Alarm Type	ALI
Alarmlist message	Wrong Config
Alarm evaluated	
Related applications	AMF, MRS
Description	This alarm is issued to indicate that content of the configuration in controller unit does not match to configuration.

back to List of alarms level 1

Generator CCW Rotation

Alarm Type	WRN

Alarmlist message	Generator CCW Rotation
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm is issued if Gen-set phases are connected in a different order. Controller checks this automatically. This protection is important after controller installation to avoid wrong voltage phase connection. This alarm will prevent circuit breaker closing.

back to List of alarms level 1

Manual Restore

Alarm Type	ALI
Alarmlist message	Manual Restore
Alarm evaluated	All the time
Related applications	AMF
Description	Alarm is activated when controller is in AUTO mode, **Return From Island (page 221)** setpoint is set to manual, load is on Gen-set and mains has returned.

back to List of alarms level 1

Wrn Battery Overvoltage

Alarm Type	WRN
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 204)** › **Battery <> Voltage Delay (page 205)**

back to List of alarms level 1

Wrn Battery Undervoltage

Alarm Type	WRN
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 204)** › **Battery <> Voltage Delay (page 205)**

back to List of alarms level 1

Mains CCW Rotation

Alarm Type	WRN
Alarmlist message	Mains CCW Rotation

Alarm evaluated	All the time
Related applications	AMF
Description	The controller detects phase sequence on mains voltage terminals. This protection is important after controller installation to avoid wrong voltage phase connection. There is a fixed defined phase sequence in InteliLite 9 controller: T39 = N, T40 = L1, T41 = L2 and T42 = L3. When the phases are connected in a different order, alarms are detected. This alarm prevent circuit breaker closing.

back to List of alarms level 1

8.2.3 Alarms level 2

What alarms level 2 are:

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

List of alarms level 2

BOC Short Circuit 394
Sd Emergency Stop 394
Sd ECU Communication Fail 394
Sd Generator L1 Overvoltage 394
BOC Generator L1 Undervoltage 395
Sd Generator L1L2 Overvoltage 395
BOC Generator L1L2 Undervoltage 395
Sd Generator L2 Overvoltage 395
BOC Generator L2 Undervoltage 396
Sd Generator L2L3 Overvoltage 396
BOC Generator L2L3 Undervoltage 396
Sd Generator L3 Overvoltage 397
BOC Generator L3 Undervoltage 397
Sd Generator L3L1 Overvoltage 397
BOC Generator L3L1 Undervoltage 397
BOC Generator Overfrequency 398
Generator Underfrequency 398
Sd Overload 398
Sd Battery Flat 398
Sd GCB Fail 399
Sd Overspeed 399
Sd RPM Measurement Fail 399
Sd Start Fail 400
Sd Underspeed 400
Sd Short Circuit 400
Sd Charging Alternator Fail 400

back to Alarms

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 208)** adjusts the short current limit › **Short Circuit BOC Delay (page 208)** adjusts the delay in fine steps

back to List of alarms level 2

Sd Emergency Stop

Alarm Type	SD
Alarmlist message	Emergency Stop
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	Alarm is activated when binary input **EMERGENCY STOP (PAGE 319)** 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 ECU Communication Fail

Alarm Type	Shutdown
Alarmlist message	Sd ECU Communication Fail
Alarm evaluated	With configured LBO **ECU POWER RELAY (PAGE 340)** – only when this LBO is active Without configured LBO **ECU POWER RELAY (PAGE 340)** – 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 Generator L1 Overvoltage

Alarm Type	SD
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 209)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 2

BOC Generator L1 Undervoltage

Alarm Type	BOC
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 210)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 2

Sd Generator L1L2 Overvoltage

Alarm Type	SD
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 209)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 2

BOC Generator L1L2 Undervoltage

Alarm Type	BOC
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 210)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 2

Sd Generator L2 Overvoltage

Alarm Type	SD
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 209)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 2

BOC Generator L2 Undervoltage

Alarm Type	BOC
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 210)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 2

