

InteliMains^{NT}[®]

Bus Tie Breaker Application

IM-NT-BB, IM-NTC-BB, IM-NT

SW version 3.2.0, March 2015



Reference Guide



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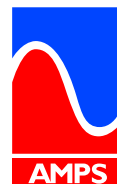


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1 Document information

InteliMains-NT® – BTB Reference guide

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DOCUMENT HISTORY

REVISION NUMBER	RELATED SW. VERSION	DATE
1	3.0	1.3.2012
2	3.1.0	3.9.2014
3	3.2.0	30.3.2015



Pressing F1 in the GenConfig and IntelliMonitor setpoint, values or configuration window will open the help with the context of currently selected setpoint, value and binary input or output function.

1.1 Clarification of notation

HINT

This type of paragraph points out details to help user installation/configuration.

NOTE:

This type of paragraph calls readers' attention to a notice or related theme.

CAUTION!

This type of paragraph highlights a procedure, adjustment, etc. which may cause damage or improper functioning of the equipment if not carried out correctly and may not be clear at first sight.

WARNING!

This type of paragraph indicates things, procedures, adjustments, etc. which demand a high level of attention, otherwise personal injury or death may occur.

EXAMPLE:

This type of paragraph indicates examples of usage for illustrational purposes.

TYPE	TEXT NOTATION
Setpoints in the text	SetpointGroup: <i>SetpointName</i>
Values in the text	ValueGroup: <i>ValueName</i>
Logical Binary/Analog Input/Output functions in the text	LOGICALFUNCTION
Setpoint setting option	OPTION

1.2 Conformity Declaration



The following described machine complies with the appropriate basic safety and health requirement of the EC Low Voltage Directive No: 73/23 / EEC and EC Electromagnetic Compatibility Directive 89/336 / EEC based on its design and type, as brought into circulation by us.

2 System overview

2.1 General description

InteliMains-NT controller is comprehensive mains supervision controller for multiple generating sets operating in parallel to the Mains. A modular construction allow upgrades to different levels of complexity in order to provide the best solution for various customer applications.

NT Family controllers are equipped with a powerful graphic display showing icons, symbols and bar-graphs for intuitive operation, which sets, together with high functionality, new standards in Gen-set controls.

BaseBox versions of InteliMains controllers is now available. This version features controller without built-in monochromatic display and can be combined with new and powerful display units InteliVision-8 and InteliVision-5. For more information on these products, please go to comap.cz web pages.

The controller automatically connects and synchronizes two parts of bus bar and controls the bus tie circuit breaker (BTB).

The key feature of the controller is its easy-to-use operation and installation. Predefined configurations for typical applications are available as well as user-defined configurations for special applications.

The key features are:

- BTB controlled by InteliMains-NT
- Highly customizable behavior of breaker control (dead bus, blockation of closing etc.)
- Synchronization (voltage and phase matching) of two control groups separated by InteliMains-BTB with various settings (which group synchronizes to which etc.)
- Load shedding control (based on power transferred via BTB)
- Full PLC logic included (useful in complex systems – BTB can for example serve as auxiliary PLC for other controllers)
- Support of redundancy controller
- Full set of protections for BusL and additional protections for BusR
- Group Link function
- Active calls and SMS

2.2 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 ComAp PC/mobile tools.

Supported configuration and monitoring tools:

- [GenConfig](#) – complete configuration and firmware upgrade
- [InteliMonitor](#) – multiple site monitoring and setpoint setting
- [WinScope](#) – special graphical monitoring software
- [WebSupervisor](#) – web-based system for monitoring and controlling
 - WebSupervisor mobile – supporting application for smartphones

NOTE:

Use the [GenConfig](#) PC software to read, view and modify configuration from the controller or disk and write the new configuration to the controller or disk.

2.2.1 GenConfig

Configuration and monitoring tool for InteliMains^{NT}, InteliGen^{NT} and other controllers. See more in [GenConfig Reference Guide](#).

This tool provides the following functions:

- Direct, modem or internet communication with the controller
- Offline or online controller configuration
- Controller firmware upgrade
- Reading/writing/adjustment of setpoints
- Binary/Analog Inputs and Outputs logical functions adjustments
- Exporting data into a XLS file
- Controller language translation
- Screen Editor for editing InteliVision 5 a 8 screens
- PLC Editor for editing built-in PLC functions
- Updating and configuration of InteliVision 8 firmware
- User Protections, User sensor curves, password protection and history management



2.2.2 InteliMonitor

PC Monitoring tool for Inteli controllers. See more in the [InteliMonitor Reference Guide](#).

This tool provides the following functions:

- Online monitoring of a controller or whole site
- Fully customizable SCADA diagram
- Reading/writing/adjustment of setpoints
- Reading of measured values
- Browsing of controller history records

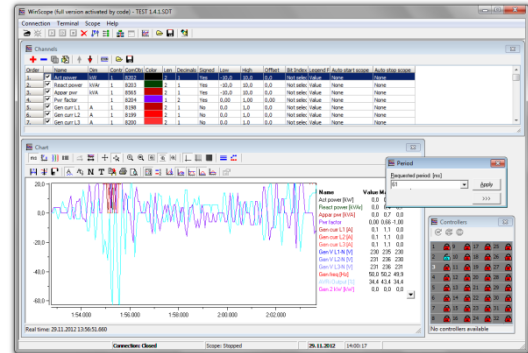


2.2.3 WinScope

Special graphical controller monitoring software. 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/historic trends in controller
- On-line change of controllers' parameters for easy regulator setup



2.2.4 WebSupervisor

Web-based system for monitoring and controlling ComAp controllers. See more at the [WebSupervisor webpage](#).

This tool provides the following functions:

- Site and fleet monitoring
- Reading of measured values
- Browsing of controller history records
- On-line notification of alarms
- E-mail notification
- Also available as a smartphone application






2.3 Applications overview


For detailed description of several possible applications using IntelliMains^{NT}, please refer to the [IGS-NT-Application Guide](#).

3 Installation

There are currently three HW versions of IntelliMains^{NT} controller. Please refer to the corresponding portion of this chapter for installation instruction for your particular controller type. Chapters relevant for both HW configurations are marked as “(general)”.

CONTROLLER TYPE	HARDWARE FEATURES
<p>IM-NT</p> 	<ul style="list-style-type: none"> • 6 Binary Outputs • 6 Binary Inputs • Mains and Bus Voltage measurement (3-phase) • Mains Current measurement (3-phase) • Auxiliary Current measurement (1-phase) • RS485 Communication port for universal use • RS232 Communication port • CAN1 Communication port (for extension modules) • CAN2 Communication port (for intercontroller communication and monitoring)
<p>IM-NT-BB</p> 	<ul style="list-style-type: none"> • 12 Binary Outputs • 12 Binary Inputs • 3 Analog Inputs • 1 Analog Output • Mains and Bus Voltage measurement (3-phase) • Mains Current measurement (3-phase) • Auxiliary Current measurement (1-phase) • RS485 Communication port dedicated for display • RS232 Communication port • CAN1 Communication port (for extension modules) • CAN2 Communication port (for intercontroller communication and monitoring)
<p>IM-NTC-BB</p> 	<ul style="list-style-type: none"> • 12 Binary Outputs • 12 Binary Inputs • 3 Analog Inputs • 1 Analog Output • Mains and Bus Voltage measurement (3-phase) • Mains Current measurement (3-phase) • Auxiliary Current measurement (1-phase) • RS485 Communication port dedicated for display • RS485 Communication port for universal use with galvanic separation • RS232 Communication port • CAN1 Communication port (for extension modules) • CAN2 Communication port (for intercontroller communication and monitoring) • USB Communication port • RJ45 (Ethernet) Communication port

3.1 IM-NT Installation instructions

	<p>This portion of Installation instructions is dedicated to the IntelMains-NT-GC controller with built-in display. If you have BaseBox type of the controller (without the built-in display), please refer to the section 3.2.</p>
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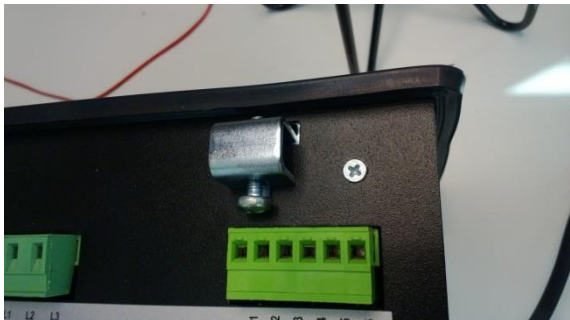
3.1.1 Mounting



Prepare the screw holders



Locate four sockets for screw holders

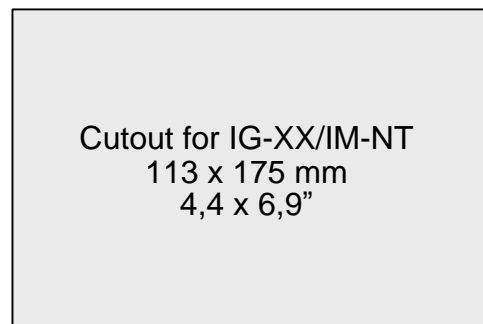
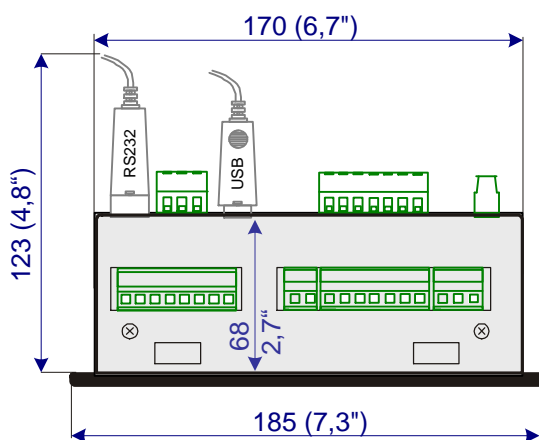
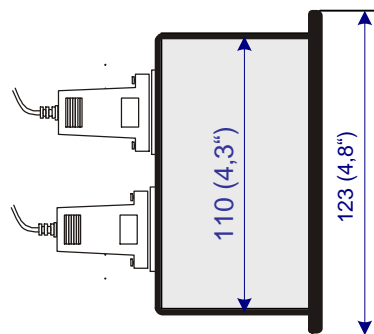
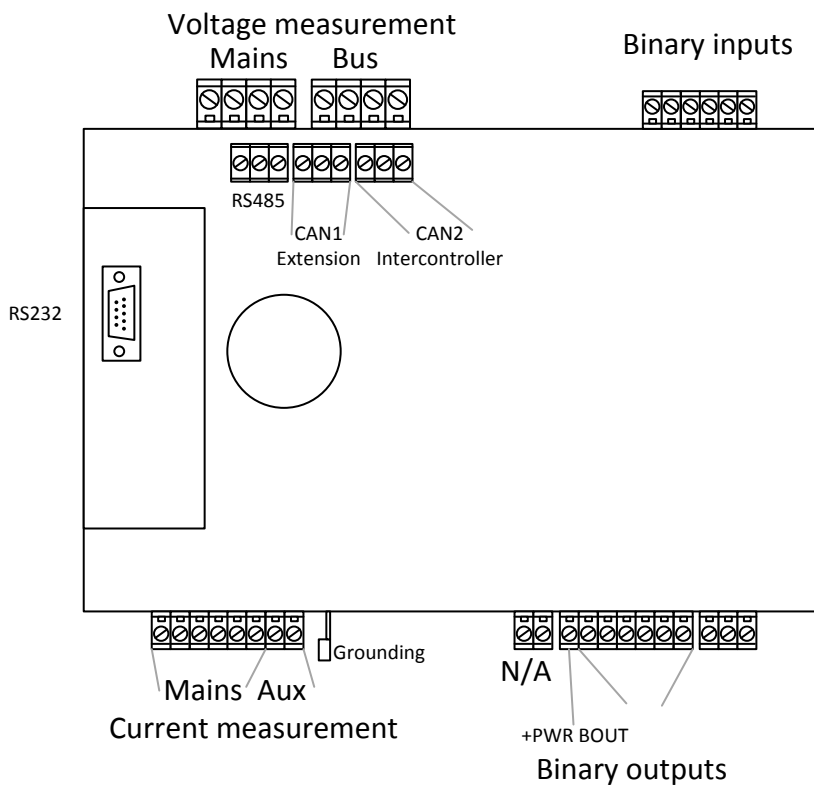


Insert the unit into cut-out in a switchboard and insert all four screw holders accordingly to their positions



Tighten as required to fix the controller in the position

3.1.2 Terminal diagram, Dimensions



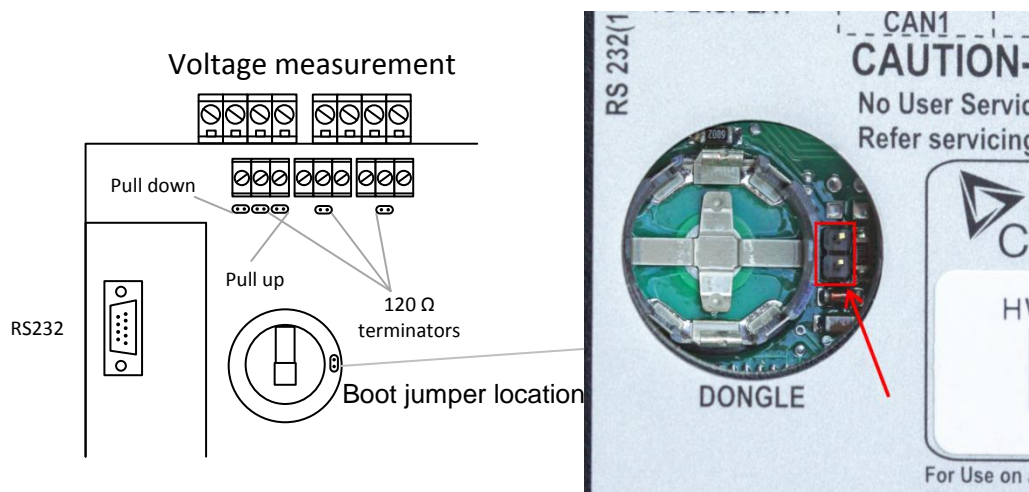
3.1.3 Package contents

The package contains:

- Controller
- Mounting holders
- Terminal blocks

3.1.4 Jumper settings

There are several jumpers available on the unit. Their location and purpose is described below.




Use boot jumper if controller is not responding to communication (e.g. due to faulty programming sequence). Take off the rubber cover using screwdriver to access boot jumper next to dongle slot.

Use 120 Ω terminators at the end of CAN1, CAN2 or RS485 buses. Do not use these terminators on units that are not terminating the bus.

Use pull up and pull down resistors on RS485 to bias the line when no device is active on the bus to prevent noise from undriven line to be interpreted as data.

3.2 *IM-NT-BB and IM-NTC-BB Installation instructions*

	<p>This portion of Installation instructions is dedicated to the IntelMains-NT-BaseBox and IntelMains-NTC-BaseBox controllers without built-in display. If you have version with built-in display of the controller, please refer to the section 3.1.</p>
---	---

3.2.1 Mounting

BaseBox units are prepared for mounting on DIN rain mount (35mm).



Locate two plastic holders on the back side of the controller



Make sure both holders are in open position (right image). If not (left image) open them by pulling them slightly out



Mount the unit on the DIN rail and secure by pressing two plastic holder until they click and fix the unit into position

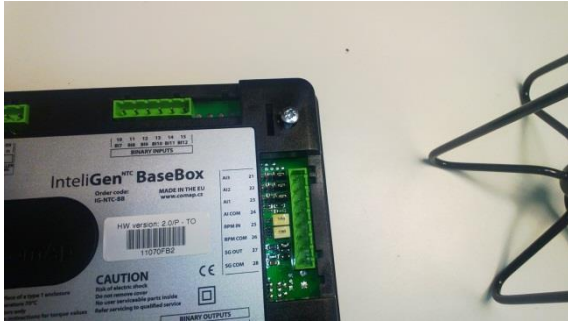
BaseBox units may also be mounted on IntelliVision 5 and together with it mounted into cut-out in a switchboard.



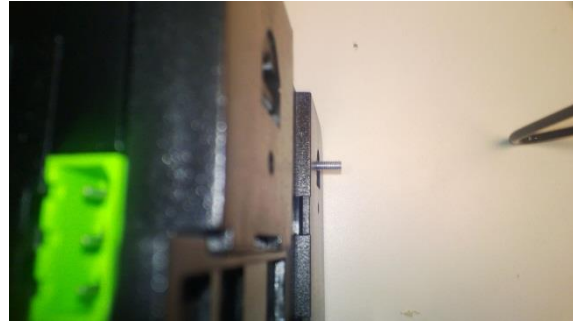
Mount IntelliVision 5 into the switchboard cut-out (for more information on IntelliVision 5 mounting please refer to the IntelliVision 5 Reference Guide)



Use the rail provided on the back side of IntelliVision 5 and mount the controller to it while following the same steps when mounting on standard rail (rail openings on IntelliVision 5 are fixed so there is only one possible way how to mount the controller to it)

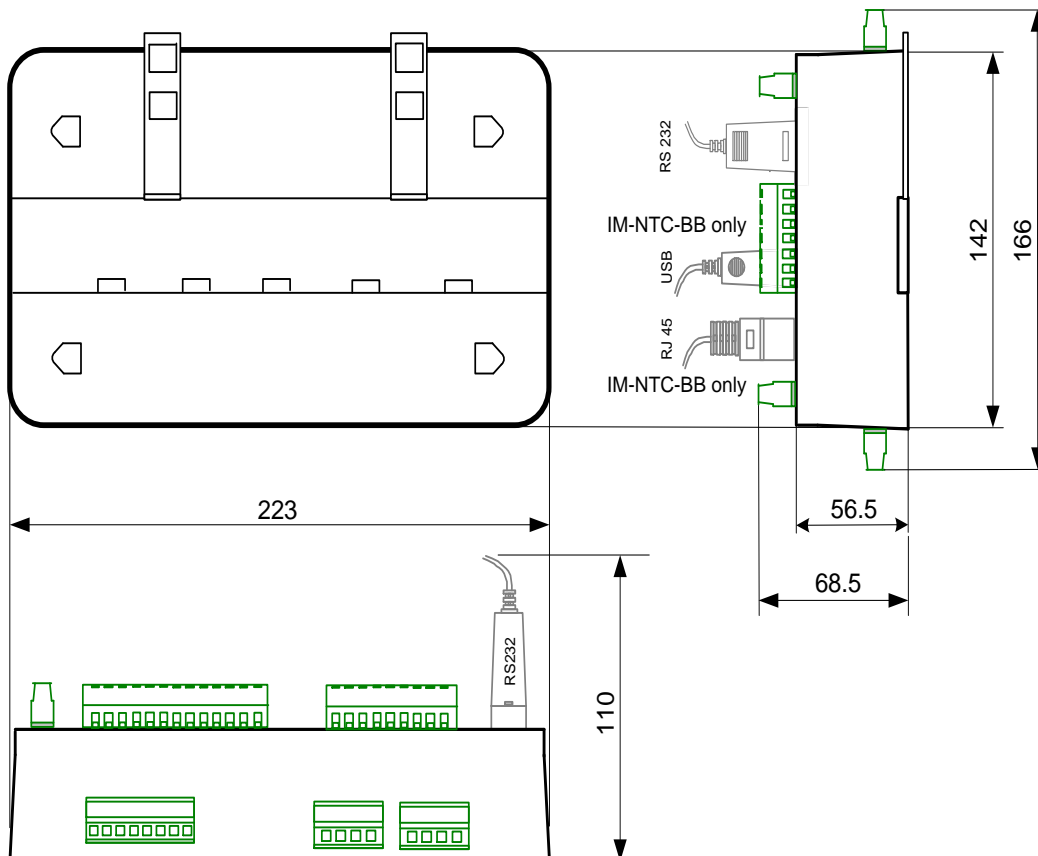
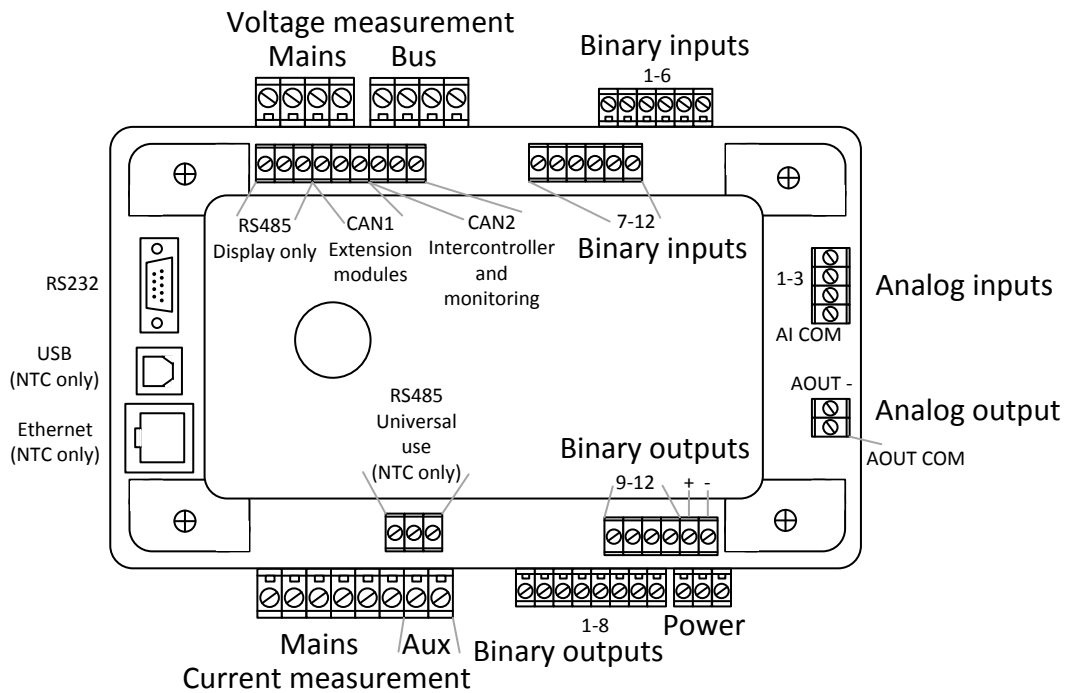


Locate four screw holes on the front of the controller



Insert provided screws and use them to secure the controller mounted to IntelliVision 5 (screws fit into IntelliVision 5 holder pieces)

3.2.2 Terminal diagram, Dimensions



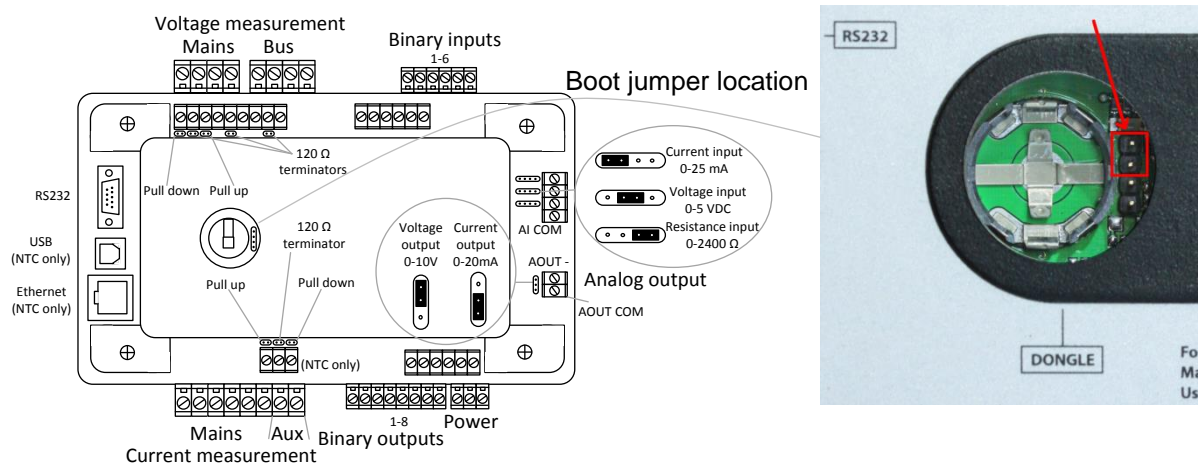
3.2.3 Package contents

The package contains:

- Controller
- Screws for optional screw mounting
- Terminal blocks

3.2.4 Jumper settings

There are several jumpers available on the unit. Their location and purpose is described below.



Use boot jumper if controller is not responding to communication (e.g. due to faulty programming sequence). Take off the rubber cover using screwdriver to access boot jumper next to dongle slot.

Use 120 Ω terminators at the end of CAN1, CAN2 or RS485 buses. Do not use these terminators on units that are not terminating the bus.

Use pull up and pull down resistors on RS485 to bias the line when no device is active on the bus to prevent noise from undriven line to be interpreted as data.

3.3 Wiring (general)

To ensure proper function:

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

Tightening torque, allowable wire size and type, for the Field-Wiring Terminals:

- For Mains(Bus) Voltage, Generator Voltage a Current terminals
 - Specified tightening torque is 0,56Nm (5,0 In-lb)
 - Use only diameter 2,0-0,5mm (12-26AWG) conductor, rated for 90°C minimum.





- For other controller field wiring terminals
 - Specified tightening torque 0,79Nm (7,0 In-lb)
 - Use only diameter 2,0-0,5mm (12-26AWG) conductor, rated for 75°C minimum.
 - Use copper conductors only.

3.4 Grounding (general)

The shortest possible piece of wire should be used for controller grounding. Use cable min. 2.5 mm². A brass M4x10 screw with star washer securing ring type grounding terminal shall be used.

The negative “-” battery terminal must be properly grounded.

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

3.5 Power supply (general)

To ensure proper function:

- Use power supply cable min. 2,5mm²
- Use fuse
 - 1 amp for IM-NT
 - 2 amps for IM-NT-BB or IM-NTC-BB
- Maximal continuous DC power supply voltage is 36VDC.

CAUTION!

Switchboard lightning strikes protection according standard regulation is expected!!!
The maximum allowable current through the controller negative terminal is 3 to 8A (depends on the controller type and binary output load).

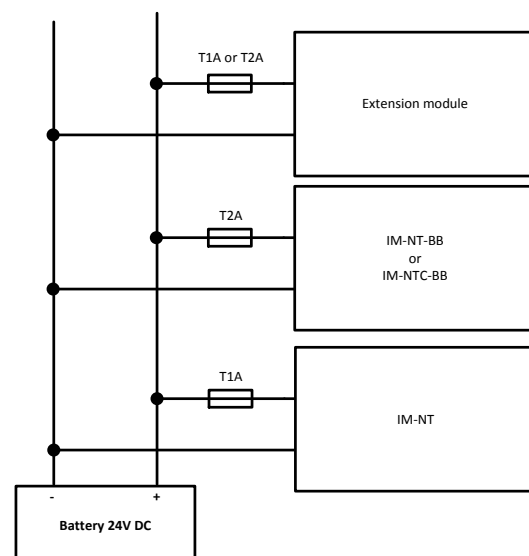
HINT

For more information on technical data regarding supply, inputs, outputs etc. please refer to [IGS-NT-Instalation Guide](#).

3.6 Power supply fusing (general)

Always use according fuse (1Amp or 2Amps) when connection controller, extension modules or relays to a power source.

See the diagram for proper fusing.



3.7 Voltage and current inputs

WARNING!

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.

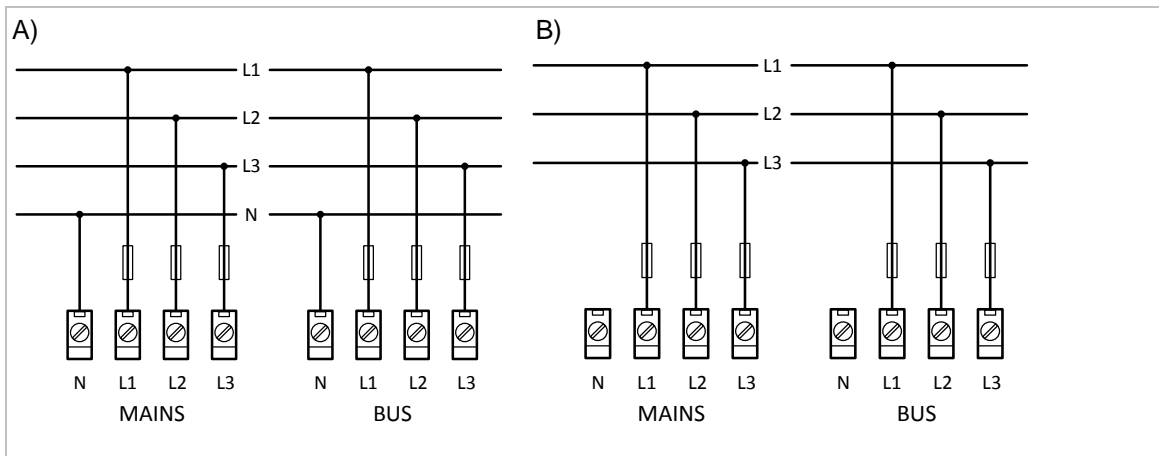
WARNING!

Do not open the secondary circuit of current transformers when the primary circuit is closed!!! Open the primary circuit first!

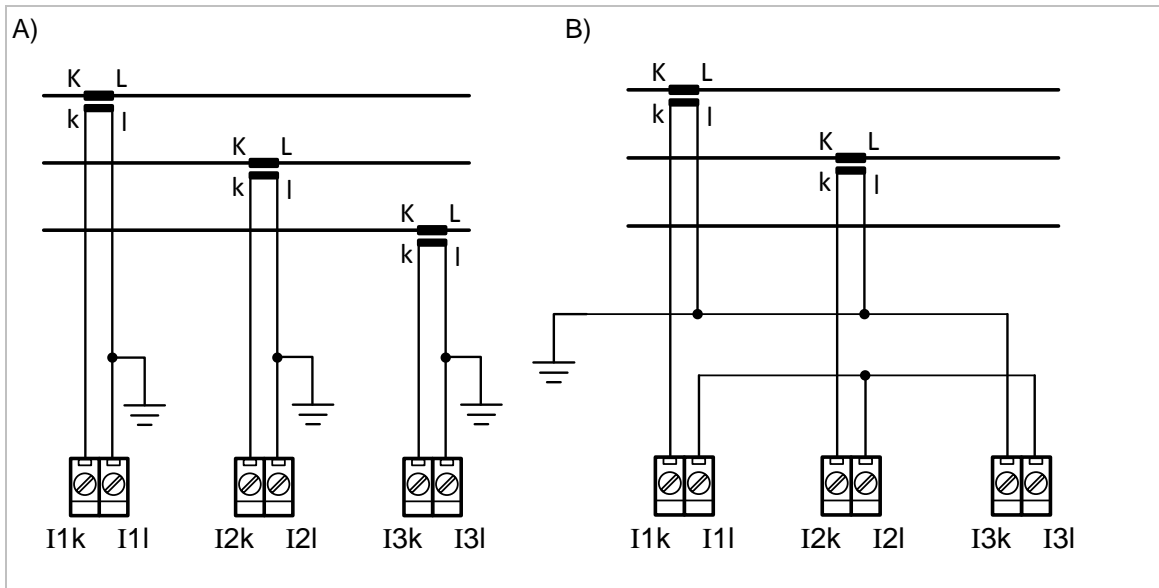
Use **1.5 mm²** cables for voltage connection and **2.5 mm²** for current transformers connection.

Adjust nominal voltage, nominal current, CT ratio and PT ratio by appropriate setpoints in the Basic Settings group.

VOLTAGE MEASUREMENT WIRING



CURRENT MEASUREMENT WIRING



CAUTION!

Check measurement connections carefully! Failure is possible if phases are connected in wrong order (WrongPhSequence detected by the controller) but this is not detected if the phases are just rotated (i.e. instead of phase sequence L1, L2, L3, phase sequence is e.g. L2, L3, L1).

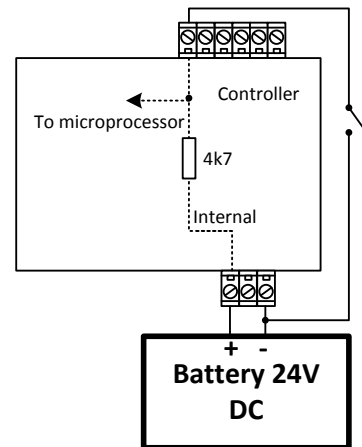
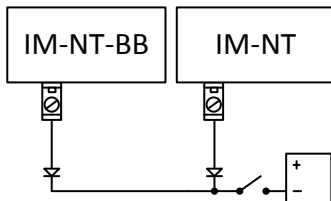
3.8 Binary Input wiring (general)

Use min. 1 mm² cables for wiring of binary inputs.

NOTE:


The name and function or alarm type for each binary input have to be assigned during the configuration. Binary inputs may be used in built-in PLC as well. Please refer to the manual of [GenConfig](#) for more information.

It is recommended to use separation diodes when multiple binary input terminals are connected together to prevent unwanted activation of binary input when one of the controllers is switched off.

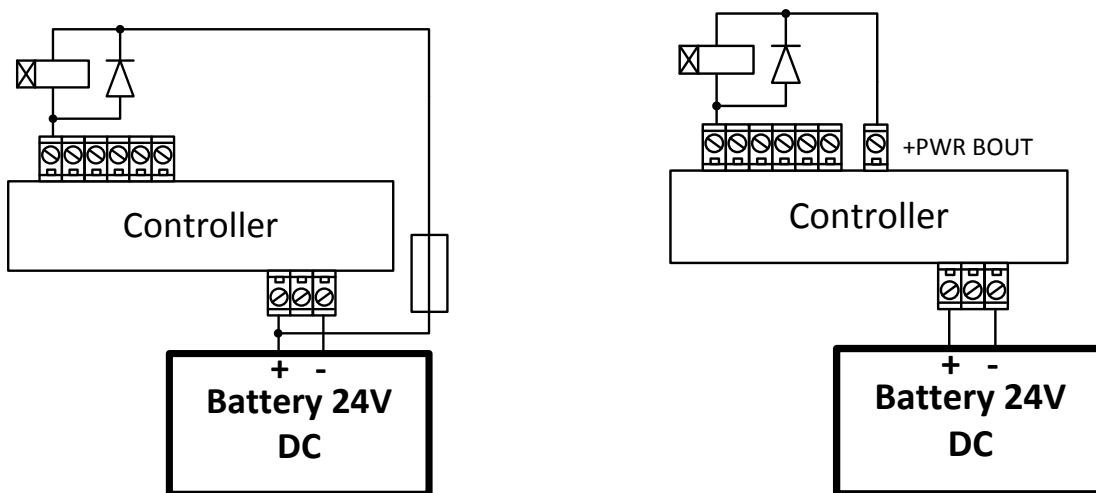


3.9 Binary Output wiring

3.9.1 IM-NT

	<p>This portion of Installation instructions is dedicated to the IntelliMains-NT-GC controller with built-in display. If you have BaseBox type of the controller (without the built-in display), please refer to the section 3.8.2.</p>
---	--


Correct wiring for Binary output is shown in the diagram below. On the left +PWR BOUT is not used, on the right +PWR BOUT is used. If Binary outputs are connected directly to the power source, additional fuse should be used.



NOTE:

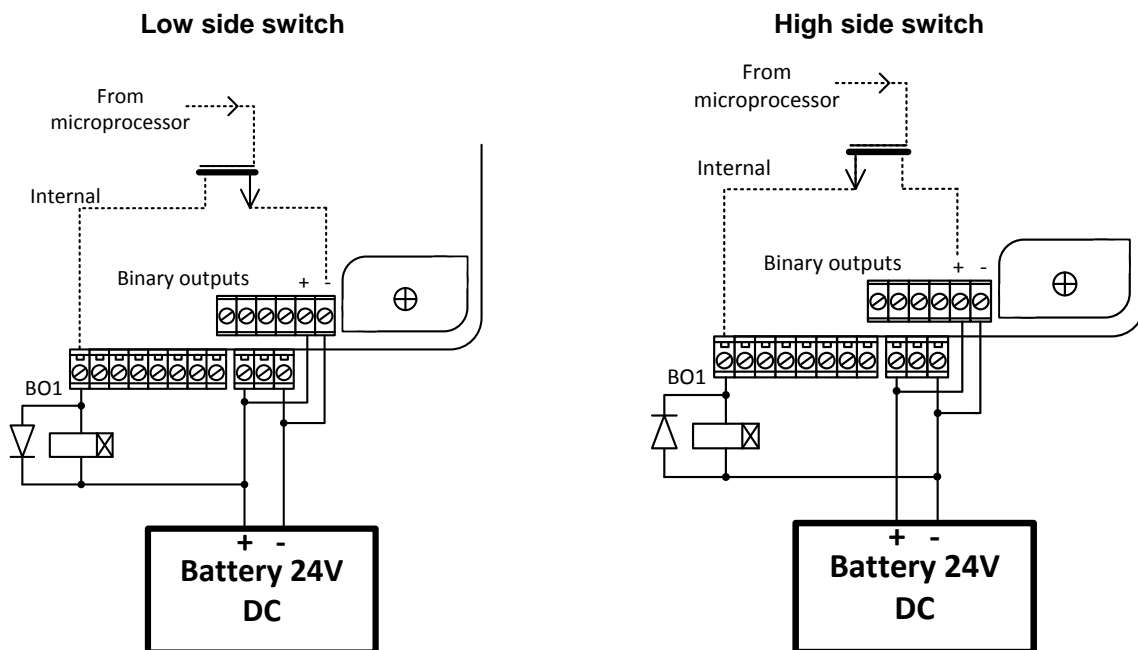
If +PWR BOUT is used, it increases power consumption of the controller.

3.9.2 IM-NT-BB and IM-NTC-BB



This portion of Installation instructions is dedicated to the **InteliMains-NT-BaseBox** and **InteliMains-NTC-BaseBox** controllers without built-in display. If you have version with built-in display of the controller, please refer to the section 3.8.1.

It is possible to use binary outputs as low side switch or high side switch in BaseBox type of controller. For correct wiring in both cases please refer to the following diagrams.

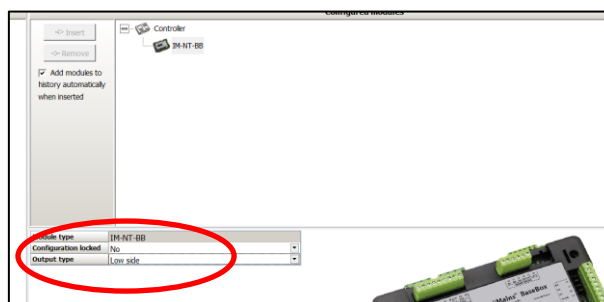


CAUTION!


Both power supply sockets for binary outputs need to be connected to ensure proper function of binary outputs.

Never use DC relays without protection diods!

Low side or High side function of binary outputs can be chosen in configuration tool GenConfig in Modules tab. This configuration is used for all binary inputs available on the controller.



3.10 Analog Input and Output wiring

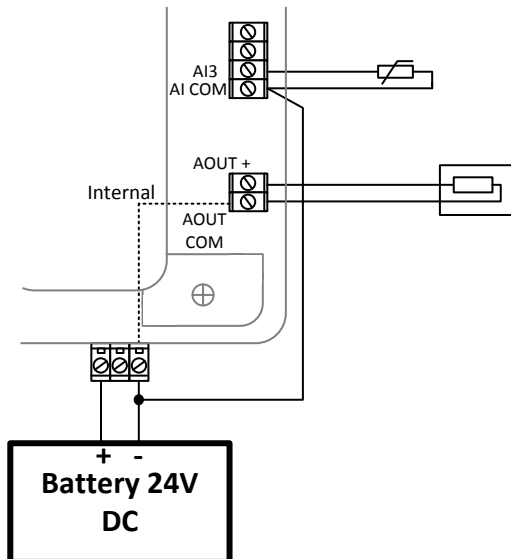


This portion of Installation instructions is dedicated to the **IntelIMains-NT-BaseBox** and **IntelIMains-NTC-BaseBox** controllers without built-in display. Analog inputs and output are not available in IntelIMains-NT-GC.

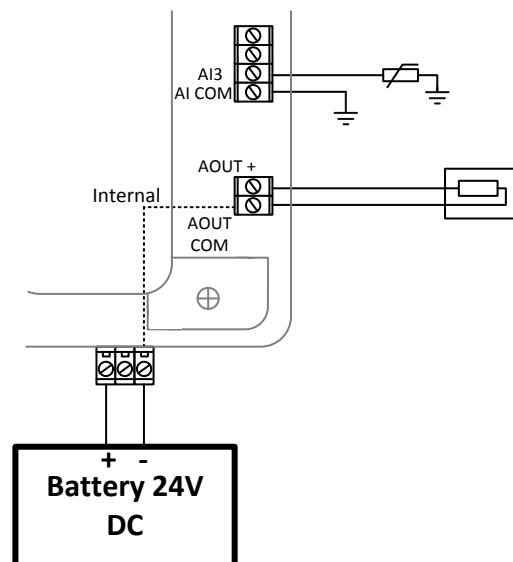
HINT

For more information on technical data regarding supply, inputs, outputs etc. please refer to For jumper setting of Analog inputs please refer to the section **3.2.4 Jumper settings**.

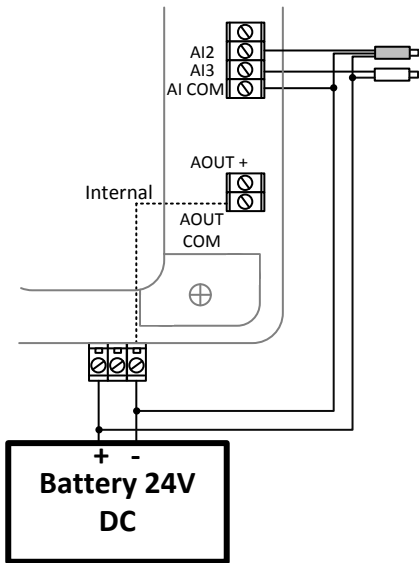
Resistive sensor on Analog input 3 and Analog output wiring



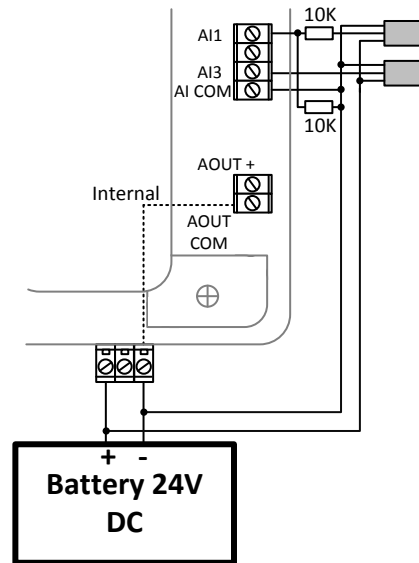
Resistive sensor with grounding on Analog input 3 and Analog output wiring. **Note, that battery should be also grounded to common ground in all cases!**



Passive Current sensor on Analog input 3 and
Active Current sensor on ANalog input 2



Voltage sensors on Analog input 1 and 3

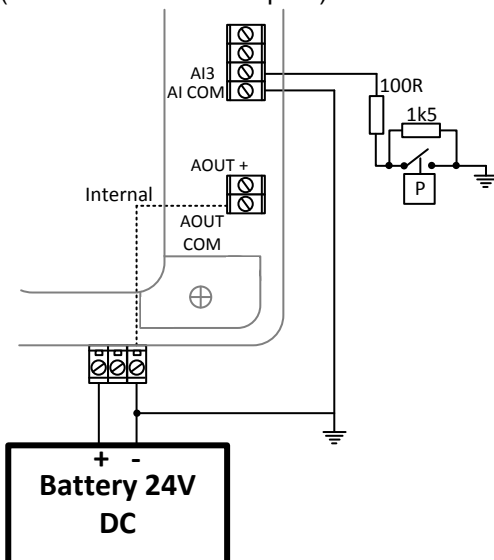


Tristate sensor (binary sensor with fail detection)
on Analog input 3

Below 750Ω = Inactive

Between 750Ω and 2400Ω = Active

Below 10 Ω or Over 2400Ω = sensor failure
(wire shorted or interrupted)



3.11 CAN and RS485 bus wiring

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

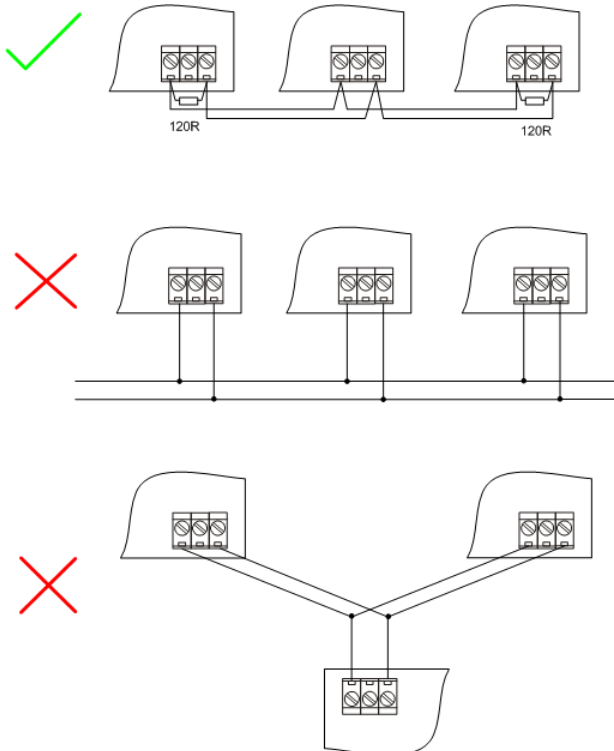
- The maximum length of the CAN bus depends on the communication speed. For a speed of 250 kbps, which is used on the CAN1 bus (extension modules, ECU) and CAN2 bus if it is switched to 32C mode, the maximum length is 200 m. If the CAN2 bus is switched to 8C mode the speed is 50 kbps and the maximum length is 800 m.
- The maximum length of the RS485 bus is 1000 m
- The bus (CAN and RS485) must be wired in linear form with termination resistors at both ends. No nodes are allowed except on the controller terminals.

NOTE:

A termination resistors at the CAN and RS485 are already implemented on the PCB. For connecting, close the jumper near the appropriate CAN or RS485 terminal. For more information on jumper settings please refer to the section **3.1.4 Jumper setting**.

- Use a cable with following parameters:

Cable type	Shielded twisted pair
Impedance	120 Ω
Propagation velocity	$\geq 75\%$ (delay ≤ 4.4 ns/m)
Wire crosscut	≥ 0.25 mm ²
Attenuation (@1MHz)	≤ 2 dB/100 m



CAN AND RS485 BUS TOPOLOGY

NOTE:

See the website www.can-cia.org for information about the CAN bus, specifications, etc.

3.11.1 Wiring examples

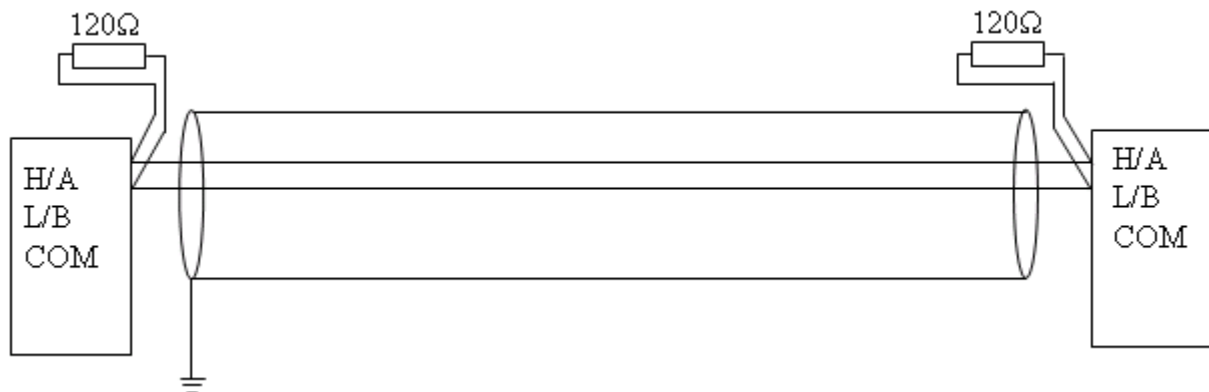
1. For shorter distances (all network components within one room) – picture 1 interconnect A and B; shielding connect to PE on controller side
2. For longer distances (connection between rooms within one building) – picture 2 interconnect A, B, COM; shielding connect to PE at one point
3. In case of surge hazard (connection out of building in case of storm etc.) – picture 3

We recommend using the following protections:

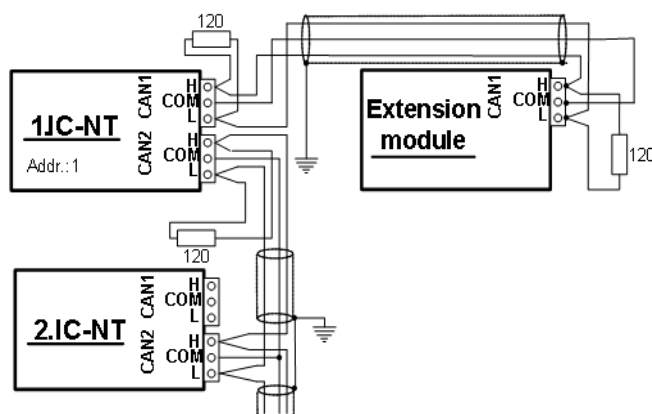
- Phoenix Contact (<http://www.phoenixcontact.com>): PT 5-HF-5DC-ST with PT2x2-BE (base element)(or MT-RS485-TTL)
- Saltek (<http://www.saltek.cz>): DM-006/2 R DJ

Recommended data cables: BELDEN (<http://www.belden.com>)

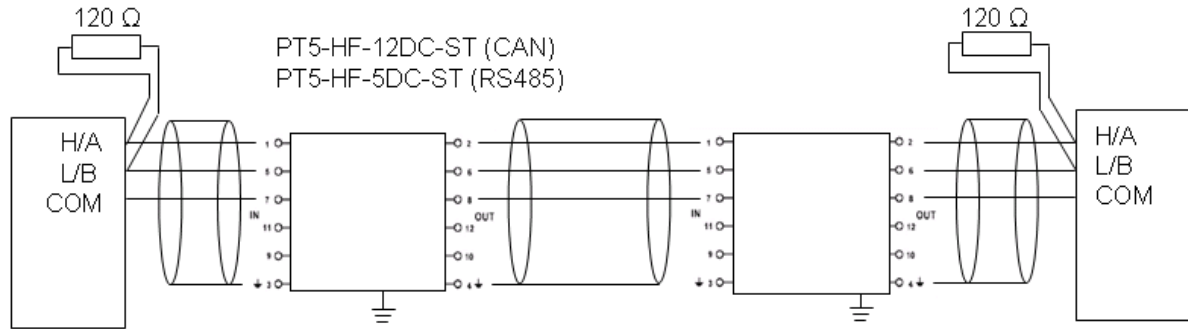
1. For shorter distances: 3105A Paired – EIA Industrial RS-485 PLTC/CM (1x2 conductors)
2. For shorter distances: 3105A Paired – EIA Industrial RS-485 PLTC/CM (1x2 conductors)
3. In case of surge hazard: 3106A Paired – EIA Industrial RS-485 PLTC/CM (1x2+1 conductors)



PICTURE 1 – SHORTER DISTANCES (ALL NETWORK COMPONENTS WITHIN ONE ROOM)



PICTURE 2 – LONGER DISTANCES (CONNECTION BETWEEN ROOMS WITHIN ONE BUILDING)



PICTURE 3 – SURGE HAZARD (CONNECTION OUT OF BUILDING IN CASE OF STORM ETC.)

3.12 Extension modules (general)

For detailed description of several available extension modules for IntelliMains^{NT} please refer to the [IGS-NT-Instalation Guide](#).

4 Putting it into operation

In this section brief introduction how to

- connect to a controller,
- modify various settings,
- program controller and reprogram non-responsive controller,
- manage passwords and password protections and
- operate related tools (ScreenEditor, PLC Editor etc.)

is presented.

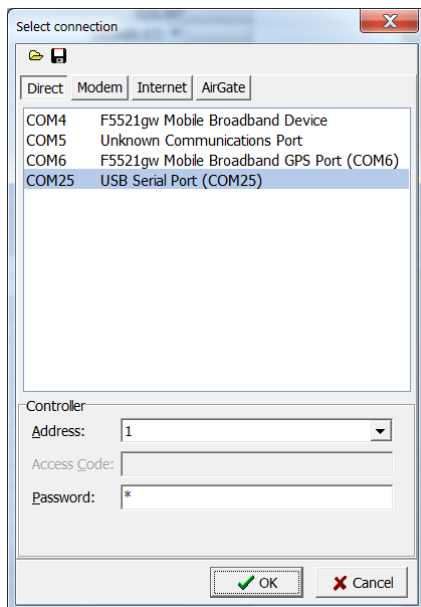
4.1 Connection to a controller using PC

There are several available ways to connect to controller using PC for monitoring, control or configuration/programming. For more information on related PC tools please refer to the section **2.2 Configurability and monitoring**.

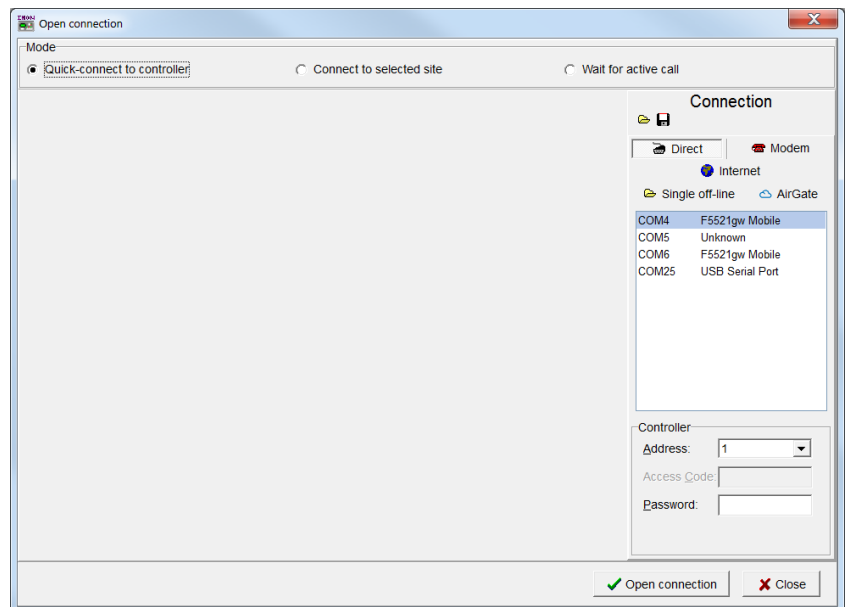
4.1.1 Direct connection

A direct connection can be realized by RS232 connection or USB connection (available on NTC BaseBox only). Figures below illustrate the connection setting in GenConfig and IntelliMonitor.

GenConfig



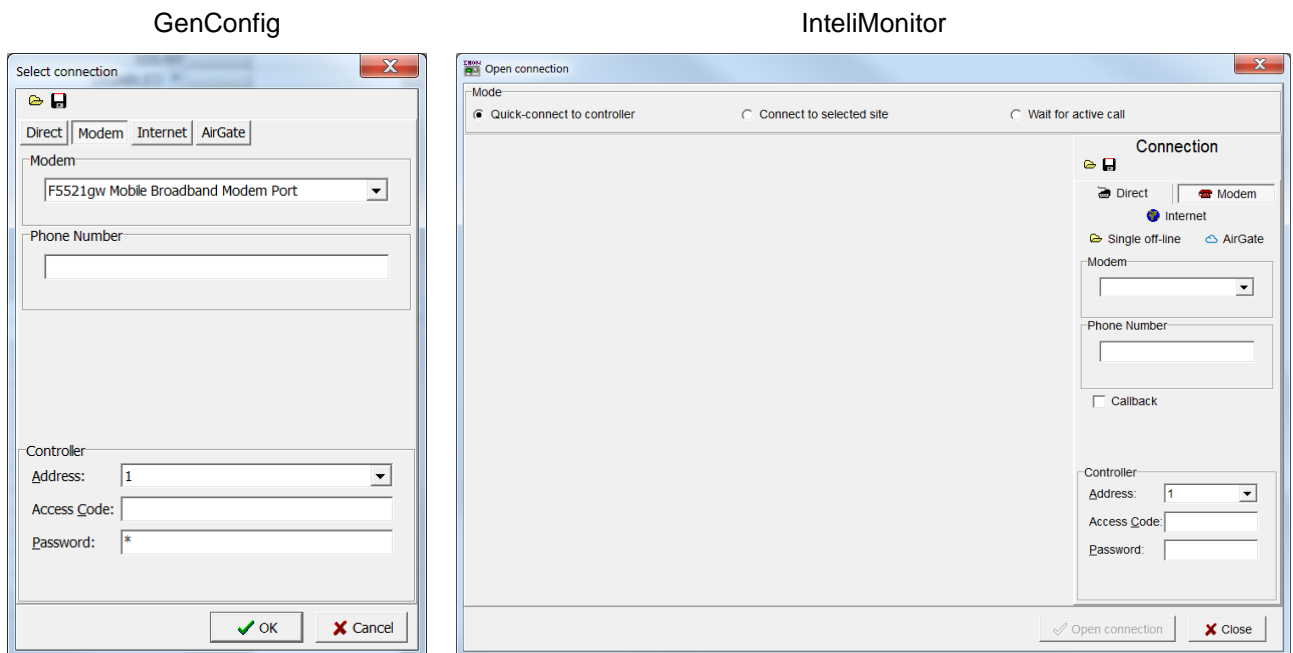
IntelliMonitor



Select according COM port, adjust CAN address and enter password (optional for locked configuration).

4.1.2 Modem connection

A modem connection can be realized by suitable modem connected to the controller. Figures below illustrate the connection setting in GenConfig and IntelliMonitor.

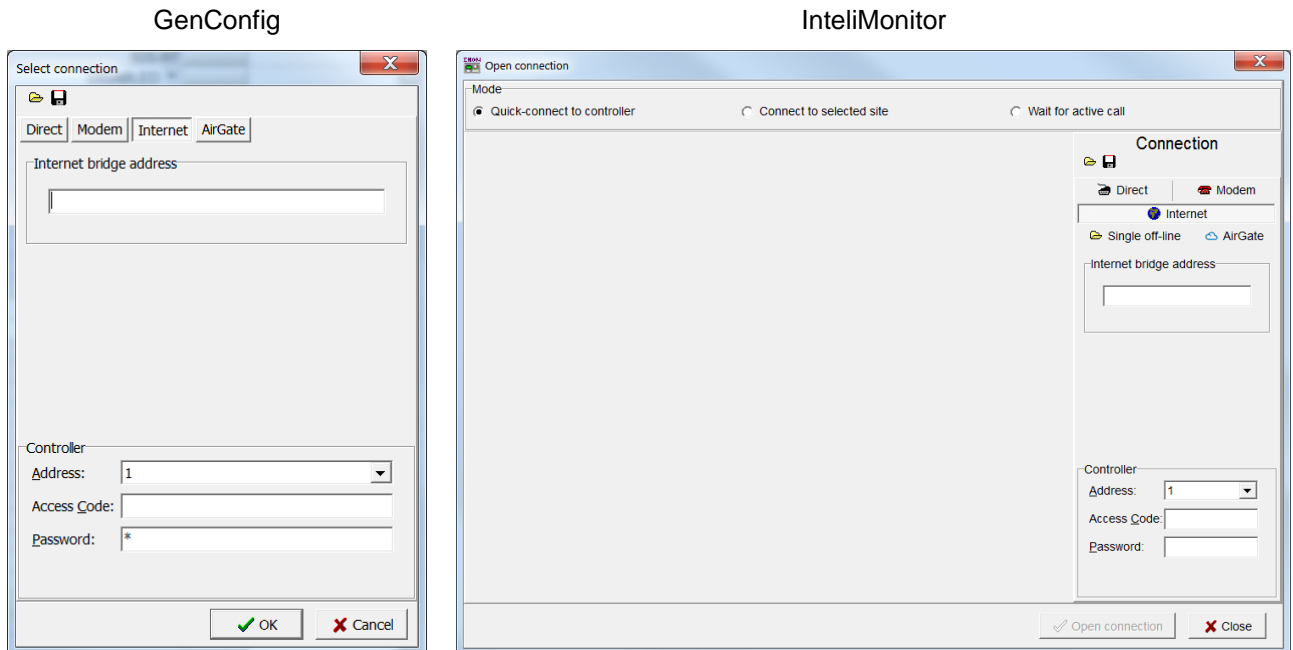


Select connected modem, adjust Phone number and enter CAN address and enter correct Access Code for remote connection. Enter password (optional for locked configuration).

It is possible to adjust number of rings before the controller accepts the connection from modem – use **Comms settings: NumberRings AA**.

4.1.3 Internet connection

Internet (Ethernet) connection can be used directly in NTC BaseBox version of the controller. For connection to other versions, use InternetBridge-NT device. Figures below illustrate the connection setting in GenConfig and IntelliMonitor.