Sd Generator L2L3 Overvoltage

Alarm Type	SD
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 209)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 2

BOC Generator L2L3 Undervoltage

Alarm Type	BOC
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 210)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 2

Sd Generator L3 Overvoltage

Alarm Type	SD
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 209)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 2

BOC Generator L3 Undervoltage

Alarm Type	BOC
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 210)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 2

Sd Generator L3L1 Overvoltage

Alarm Type	SD
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 209)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 2

BOC Generator L3L1 Undervoltage

Alarm Type	BOC
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 210)** › **Generator <> Voltage Delay (page 211)**

back to List of alarms level 2

BOC Generator Overfrequency

Alarm Type	BOC
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 211)** › **Generator <> Frequency Delay (page 212)**

back to List of alarms level 2

Generator Underfrequency

Alarm Type	BOC
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 212)** › **Generator <> Frequency Delay (page 212)**

back to List of alarms level 2

Sd Overload

Alarm Type	BOC
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 207)** adjusts the overload limit. › **Overload Delay (page 207)** adjusts the delay.

back to List of alarms level 2

Sd Battery Flat

Alarm Type	SD
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 GCB Fail

Alarm Type	SD
Alarmlist message	Sd GCB Fail
Alarm evaluated	All the time
Related applications	AMF, MRS
Description	This alarm will occur when the **GCB Feedback (page 321)** input does not match the expected position given by the **GCB Close/Open (page 343)** 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 Overspeed

Alarm Type	SD
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 192)** adjust the overspeed limit › **Overspeed Overshot (page 193)** adjust the additional overspeed limit › **Overspeed Overshot Period (page 193)** adjust the time period of additional overspeed limit

back to List of alarms level 2

Sd RPM Measurement Fail

Alarm Type	SD
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 177)** within the **Maximum Cranking Time (page 176)**, although some of additional running engine indication sources indicate that the engine has started.

back to List of alarms level 2

Sd Start Fail

Alarm Type	SD
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 176)** adjust the number of attempts

back to List of alarms level 2

Sd Underspeed

Alarm Type	SD
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 192)**. 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

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 208)** adjusts the short current limit › **Short Circuit BOC Delay (page 208)** adjusts the delay in fine steps

back to List of alarms level 2

Sd Charging Alternator Fail

Alarm Type	SD
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+ Threshold (page 184)** 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 2

8.2.4 Fail sensor and other types

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.

List of fail sensor

Fls AIN Prot 1 401
Fls Coolant Temp 401
Fls Fuel Level 401
Fls Oil Pressure 402

back to Alarms

Fls AIN Prot 1

Alarm Type	Fls
Alarmlist message	Fls + 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

Fls Coolant Temp

Alarm Type	Fls
Alarmlist message	Fls 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

Fls Fuel Level

Alarm Type	Fls
Alarmlist message	Fls 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.

back to List of fail sensor

Fls Oil Pressure

Alarm Type	Fls
Alarmlist message	Fls 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

8.3 Modules

8.3.1 Plug-in modules

> **IMPORTANT: 2nd generation of InteliLite 9 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 plug-in module slot.*

Communication modules

CM-RS232-485 403
CM-Ethernet 405
CM-GPRS 407
CM-4G-GPS 410

CM-RS232-485

CM-RS232-485 is optional plug-in card to enable InteliLite 9 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 8.58 CM-RS232-485 interface