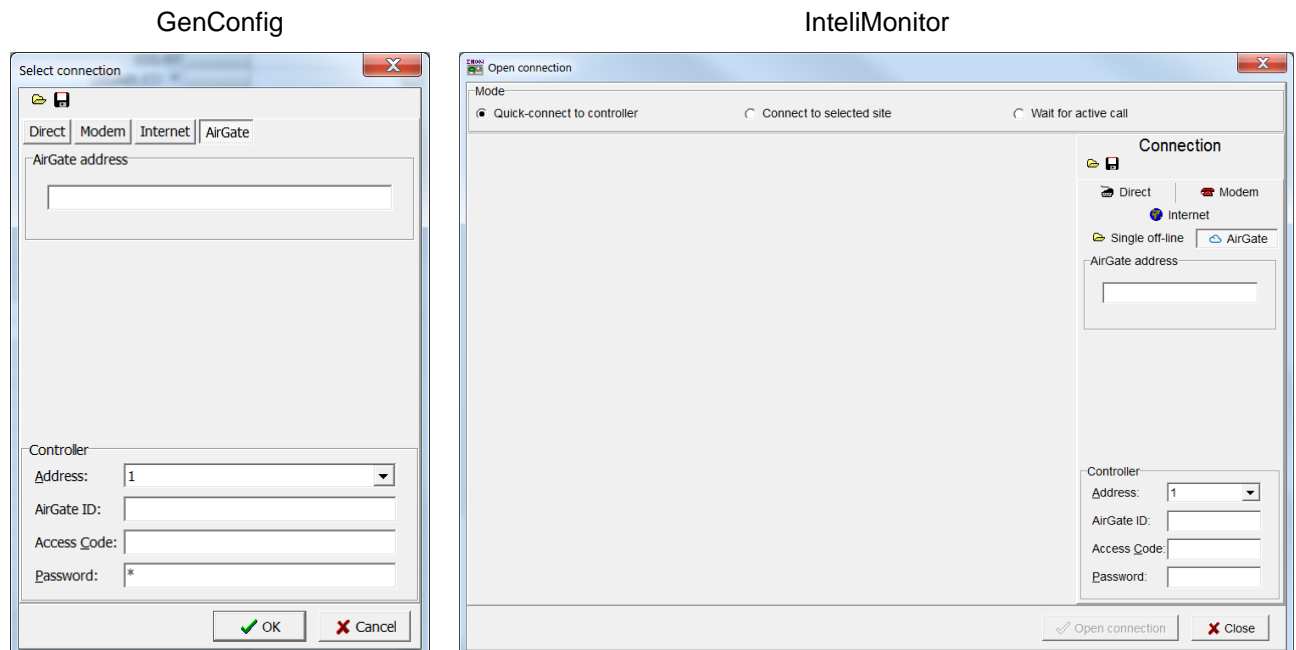
Adjust IP address of the controller (InternetBridge) you want to connect to. Select CAN address of the controller. Enter Access Code for remote connection. Enter password (optional for locked configuration).

NOTE:

The controller must have public IP address or it must be reachable for connection in the specific network.

4.1.4 Airgate connection

AirGate connection can be used directly in NTC BaseBox version of the controller. For connection to other versions, use InternetBridge-NT device. Figures below illustrate the connection setting in GenConfig and IntelliMonitor.



Enter AirGate address of a server with AirGate service (currently **airgate.comap.cz**). Select CAN address of the controller you want to connect to. Enter AirGate ID of the controller (InternetBridge) you want to connect to (AirGate ID is assigned automatically if the controller is properly connected to the Internet and corresponding AirGate setting is enabled. You can find AirGate ID in controller values.). Enter Access Code for remote connection. Enter password (optional for locked configuration).

NOTE:

What is AirGate service? AirGate is a service provided for free by ComAp which allows users to connect to controllers even though they are not assigned public IP address or if there are behind corporate firewalls. Controller connects to the AirGate server (secure and fast server located in Central Europe) and obtains AirGate ID (used in the connection, see above). Then it communicates with the server on a secure line and any user that know AirGate ID and access code for that particular controller can connect from anywhere (Internet access needed) to the controller and monitor and control it.

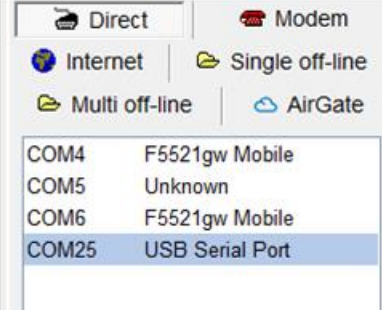


4.1.5 Connection to multiple controllers

Connection to multiple controller is available in IntelliMonitor. It is possible to connect to multiple controller using Direct connection to I-LB+, using Internet connection to NTC BaseBox controllers or to InternetBridge, using modem connection capable of multiple connections or AirGate connection to multiple NTC BaseBox controllers or to InternetBridge.

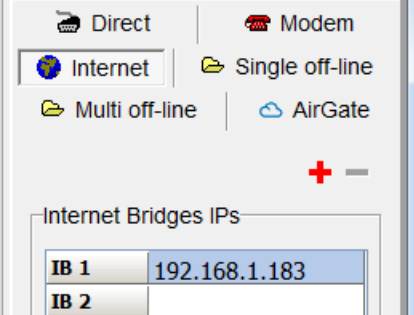
Direct multiple connection

Name	Type	Addr	Acc	Pass	User	Ena
GEN1	iGS-NT	1	*	*	Admir	<input checked="" type="checkbox"/>
GEN2	iGS-NT	2	*			<input checked="" type="checkbox"/>
GEN3	iGS-NT	3	*			<input checked="" type="checkbox"/>
GEN4	iGS-NT	4	*			<input checked="" type="checkbox"/>
IM - UPPER	iGS-NT	5	*			<input checked="" type="checkbox"/>
IM - LOWER	iGS-NT	6	*			<input checked="" type="checkbox"/>
IM -BTB	iGS-NT	7	*			<input checked="" type="checkbox"/>
PSC	iGS-NT	8				<input type="checkbox"/>



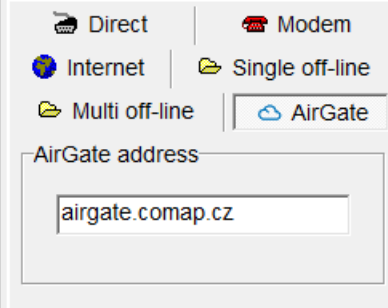
Internet multiple connection (use Internet Bridges IPs for connection to NTC BaseBox controllers as well)

Name	Type	Addr	Acc	Pass	User	IB	Ena
GEN1	iGS-NT	1	*	*	Admir	1	<input checked="" type="checkbox"/>
GEN2	iGS-NT	2	*			1	<input checked="" type="checkbox"/>
GEN3	iGS-NT	3	*			1	<input checked="" type="checkbox"/>
GEN4	iGS-NT	4	*			1	<input checked="" type="checkbox"/>
IM - UPPER	iGS-NT	5	*			1	<input checked="" type="checkbox"/>
IM - LOWER	iGS-NT	6	*			1	<input checked="" type="checkbox"/>
IM -BTB	iGS-NT	7	*			1	<input checked="" type="checkbox"/>
PSC	iGS-NT	8				1	<input type="checkbox"/>



Airgate multiple connection (fill in AirGate IDs for each controller, when using InternetBridge fill in InternetBridge AirGate ID for each controller)

Name	Type	Addr	Acc	Pass	User	AirGate ID	Ena
GEN1	iGS-NT	1	*	*	Admir	000	<input checked="" type="checkbox"/>
GEN2	iGS-NT	2	*				<input checked="" type="checkbox"/>
GEN3	iGS-NT	3	*				<input checked="" type="checkbox"/>
GEN4	iGS-NT	4	*				<input checked="" type="checkbox"/>
IM - UPPER	iGS-NT	5	*				<input checked="" type="checkbox"/>
IM - LOWER	iGS-NT	6	*				<input checked="" type="checkbox"/>
IM -BTB	iGS-NT	7	*				<input checked="" type="checkbox"/>
PSC	iGS-NT	8					<input type="checkbox"/>



4.2 **Modification of configuration, setpoints etc.**

For full configuration of controller configuration use GenConfig. You may open archive prepared for specific application and upload it to the controller. You may also change:

- Controller type (Modules tab)
- Extension modules (Modules tab)
- Binary Input and Output logical functions and protections (I/O tab)
- Analog input sensor type, logical functions and protections (I/O tab)
- Analog output function, conversion, normalization, resolution (I/O tab)
- Setpoints and password level for particular setpoint (Setpoints tab)
- Commands password protection (Commands tab)
- Prepare custom protections (Protections tab)
- Modify History data selection (History tab)
- Prepare custom user sensor characteristics (User Sensor tab)
- Modify languages settings (Languages tab)
- Translate corresponding names to other language prepared in Languages tab (Translator tab)
- Prepare complex logical functions with built-in PLC functions (PLC Editor tab)
- Modify screens for IntelliVision 5 and 8 (Screen Editor tab)
- Review and modify assigned logical binary functions (LBI tab)
- Review and modify assigned logical analog functions (LAI tab)
- Select power format, rename Pulse counters and Remote switches (Miscellaneous tab)

CAUTION!

Do not forget that changes in GenConfig are not sent to the controller unless you write them to the controller.

In IntelliMonitor it is possible to configure:

- Setpoints (multiple setpoint configuration in several controllers at once)
- Set/Reset statistics
- Administrate users and their rights

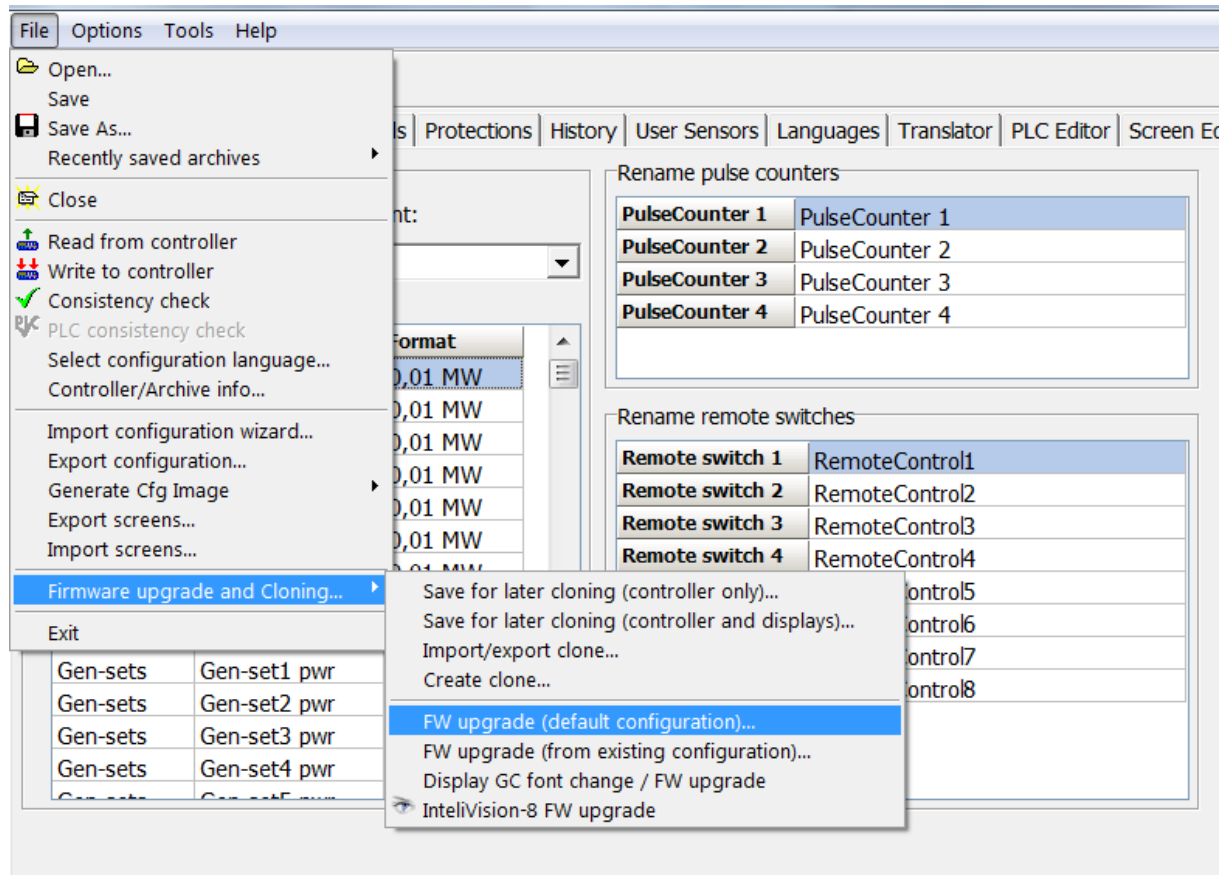
CAUTION!

Do not forget that all changes in IntelliMonitor are sent to the connected controller and controller immediately acts on it. Do not change CAN address of the controller or connection is lost and need to be re-established with new CAN address.

4.3 Programming of a controller

4.3.1 Standard programming

For programming GenConfig is used. Select correct connection mode and then select the following option:

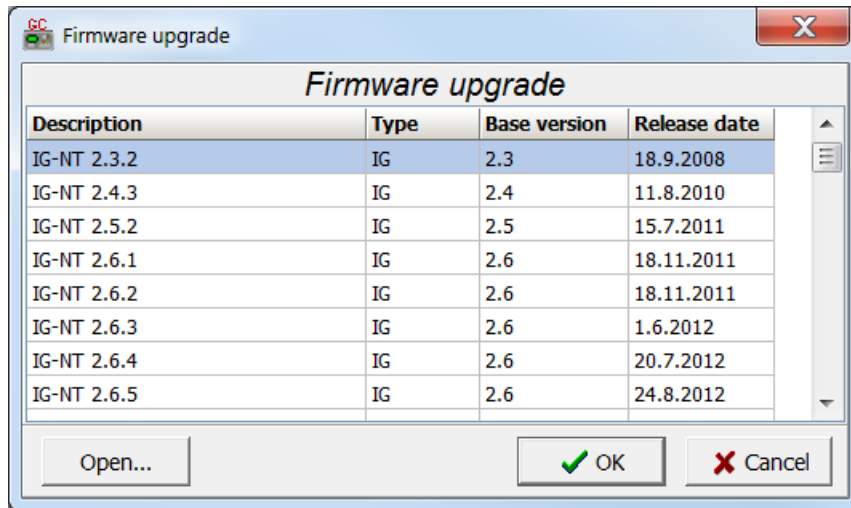


You may use “FW upgrade (from default configuration)” (this will overwrite all of the settings in the controller with default settings. If you need to upgrade firmware from existing configuration, select “FW upgrade (from existing configuration)”. This function will automatically open wizard which will help you update the existing configuration to be compatible with the newly selected firmware.

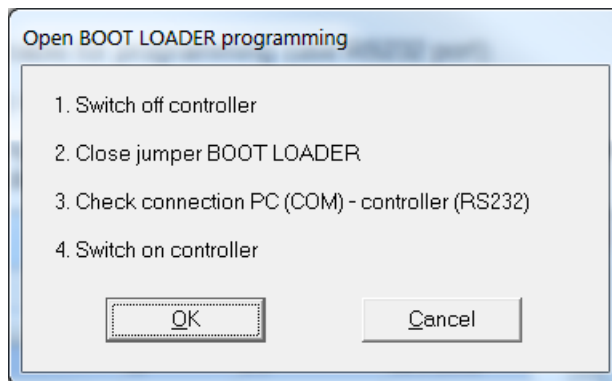
4.3.2 Programming of non-responsive controller

If the controller does not contain valid firmware, new firmware cannot be programmed in the standard way. This situation can occur if the connection between the PC and the controller was interrupted e.g. during a previous firmware upgrade. In such case the controller may have a blank display or connection to InteliVision may not be established and it does not communicate with the PC. The boot-jumper must be used to get valid firmware into the controller.

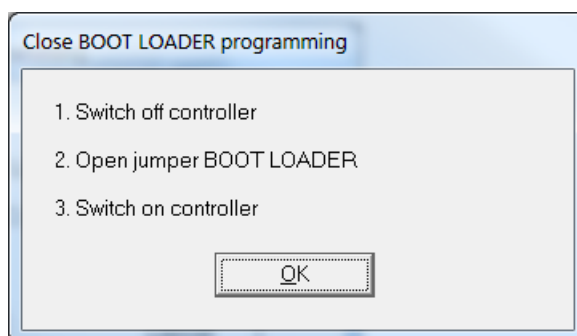
- Connect proper cable for programming (use RS232 port).
- Open GenConfig and select “FW upgrade (default configuration)”
- From the following table select FW that is required or click open and browse your files to find firmware in non-default location



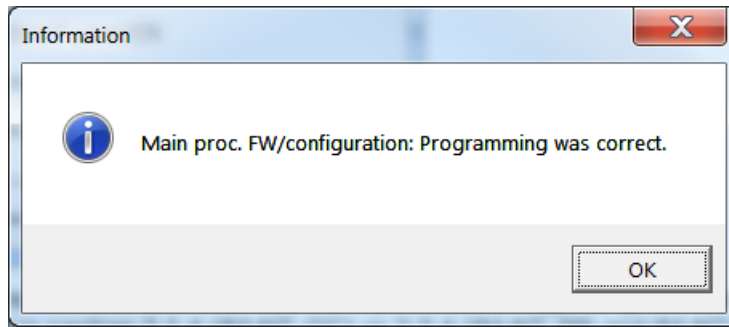
- Click OK
- Wait until the connection times out and following dialog appears



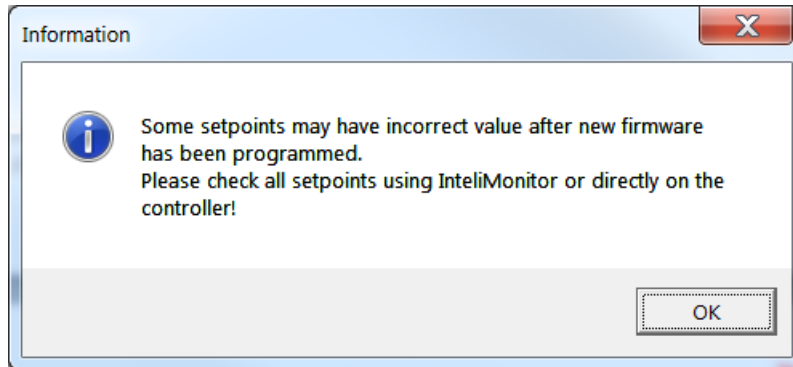
- Follow the instructions and then click OK (information regarding the location of boot jumper can be found in section 3.1.4 (IM-NT-GC) or 3.2.4 (IM-NT-BB and IM-NTC-BB))
- Programming starts momentarily
- When the programming is done following dialog appears



- Follow the instructions and press OK. Following diagram will appear and programming is done




- Additional dialog warns you that the setpoints may have improper values. Change the configuration in normal way.



4.4 Changing the language

There is step-by-step guide in GenConfig help available for the Languages and Translator tabs which contains all the information on how to prepare new languages in the configuration (press F1 in Languages or Translator tab or go to Help->GenConfig Help and locate corresponding chapters).

4.4.1 Selection of the language in InteliMains-NT GC

	<p>This portion of instructions is dedicated to the InteliMains-NT-GC controller with built-in display. If you have BaseBox type of the controller (without the built-in display), please refer to the section 4.4.2.</p>
---	--

Selection of the language can be either done by Binary Input selection (please refer to the section Functions description) or by selecting the language through the menu of built-in display. To select the language go to main menu and scroll down. Select “Languages” by pressing Enter. There is complete selection of languages configured in the controller. Using arrows select the preferred language and press Enter to confirm. Display reboots (controller itself remains fully functional) and new language is used.


HINT

If you need to use graphical language you may need to upload correct set of characters into the controller. By default Chinese character set is uploaded in the controller. If you need to use for example Korean characters (Hangul), in GenConfig select following menu while connected to the controller: File -> Firmware upgrade and Cloning -> Display GC font change / FW upgrade. GenConfig connects to the controller and new fonts may be uploaded to the controller as well as new firmware for the built-in display.

NOTE

If you are using InteliVision 5, InteliVision 8 or InteliVision 17 Touch with the GC type of the controller please refer also to the chapter 4.4.2 for more information on how to change language in the InteliVision.

4.4.2 Selection of the language in InteliMains-NT(C)-BaseBox

	<p>This portion of instructions is dedicated to the InteliMains-NT-BaseBox and InteliMains-NTC-BaseBox controllers without built-in display. If you have version with built-in display of the controller, please refer to the section 4.4.2.</p>
---	--

If using BaseBox version of the controller you may use InteliVision 5, InteliVision 8 or InteliVision 17 Touch. If you need to use for some reason IG or IS-Display please refer to the chapter 4.4.1 for the instructions regarding built-in display which works the same as the external displays.

For IntelliVision 5 an 8 go to main menu and select Help/Others and Languages. Scroll up and down and select preferred language. Confirm by pressing enter.

If you are using IntelliVision 17, it is running standard IntelliMonitor software. Please refer to the manual of IntelliMonitor how to change fonts in IntelliMonitor and in custom SCADA.

HINT

If you need to use graphical language you may need to upload correct set of characters into the IntelliVision via controller. By default Chinese character set is uploaded in the controller. If you need to use for example Korean characters (Hangul), in GenConfig select following menu while connected to the controller: File -> Firmware upgrade and Cloning -> Display GC font change / FW upgrade. GenConfig connects to the controller and new fonts may be uploaded to the controller as well as new firmware for the built-in display.

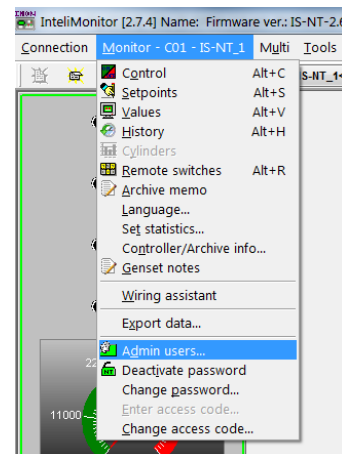
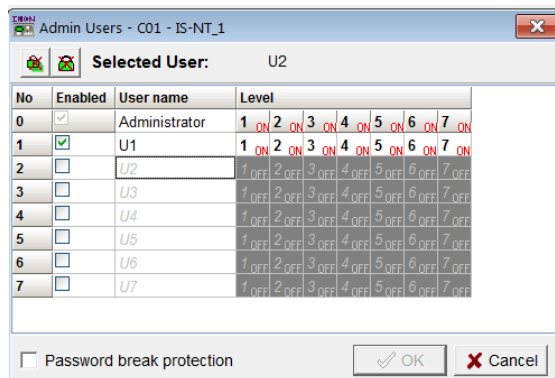
4.5 Password management

Password management requires IntelliMonitor for user names, passwords and rights modification. It also requires GenConfig for assigning corresponding setpoints and command to correct right groups.

4.5.1 User administration

User administration is available only when logged in as an Administrator. Once logged in select “Admin users...” as shown on the right.

Following dialog is displayed:



Enable or disable users. Change user names and by double clicking change the access groups that are accessible by particular user. Hold CTRL and click separate access groups to select only several of them with no access to lower groups.

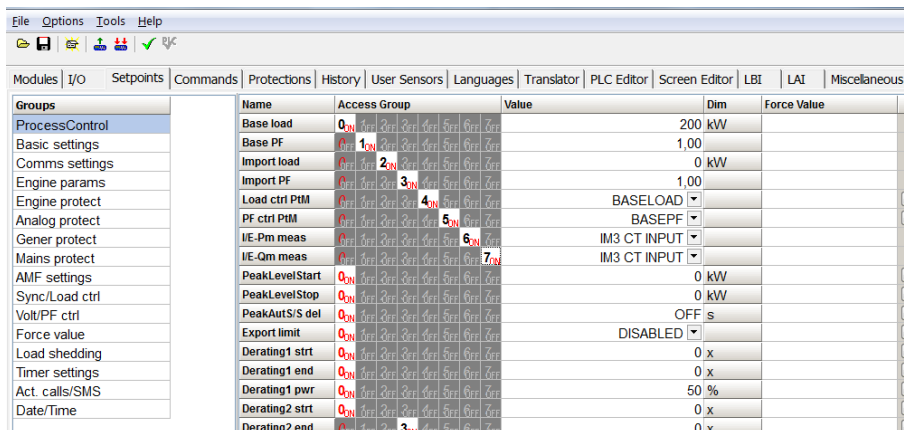
Log in as a different user to change password for that particular user.

NOTE:

Newly enabled user has always default password “0”.

4.5.2 Access group setting in GenConfig

To assign particular setpoint to access group use the following function in GenConfig (by clicking select the correct access group).

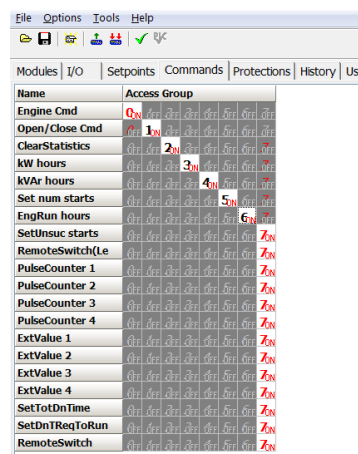


Name	Access Group	Value	Dim	Force Value
Base load	0	200	kW	
Base PF	1	1,00		
Import load	2	0	kW	
Import PF	3	1,00		
Load ctrl PIM	4	BASELOAD		
PF ctrl PIM	5	BASEPF		
IE-Pm meas	6	IM3 CT INPUT		
IE-Qm meas	7	IM3 CT INPUT		
PeakLevelStart	0	0	kW	
PeakLevelStop	0	0	kW	
PeakAutS/S del	0	OFF	s	
Export limit	0	DISABLED		
Derating1 strt	0	0	x	
Derating1 end	0	0	x	
Derating1 pwr	0	50	%	
Derating2 strt	0	0	x	
Derating2 end	3	0	x	

NOTE:

Each setpoint may be assigned to only one access group. This setpoint can be changed by all users with activated corresponding access rights.

To assign particular command to access group use the following function in GenConfig (by clicking select the correct access group).



Name	Access Group
Engine Cmd	0
Open/Close Cmd	1
ClearStatistics	2
kW hours	3
kVAr hours	4
Set num starts	5
EngRun hours	6
SetUnsuc starts	ZON
RemoteSwitch(Le	ZON
PulseCounter 1	ZON
PulseCounter 2	ZON
PulseCounter 3	ZON
PulseCounter 4	ZON
ExtValue 1	ZON
ExtValue 2	ZON
ExtValue 3	ZON
ExtValue 4	ZON
SetTotDnTime	ZON
SetDnTReqToRun	ZON
RemoteSwitch	ZON

NOTE:

Each command may be assigned to only one access group. This command can be used by all users with activated corresponding access rights.

4.5.3 Password break protection

- Password break protection (PBP) can be adjusted to ENABLED or DISABLE by a tick box in password management in IntelliMonitor (see the figure below). Default value is ENABLED.
- Warning “PassInsertBlick” is displayed in alarm list during the blocking period.
- Controller does not accept attempts to insert correct or incorrect password during the blocking period. In case of this attempt there is a message displayed in IntelliMonitor, GenConfig and IntelliVision 5 and 8 which states the remaining time of blocking.

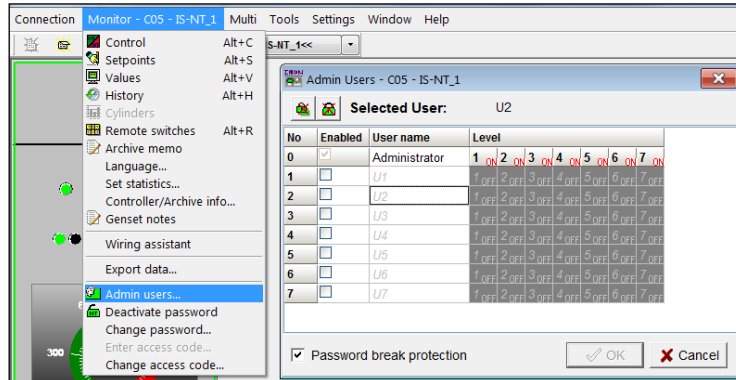
Controller is blocked for 5 minutes if there were 6 attempts to insert incorrect password. In case of another six failed attempts (after the period of blocking elapses) the blocking period is 30, 60, 120 and 240 minutes long respectively.

History record “Incorrect password” is written after the 6th failed attempt to enter password (i.e. this record is written once the PBP is activated). During the blocking no history records of inserting incorrect or correct password are written.

Entering of passwords during the blocking period does not prolong the blocking period (passwords are not actually entered because they are rejected by the controller at all).

When the controller is switched OFF and ON again (i.e. power down and up again) during the blocking period, the blocking period is reset back to the full length of currently active PBP (e.g. if there is 24 minutes remaining out of 30 minutes after the controller reset there will be again 30 minutes remaining).

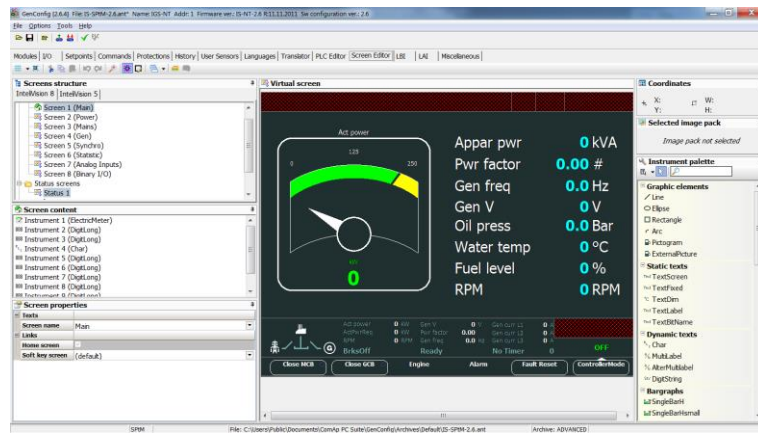
After the correct password is inserted the PBP blocking period for next 6 failed attempts is reverted back to 5 minutes.



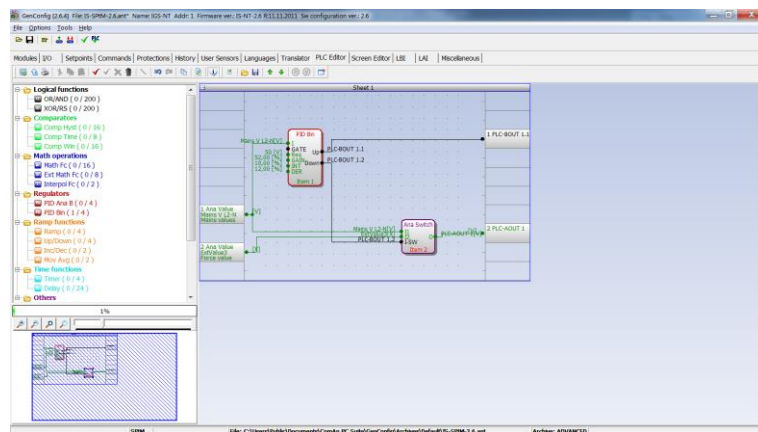
4.6 Related tools

There are two tools available for user regarding the configuration of the controller:

- Screen Editor – it can be used to modify screens in IntelliVision 5 and 8




- PLC Editor – it can be used to create and modify built-in PLC functions



HINT
 For more information on Screen Editor use help in GenConfig (Help -> Screen Editor Help).
 For more information on PLC Editor use [GenConfig Reference Guide](#).


5 Operator guide

5.1 IM-NT

	<p>This portion of instructions is dedicated to the IntelIMains-NT-GC controller with built-in display. If you have BaseBox type of the controller (without the built-in display) or you are using also InteliVision with IntelIMains-NT-GC, please refer to the section 5.2.</p>
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For extensive information regarding operator control use [operator guide for IM-NT](#).

5.2 Systems with InteliVision displays

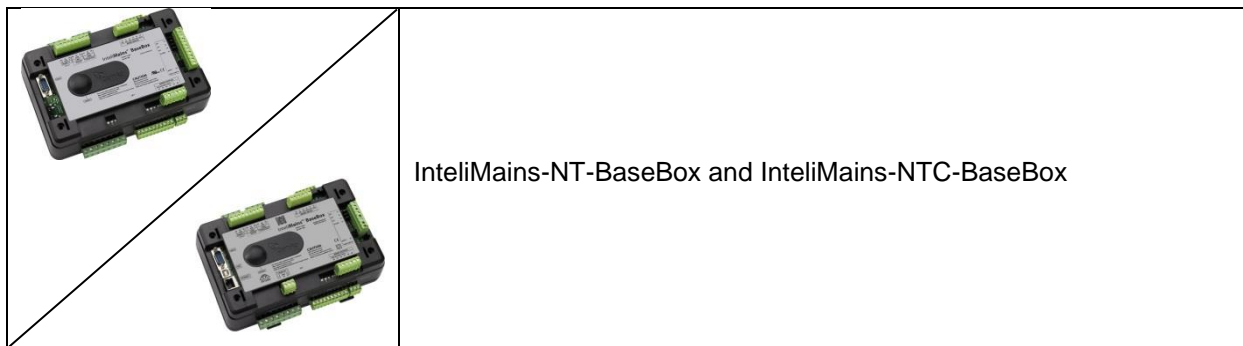
	<p>This portion of instructions is dedicated to the all three types of controller with connected InteliVision 5 or 8. If you have IntelIMains-NT-GC and you are not using InteliVision 5 or 8 please refer to the section 5.1.</p>
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For extensive information regarding operator control use [operator guide for IGS-NT](#) since general functions of InteliVision displays are the same for InteliGen, InteliSys and IntelIMains.

6 Firmware and Archives

Since the version 3.0, controller firmware was differentiated for BaseBox type controllers and GC (Graphical Character, with built-in display) controllers. These firmwares are compatible but their functions differ slightly. It is not possible to upload BaseBox type firmware to GC controller and vice versa.

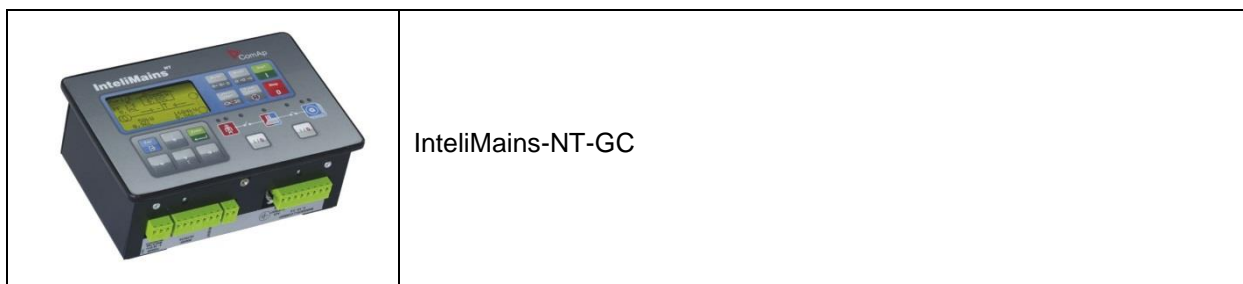
6.1 *BaseBox type controllers*



The firmware for these controllers has specific functions available which are not available in Graphical Character type controllers. The list of BaseBox-exclusive function is as follows:

- Distributed Binary Inputs and Outputs
- User MODBUS

6.2 *Graphical Character type controllers*



The firmware for GC controllers do not support functions described above, although it can still be used in combination with BaseBox type controllers.

NOTE:

It is possible to use specialized IntelIMains-NT firmware for IntelliSys controllers. This firmware supports all the functions mentioned above.

7 Function description


7.1 Overview



HINT





There are numerous built-in functions in the controller that can be modified or combined to produce new functions for specific uses. Note that it is not possible to describe all the combinations or modifications in detail in this manual. Users are encouraged to find new way of how to use existing functions to their benefit.







Click this symbol at the functions for more information on particular complex function.




FUNCTION NAME (ALPHABETICAL ORDER)	BRIEF DESCRIPTION	RELATED SETPOINTS, INPUTS AND OUTPUTS
Access locking from various sources	<p>There are vast options regarding access restrictions in the controller. It is possible to lock:</p> <ul style="list-style-type: none"> Buttons for various commands on the terminal. External buttons for various commands on binary inputs. Built-in terminal or terminal #1 to monitoring mode only. External local terminal or terminal #2 to monitoring mode only. All external remote terminals (PC connection, displays on all buses except on RS485 dedicated port). 	<p><i>Local buttons</i> ACCESSLOCK INT ACCESSLOCK D#2 ACCESSLOCK D#3 ACCESSLOCK EXT FAULTRESBUTTON HORNRESBUTTON LCBBUTTON</p>
Active call, emailing and SMS service 	<p>This function allows user to choose under which conditions active emailing happens, what is the type of the message and separate addresses or numbers. Learn more about these functions in a separate chapter.</p>	<p><i>History record</i> <i>Alarm only</i> <i>Warning</i> <i>Breaker open</i> <i>BrkOpn w/Reset</i> <i>AcallCH1-Type</i> <i>AcallCH2-Type</i> <i>AcallCH3-Type</i> <i>AcallCH1-Addr</i> <i>AcallCH2-Addr</i> <i>AcallCH3-Addr</i> <i>ActCallAttempt</i> <i>Acall+SMS lang</i> ISSUEACTCALLC1 ISSUEACTCALLC2</p> <p>ISSUEACTCALLC3 SMTP authent SMTP user name SMTP password SMTP address Contr mailbox Time zone</p>
Alternative brightness for built-in InteliGen display.	<p>It is possible to choose two different levels of brightness and switch them with logical binary input.</p>	<p><i>Alt brightness</i></p>



FUNCTION NAME (ALPHABETICAL ORDER)	BRIEF DESCRIPTION	RELATED SETPOINTS, INPUTS AND OUTPUTS
Automatic CAN address assignment	It is possible to leave the assignment of CAN addresses on controllers themselves. If the function is activated controllers will look for possible collisions of CAN bus communication and they will change their addresses accordingly. This function need to be activated or deactivated in all controllers on CAN bus. It is available only in some applications.	<i>CANnegotiation</i>
Automatic display backlight timeout	It is possible to adjust timeout for backlight of built-in display of the controller. When using IntelliVision display the backlight timeout is adjusted separately in the the display.	<i>DispBaklightTO</i>
Automatic synchronization 	Controller automatically performs synchronization sequence including corresponding regulations to achieve correct phase and voltage on both synchronized sides. It possible to set phase shift caused by transformers to be taken into account during synchronization. Synchronization automatically closes corresponding breaker if the voltages on both sides do not differ more than Voltage window and their phases do not differ more than Phase window for time equal to Dwell time. For regulation loops functions please refer to a separate chapter.	<i>Voltage window</i> <i>BRtoBLAngleReq</i> <i>Phase window</i> <i>Dwell time</i> <i>Sync timeout</i> FORWARDSYNCHRO REVERSESYNCHRO IN SYNCHRONISM
Basic Voltage and Current settings 	In the controller there are many parameters that are used for entering of nominal values of Mains and Bus characteristics. It also allows users to set measurement transformers ratio and select range of voltage measurement. All of these parameters are crucial for the right function of the controller since regulations, protections and other function are directly dependant of these settings. For additional information on protections please refer to separate chapter Protections and Alarm Management.	<i>VbL VT ratio</i> <i>VbLinpRangeSel</i> <i>VbR VT ratio</i> <i>VbRinpRangeSel</i> <i>BusLNomV</i> <i>BusLNomVph-ph</i> <i>BusRNomV</i> <i>BusRNomVph-ph</i> <i>Nomin current</i> <i>NominBusLImp</i> <i>BusLeftCTprim</i> <i>BusLeftCTsec</i> <i>AuxCurrCTprim</i> <i>AuxCurrCTsec</i> <i>Nominal freq</i>
CAN bus communication mode	It is possible to change speed of communication on CAN2 bus (Intercontroller and Monitoring) to lower (longer distance, limited to 8 controllers) or to higher (shorter distance, limited to 32 controllers).	<i>CAN bus mode</i>




FUNCTION NAME (ALPHABETICAL ORDER)	BRIEF DESCRIPTION	RELATED SETPOINTS, INPUTS AND OUTPUTS
Circuit Breaker control 	Circuit Breaker control depends on many various parameters. Please refer to a separate chapter.	BTB CLOSE/OPEN BTB ON COIL BTB OFF COIL BTB UV COIL BTB STATUS
Circuit breaker feedback sensing 	Learn more about circuit breaker feedback sensing in a separate chapter.	BTB FEEDBACK BTB FDB NEG
Communication log in controller history	It is possible to log communication events into the controller history (e.g. opened new communication, communication closed etc.).	<i>LB/UART Log</i>
Controller modes of operation 	Controller can be switched to several modes of operation. It is possible to switch modes using buttons on terminal, using buttons in IntelliMonitor, changing of a setpoint or activation of binary inputs for remote change of the mode of operation. For more information on modes of operation please refer to a separate chapter.	<i>ControllerMode</i> REMOTE OFF REMOTE MAN REMOTE AUT OFF MODE MAN MODE AUT MODE
Controller Redundancy 	It is possible to use redundant controller which is in monitoring mode only unless the primary controller fails. This is a complex function and it is described in a separate chapter.	<i>Watched Contr</i> CTRLHEARTBEAT CTRLHBEAT FD EMERG. MANUAL CTRLHBEAT SENS
Detection of communication error of peripheral modules	Controller detects any problems in communication with extension modules (it is possible to adjust corresponding level of protection in GenConfig) and issues alarm based on it.	<i>PeriphCommErr</i>
Detection of empty CAN bus	This function can be used to detect failed communication via CAN2 bus. If no other controllers are found on CAN2 bus, alarm is issued.	<i>CAN2emptDetect</i>
Disable Circuit breaker function	It is possible to disable one or both breakers via IntelliMains. This function prevents the closing of the breaker. The function does not open previously closed circuit breaker.	BTB DISABLE
Evaluation of CAN2 communication collision	Controller automatically detects possible collisions on CAN2 bus (e.g. same shared binary outputs are broadcasted by two controllers on one CAN bus).	<i>SHxOcol detect</i>




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FUNCTION NAME (ALPHABETICAL ORDER)	BRIEF DESCRIPTION	RELATED SETPOINTS, INPUTS AND OUTPUTS	
External values available for repeated writing 	<p>It is not possible to repeatedly write setpoints from external device (although it is possible to repeatedly force different values or continuously changing values into setpoint because forced value is not stored in the memory) because of possible memory damage. If continuous writing of some value into a setpoint from external device is needed, External values should be used and their value should be subsequently forced to the setpoint for safe operation. For detailed guide to the usage of external value please refer to a separate chapter.</p>	<i>ExtValue1deflt</i> <i>ExtValue2deflt</i> <i>ExtValue3deflt</i> <i>ExtValue4deflt</i> <i>ExtValue1LoLim</i> <i>ExtValue2LoLim</i> <i>ExtValue3LoLim</i> <i>ExtValue4LoLim</i> <i>ExtValue1HiLim</i> <i>ExtValue2HiLim</i> <i>ExtValue3HiLim</i> <i>ExtValue4HiLim</i> <i>ExtValue1 rate</i> <i>ExtValue2 rate</i> <i>ExtValue3 rate</i> <i>ExtValue4 rate</i>	EXTVALUE1 UP EXTVALUE2 UP EXTVALUE3 UP EXTVALUE4 UP EXTVALUE1 DOWN EXTVALUE2 DOWN EXTVALUE3 DOWN EXTVALUE4 DOWN EXTVALUE1RESET EXTVALUE2RESET EXTVALUE3RESET EXTVALUE4RESET
Forcing of a value to the setpoint 	<p>It is possible to force up to 16 different values to one setpoint to change various functions of the controller. Any suitable setpoint or value can be forced into the setpoint provided that this setpoint is forcable. There are 16 Force value setpoints designed just for forcing (if correct value for forcing is not available in any other setpoint or value). For detailed step-by-step instruction on how to use value forcing please refer to a separate chapter.</p>	<i>Force value 1</i> <i>Force value 2</i> <i>Force value 3</i> <i>Force value 4</i> <i>Force value 5</i> <i>Force value 6</i> <i>Force value 7</i> <i>Force value 8</i> <i>Force value 9</i> <i>Force value 10</i> <i>Force value 11</i> <i>Force value 12</i> <i>Force value 13</i> <i>Force value 14</i> <i>Force value 15</i> <i>Force value 16</i>	FORCEVALUEIN 1 FORCEVALUEIN 2 FORCEVALUEIN 3 FORCEVALUEIN 4 FORCEVALUEIN 5 FORCEVALUEIN 6 FORCEVALUEIN 7 FORCEVALUEIN 8 FORCEVALUEIN 9 FORCEVALUEIN 10 FORCEVALUEIN 11 FORCEVALUEIN 12 FORCEVALUEIN 13 FORCEVALUEIN 14 FORCEVALUEIN 15 FORCEVALUEIN 16
Group Link function for complex installations (Bus Tie Breaker) 	<p>Group Link function enables ComAp controllers to work independently or together dependent on the state of a Bus Tie Breaker. For more information refer to the chapter Power management.</p>	GROUPLINK <i>GroupLinkLeft</i> <i>GroupLinkRight</i>	
History related functions 	<p>It is possible to modify history records layout and set periodic time stamping in history. Controller has adjustable time and date setpoints (time is update each second) and there is inbuilt summer time mode function. Read about history layout modification in separate chapter.</p>	<i>Time stamp act</i> <i>Time Stamp Per</i> <i>#SummerTimeMod</i> <i>#Time</i> <i>#Date</i> TIME STAMP ACT	

FUNCTION NAME (ALPHABETICAL ORDER)	BRIEF DESCRIPTION	RELATED SETPOINTS, INPUTS AND OUTPUTS	
Internet related communication functions 	It is possible to connect controllers to Internet. AirGate function is also available when Internet connection is established. Active emails may be sent upon various reasons. For more information on these functions please refer to a separate chapter.	<i>IP Addr mode</i> <i>IP address</i> <i>Net mask</i> <i>Gateway IP</i> <i>ComApProtoPort</i> <i>AirGate</i> <i>AirGate IP</i> <i>DNS IP</i> <i>NumberRings AA</i>	
Language selection	InteliMains can change language in its built-in display as well as in attached displays by activation of binary inputs.	<i>LANG SEL INT A</i> <i>LANG SEL INT B</i> <i>LANG SEL INT C</i> <i>LANG SEL D#2 A</i> <i>LANG SEL D#2 B</i> <i>LANG SEL D#2 C</i> <i>LANG SEL D#3 A</i> <i>LANG SEL D#3 B</i> <i>LANG SEL D#3 C</i>	
Load shedding function 	Complex load shedding and reconnection function is available in the controller. It is described in the separate chapter.	<i>Ld shed active</i> <i>LdShedBased on</i> <i>Ld shed mode</i> <i>Ld shedStages</i> <i>Ld shedLevel1</i> <i>Ld shedLevel2</i> <i>Ld shedLevel3</i> <i>Ld shed f lV1</i> <i>Ld shed f lV2</i> <i>Ld shed f lV3</i> <i>Ld shedDelay1</i> <i>Ld shedDelay2</i> <i>Ld shedDelay3</i>	<i>Ld reconLevel1</i> <i>Ld reconLevel2</i> <i>Ld reconLevel3</i> <i>LdRecon f lV1</i> <i>LdRecon f lV2</i> <i>LdRecon f lV3</i> <i>Ld reconDelay1</i> <i>Ld reconDelay2</i> <i>Ld reconDelay3</i> <i>AutoLd recon</i> <i>LDShED STAGE 1</i> <i>LDShED STAGE 2</i> <i>LDShED STAGE 3</i> <i>MANUALLDRECON</i>
Mains Coupling	This function defines if Mains Coupling is enabled via controller breaker. It should be enabled only if two or more Mains incommers are in phase and it is allowed by local authorities.	<i>Mains coupling</i>	
Measurement of P and Q selection	You may select the source of Mains current measurement or disable this measurement.	<i>I/E-PbL meas</i> <i>I/E-QbL meas</i> <i>I/E-PbL</i> <i>I/E-QbL</i>	
Modbus switches 	There are two Modbus registers containing 16 bits each that can be easily written using Modbus. Their values are available in the form of a Value (BINARY) and in the form of logical binary outputs that can be used further in the configuration.	<i>MODBUSW1-32</i> <i>ModbusSw1</i> <i>ModbusSw2</i>	
Permanent logical 0 or 1 outputs	It is possible to use permanent logical binary function that is always logical 0 or logical 1. It may used for various purposes.	<i>LOGICAL 0</i> <i>LOGICAL 1</i>	

FUNCTION NAME (ALPHABETICAL ORDER)	BRIEF DESCRIPTION	RELATED SETPOINTS, INPUTS AND OUTPUTS
Power Management 	<p>Power management is a very complex function with many settings that is used if the gen-sets are in AUT mode of operation (and other requirements are fulfilled) to start and stop engines accordingly to set parameters for more efficient function of the system. Part of Power Management consists of automatic priority swapping for extended efficiency of the system. For complete information of all Power Management function please refer to a separate chapter.</p>	<p>#Pwr mgmt mode #PriorAutoSwap Priority ctrl #SysAMFstrtDel #SysAMFstopDel LoadResStrt 1 LoadResStop 1 LoadResStrt 2 LoadResStop 2 LoadResStrt 3 LoadResStop 3 LoadResStrt 4 LoadResStop 4 %LdResStrt 1 %LdResStop 1 %LdResStrt 2 %LdResStop 2 %LdResStrt 3 %LdResStop 3 %LdResStrt 4 %LdResStop 4 NextStrt Del OverldNext Del</p> <p>NextStopDel SlowStopDel MinRunPower 1 MinRunPower 2 MinRunPower 3 RunHrsMaxDiff PwrBandContr 1 PwrBandContr 2 PwrBandContr 3 PwrBandContr 4 PwrBnChngDIUp PwrBnChngDIDn LOAD RES 2 LOAD RES 3 LOAD RES 4 SYSTRADY SYST RES OK SYST RES 1 OK SYST RES 2 OK SYST RES 3 OK SYST RES 4 OK ALLAVAILGS RUN ENGINES SWAPPED</p>
Process limitation control 	<p>This function is used to limit process (e.g. parallel operation is not allowed). This function is complex and it is described in a separate chapter.</p>	<p>DeadBusClosing Synchro enable</p>

FUNCTION NAME (ALPHABETICAL ORDER)	BRIEF DESCRIPTION	RELATED SETPOINTS, INPUTS AND OUTPUTS
Protections 	Protections in the controller are very complex function with many settings. Please refer to a separate chapter for more information about protection functions in InteliMains.	<i>Horn Timeout</i> <i>BinInp delay 1</i> <i>BinInp delay 2</i> <i>BinInp delay 3</i> <i>ForceBlockDel1</i> <i>ForceBlockDel2</i> <i>ForceBlockDel3</i> <i>ResetActAlarms</i> <i>Force block 1</i> <i>Force block 2</i> <i>Force block 3</i> VBUSL <> VBUSR <> FBUSL <> FBUSR <> BUSL OK BUSR OK BUSL FAIL BUSR FAIL HORN ALARM HORN FLASHING ALARM FLASHING COMMON WRN COMMON BOR COMMON FLS COMMON BOP COMMON AL COMMON HST COMMONACTLEV 1 COMMONALLEV 1 COMMONACTLEV 2 COMMONALLEV 2 <i>BusL2POvrldProt</i> <i>OverldStrtEval</i> <i>2POvrldStEvDel</i> <i>BusL2Inom prot</i> <i>BusL2Inom del</i> <i>BusLVolt prot</i> <i>BusLeft >V</i> <i>BusLeft <V</i> <i>BusLeft V del</i> <i>BusLfreq prot</i> <i>BusLeft >f</i> <i>BusLeft <f</i> <i>BusLeft f del</i> <i>BusMeasErrLR</i>
Pulse Counters	The controller offers up to 4 pulse counters that can count incoming pulses of at least 100 ms (high and low) length with various conversion. The counted value is stored in the controller and can be displayed.	<i>ConvCoefPulse1</i> <i>ConvCoefPulse2</i> <i>ConvCoefPulse3</i> <i>ConvCoefPulse4</i> PULSECOUNTER 1 PULSECOUNTER 2 PULSECOUNTER 3 PULSECOUNTER 4
Regulation functions 	There is whole variety of regulation functions in the controller. Please refer to a separate chapter to find out more.	<i>Freq gain</i> <i>Freq int</i> <i>Angle Gain</i> <i>Voltage gain</i> <i>Voltage Int</i>
Remote Control Function 	This particular function enables user to close or open binary output assigned to RemoteControl function from InteliMonitor or via Modbus commands. For more information please refer to a separate chapter.	REMOTECONTROL1 REMOTECONTROL2 REMOTECONTROL3 REMOTECONTROL4 REMOTECONTROL5 REMOTECONTROL6 REMOTECONTROL7 REMOTECONTROL8

FUNCTION NAME (ALPHABETICAL ORDER)	BRIEF DESCRIPTION	RELATED SETPOINTS, INPUTS AND OUTPUTS	
RS232 and RS485 communication functions	The controller has several settings regarding RS232 and RS485 functions. It is possible to set mode of communication on particular port, speed of communication and AT commands for modem connection.	<i>RS232(1) mode</i> <i>RS232(2) mode</i> <i>RS232(1)MBCSpd</i> <i>RS232(2)MBCSpd</i> <i>RS232(1)Mdmlni</i> <i>RS232(2)Mdmlni</i> <i>RS485(1) conv.</i> <i>RS485(2) conv.</i>	
Timers 	Up to 16 timers are provided in the controller (with 4 combined outputs). They can be used to trigger various internal functions as well as external devices. Please refer to a separate chapter for detailed information.	<i>Timer channel 1</i> <i>Timer channel 2</i> <i>Timer channel 3</i> <i>Timer channel 4</i> <i>Timer channel 5</i> <i>Timer channel 6</i> <i>Timer channel 7</i> <i>Timer channel 8</i> <i>Timer channel 9</i> <i>Timer channel 10</i> <i>Timer channel 11</i> <i>Timer channel 12</i> <i>Timer channel 13</i> <i>Timer channel 14</i> <i>Timer channel 15</i> <i>Timer channel 16</i> TIMERACT 1-4 TIMERACT 5-8 TIMERACT 9-12 TIMERACT 13-16 TIMERACTIVECOM TIMER BLOCK 1 TIMER BLOCK 2 TIMER BLOCK 3 TIMER BLOCK 4 TIMER BLOCK 5 TIMER BLOCK 6 TIMER BLOCK 7 TIMER BLOCK 8 TIMER BLOCK 9 TIMER BLOCK 10 TIMER BLOCK 11 TIMER BLOCK 12 TIMER BLOCK 13 TIMER BLOCK 14 TIMER BLOCK 15 TIMER BLOCK 16	
User Buttons 	It is possible to use up to 8 user buttons. User buttons can be for example assigned to software buttons in IntelliVision displays. Pressing of corresponding button then activates the output with function that is chosen in the configuration. For more information on how to use User Buttons please refer to a separate chapter.	<i>UserBtn pulse</i> USER BUTTON 1 USER BUTTON 2 USER BUTTON 3 USER BUTTON 4 USER BUTTON 5 USER BUTTON 6 USER BUTTON 7 USER BUTTON 8 USER BUTTON 9 USER BUTTON 10 USER BUTTON 11 USER BUTTON 12 USER BUTTON 13 USER BUTTON 14 USER BUTTON 15 USER BUTTON 16	
User Configurable protections 	There are several prepared user configurable protections in default archive. Please refer to a separate chapter for complex step-by-step instructions on user configurable protections.	<i>Batt >V</i> <i>Batt <V</i> <i>Batt volt del</i> <i>BusL V unbal</i> <i>BusL Vunb del</i> <i>BusL I unbal</i> <i>BusL I unb del</i>	

FUNCTION NAME (ALPHABETICAL ORDER)	BRIEF DESCRIPTION	RELATED SETPOINTS, INPUTS AND OUTPUTS
Variable connection of devices on CAN bus	It is possible to select number and type of devices connected on CAN2 bus (MODEM: I-LB+ or OTHER: IntelliVision, I-RD). CAN addresses 123 and 124 are always dedicated to connection of OTHER devices (e.g. IntelliVision 5 CAN). Using two setpoints dedicated to this function, it is possible to choose if addresses 122 and 125 are used for communication by OTHER devices or in MODEM mode (i.e. prepared for I-LB+ or IB-NT connection).	<i>CANAddrSwitch1</i> <i>CANAddrSwitch2</i>
Voltage protections mode Ph-N or Ph-Ph 	In the controller it is possible to select whether fixed protections are based on measured Ph-N voltage or on measured Ph-Ph voltage. For more information of fixed protections please refer to the separate chapter Protections and Alarm management.	<i>FixVoltProtSelect</i>
Wrong Phases sequence	Controller automatically detects if phases measurement is connected in wrong sequence (note that the wrong sequence is not detected if the phases are just rotated, i.e. L2-L3-L1)	WRONGPHSEQ

7.2 Modes

7.2.1 OFF mode

All regulations are switched off.

Switching to OFF mode causes opening of BTB regardless of the settings.

7.2.2 MAN mode

It is possible to close/open BTB manually under supervision of IM-NT controller (automatic synchronization is started if there are voltages on both sides).

Pressing BTB ON/OFF button closes/opens BTB if it is allowed by

- setpoints **Process control:** *Synchro enable, Mains coupling, DeadBusClosing*
- binary input BTB DISABLE

NOTE:

It is possible to close BTB in MAN mode without voltage on bus left and bus right based on setting of DeadBusClosing setpoint.

7.2.3 AUT mode

Controller closes automatically BTB if

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- bus voltages are within the limits (**Sync ctrl**:*Phase window, Voltage window*)
- there is voltage on both, one or none of the buses and closing to dead bus is enabled by **Process control**:*DeadBusClosing* (refer to this setpoint in Context Help or in APPENDIX of this document to get more information)
- binary input BTB DISABLE is not closed
- it is enabled by setting of **Process control**:*Synchro enable, Mains coupling* setpoints

NOTE:

If voltage on both left and right buses disappears, the BTB is automatically opened regardless of **Process control**:*DeadBusClosing*.

After the BTB is closed, IntelliMains-BTB deactivates all regulation loops and they are taken over by the IM-M(G)CB.

7.3 Process Limitation

It is possible to influence the behavior of the controller in MAN and AUT mode and limit the process. There are many possibilities but only some of them allow valid function of the breaker (e.g. the breaker will not be able to close if Synchronization is set to NONE and DeadBusClosing set to NONE as well). Process Limitation is also influenced by the setpoint **ProcessControl**:*Mains coupling*, so even though it is possible to e.g. synchronize two Buses together, controller will block this function if both Buses are connected to Mains incomers and Mains coupling is DISABLED.

SYNCHRO ENABLE	DEADBUSCLOSING	SHORT DESCRIPTION
NONE		<ul style="list-style-type: none"> • It is not possible to synchronize Buses together if there are healthy voltages on both buses
L->R		<ul style="list-style-type: none"> • It is possible to synchronize Buses together if there are healthy voltages on both buses and the Left Bus is available for synchronizing (i.e. the synchronization will not be successful if Left Bus is connected to the Mains)
R->L		<ul style="list-style-type: none"> • It is possible to synchronize Buses together if there are healthy voltages on both buses and the Right Bus is available for synchronizing (i.e. the synchronization will not be successful if Right Bus is connected to the Mains)
BOTH		<ul style="list-style-type: none"> • It is possible to synchronize Buses together if there are healthy voltages on both buses (the controller will synchronize Left Bus to the Right Bus if the Left Bus is not connected to the Mains, if Left Bus is connected to the Mains, controller synchronizes Right Bus to the Left Bus)
	NONE	<ul style="list-style-type: none"> • It is not possible to close the breaker if there is healthy voltage on one of the Buses and there is no voltage on the other one or if there is no voltage on both Buses
	L->R	<ul style="list-style-type: none"> • It is possible to close the breaker if there is healthy voltage on the Left Bus and there is no voltage on the Right Bus
	R->L	<ul style="list-style-type: none"> • It is possible to close the breaker if there is healthy voltage on the Right Bus and there is no voltage on the Left Bus
	BOTH	<ul style="list-style-type: none"> • It is possible to close the breaker if there is healthy voltage on one of the Buses and there is no voltage on the other one

7.4 Power management

7.4.1 Power management limitations

WARNING!

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This section contains important information regarding power management function that are crucial for the correct function of power management.

The function of the controller is designed to handle the maximum sum of nominal power at 32000kW (3200.0kW, 320.00MW depending on the power format in the controller). If the sum of nominal power of all gen-sets connected to the intercontroller CAN exceeds these values the power format needs to be changed accordingly.

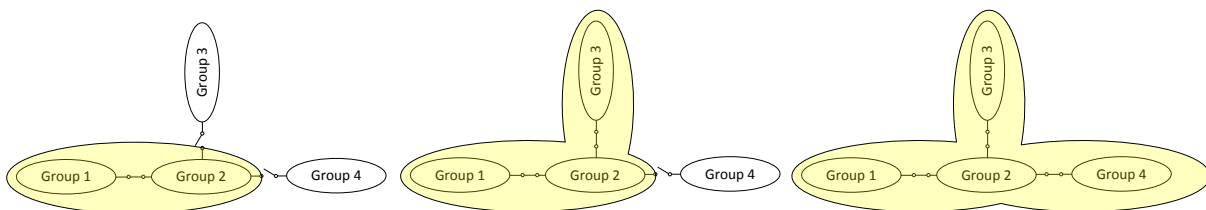
EXAMPLE:

There are 20 gen-sets each with 2000kW of nominal power. The sum of the nominal power is 40000kW. Therefore the power format in kW cannot be used because the sum exceeds 32767. Therefore power format in MW needs to be chosen because the sum in MW is 40MW (it does not exceed 320.00MW).

7.4.2 Standard Power management

Standart Power management setpoints and values are included in BTB application for compatibility purposes and InteliMains-BTB does not play active role in power management.

Nonetheless, InteliMains-BTB plays crucial role in Control Group functions – it performs synchronization of the Control Groups together (based on Process Limitation). In connection to this, GroupLink function may be performed by InteliMains-BTB. This function broadcasts information about the connection of two groups together via CAN to all other controllers. Two connected groups are considered as one new group by all other controllers. The diagram below shows how the principle of the function works. Once Group 3 is connected to the Group 2, it is also considered connected to the Group 1 because the connection of Group 1 and Group 2 is also broadcasted on the CAN.



7.4.3 Load shedding based on active power

Load shedding is a function that automatically disconnects and reconnects various loads depending on several user defined parameters. The load shedding based on active power is activated in BTB application only when Group link function is active.

Important setpoints: *all setpoints in group **Load shedding***

The load shedding function is active in all controller modes except OFF. Load shedding works based on the total gen-set group (in both groups that are linked to by Group link function in BTB) active power (setpoint **Load shedding:LdShedBased on**).

Load shedding has three steps and each step is linked with its own Load shed binary output (LDSHED STAGE X). There are three load shed levels and delays for all three steps as well as recon levels and delays (setpoints in **Load shedding** group *Ld shedLevel1-3, Ld shedDelay1-3, Ld reconLevel1-3, Ld reconDelay1-3*). Load shed can only move from one step to the next, e.g. “No LoadShed” to “LdShed stage 1” to “LdShed stage 2” to “LdShed stage 3” and vice versa.

If manual reconnection of the load is desired, the **Load shedding:AutoLd recon** setpoint needs to be disabled (DISABLED) and the MANUALLDRECON binary input needs to be configured.

Rising edge on this input resets the controller to a lower stage, but only if the load is under the *Ld recon level* for *Ld recon delay* at that moment.

NOTE:

If no Load Shedding outputs are configured, there is no record to history and no screen timer indication of the activity of this function.