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

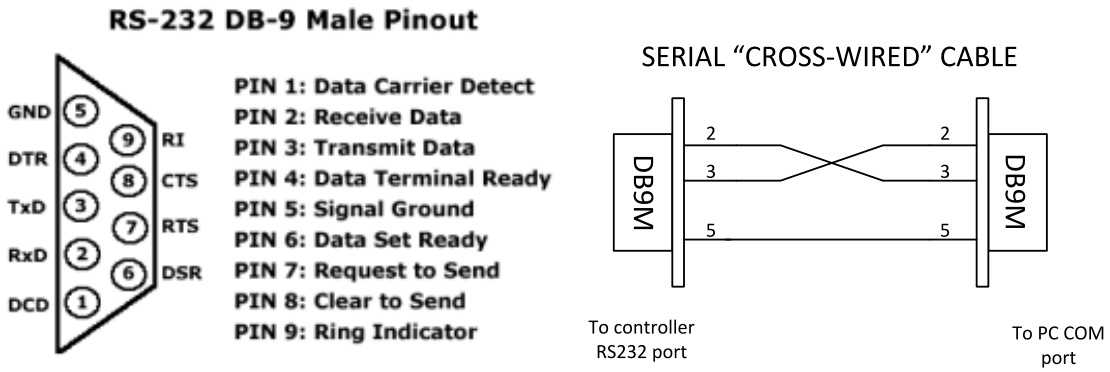

Image 8.59 Pinout of RS232 line

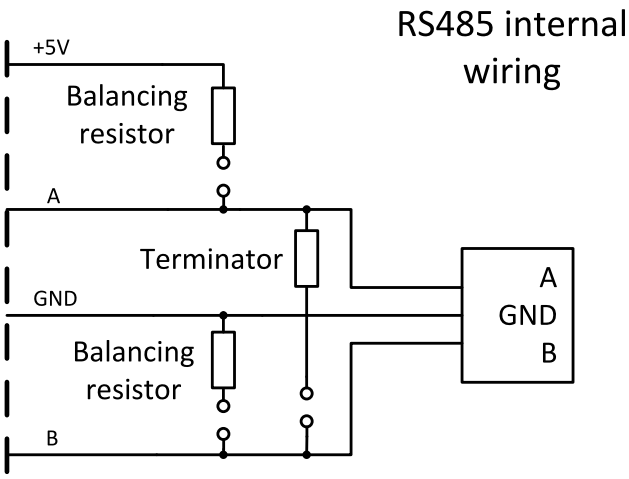

Image 8.60 Pinout of RS485 line

Image 8.61 Jumpers description

Note: *Balancing resistors shall be both closed at only one device in whole RS485 network.*

Maximal distance of line is 10 m for RS232 line and 1200 m for RS485 line.

Terminator 120 Ω

Balancing resistor +5 V

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.

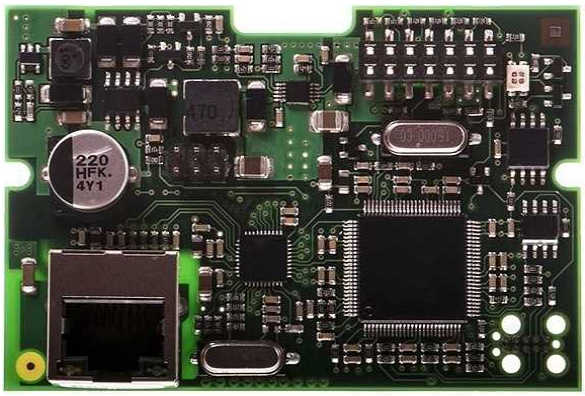

Image 8.62 CM-Ethernet interface

> **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.