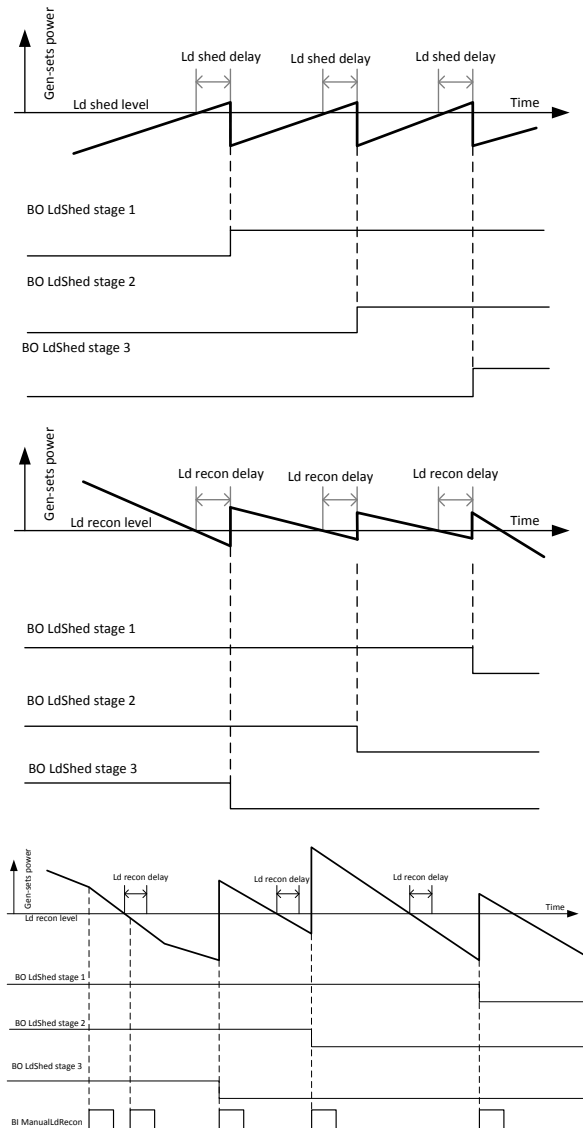


Figure: Examples of load shedding and load reconnection (load shed, load recon, manual load recon)

7.4.4 Load shedding based on frequency

Load shedding is a function that automatically disconnects and reconnects various loads depending on several user defined parameters. The load shedding based on frequency is activated by setting the setpoint *Ld shed mode* to **FREQ ONLY**.

Important setpoints: *all setpoints in group Load shedding*

The load shedding function is active in all controller modes except OFF. Load shedding works based on BusL frequency.

Load shedding has three steps and each step is linked with its own Load shed binary output (LDShED STAGE X). There are three load shed levels and delays for all three steps as well as recon levels and delays (setpoints in **Load shedding** group *Ld shed f lv1-3*, *Ld shedDelay1-3*, *LdRecon f lv1-3*, *Ld reconDelay1-3*). Load shed can only move from one step to the next, e.g. “No LoadShed” to “LdShed stage 1” to “LdShed stage 2” to “LdShed stage 3” and vice versa.

If manual reconnection of the load is desired, the **Load shedding:AutoLd recon** setpoint needs to be disabled (DISABLED) and the **MANUALLDRECON** binary input needs to be configured.

Rising edge on this input resets the controller to a lower stage, but only if the load is under the *Ld recon level* for *Ld recon delay* at that moment.

NOTE:

If no Load Shedding outputs are configured, there is no record to history and no screen timer indication of the activity of this function.

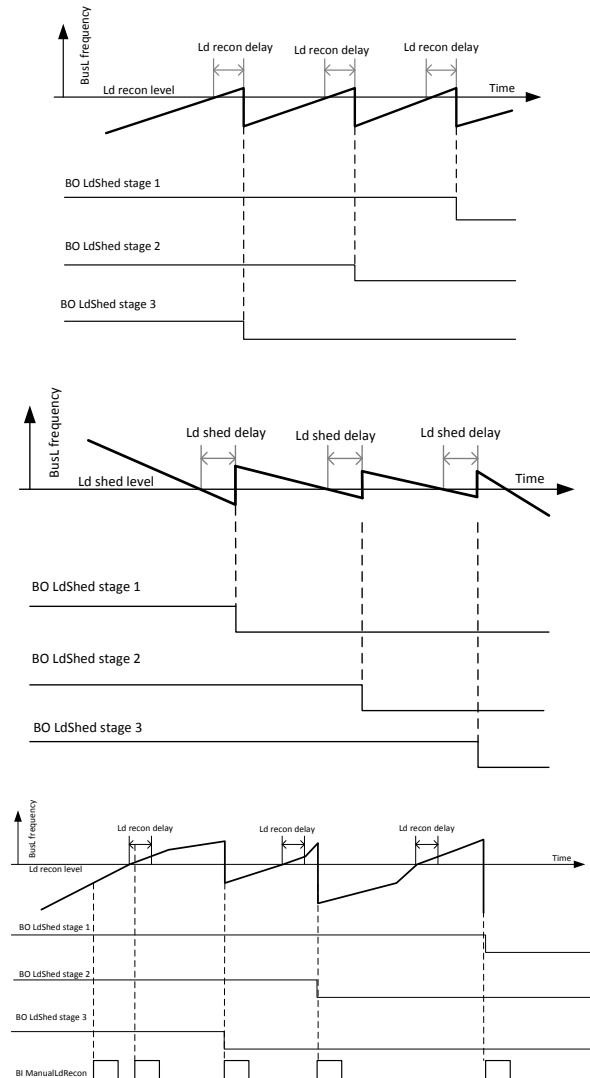


Figure: Examples of load shedding and load reconnection (load shed, load recon, manual load recon) based on frequency

7.5 Remote Alarm Messaging

It is possible to use up to five channels for Active Call, Email and SMS upon defined type of Alarm. It is possible to define protection type for all ENABLED channels to react. All the possibilities in IntelliMains are: History record, Alarm only, Warning, Breaker open and BrkOpen w/Reset. Find more information about alarm types in the chapter Protections and alarm management.

7.5.1 Communication Types for Remote Alarm Messaging

Below there all types of communication available for each Active Call channel.

DATA-ANA: This option sends a complete archive to the recipient's PC via analog modem. An analog modem must be connected either to one of controller COM ports or to one of I-LB modules connected to the controller via CAN2 bus. The channel address must contain complete telephone number of the recipient's PC where IntelliMonitor is running in Active call receiving mode.

DATA-GSM: This option sends a complete archive to the recipient's PC via GSM modem. A GSM modem with activated CSD data transfers must be connected either to one of controller COM ports or to one of I-LB modules connected to the controller via CAN2 bus. The channel address must contain complete telephone number of the recipient's PC where IntelliMonitor is running in Active call receiving mode.

DATA-ISDN: This option sends a complete archive to the recipient's PC via ISDN modem. An ISDN modem must be connected either to one of controller COM ports or to one of I-LB modules connected to the controller via CAN2 bus. The channel address must contain complete telephone number of the recipient's PC where IntelliMonitor is running in Active call receiving mode.

DATA-CDMA: This option sends a complete archive to the recipient's PC via CDMA modem. A CDMA modem must be connected either to one of controller COM ports or to one of I-LB modules connected to the controller via CAN2 bus. The local CDMA network must allow point-to-point data transfers. The channel address must contain complete telephone number of the recipient's PC where IntelliMonitor is running in Active call receiving mode.

SMS-GSM: This option sends a short text message (SMS) containing the actual Alarmlist contents to the recipient's mobile phone via the GSM modem. The channel address must contain complete telephone number of the recipient's mobile phone.

SMS-CDMA: This option sends a short text message (SMS) containing the actual Alarmlist contents to the recipient's mobile phone via the CDMA modem. The channel address must contain complete telephone number of the recipient's mobile phone.

IB-E-MAIL: This option sends an e-mail containing the actual Alarmlist contents and latest 20 history records (only date, time, reason) to the recipient's mailbox via the IB-COM module or IG-IB module. The channel address must contain valid e-mail address of the recipient.

NOTE:

The SMTP settings (SMTP authent,SMTP user name, SMTP password, SMTP address, Contr mailbox) must be properly adjusted for sending e-mails.

7.5.2 Example of setting

There is an example of setting of Remote Alarm Messaging. In this case active calls we be triggered on Breaker open and BrkOpen w/Reset alarms. Message is sent via email to emailAddress@domain.com (Channel 1 – available for NTC controller or with any controller with connected IB-NT or I-LB+), archive is sent via ISDN modem to the number +111222333444 (Channel 2) and SMS is sent to the number +999111333555 (Channel 3).

Name	Access Group	Value
History record	0 ON 1 OFF 2 OFF 3 OFF 4 OFF 5 OFF 6 OFF 7 OFF	DISABLED ▾
Alarm only	0 ON 1 OFF 2 OFF 3 OFF 4 OFF 5 OFF 6 OFF 7 OFF	DISABLED ▾
Warning	0 ON 1 OFF 2 OFF 3 OFF 4 OFF 5 OFF 6 OFF 7 OFF	DISABLED ▾
Breaker Open	0 ON 1 OFF 2 OFF 3 OFF 4 OFF 5 OFF 6 OFF 7 OFF	ENABLED ▾
BrkOpn w/Reset	0 ON 1 OFF 2 OFF 3 OFF 4 OFF 5 OFF 6 OFF 7 OFF	ENABLED ▾
AcallCH1-Type	0 ON 1 OFF 2 OFF 3 OFF 4 OFF 5 OFF 6 OFF 7 OFF	IB-E-MAIL ▾
AcallCH1-Addr	0 ON 1 OFF 2 OFF 3 OFF 4 OFF 5 OFF 6 OFF 7 OFF	emailAddress@domain.com
AcallCH2-Type	0 ON 1 OFF 2 OFF 3 OFF 4 OFF 5 OFF 6 OFF 7 OFF	DATA-ISDN ▾
AcallCH2-Addr	0 ON 1 OFF 2 OFF 3 OFF 4 OFF 5 OFF 6 OFF 7 OFF	+111222333444
AcallCH3-Type	0 ON 1 OFF 2 OFF 3 OFF 4 OFF 5 OFF 6 OFF 7 OFF	SMS-GSM ▾
AcallCH3-Addr	0 ON 1 OFF 2 OFF 3 OFF 4 OFF 5 OFF 6 OFF 7 OFF	+999111333555
NumberRings AA	0 ON 1 OFF 2 OFF 3 OFF 4 OFF 5 OFF 6 OFF 7 OFF	3
ActCallAttempt	0 ON 1 OFF 2 OFF 3 OFF 4 OFF 5 OFF 6 OFF 7 OFF	5
Acall+SMS lang	0 ON 1 OFF 2 OFF 3 OFF 4 OFF 5 OFF 6 OFF 7 OFF	1

It is also possible to adjust number of attempts that controller performs in case of not successful Active Call – **Comms settings:ActCallAttempt**. The language of messages can be changed – **Comms settings:Acall+SMS lang** (use Translator and Languages tabs in GenConfig to adjust languages).

7.6 Controller Redundancy

Redundant system is a general term for applications where there are two controllers at each gen-set. One is the main controller, which controls the gen-set in normal conditions, the other is the redundant controller, which takes over the control when the main controller fails. Both controllers have identical firmware and most of the configuration and setpoints. Only several things need to be adjusted/configured differently because of the redundancy function itself.

CAUTION!

If there are shared binary or analog outputs used on IntelliMains (e.g. for system start/stop), it is necessary to prepare the configuration in the way so each controller uses binary or analog output set with different address. Configuration in gen-set controllers then needs to be altered so it can receive signals from both IntelliMains controller (e.g. using built-in PLC functions).

7.6.1 Redundant systems using binary signals

It is not possible to use this redundancy system since correct function of IntelliMains depends on CAN bus communication and thus CAN redundancy should be always used.

7.6.2 Redundant systems using CAN bus

This system uses the CAN bus for detection whether the main controller is operational or not. If the redundant controller has not received two consequent messages from the main one (~100ms) it will take over the system control - it activates the binary output CTRLHBEAT FD, which has to be wired in such a way, that it disconnects the dead main controller from the control, connects the redundancy controller instead and activates it by deactivation of the binary input EMERG. MANUAL.

As there can be up to 16 pairs of controllers at the CAN bus it is necessary to select which main controller (address) belongs to which redundant one. The setpoint **ProcessControl:Watched Contr** is used for this purpose. It must be adjusted to address of the respective main controller in each redundant controller and it must be adjusted to 0 in each main controller.

CAUTION!

Correct wiring of all inputs and outputs that should be used both by the main and the redundant controller needs to be done. Please refer to the corresponding chapter for wiring of binary inputs and outputs.

Do not use Shared Binary Inputs/Outputs for CTRLHBEAT FD -> EMERG.MANUAL connection since the failed controller may not interpret it correctly!

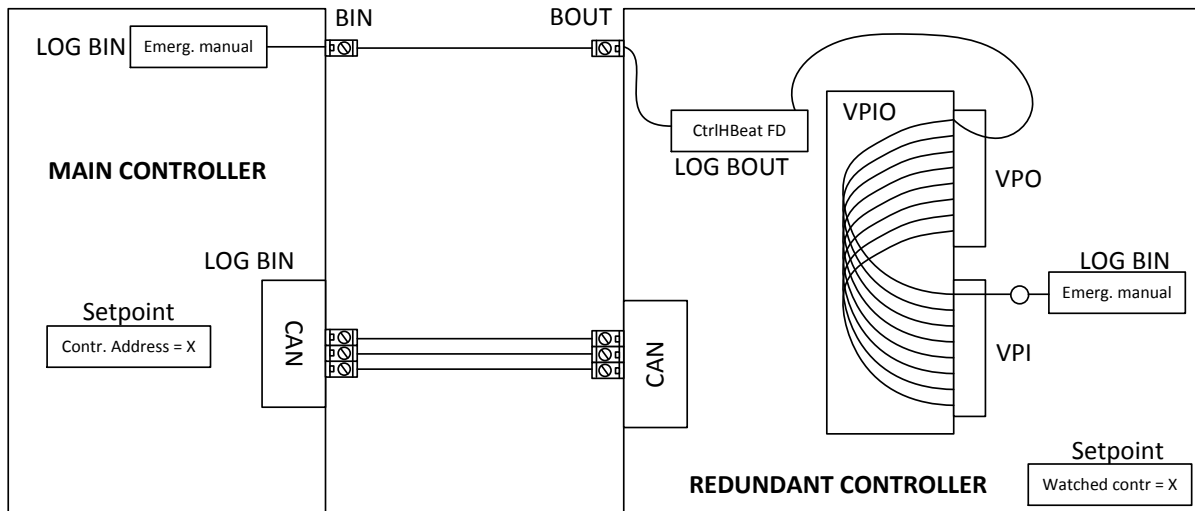


Figure: Example of redundancy function

In the figure above the signal of logical function CtrlHBeat FD is used to disable the main controller if it is lost from CAN bus or CAN bus communication from that controller becomes erratic. It is used also to disable the redundant controller when the communication on CAN bus is alright (it is negated). For more information on Virtual Binary Inputs and Outputs (VPIO) please refer to the chapter about Shared Binary Inputs and Outputs and Virtual Binary Inputs and Outputs.

NOTE:

Use pulse signals for control of circuit breakers. LCB ON COIL and LCB OFF COIL should be used to prevent sudden opening for a short period of time when the controller fails and to ensure proper function of redundancy.

7.7 Force value – step by step guide

In this chapter there is complete step by step guide which shows how to use Force value function of the controller.

Forcing of values is used to change particular setpoint temporarily by activation of related Binary Input. This is used to change function of controller under given conditions (e.g. there are two different periods during the day when Export limit given by distribution network is required or not).

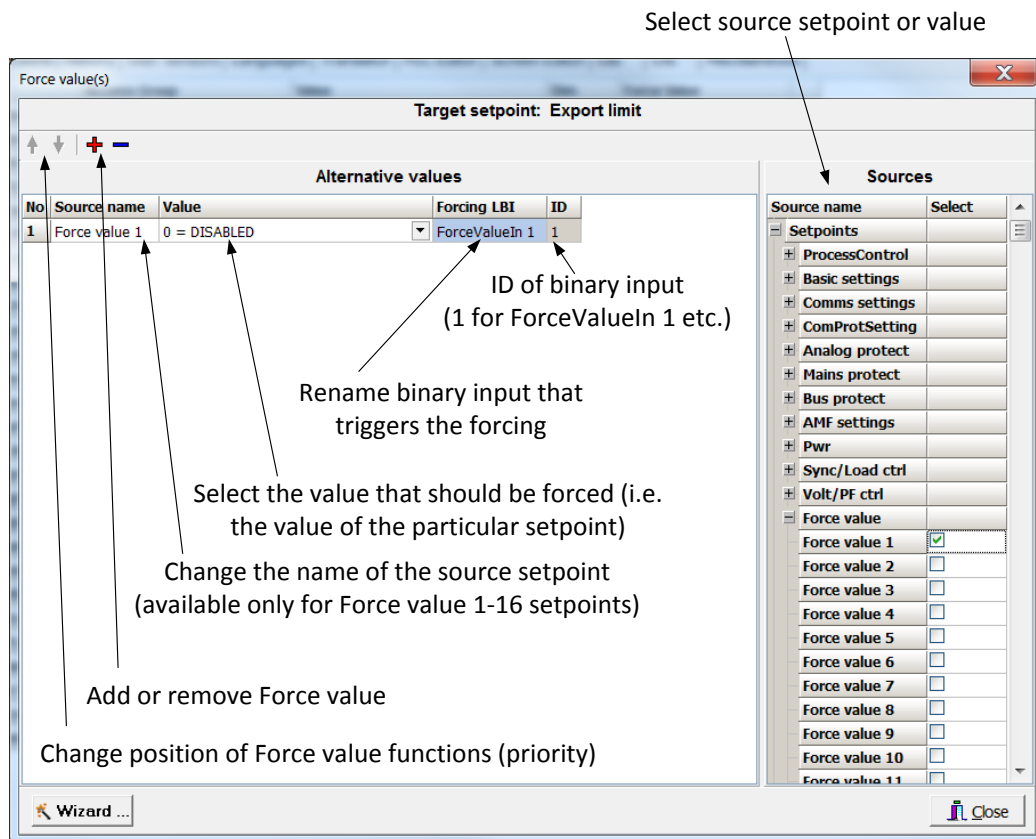
WARNING!

Setpoints must not be written **continuously** (e.g. via Modbus connection)! If continuous change of setpoints is required, combination of External values and Force value function needs to be used. The memory that holds setpoints is designed for up to 10^5 writings. Than memory may be damaged!

Setpoints that are available for forcing may be identified by Force value button on the right side in GenConfig (see the figure below).



When the button is clicked, Force value dialog appears.



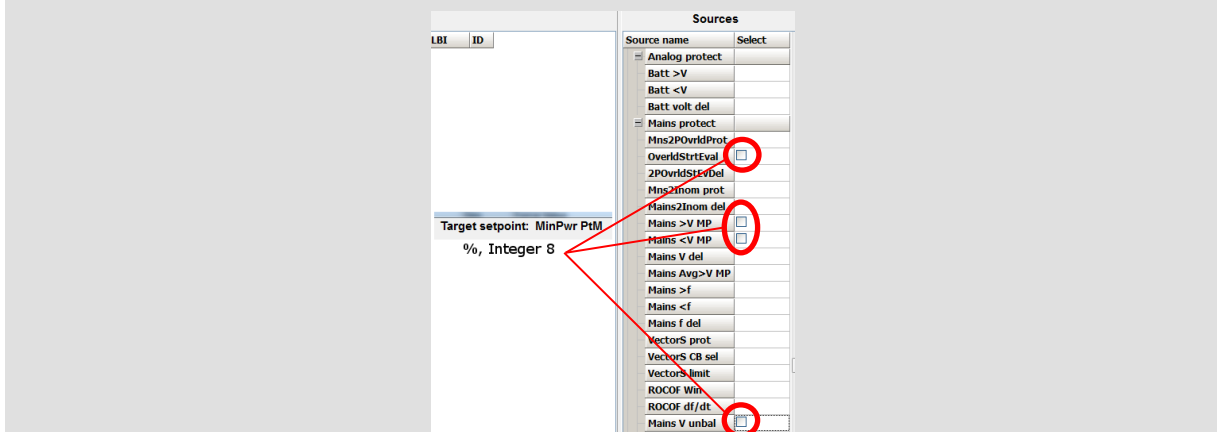
For example if we add **Force value:Force value 1** to be forced to **ProcessControl:Export limit** as value 0 (DISABLED) by Binary Input FORCEVALUEIN 1 we can change the function of Export limit from ENABLED to DISABLED by activation of FORCEVALUEIN 1. It is possible to rename the setpoint to e.g. **Force value:ExportDisabled** and Binary Input as well to e.g. DISABLEEXPLIM. The function will not change (only the corresponding names).

It is possible to use several force value functions for one setpoint. If more than one forcing Binary Input is active, the one with the highest position (lowest number in the Force value dialog) is used.

It is possible as well to use one Binary Input to force multiple setpoints (e.g. in case of complex function change).

NOTE:

It is possible only to force value or setpoint in other setpoint if their dimension and range are the same (e.g. only value with dimension in hours and which is Integer 16 to a setpoint with dimension hours and which is as well Integer 16). You may use PLC block Convert to change the dimension and range if needed.



7.8 Regulation loops

There are following regulation loops built-in in the controller. All of them are PI type except angle loop, which is P type.

FREQUENCY LOOP	The frequency loop is active in the following situations depending on the application. For more information see the table below.				
	<table border="1"> <thead> <tr> <th>APPLICATION</th> <th>FREQ GAIN AND FREQ INT SETPOINTS ARE ACTIVE DURING:</th> </tr> </thead> <tbody> <tr> <td>BTB</td> <td>synchronization between "left" and "right" buses</td> </tr> </tbody> </table>	APPLICATION	FREQ GAIN AND FREQ INT SETPOINTS ARE ACTIVE DURING:	BTB	synchronization between "left" and "right" buses
	APPLICATION	FREQ GAIN AND FREQ INT SETPOINTS ARE ACTIVE DURING:			
BTB	synchronization between "left" and "right" buses				
<p>See also setpoints: Sync ctrl:Freq gain and Sync ctrl:Freq int</p> <p>When the Sync ctrl:Freq gain is set to zero, this control loop is switched OFF.</p>					
ANGLE LOOP	<p>The differential angle control loop is active during the synchronization (see Frequency loop above) when the "near to zero" slip frequency has been successfully achieved and then the differential angle between bus and mains voltage shall be controlled to the value adjusted by the setpoint Sync ctrl:BRtoBLAngleReq.</p> <p>See also setpoint: Sync ctrl:Angle Gain</p>				
VOLTAGE LOOP	The Voltage loop is active in the following situations depending on the application. For more information see the table below.				
	<table border="1"> <thead> <tr> <th>APPLICATION</th> <th>VOLTAGE GAIN AND VOLTAGE INT SETPOINTS ARE ACTIVE DURING:</th> </tr> </thead> <tbody> <tr> <td>BTB</td> <td>synchronization between "left" and "right" buses</td> </tr> </tbody> </table>	APPLICATION	VOLTAGE GAIN AND VOLTAGE INT SETPOINTS ARE ACTIVE DURING:	BTB	synchronization between "left" and "right" buses
	APPLICATION	VOLTAGE GAIN AND VOLTAGE INT SETPOINTS ARE ACTIVE DURING:			
BTB	synchronization between "left" and "right" buses				
<p>See also setpoints: Volt ctrl:Voltage gain and Volt ctrl:Voltage Int</p> <p>When the Voltage gain is set to zero, this control loop is switched OFF.</p>					

7.8.1 PI regulation adjustment

The regulation loops have two adjustable factors: P-factor and I-factor (except angle regulation loop, which has P-factor only). The P-factor (gain) influences the stability and overshoot of the regulation loop and the I-factor influences the steady-state error as well as the settling time. See the picture below for typical responses of a PI regulation loop.

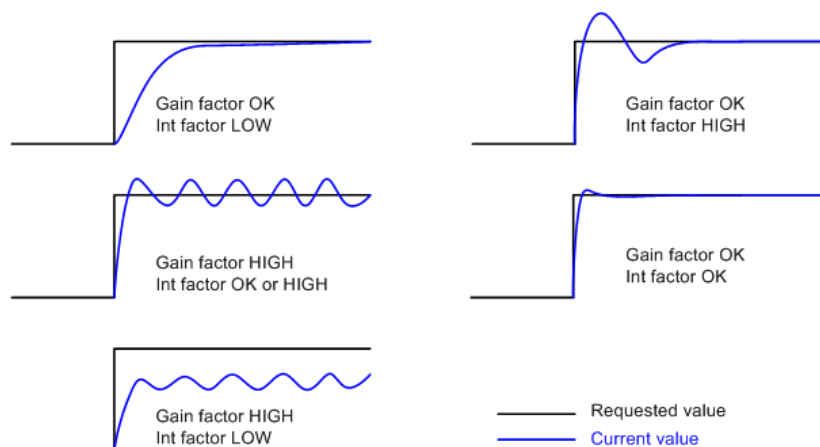


Figure: Typical responses of a PI regulator

For manual tuning of a control loop use following method:

1. Set both the I-factor and P-factor to 0.
2. Increase the P-factor slightly until the system starts to oscillate.
3. Adjust the P-factor back to approx. one half of the value where the oscillations started.
4. Increase the I-factor slightly to achieve optimal resulting response.

NOTE:

It may be helpful to disable issuing the breaker close command when adjusting synchronization loops. Adjust the setpoint [Phase window](#) to 0 to disable it. Adjust the setpoint back to it's original value after the adjustment is finished.

CAUTION!

Be ready to press emergency stop button in case the regulation loop would start to behave unacceptable while it is being adjusted.

7.9 Values for continuous writing from external sources

This function is especially designed for continuous writing of setpoints from external sources (e.g. via Modbus connection).

WARNING!

Setpoints must not be written **continuously** (e.g. via Modbus connection)! If continuous change of setpoints is required, combination of External values and Force value function needs to be used. The memory that holds setpoints is designed for up to 10^5 writings. Than memory may be damaged!

It is possible to use up to four different External values for continuous writing from external sources. The values are adjusted by setpoints in **Force value** group. Default (also initial) value may be adjusted, rate of change of *ExtValueX* (by Binary Inputs EXTVALUEX UP and EXTVALUEX DOWN) can be adjusted as well as high and low limit of the value.

There are two way, how to adjust External values. One is using Binary Inputs mentioned above. Second one is to write the value directly using e.g. Modbus. External values then may be converted using PLC block convert and force into setpoint which is then continuously forced (**note: NOT WRITTEN**) by the value of *ExtValueX*. This way internal memory is safe and no damage may occur.

External values are reverted back to their default (initial) value (given by corresponding setpoint) when Binary Input for their reset is active (and they change to the previous value after Binary Input deactivates). When the Binary Input is active the External value cannot be changed by Modbus writing or by using Binary Inputs for up and down value.

NOTE:

External values are not available for external writing when any Binary Input (up, down or reset) related to them is active.

Note also that when the controller is reset (powered down and up again), all external values are reverted back to their default (initial) values.

HINT

For information on how to write (or read) objects from controller via Modbus, please refer to the latest [Communication guide for InteliGen and InteliSys](#).

7.10 General Purpose Timers

There is 16 general-purpose timers in the controller, each 4 of them are joined together to one output. That means there are 4 fully independent timer blocks including 4 timer channels each. The combined outputs from the timer blocks are *TIMERACT 1-4*, *TIMERACT 5-8*, *TIMERACT 9-12* AND *TIMERACT 13-16*.

The timers are intended for scheduling of any operations such as e.g. periodic tests of the gen-set, scheduled transfer of the load to the gen-set prior to an expected disconnection of the mains etc. Each timer channel can be activated only once within a single day. The activation time and duration of each channel is adjustable (both as hh:mm).

7.10.1 Timer modes

Available modes of each timer:

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

The mode of each timer channel is adjusted by an assigned setpoint. The setpoints are located in the **Timer settings** group and can be adjusted via IntelliMonitor and GenConfig.

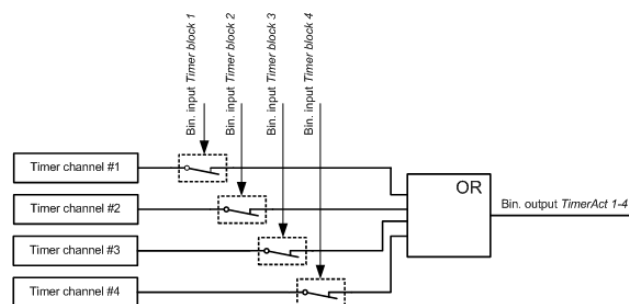
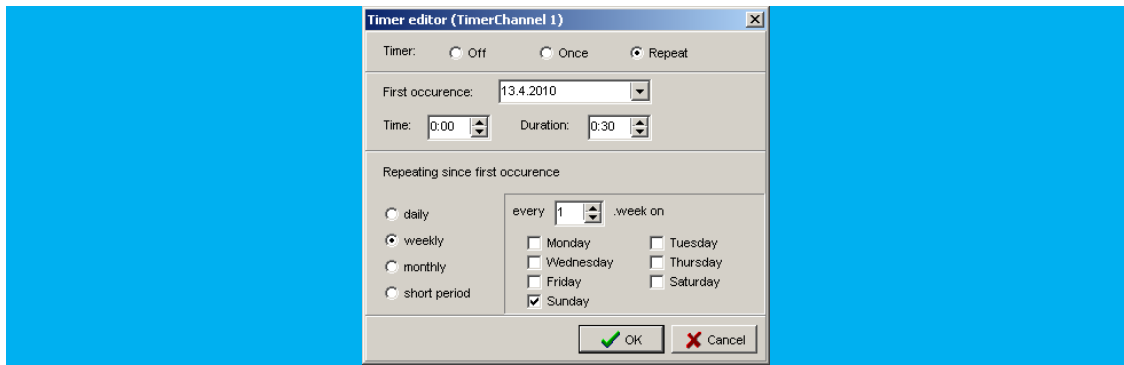


Figure: Principal scheme of one block containing 4 timers

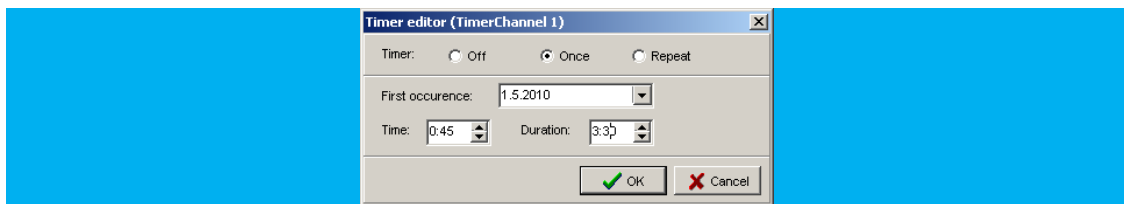
EXAMPLE:

Below is an example how to use the timers for periodic tests of the gen-set performed every Sunday with duration of 30 minutes and also for scheduled transfer of the load before expected mains failure announced by the local electricity distribution company to 1.5.2010 from 01:00 to 04:00.

1. The output *TIMERACT 1-4* is configured internally in GenConfig (LBI tab) to the logical binary inputs *REMOTE TEST* and *TEST ON LOAD*.
2. The setpoint **Timer settings: TimerChannel 1** is adjusted to "repeated" mode, "weekly" period, only Sundays, starting date/time next Sunday at 0:00, timer duration 0:30 min.



3. The setpoint **Timer settings: TimerChannel 2** is adjusted to "once" mode, starting date/time 1.5.2010 at 01:00, timer duration 3:00 hrs.

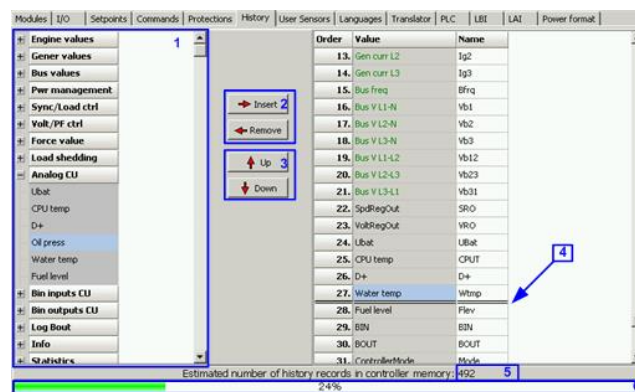


7.11 History Related functions

7.11.1 History Records Adjustment

It is possible to change History records content. Each record contains date, time and cause of the record as obligatory columns. The rest of columns are configurable.

The history record structure has two parts. The upper part is so-called fast and is written into the history memory immediately in the moment when the written event occurs. The rest of the record may be written with a delay max. 100ms. The fast part is intended for fast changing values as e.g. currents, voltages or power. The parts are separated by a line in the record content list.



1. Values selection tree
2. Buttons for adding/removing values into/from the record structure
3. Buttons for ordering of the values in the record structure
4. Fast history separator. The fast part is located above the separator
5. Estimated number of records depending on record size
6. Record capacity usage indicator

NOTE:

Values that are displayed in green color are recommended to be placed in the fast part.

If the checkbox Add modules to history automatically.. in the Modules tab is checked then all values of a module are automatically added into the history record when the module is inserted into the configuration.

7.11.2 Time Stamp function

The controller allows user to define when the history records are written even though there is no other reason for history record (so called Time Stamp).

It is possible to disable time stamping function (for example when time stamping is not needed and just floods the history). It may be conditioned by activation of logical Binary Input function (TIME STAMP ACT) or it may be enabled always.

Period of time stamping may be adjusted from 1 to 240 minutes.

NOTE:

Beware of History flooding by too many Time Stamps (vital information may be overwritten).

7.11.3 Time and Date Intercontroller Sharing

Time and Date are used mainly for History records. These values are shared between controllers that are connected to CAN. When the value is changed in one controller, it sends its new value to all other controllers that are connected to the same CAN bus and they update their time and date values and setpoints accordingly.

7.11.4 Summer Time Mode

Summer Time Mode function may be enabled and disabled by user. It is possible to set if the controller is located in the northern or southern hemisphere as well.

SummerTimeMode implemented in ComAp controllers is based on CET summer time which means:

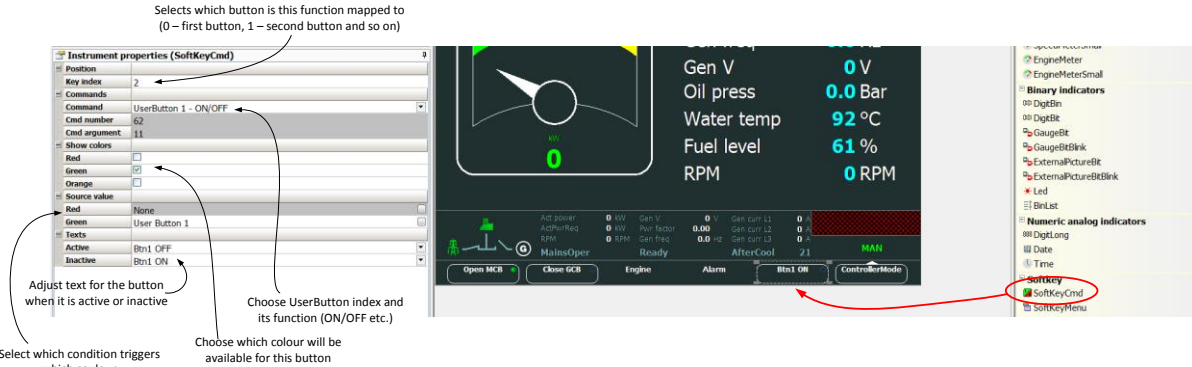
- Clock goes forward 1 hour at 2:00 a.m. on the last Sunday in March
- Clock goes backwards 1 hour at 3:00 a.m. on the last Sunday in October

NOTE:

Please be aware that in other regions summer time adjustments may be done in different time.

7.12 User Buttons

There are several User Buttons available in the controller. It is possible to set them on Soft Buttons in IntelliVision 5 or 8.



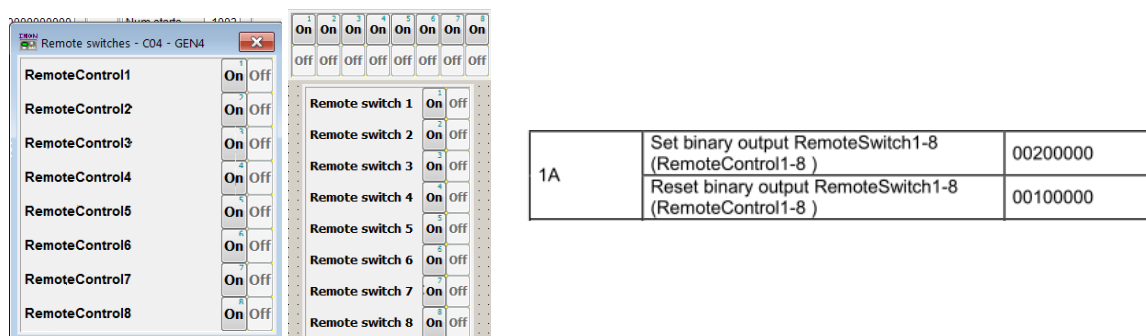
Available functions for soft buttons are listed in the following table.

ON	Pressing the button changes the state of log. Binary Output USER BUTTON X to closed. When the output is closed and the button is pressed state is not changed.
OFF	Pressing the button changes the state of log. Binary Output USER BUTTON X to opened. When the output is opened and the button is pressed state is not changed.
ON/OFF	Pressing the button changes the state of log. Binary Output USER BUTTON X to opened or closed depending on previous state (it is changed to the opposite state).
PULSE ON	Pressing the button issues log. Binary Output USER BUTTON X to close for the time given by setpoint Basic settings: UserBtn pulse (from 0.2s to 10s). NOTE: Repeated pressing of button during the closed period causes issuing other pulsed of length of the given length to be generated from the moment of button pushing.

7.13 Remote Control Function

It is possible to remotely control several Binary Outputs in the controller. You can either use Remote Switches tool in IntelliMonitor (select Remote switches in menu for corresponding controller), import Remote Switches tool to a SCADA diagram in Line Diagram Editor or use external device via Modbus (register #46361 and command #26 (1A hex), for more information on Modbus please refer to the IntelliGen/IntelliSys Communication guide).

Remote Switch will activate or deactivate depending on remote control so it can be used to manually control devices, simulate malfunctions while commissioning etc.



1A	Set binary output RemoteSwitch1-8 (RemoteControl1-8)	00200000
	Reset binary output RemoteSwitch1-8 (RemoteControl1-8)	00100000

Figure: Remote Switches tool in IntelliMonitor, Remote Switches tools in Line Diagram Editor and Modbus commands

Remote Switches may be easily used to trigger logical Binary Input function and all other related functions as normal switch on Binary Input. Module VPIO (Virtual Peripheral Inputs- Outputs) can be added to configuration and it will copy the state of Remote Switch on virtual output to its counterpart virtual input. Refer to the figure below for example.

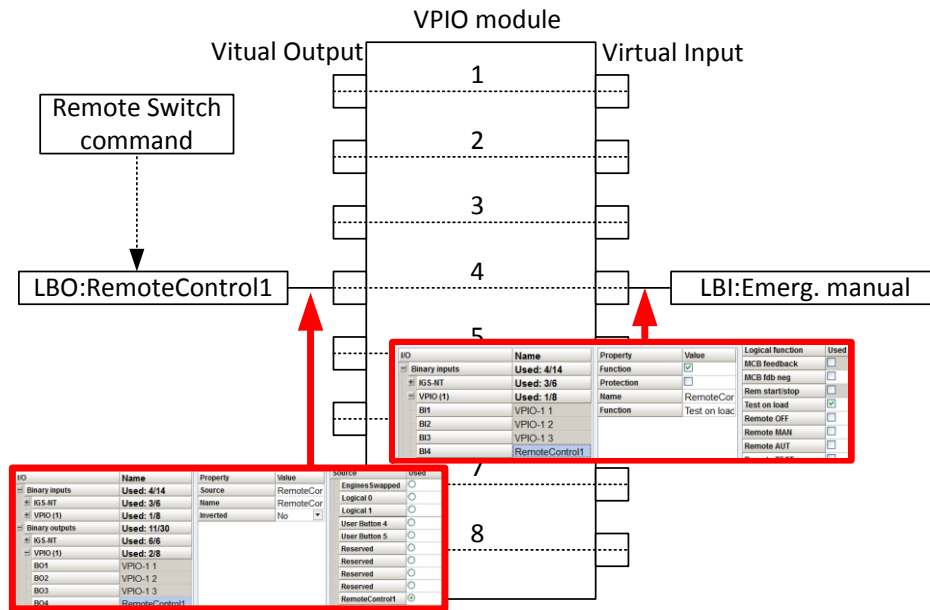


Figure: Using of Remote Switches to trigger logical binary inputs

7.14 Virtual Peripheral Inputs-Outputs (VPIO) module

For IntelliMains there are several modules available. One of them is Virtual Peripheral Inputs-Outputs module which is particularly useful for connection of logical Binary Output functions to logical Binary Input functions. This way internal controller function may easily trigger other internal controller functions without unnecessary wiring or usage of PLC functions.

Module is functioning the same way as normal module with 8 outputs and 8 inputs, but the difference is, that each input copies its counterpart output. It is possible to select any logical Binary Output function for one of the outputs of VPIO module. Inputs on VPIO module work the same way as standard input of the controller (i.e. it can be assigned function and protection).

For example of this function please refer to the chapter Remote Control function.

7.15 Shared Inputs and Outputs

IntelliMains uses the same type of Shared Inputs and Outputs (SHBOUT, SHBIN, SHAIN and SHAOUT modules) as IntelliGen and IntelliSys. Thanks to this, it is possible to share Binary and Analog values between all the controllers via CAN bus, thus saving physical Inputs and Outputs and excess wiring.

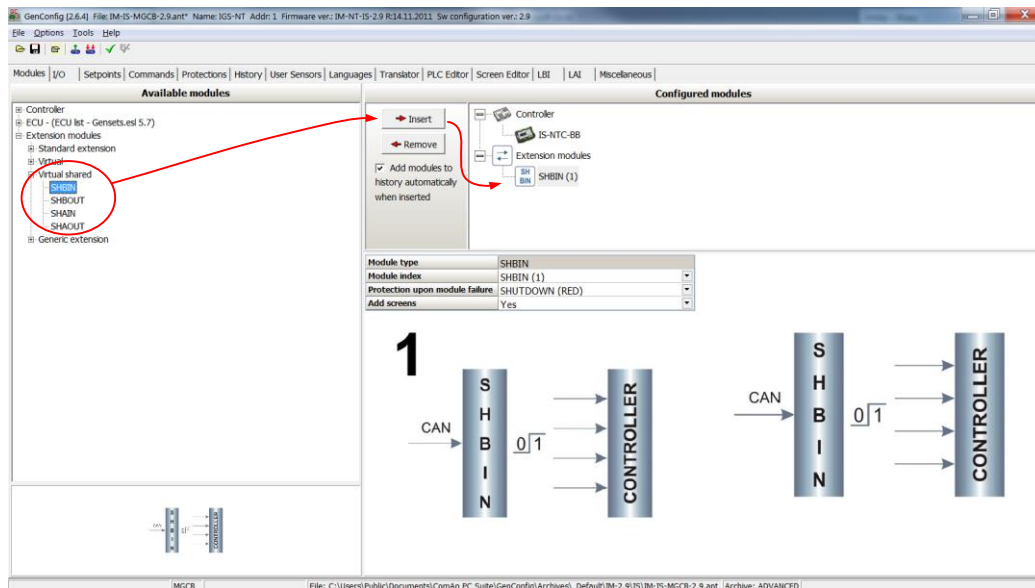


Figure: Adding of various modules

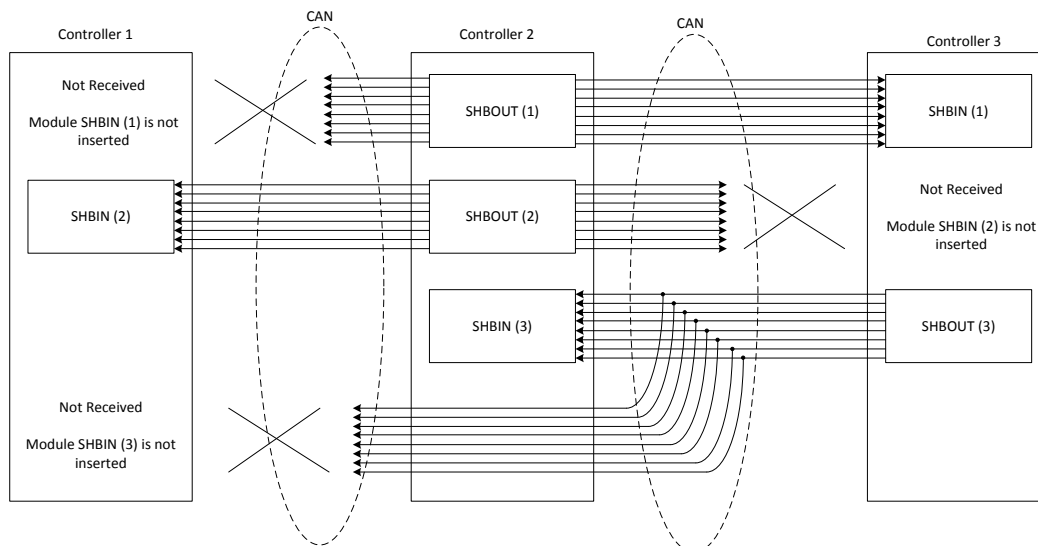


Figure: Principal Scheme (same for shared Binary I/O and shared Analogue I/O)

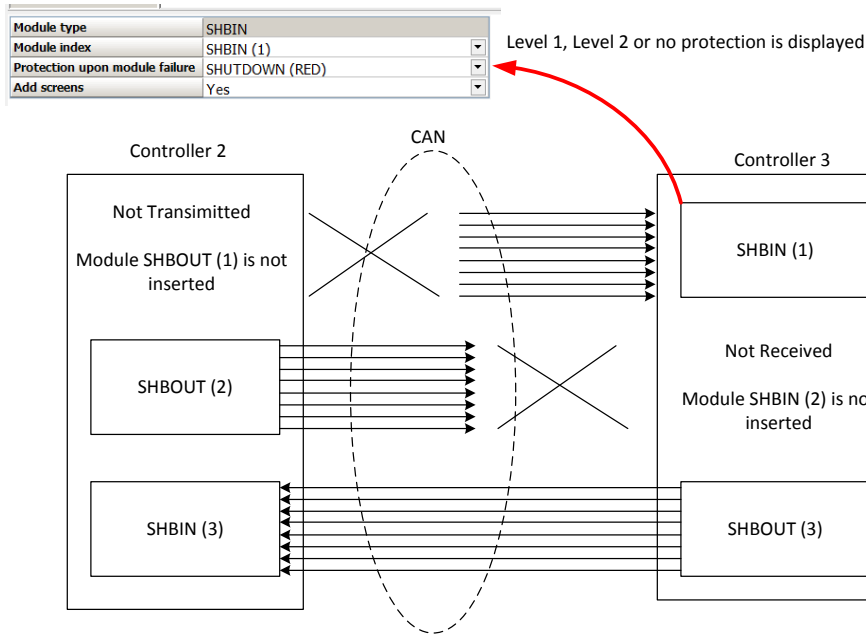
Shared Binary Inputs and Outputs may be used exactly in the same way as standard physical Inputs and Outputs. If SHBIN or SHAIN modules are configured, at least one corresponding module of SHBOUT or SHAOUT (respectively) is needed. If it is not configured, corresponding protection appears because SHBIN or SHAIN will be missing. See the figure below for more information.

NOTE:

If SHUTDOWN (RED) protection is chosen, it is interpreted in IntelliMains as Mains Protect with Reset type protection. For more information on Protection types and alarms please refer to the chapter Protection and Alarms management.

CAUTION!

For proper function of Shared Binary and Analog Inputs and Outputs, only one source of Shared Binary or Analog Outputs must be configured (i.e. it is not possible to configure in one controller SHBOUT1 and to another one as well SHBOUT1).



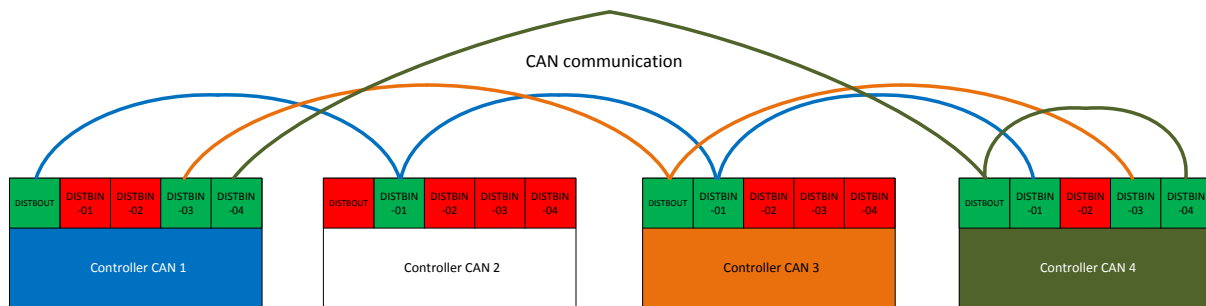
7.16 Distributed Binary Inputs and Outputs

InteliMains uses the same type of Distributed Binary Inputs and Outputs (DISTBIN and DISTBOUT modules) as InteliGen and InteliSys. Thanks to this, it is possible to share Binary and Analog values between all the controllers via CAN bus, thus saving physical Inputs and Outputs and excess wiring.

DISTBIN and DISTBOUT work in a different way than SHBIN and SHBOU. Each controller has one pack of eight DISTBOUT available (if not configured or no function is assigned to any output, it does not broadcast them). The number of DISTBOUT module is not shown in the configuration and it is always corresponding to the CAN address of the controller (e.g. the controller with address 5 will be broadcasting DISTBOUT-05 which can be received if module DISTBIN-05 is configured in another controller). Up to 32 DISTBIN modules can be configured (meaning that the controller will be receiving all DISTBOUT from all the controller, even his own).

It is not possible to change the name of DISTBIN inputs or add protections.

In the example below you can see 4 controllers with various DISTBIN and DISTBOUT configuration.



NOTE:

If SHUTDOWN (RED) protection is chosen, it is interpreted in InteliMains as Mains Protect with Reset type protection. For more information on Protection types and alarms please refer to the chapter Protection and Alarms management.

HINT

Controller sends Distributed Binary Outputs each 100ms if there are any changes in any bit position. If there are no changes, controller sends the information with period 1s.

NOTE:

InteliMains^{NT}, SW version 3.2.0

DISTBIN and DISTBOUT function is not available for IM-NT-GC controller.

7.17 Modbus Reading and Writing

Controller supports Modbus Slave functions (an external device may write or read from a controller). Modbus registers corresponding to objects in the controller can be exported to text form in GenConfig.

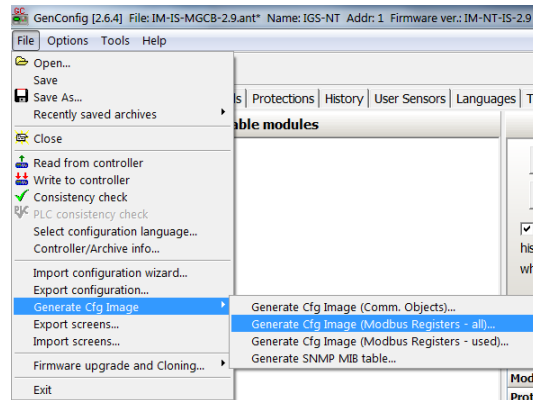
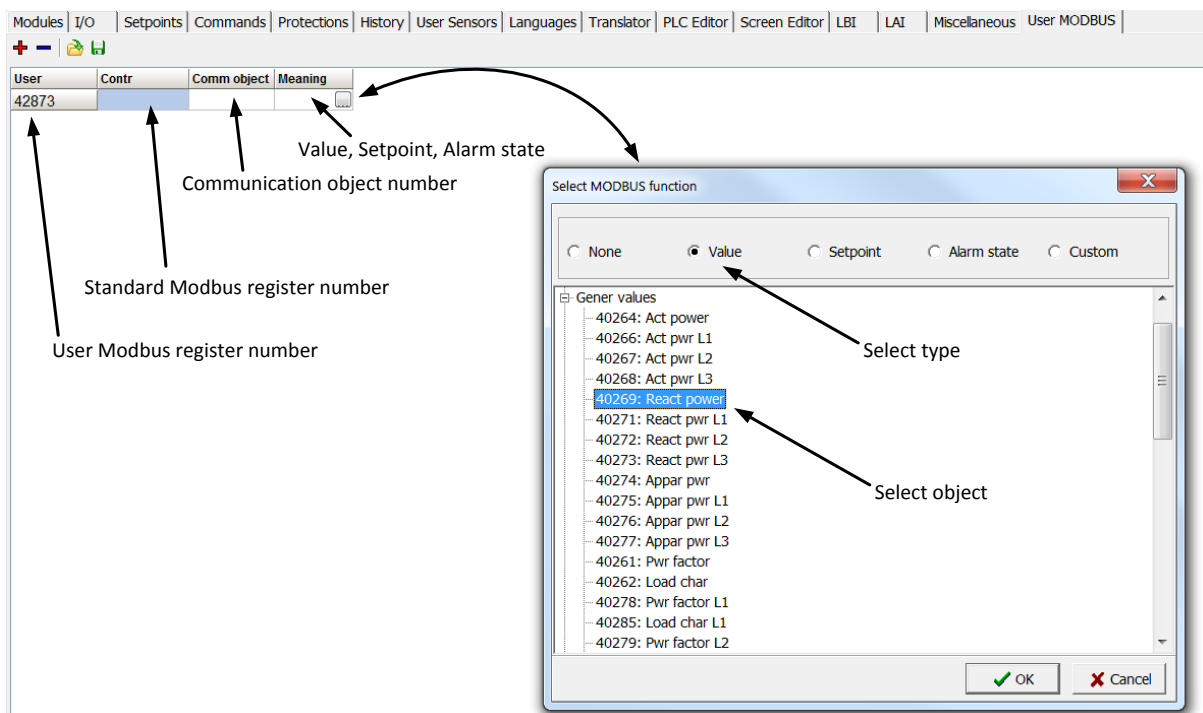


Figure: Exporting of Modbus registers

If Modbus Master function is required extension module I-CB/Modbus connected via CAN1 can be used. For more information on how to use this module please refer to InteliGen/InteliSys Communication Guide and to [I-CBEdit manual](#).

7.18 User MODBUS

Users can define Modbus registers from 42873 to 43000. Values, setpoints and Alarm states can be specified for these new Modbus registers to prepare the Modbus protocol for batch reading and writing or to standardize Modbus protocol between FW versions or branches.



The screenshot shows the 'User MODBUS' configuration window. A table lists Modbus registers with columns: User, Contr, Comm object, and Meaning. The first row shows register 42873. A dialog box titled 'Select MODBUS function' is open, with 'Value' selected. The dialog lists various objects, with '40269: React power' selected. Arrows point from the dialog to the table columns: 'Standard Modbus register number' points to the 'User' column, 'User Modbus register number' points to the 'Contr' column, 'Communication object number' points to the 'Comm object' column, and 'Value, Setpoint, Alarm state' points to the 'Meaning' column.

NOTE:

InteliMains^{NT}, SW version 3.2.0

User MODBUS function is not available for IM-NT-GC controller.

7.19 Modbus Switches

The “Modbus Switches” are two Modbus registers dedicated for continuous writing of binary information via Modbus. Both registers are available on Modbus for simple writing (using command 6 or 16). The particular bits of these registers are available as binary status for universal use in logical binary outputs of the controller as “MODBUSW1 .. MODBUSW32”. No password is required for writing of those registers (if there is no general password for Modbus writing). There are two Values “ModbusSw1” and “ModbusSw2” in group “Log Bout” available for back-reading.

Register for writing	Modbus register number	Value for back-reading	Modbus register number
ModbusSw1	46337	ModbusSw1	40547
ModbusSw2	46338	ModbusSw2	40548

NOTE:

The LSB of ModbusSw1 (46337) corresponds with LBO “ModbusSw1”

The LSB of ModbusSw2 (46338) corresponds with LBO “ModbusSw17”

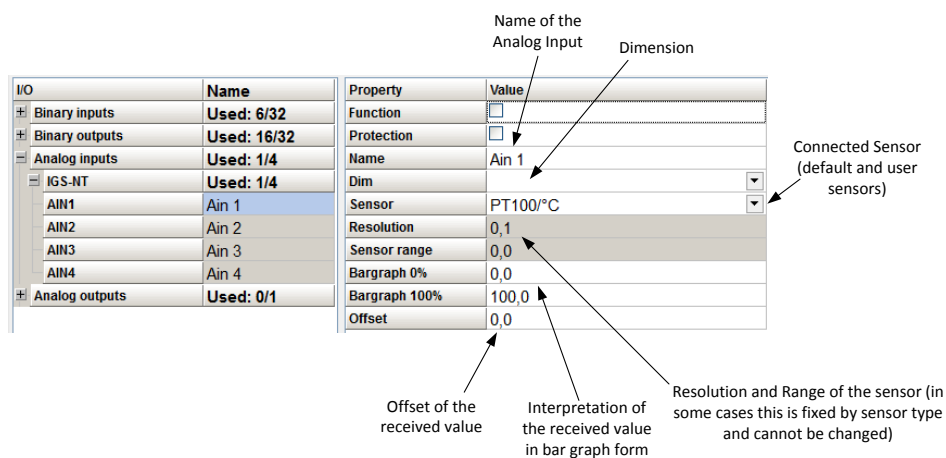
Examples:

Register port for writing	Written value	LBO ModbusSw16ModbusSw1
ModbusSw1 (46337)	000F HEX	0000 0000 0000 1111

Register port for writing	Written value	LBO ModbusSw32ModbusSw17
ModbusSw2 (46338)	F000 HEX	1111 0000 0000 0000

7.20 Analog Input Sensors and User Sensors

Controller and/or some extension modules allow connection of sensor outputs to Analog Inputs. There is whole variety of common sensor output characteristics prepared in configuration by default. Although if there is sensor that is not in the list, it is possible to prepare custom characteristics (up to 16) with up to 31 definition points.



I/O	Name	Property	Value
Binary inputs	Used: 6/32	Function	<input type="checkbox"/>
Binary outputs	Used: 16/32	Protection	<input type="checkbox"/>
Analog inputs	Used: 1/4	Name	Ain 1
IGS-NT	Used: 1/4	Dim	
AIN1	Ain 1	Sensor	PT100/°C
AIN2	Ain 2	Resolution	0,1
AIN3	Ain 3	Sensor range	0,0
AIN4	Ain 4	Bargraph 0%	0,0
Analog outputs	Used: 0/1	Bargraph 100%	100,0
		Offset	0,0

Figure: Sensor adjustment in GenConfig

Default sensors: PT100/°C, PT1000/°C, NI1000/°C, PT100/°F, PT1000/°F, NI1000/°F, 4-20mA active, 0-2400ohm, 0-2.4V, Tristate

HINT

There is “electronic” type of sensor available for Shared Analog Inputs which can be used to interpret shared data over CAN bus.

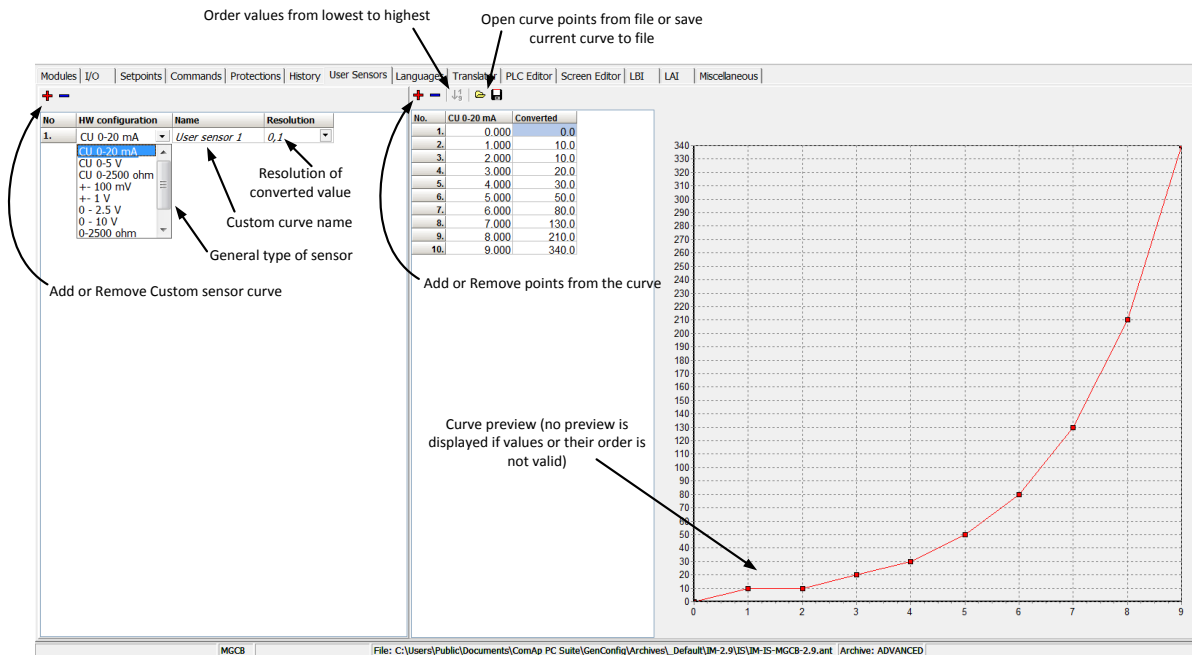


Figure: User Sensor definition

7.21 Languages and Translator tool in GenConfig

For detailed description of Languages and Translator tool please refer to GenConfig interactive help (press F1 when in corresponding tab or open Help -> GenConfig Help).

7.22 Power Formats

InteliMains allows user to choose from several Power Formats that affect dimensions in which values and some setpoints are interpreted or adjusted. Power formats may be changed in Miscellaneous tab in GenConfig. There are following Power Formats available:

- 1 kW kVAr kVA kX V
- 0,1 kW kVAr kVA kX V
- 0,01 MW MVAr MVA MX kV
- 0,01 MW MVAr MVA MX V

NOTE:

Range of some setpoints and values is changed significantly when different Power Formats are selected.