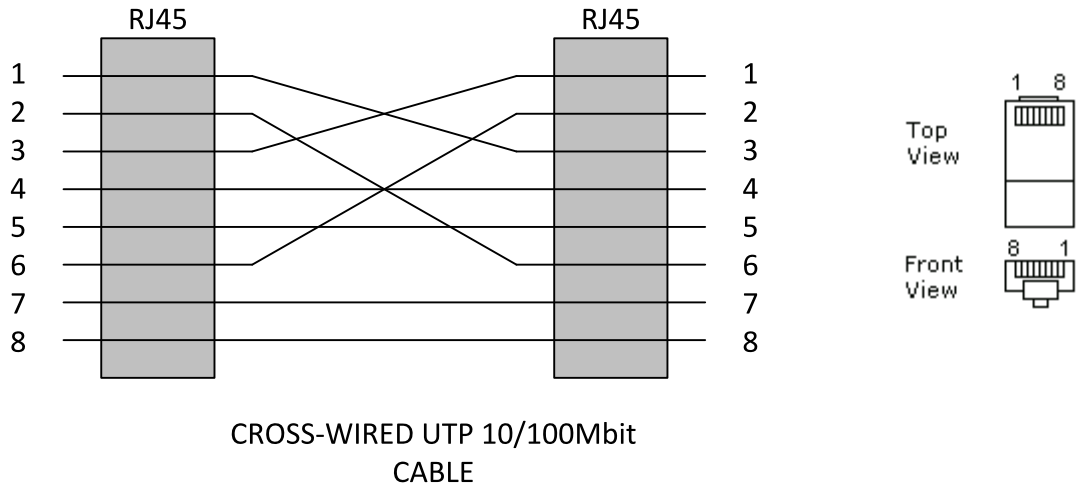

Image 8.63 Cross-wired cable

Technical data

General

Width × Height × Depth	73.8 × 50.3 × 21
Weight	~30 g
Power supply	8-36 V DC
Power consumption	1 W
Peak power consumption	2 W
Operating temperature	-40 ˚C to +70 ˚C
Storage temperature	-40 ˚C to +80 ˚C

Ethernet port

100 Mbit/s, full duplex
RJ45 socket

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 248)**.

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

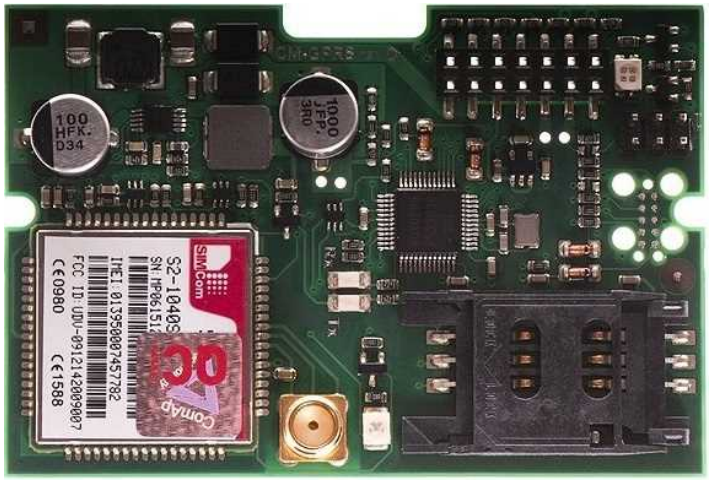

Image 8.64 CM-GPRS module

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

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.

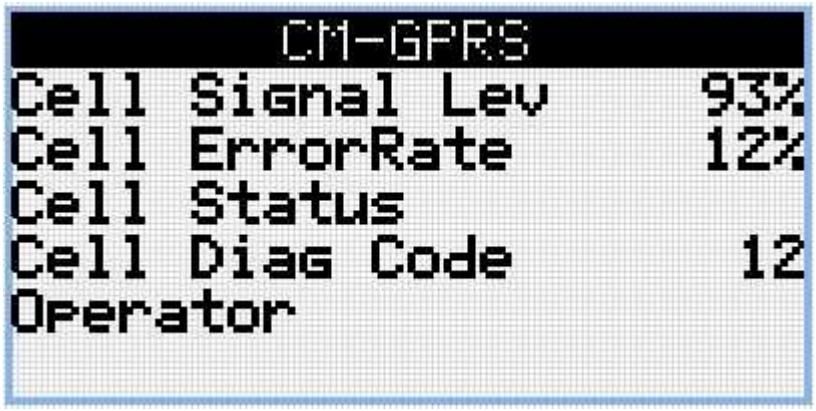

Image 8.65 Main screen of CM-GPRS module

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 8.66 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.*

Technical data

General

Width × Height × Depth	73.8 × 50.3 × 15
Weight	~35 g
Power supply	8-36 V DC
Power consumption	1.7 W
Peak power consumption	10 W
Operating temperature	-30 ˚C to +70 ˚C
Storage temperature	-40 ˚C to +80 ˚C