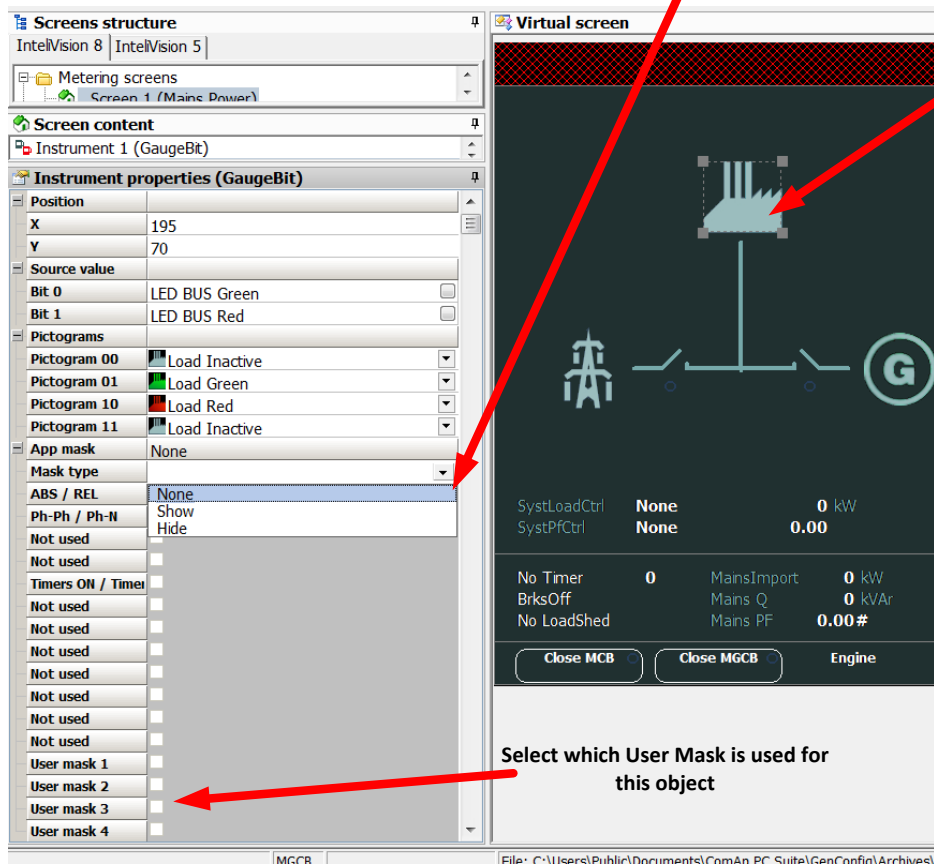
Last Power Format is designed to be used in combined High Power/High Voltage and Low Voltage installations. High voltage is then interpreted in Volts (e.g. 33256V instead of 33kV).

Last two Power Formats can be used in combination on one CAN bus.

7.23 User Mask function

In GenConfig you can easily set any object in Screen Editor to show or hide based on activation of particular Logical Binary Input available for users. Below, there is diagram showing the setup of User Mask function in Screen Editor.

Select the proper function
 Show = appears when LBI gets active
 Hide = disappears when LBI gets active
 None = no function



Select the object

Select which User Mask is used for this object

NOTE:

Masking of screens in IntelliVision 5 supports only Show function

Use also other masking functions (masking can react on several internal states, e.g. activation of Timers).

7.24 PLC functions

Number of PLC functions is the same for IntelliMains-NT and IntelliSys-NT. See description in IGS-NT-Application guide-2.7.pdf.

7.25 Multi language support

NT Family controllers support up to three languages that can be switched during controller duty. Every terminal (i.e. Remote display or PC-IntelliMonitor) can be switched to different language. Use PC-GenConfig - Translator tool to translate texts to another language.

Default application archives contain all texts in English only.

IntelliMains^{NT}, SW version 3.2.0

IntelliMains-NT-BTB-3.2.0-Reference Guide.pdf, ©ComAp – April 2015

8 Protections and Alarm management

ComAp mains controllers provide following range of mains protections.

For each protection adjustable limit and time delay are available.

ANSI CODE	PROTECTION	IM-NT, IM-NT-BB
25	Synchronism Check	•
27	Undervoltage	•
32P	Load Shedding	•
37	Undercurrent	•@
46	Current Unbalance	•@
47	Voltage Unbalance and Phase-sequence	•
49T	Temperature Monitoring (using configurable Analog input)	•@
55	Power Factor	•@
59	Overvoltage	•
79	AC Reclosing	•
81H	Overfrequency	•
81L	Underfrequency	•

NOTE:

• - included

@ - example of protections that can be created using universal protections (it is possible to utilize controller functions to prepare even more protections)

8.1.1 Protection groups

PROTECTION GROUP	COFIGURABILITY	SETPOINT GROUP
Analog protections	Configurable	Analog protect
Bus protections	Configurable	BusL protect BusR protect
Fixed protections	Fixed	BusL protect BusR protect

8.1.2 Protection types

LEVEL	PROTECTION TYPE	ABBREVIATION	CONTROLLER ACTION	RECORD	FAULT RESET NEEDED
1	History record	Hst	none	History only	NO
1	Alarm only	Al	none	Alarmlist only	YES
1	Warning	Wrn	none	Alarmlist and History	YES
1	AL indication	ALI	none	Alarmlist only	NO
1	A+H indication	AHI	none	Alarmlist and History	NO
2	Breaker open	BO	Controller opens BTB, no fault reset needed after alarm inactivation to reclose BTB	History only	NO
2	Breaker open with fault reset	BOR	Controller opens BTB, BTB cannot be closed before alarm inactivation and fault reset	Alarmlist and History	YES
X	Fail sensor	FIs	Can be indicated when Analog input value is $\pm 6\%$ out of sensor characteristic range. FIs can optionally activate corresponding (e.g. Sd) Analog input protection as well.	Alarmlist and History	Configurable

8.1.3 Default protections in MCB/MGCB applications

Following protections are firmware based

PROTECTION	PROTECTION TYPE	CORRESPONDING SETPOINTS
Bus left protections:		
IDMT current	BOR	Load Protect: <i>Load2Inom prot; Load2Inom del</i>
IDMT Active power	BOR	Load Protect: <i>Load2POvrdPro; OverldStrtEval; 2POvrdStEvDel</i>
Bus Left Voltage – over and under voltage in all phases	Hst	BusL protect: <i>BusL Volt prot; BusLeft >V; BusLeft <V; BusLeft V del</i>
Bus Left Frequency – over and under frequency	Hst	BusL protect: <i>BusLfreq prot; BusLeft >f; BusLeft <f; BusLeft f del</i>
Bus right protections:		
Bus Right Voltage – over and under voltage in all phases	Hst	BusR protect: <i>BusRVolt prot; BusRight >V; BusRight <V; BusRight V del</i>
Bus Right Frequency – over and under frequency	Hst	BusR protect: <i>BusRfreq prot; BusRight >f; BusRight <f; BusRight f del</i>
Configured in Protections tab in default archive:		

InteliMains^{NT}, SW version 3.2.0

PROTECTION	PROTECTION TYPE	CORRESPONDING SETPOINTS
Bus Left Voltage Unbalance	Hst	BusL protect: <i>BusL V unbal; BusL V unb del</i>
Bus Left Current Unbalance	Hst	BusL protect: <i>BusL I unbal; BusL I unb del</i>
Bus Right Voltage Unbalance	Hst	BusL protect: <i>BusR V unbal; BusR V unb del</i>
Batt <V, Batt >V	Wrn	Analog protect: <i>Batt >V; Batt <V; Batt volt del</i>

8.1.4 Bus left voltage and frequency protections - limits and indications

IDMT Current: This protection can be activated or deactivated by the setpoint **BusL Protect:***BusL2Inom prot*. For more information on the dynamic delay of this protection refer to the setpoint **BusL Protect:***BusL2Inom del* in the APPENDIX of this document or in context help in GenConfig.

IDMT Active Power: This protection can be activated or deactivated by the setpoint **BusL Protect:***BusL2POvrdPro*. **BusL protect:***OveldStrtEval* setpoint defines when the IDMT Active Power protection starts to be evaluated. For more information on the dynamic delay of this protection refer to the setpoint **BusL Protect:***2POVrdStrtEvDel* in the APPENDIX of this document or in context help in GenConfig.

BusL Over and Under Voltage: This protection limits are given by setpoints **BusL protect:***BusLeft >V*, **BusL protect:** *BusLeft <V*. Delay for over and under voltage is given by the setpoint **BusL protect:***BusLeft V del*. Protection is indicated by message “BL LX over” (X = number of corresponding phase) or “BL LX under”. When **Basic settings:***FixVoltProtSel* is adjusted to PHASE-PHASE then this protection is evaluated based on voltage between phases and it is indicated by “BL LXY over” or “BL LXY under” (where XY are number of corresponding phases).

BusL Over and Under Frequency: This protection limits are given by setpoints **BusL protect:***BusLeft >f*, **BusL protect:** *BusLeft <f*. Delay for over and under frequency is given by the setpoint **BusL protect:***BusLeft f del*. Protection is indicated by message “BusL f over” or “BusL f under”.

8.1.5 Bus right voltage and frequency protections - limits and indications

BusR Over and Under Voltage: This protection limits are given by setpoints **BusR protect:***BusRight >V*, **BusR protect:** *BusRight <V*. Delay for over and under voltage is given by the setpoint **BusR protect:***BusRight V del*. Protection is indicated by message “BR LX over” (X = number of corresponding phase) or “BR LX under”. When **Basic settings:***FixVoltProtSel* is adjusted to PHASE-PHASE then this protection is evaluated based on voltage between phases and it is indicated by “BR LXY over” or “BR LXY under” (where XY are number of corresponding phases).

BusR Over and Under Frequency: This protection limits are given by setpoints **BusR protect:***BusRight >f*, **BusR protect:** *BusRight <f*. Delay for over and under frequency is given by the setpoint **BusR protect:***BusRight f del*. Protection is indicated by message “BusR f over” or “BusR f under”.

8.1.6 User configurable protections

Controller provides vast possibilities for user configurable protections. There are several protections that configured by default in standard configuration. For step-by-setp guide on how to configure your own protections please go to chapter 7.1.6.2.

8.1.6.1 Configured protections by default

BusL Voltage Unbalance: This protection is by default configured as HistRecOnly with indication “BusL V unbal”. For more information on this protection see the Protections tab in default archive.

BusL Current Unbalance: This protection is by default configured as HistRecOnly with indication “BusL I unbal”. For more information on this protection see the Protections tab in default archive.

BusR Voltage Unbalance: This protection is by default configured as HistoryRecOnly with indication “BusR U unbal”. For more information on this protection see the Protections tab in default archive.

Battery Over and Under Voltage: There are two protections configured by default as Warnings with indication “Batt volt”. For more information on this protection see the Protections tab in default archive.

8.1.6.2 Configuration of User configurable protections in GenConfig

It is possible to configure protections on Binary Input, Analog Input or any value that is available in the controller.

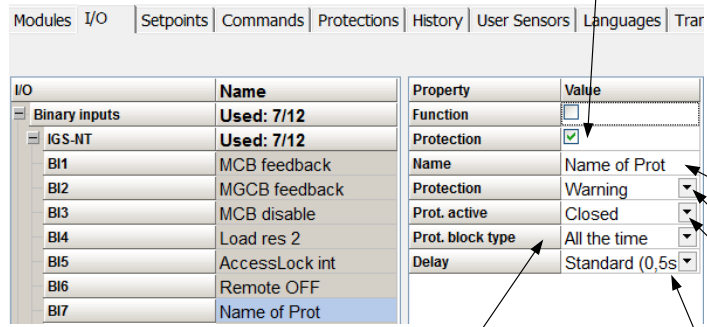
HINT

Since there can be number of protections configured by the user it is possible to prepare more complex reaction of the Feeder to the state of the voltage on Bus. It is possible to add reaction on over and under frequency, over and under voltage and other parameters. These protection will be working along with the fixed protections.

8.1.6.2.1 Binary Input protection configuration

Open I/O tab in GenCofig and adjust parameters that are described below.

Enable/Disable protection for this input



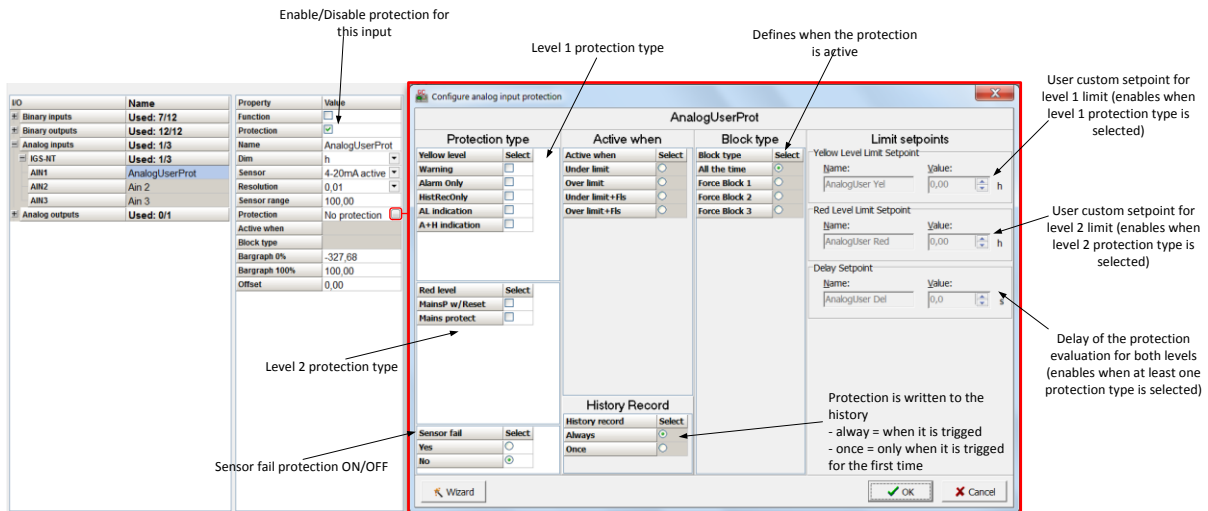
I/O	Name	Property	Value
Binary inputs	Used: 7/12	Function	<input type="checkbox"/>
IGS-NT	Used: 7/12	Protection	<input checked="" type="checkbox"/>
BI1	MCB feedback	Name	Name of Prot
BI2	MGCB feedback	Protection	Warning
BI3	MCB disable	Prot. active	Closed
BI4	Load res 2	Prot. block type	All the time
BI5	AccessLock int	Delay	Standard (0,5s)
BI6	Remote OFF		
BI7	Name of Prot		

Annotations:

- Enable/Disable protection for this input (points to Function checkbox)
- Name of the binary input is also used as the name of the protection (points to Name dropdown)
- Type of protection (points to Protection dropdown)
- Toggle normally closed/normally open (points to Prot. active dropdown)
- Defines when the protection is active (points to Prot. block type dropdown)
- Defines protection delay (points to Delay dropdown)

8.1.6.2.2 Analog Input protection configuration

Open I/O tab in GenCofig and adjust parameters that are described below.



Enable/Disable protection for this input

Level 1 protection type

Defines when the protection is active

User custom setpoint for level 1 limit (enables when level 1 protection type is selected)

User custom setpoint for level 2 limit (enables when level 2 protection type is selected)

Delay of the protection evaluation for both levels (enables when at least one protection type is selected)

Level 2 protection type

Sensor fail protection ON/OFF

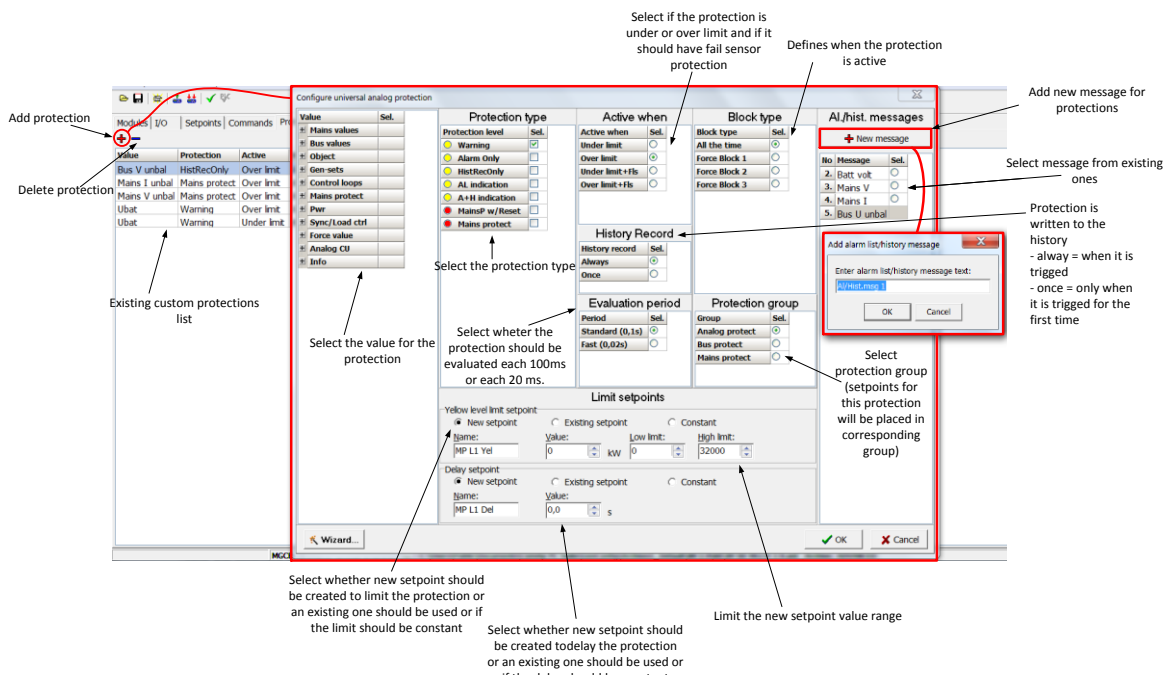
Protection is written to the history
- always = when it is triggered
- once = only when it is triggered for the first time

HINT

Fail Sensor protection (when activated) does not affect the function of the system itself. If you adjust "Active when" to Under limit + FIs or Over limit + FIs the protection will be considered the value that is out of range (failed sensor) to be under or over limit (depending on the setting) and it will issue corresponding alarm after the delay of the protection. This can be used for example when the function of the particular sensor connected to an analog input is crucial for the operation of the system and its failure requires the system to be affected (open breakers etc.).

8.1.6.2.3 Custom configurable protection

Open Protections tab in GenCofig and adjust parameters that are described below.



Select if the protection is under or over limit and if it should have fail sensor protection

Defines when the protection is active

Add new message for protections

Select message from existing ones

Protection is written to the history
- always = when it is triggered
- once = only when it is triggered for the first time

Select protection type

Select whether the protection should be evaluated each 100ms or each 20 ms.

Select protection group (setpoints for this protection will be placed in corresponding group)

Select whether new setpoint should be created to limit the protection or an existing one should be used or if the limit should be constant

Select whether new setpoint should be created to delay the protection or an existing one should be used or if the delay should be constant

Limit the new setpoint value range

Existing custom protections list

Select the value for the protection

Add protection

Delete protection

Al/hist. messages

Add alarm list/history message

Enter alarm list/history message text:

OK Cancel

HINT

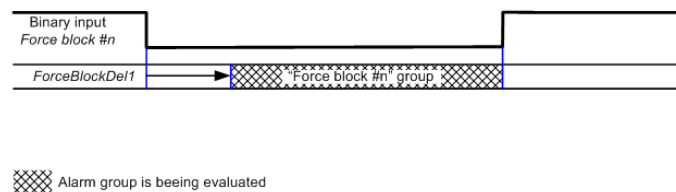
You need to prepare two separate protections for level 1 and level 2.

Select the value for protection first and then use Wizard – it will take you through all the steps and help you adjust them correctly.

8.1.6.2.4 Protection blocking

It is possible to block user defined protections (on binary inputs, analog inputs or any value available in the controller).

BLOCKING TYPE	DESCRIPTION
All the time	The alarms are being evaluated all the time the controller is switched on.
Force block 1	The alarms are being evaluated while the input <i>Force block 1</i> is not active. The evaluation begins <i>ForceBlockDel1</i> seconds after the input has been deactivated.
Force block 2	The alarms are being evaluated while the input <i>Force block 2</i> is not active. The evaluation begins <i>ForceBlockDel2</i> seconds after the input has been deactivated.
Force block 3	The alarms are being evaluated while the input <i>Force block 3</i> is not active. The evaluation begins <i>ForceBlockDel3</i> seconds after the input has been deactivated.



8.1.7 Reset Actual Alarms selection

It is possible to determine the behavior of alarms that are in alarm list when Fault Reset button is pressed. Select behavior with ComProtSetting:ResetActAlarms.

DISABLED	Pressing of the fault reset button (at any terminal or external button) resets only inactive alarms. Active alarms remain in the alarmlist unchanged and must be reset again when they become inactive.
ENABLED	Pressing of the fault reset button (at any terminal or external button) resets all alarms that are currently present in the alarm list. Inactive alarms disappear from the alarm list immediately, active alarms are changed to "confirmed" state and disappear when the alarm condition disappear or the alarm starts to be blocked.

NOTE:

ENABLED position corresponds to the method how the IG-classic and IS-classic controllers handled the alarms.

8.1.8 Bus Measurement Error detection

InteliMains is able to detect Bus Measurement Error. It is evaluated based on gen-sets and mains incommers.

GEN-SETS: If any gen-set from the logical group that is connected to the InteliMains has closed breaker and InteliMains is not measuring correct values on Bus it automatically detects bus measurement error.


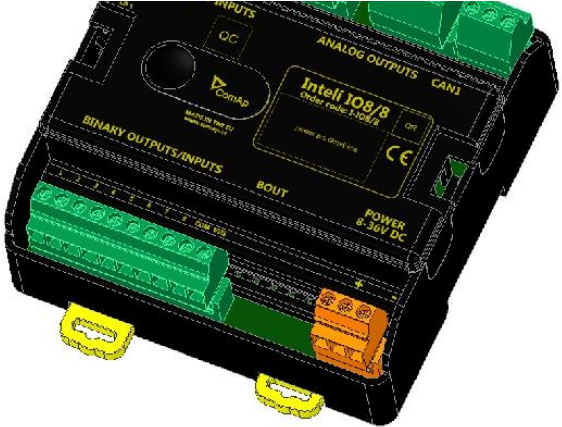
MAINS: If any Mains incomer is connected to the bus (provided that all corresponding Bus Tie Breakers are closed as well) and InteliMains is not measuring correct values on Bus it automatically detects bus measurement error.

8.1.9 Peripheral Modules Error detection

It is possible to adjust the protection of level 1 (yellow) or level 2 (red) to any configured peripheral module. If the controller detects that this periphery is missing it issues the corresponding alarm. In BTB application Warning is issued when WARNING(YEL) option is selected and level 2 with no action is issued when SHUTDOWN(RED) option is selected (this alarm has the type of MPR (Mains Protect with Reset) which is not present in BTB application and therefore the controller takes no action). If opening of the breaker is required, utilize the function shown below.

Module type	IntelI08/8
Module index	IntelI08/8(1)
Protection upon module failure	SHUTDOWN (RED)
Module failure prefix	I08/8(1)
Add screens	Yes
Output type	Low side
Output state check	Deactivated
Input type	Pull up

The corresponding protection can be adjusted. Alarm level 1 or level 2 is issued when the controller detects missing periphery (WARNING (YEL) – level 1, SHUTDOWN (RED) – level 2)

Binary outputs	Used: 13/28
IGS-NT	Used: 12/12
IntelI08/8(1)	Used: 0/8
VPIO (1)	Used: 1/8
B01	PeriphMissing
B02	VPIO-1 2
B03	VPIO-1 3
B04	VPIO-1 4
B05	VPIO-1 5
B06	VPIO-1 6
B07	VPIO-1 7
B08	VPIO-1 8

Adjust LBO PeriphCommErr to one VPIO output

CtrlHeartBeat	<input type="checkbox"/>
CtrlHeart FD	<input type="checkbox"/>
EnginesSwapped	<input type="checkbox"/>
Logical 0	<input type="checkbox"/>
Logical 1	<input type="checkbox"/>
PeriphCommErr	<input checked="" type="checkbox"/>
Reserved	<input type="checkbox"/>
Reserved	<input type="checkbox"/>
Reserved	<input type="checkbox"/>
Reserved	<input type="checkbox"/>
Reserved	<input type="checkbox"/>
Reserved	<input type="checkbox"/>

Adjust protection to the corresponding VPIO input

Binary inputs	Used: 6/28
IGS-NT	Used: 5/12
IntelI08/8(1)	Used: 0/8
VPIO (1)	Used: 1/8
BI1	PeriphMissing
BI2	VPIO-1 2
BI3	VPIO-1 3
BI4	VPIO-1 4
BI5	VPIO-1 5
BI6	VPIO-1 6
BI7	VPIO-1 7
BI8	VPIO-1 8

Function	<input type="checkbox"/>
Protection	<input checked="" type="checkbox"/>
Name	PeriphMissing
Protection	BrkOpen w/Reset
Prot. active	closed
Prot. block type	All the time
Delay	Standard (0,5s)

Change the type to the BrkOpen w/Reset

NOTE: If more than one module are configured, the BreakerOpen with Reset protection is issued when any of these modules is detected as missing!

9 Circuit breakers operation sequence, MGCB/MCB fail detection

NOTE:

In the following text, “CB” abbreviation is used for BTB.

9.1.1 Related binary inputs:

- CB FDB – CB feedback binary input.
- CB FDB NEG – negative CB feedback binary input. Used for increasing the reliability of CB status evaluated by the controller. In case that it is not configured, negative value of CB fdb is calculated internally within the controller.
- CB DISABLE – this input is used for disabling issuing of CB closing command (if CB is closed and this input is activated CB is opened immediately).

9.1.2 Related binary outputs:

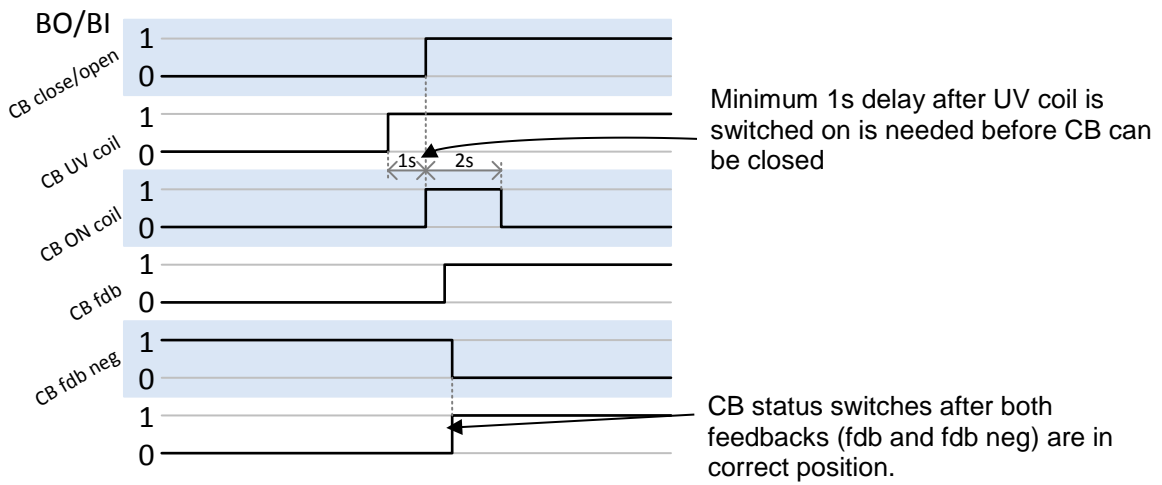
- CB CLOSE/OPEN – output for circuit breaker. Equals to 1 during the time when CB is requested to be closed.
- CB ON COIL – output for closing coil of the CB. 2s pulse (5s if synchronising is not provided by the particular CB) is used for closing the CB.
- CB OFF COIL – output for opening coil of the CB. 2s pulse (5s if synchronising is not provided by the particular CB) is used for opening the CB.
- CB UV COIL – output for undervoltage coil of the CB. Permanently active, 2s negative pulse (5s if synchronising is not provided by the particular CB) is used for CB opening request.
- CB STATUS – output indicating CB status as evaluated by the controller. This signal is used for lighting
- LEDs on the panel, switching the regulations, CB fail evaluation, etc.

NOTE:

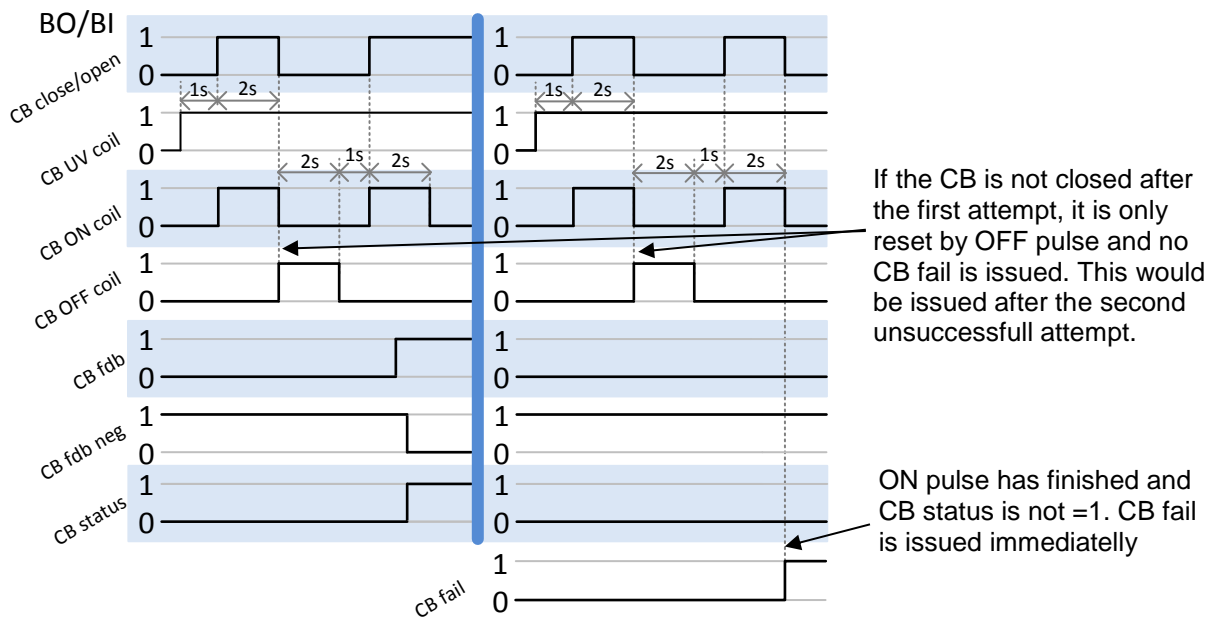
All pulse outputs for CB in following diagrams may be long 5s if the CB is not used for synchronization in that particular instance.