GNSS

Antenna interface	SMA female, 4 V / 50 mA
Antenna type	Active

Cellular

Supported networks and frequency bands	› 2G (GSM/GPRS/EDGE) Quad band, 850/900/1800/1900 MHz › 3G (UMTS/HSPA+) Seven band, 800

	(BdXIX) / 850 (BdV) / 900 (BdVIII) / AWS (BdIV) / 1800 (BdIX) / 1900 (BdII) / 2100MHz (BdI) › 4G (LTE) Twelve band, 700 (Bd12 <MFBI Bd17>, Bd28) 800 (Bd18, Bd19, Bd20) 850 (Bd5) / 900 (Bd8) / AWS (Bd4) / 1800 (Bd3) / 1900 (Bd2) / 2100 (Bd1) / 2600MHz (Bd7)
Antenna interface	2x SMA female (Main and Diversity)

SIM card settings

SIM card to be used in CM-4G-GPS or CM-GPRS modules must be adjusted as follows:

- SMS service enabled
- Packet data (Internet access) enabled (when required for the selected mode of operation)
- PIN code security disabled

How to start using CM-4G-GPS module

- You will need a controller, CM-4G-GPS module, antenna and SIM card with SMS and packet data service.

Note: *Make sure that your SIM supports the packet data network type you want to use. – i.e. if you want to use the module in LTE (4G) network you have to confirm with the operator that the particular SIM card supports 4G network.*

- Contact your mobile operator for getting packet data APN (APN = Access Point Name), username and password.
- 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 8.67 Main screen of 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

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 413

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 8.68 EM-BIO8-EFCP interface

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

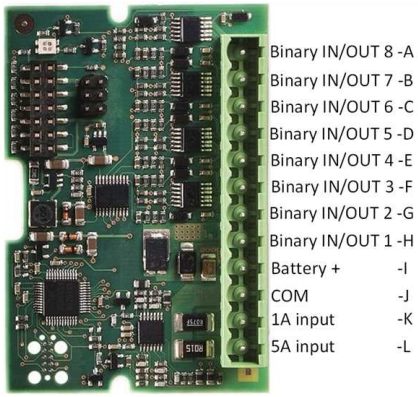

Image 8.69 Overview of EM-BIO8-EFCP

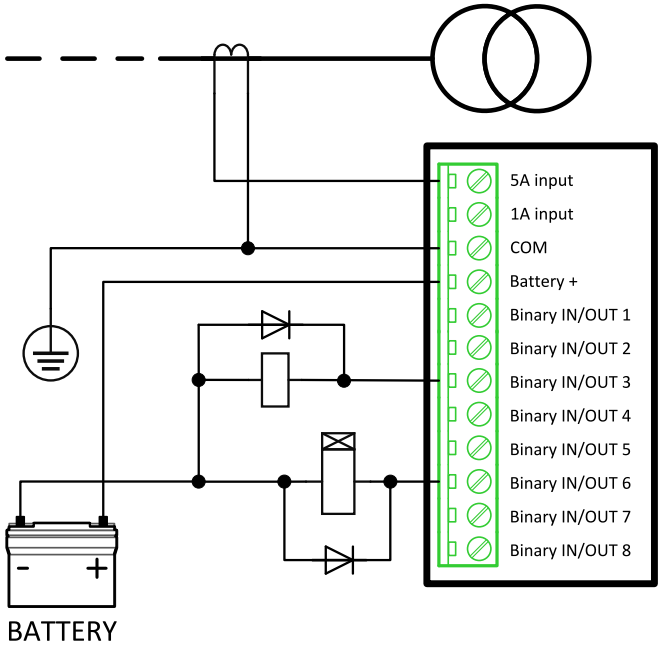

Image 8.70 EM-BIO8-EFCP wiring

EM-BIO8-EFCP technical data

Power supply

Power supply range	8-36 VDC
Power consumption	40 mA / 8 VDC 27 mA / 12 VDC 22 mA / 24 VDC 19 mA / 36 VDC

Binary inputs

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

Binary outputs

Number	Up to 8 , non-isolated
Max. current	0,5A
Switching to	positive supply terminal

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.

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