9.1.3 Following graphs depict possible CB sequences:

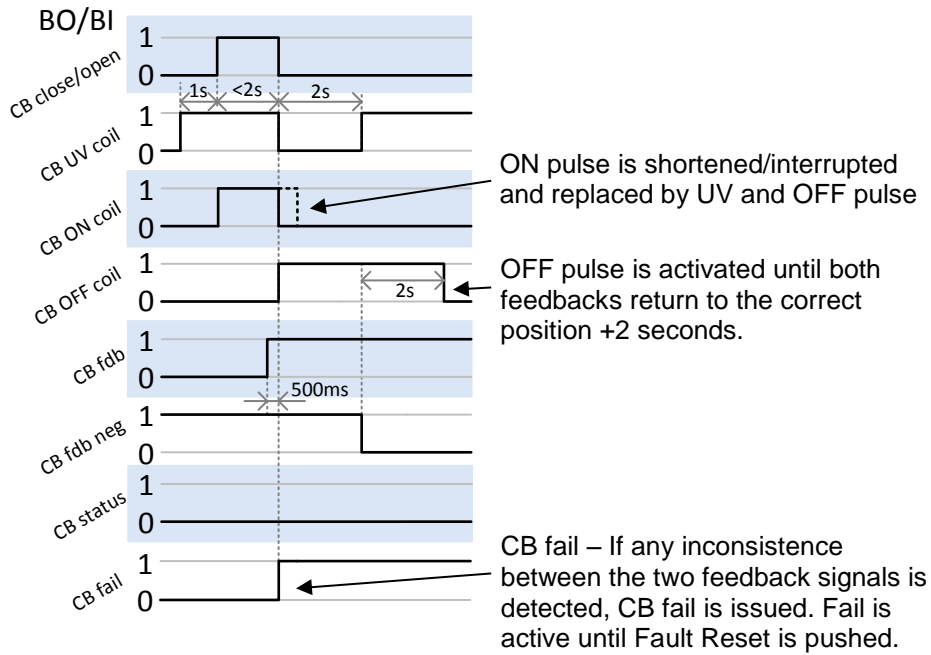
CB close command:



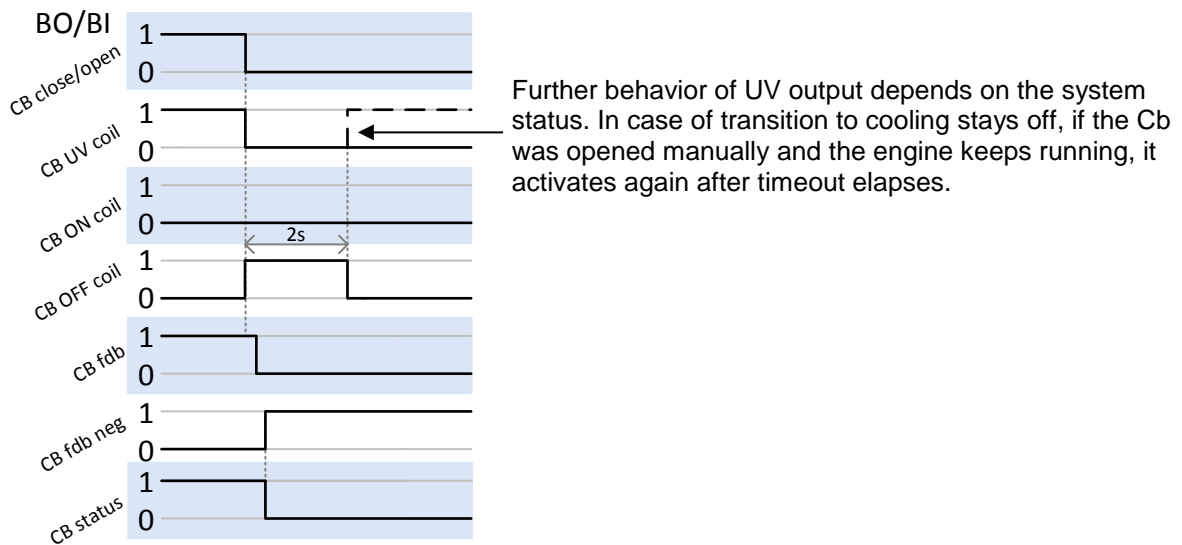
Repeated CB close command (second successful – left, second unsuccessful – right):



CB fail – fdb mismatch:

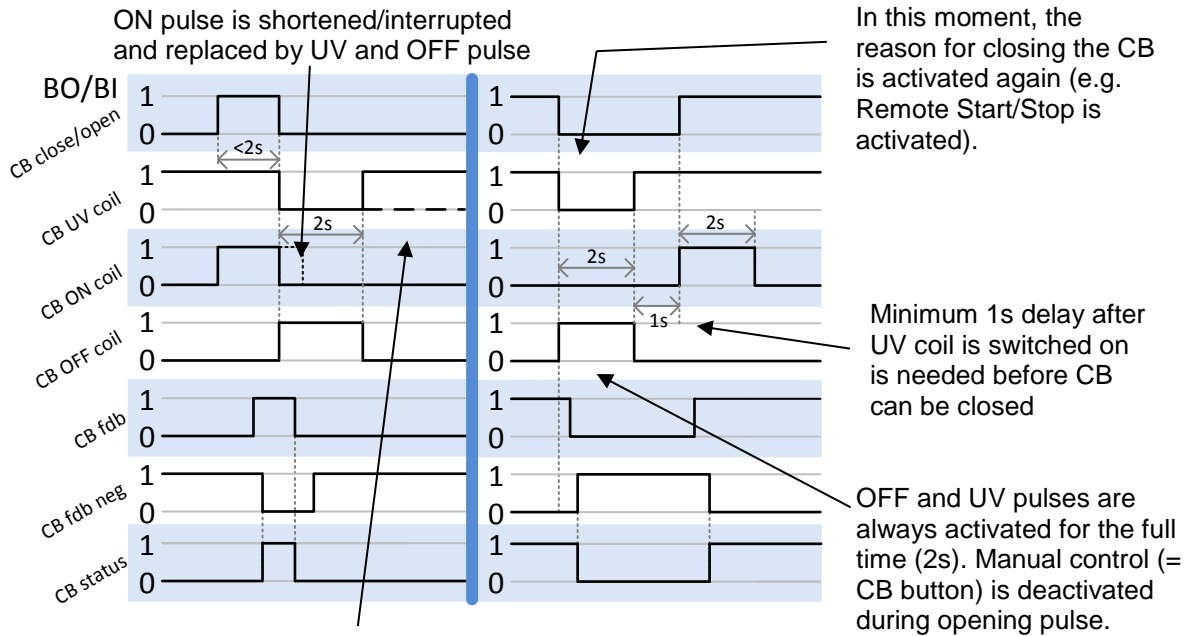


CB open command:



Transition closing -> opening (opening command is issued during closing pulse) – Left

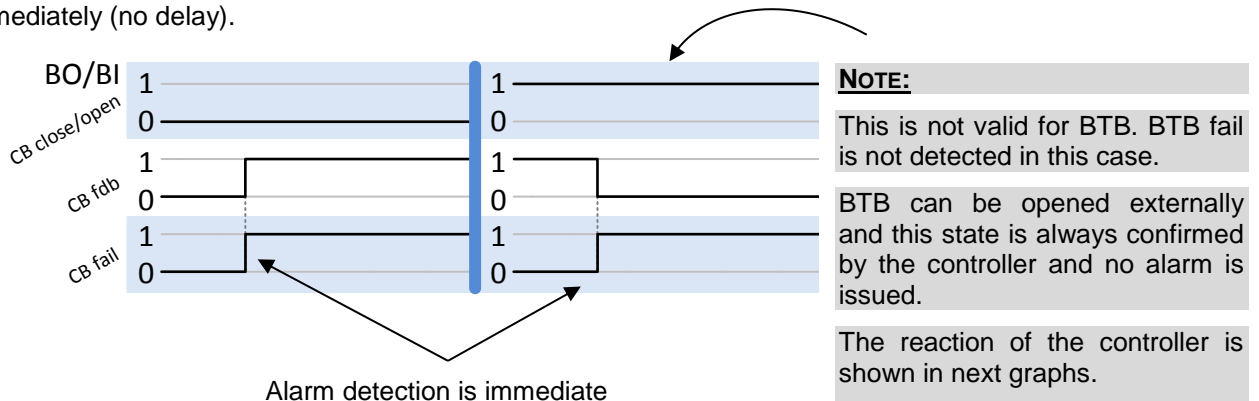
Transition opening -> closing (closing command is issued during opening pulse) – Right



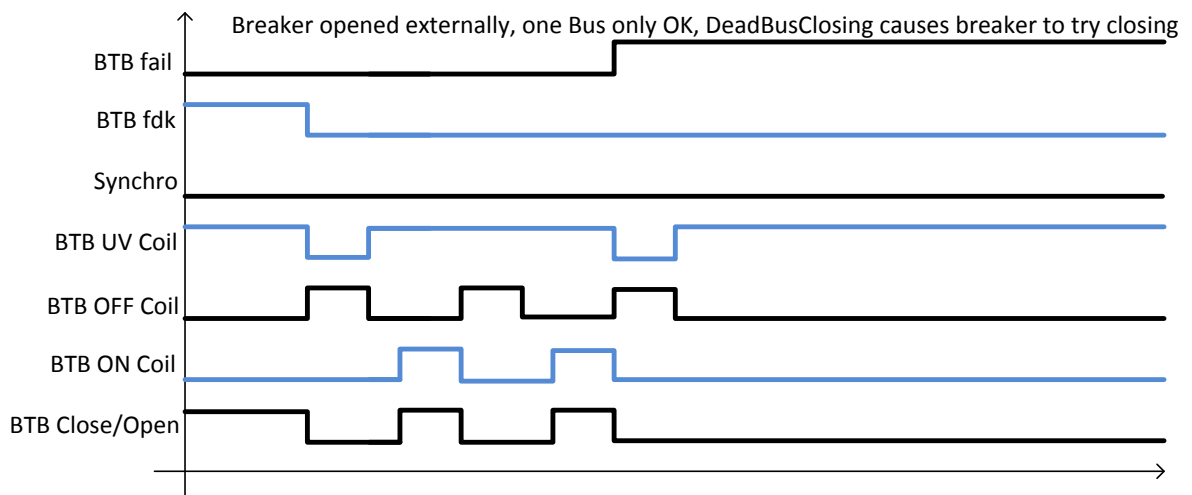
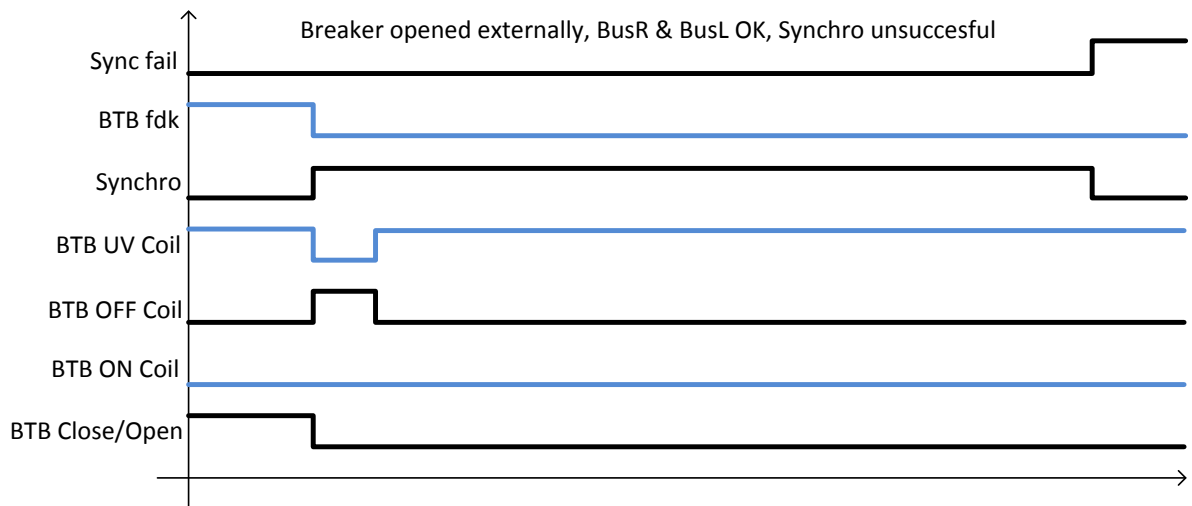
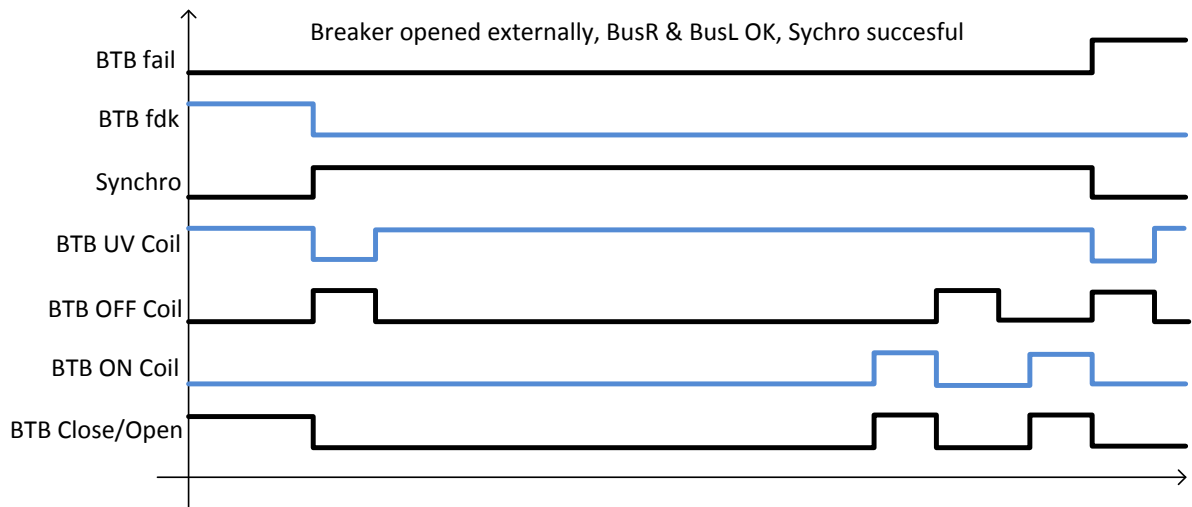
Further behavior of UV output depends on the system status. In case of transition to cooling stays off, if the Cb was opened manually and the engine keeps running, it activates again after timeout elapses.

Other CB fail reasons:

When the BO CB close/open is in steady state and CB feedback is changed, the CB fail is detected immediately (no delay).

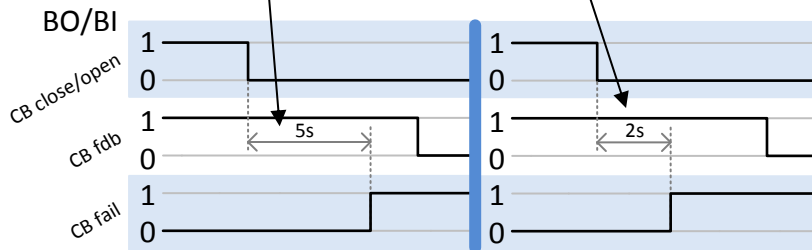


Reaction of the controller on BTB opening externally



When the BO CB close/open opens, there is 5 resp. 2 sec delay for the breaker to respond before a CB fail is detected. In such case, if CB OFF coil is used for opening the CB and CB fail occurs during opening the CB, the signal CB OFF coil is automatically extended until the breaker opening is detected (evaluated as CB status).

- 2 sec when the CB is used for synchronizing
- 5 sec in other cases



- In case that CB fail is detected after switching the controller on (CB is closed), the CB OFF coil output is activated immediately.
- **Important:**
In case that BTB feedback is active (BTB is expected to be closed) and “BTB fail” is reported due to previous incorrect manipulation of BTB, in the moment of Fault reset, the BTB fail is cleared and the controller internally goes to “closed” state. I.e. BTB fdb status is confirmed and the output BTB close/open is energized.

9.1.4 Follow function for breaker control in AUT mode

Only in MCB application.

Using setpoint **ProcessControl:BrkCtrl** in AUT behavior of breaker control can be adjusted.

PROCESSCONTROL:BRKCTRL IN AUT	CONTROLLER BEHAVIOR
NORMAL	Breaker is controller by the controller.
COX (FOLLOW)	Breaker is controlled externally and the controller does not attempt to control it nor any alarms are issued. Synchronization process can be started by the FORCE SYNC input if it is allowed by the setpoints ProcessControl:Synchro enable . Synchronization in COX(FOLLOW) does not have any timeout and controller keeps voltages synchronized indefinitely (i.e. until FORCE SYNC is opened or the breaker is closed externally).

10 Controller operation states

These states are given by requested breaker positions and other parameters (e.g. healthy Mains). Controller can operate in following states.

BTB off	BTB feedback is not active
BTB on	BTB feedback is active
Synchro	BTB feedback is not active; voltage on left and right bus is within limits; if setpoint Process control: <i>Synchro enable</i> = L->R, R->L or BOTH and left, right or at least one group (respectively) is not connected to the Mains, the controller synchronizes left, right or the one not connected to the Mains group to the right, right or the other one respectively.
EmergMan	Controller is in this state if BI EMERG. MANUAL is activated. In this state controller does not react on breaker changes and do not activate any of its binary outputs. For more information please refer to EMERG. MANUAL description in the APPENDIX of this manual or see context help in GenConfig.
Init	Initialization of controller. In this state, controller is not fully functional.

11 Quick Technical Data

11.1 Power supply

Power supply range	8-36 VDC
Power supply drop-out immunity	
Power consumption	0.4A at 8VDC, 0.15A at 24VDC, 0,1A at 36VDC
Peak power consumption (LT)	
Backup battery type	
Estimated backup battery lifetime	

APPENDIX

12 Setpoints

12.1 Password Protection

Any setpoint can be password protected - 7 levels of password protection are available. The password is up to five-digit number (maximum is 65535). Only setpoints associated with the entered password level can be modified.

Even though one level may have been set from the front panel, the affected setpoints are not accessible from IntelliMonitor (direct or Modem) until this level is set in IntelliMonitor.

Setpoints opened from front panel are automatically closed 15 minutes after the last key has been pressed or when wrong value of password is set.

Any password can be changed once that level password or higher has been entered. The controller programming (configuration) requires the highest password – only Administrator.

12.2 Table of setpoints

12.2.1 Group: ProcessControl

12.2.1.1 Setpoint: #SysBaseLoad

Group	Process Control			
Range [units]	0 .. 65000 [kW]			
Related FW	standard v3.2.0			
Description	<p>In BTB application many load control and power management functions does not play active role!</p> <p>This setpoint is used to adjust the baseload level for the whole gen-set group in parallel-to-mains operation. There are two methods of baseload control:</p> <table border="1"> <tr> <td style="background-color: #cccccc; text-align: center;">DISTRIBUTED MODE</td> <td style="text-align: center;">#SysLdCtrl PtM = BASELOAD</td> <td>Each gen-set takes proportionally equal part of the system baseload and then use load control loop (like in SPtM) to maintain the load. Load sharing is not performed, the</td> </tr> </table>	DISTRIBUTED MODE	#SysLdCtrl PtM = BASELOAD	Each gen-set takes proportionally equal part of the system baseload and then use load control loop (like in SPtM) to maintain the load. Load sharing is not performed, the
DISTRIBUTED MODE	#SysLdCtrl PtM = BASELOAD	Each gen-set takes proportionally equal part of the system baseload and then use load control loop (like in SPtM) to maintain the load. Load sharing is not performed, the		

		InteliMains does not play active role.
LOADSHARING MODE	<i>#SysLdCtrl PtM</i> = LDSHARING, <i>Load ctrl PtM</i> = SYSBLD->LS	The system baseload is maintained by the IM-NT over the load sharing.
<p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>		

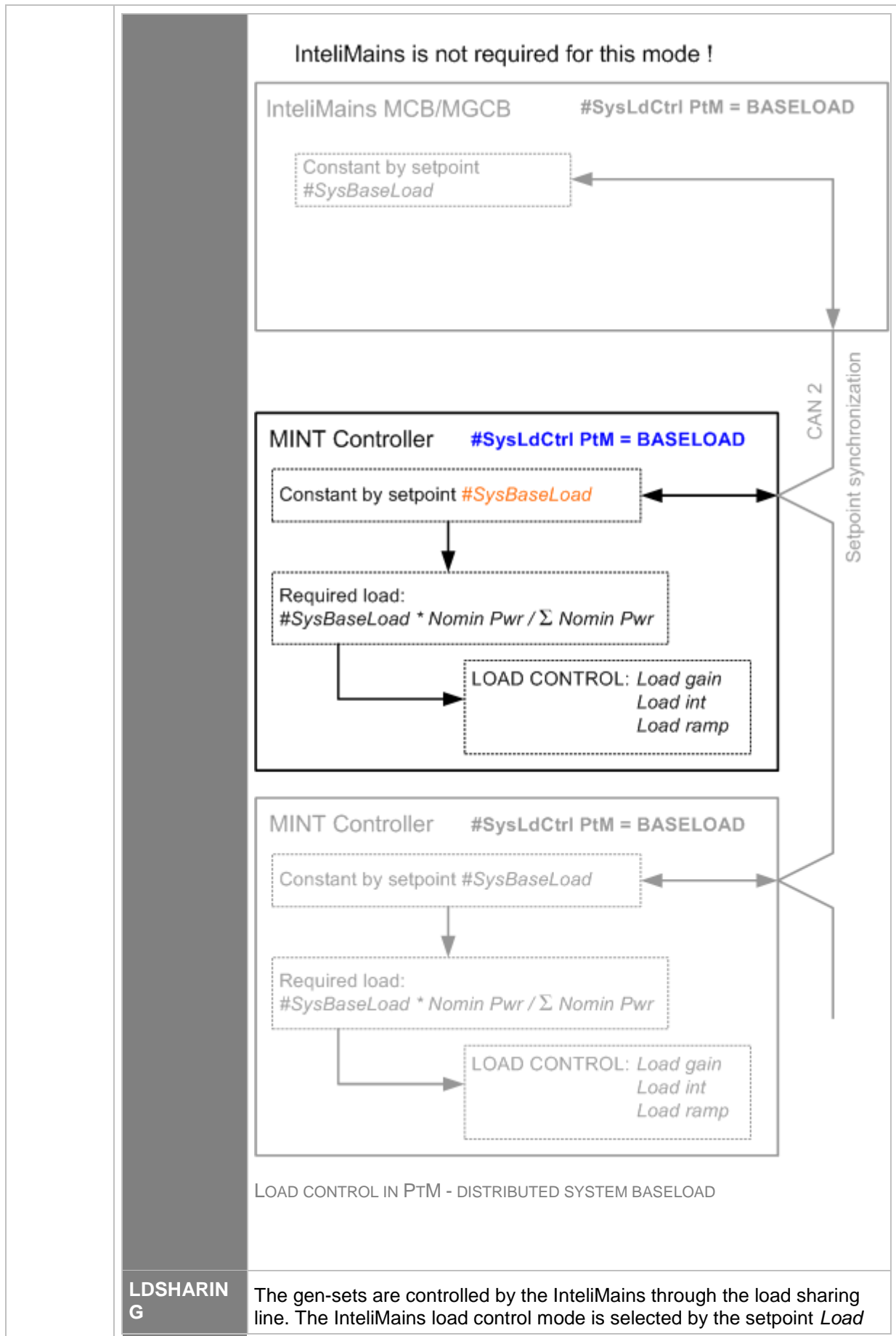
12.2.1.2 Setpoint: #SysPwrFactor

Group	Process Control
Range [units]	0.60 .. 1.20 [-]
Related FW	standard v3.2.0
Description	<p>In BTB application many load control and power management functions does not play active role!</p> <p>The setpoint is used for adjusting the requested base power factor of the gen-sets in the parallel-to-mains operation. The setpoint <i>#SysPFctrl PtM</i> must be set to BASEPF for constant power factor control. The power factor of each gen-set is controlled by it's own PF control loop and InteliMains does not play active role in this type of control.</p> <p>Settings 0.60 – 0.99 correspond to inductive PF (0.60L - 0.99L), 1.01 – 1.20 correspond to capacitive PF (0.99C - 0.80C).</p> <p style="background-color: #cccccc;">NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.1.3 Setpoint: #SysLdCtrl PtM

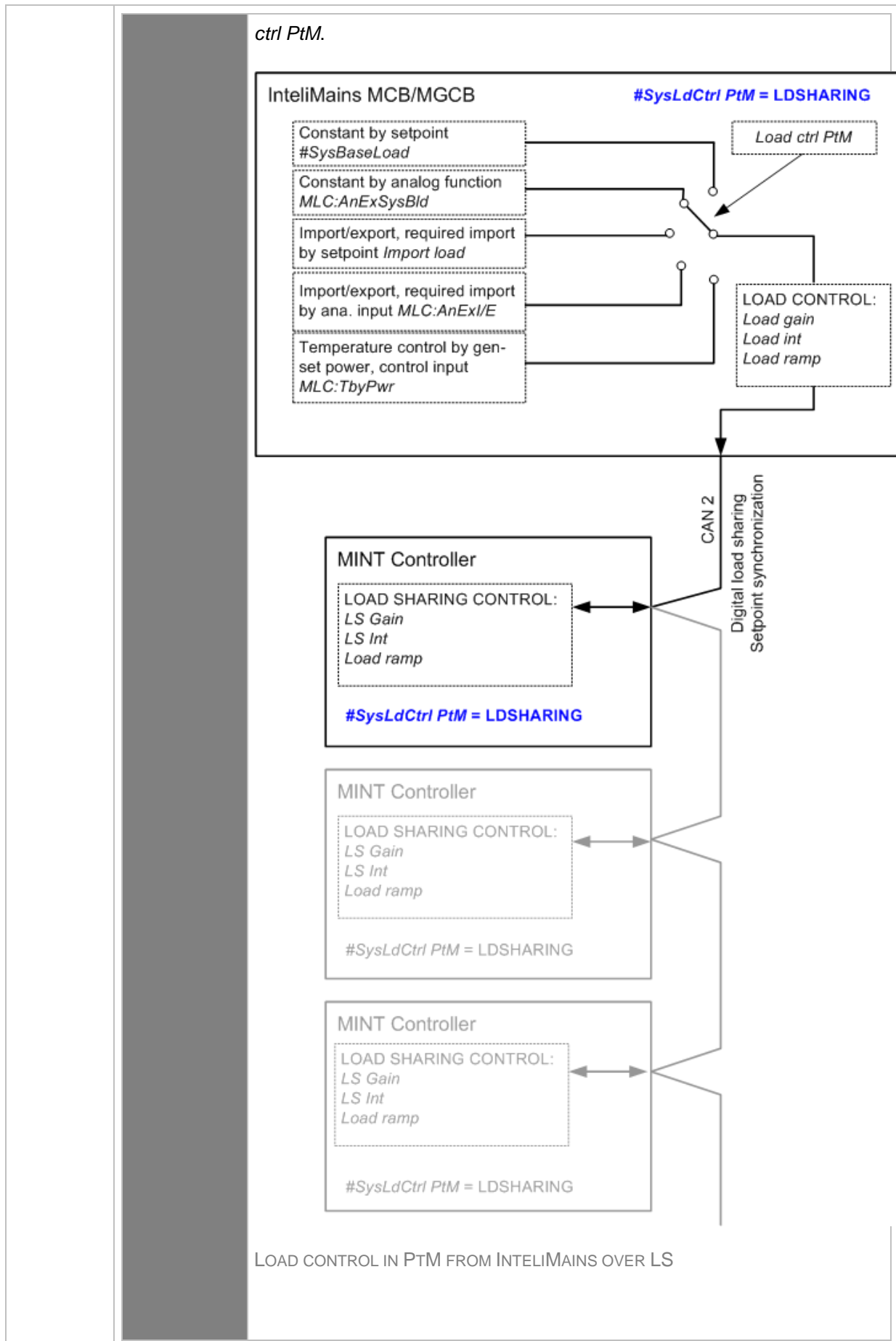
Group	Process Control
Range [units]	BASELOAD, LDSHARING [-]

Related FW	standard v3.2.0
Description	<p>In BTB application many load control and power management functions does not play active role!</p> <p>This setpoint is used to adjust the load control type in parallel-to-mains operation.</p> <div style="border: 1px solid black; padding: 5px;"> <p>BASELOAD The gen-sets are controlled by their load control loops (i.e. as in SPtM) to provide constant proportional part of the requested system baseload (see #SysBaseLoad). The InteliMains does not play active role regarding load control in parallel-to-mains operation.</p> </div>



**LDSHARIN
G**

The gen-sets are controlled by the InteliMains through the load sharing line. The InteliMains load control mode is selected by the setpoint *Load*



	<p>NOTE:</p> <p># sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>
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12.2.1.4 Setpoint: #SysPFctrl PtM

Group	Process Control				
Range [units]	BASEPF, VSHARING [-]				
Related FW	standard v3.2.0				
Description	<p>In BTB application many load control and power management functions does not play active role!</p> <p>This setpoint is used to adjust the power factor control type in parallel-to-mains operation.</p> <table border="1" style="width: 100%; margin-top: 10px;"> <tr> <td style="background-color: #cccccc; width: 20%;">BASEPF</td> <td>The gen-sets are controlled by their power factor control loops (i.e. as in SPtM) to provide constant power factor adjusted by the setpoint #SysPwrFactor. The IntelliMains does not play active role regarding power factor control in parallel-to-mains operation.</td> </tr> <tr> <td style="background-color: #cccccc;">VSHARING</td> <td>The gen-sets are controlled by the IntelliMains through the VAr sharing line (CAN2 bus). The IntelliMains power factor control mode is selected by the setpoint <i>PF ctrl PtM</i>.</td> </tr> </table> <p>NOTE:</p> <p>This type of power factor control is used for import/export mode only.</p> <p>NOTE:</p> <p>If the power factor control mode is switched to VSHARING the load control type must be switched to LDSHARING and the equivalent <i>load control mode</i> must be used.</p> <p>NOTE:</p> <p># sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>	BASEPF	The gen-sets are controlled by their power factor control loops (i.e. as in SPtM) to provide constant power factor adjusted by the setpoint #SysPwrFactor . The IntelliMains does not play active role regarding power factor control in parallel-to-mains operation.	VSHARING	The gen-sets are controlled by the IntelliMains through the VAr sharing line (CAN2 bus). The IntelliMains power factor control mode is selected by the setpoint <i>PF ctrl PtM</i> .
BASEPF	The gen-sets are controlled by their power factor control loops (i.e. as in SPtM) to provide constant power factor adjusted by the setpoint #SysPwrFactor . The IntelliMains does not play active role regarding power factor control in parallel-to-mains operation.				
VSHARING	The gen-sets are controlled by the IntelliMains through the VAr sharing line (CAN2 bus). The IntelliMains power factor control mode is selected by the setpoint <i>PF ctrl PtM</i> .				

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12.2.1.5 Setpoint: I/E-PbL meas

Group	Process Control
Range [units]	NONE, CT INPUTS, ANALOG INPUT [-]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to select, which method is used for measurement of the active power (P) transported from busL to busR. Positive measured value means that power is transmitted from busL to busR, negative value means the opposite.</p> <ul style="list-style-type: none"> • NONE: Active power from the busL is not measured. IM-NT controller will not influence gen-sets on the bus even if BTB is closed. • CT INPUTS: Active power from the busL is calculated from the busL L-N voltages and busL currents measured at the controller CT terminals. • ANALOG INPUT: Active power from the busL is measured by an external device and passed the controller via analog input MLC:I/E-PbL.

12.2.1.6 Setpoint: I/E-QbL meas

Group	Process Control
Range [units]	NONE, CT INPUTS, ANALOG INPUT [-]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to select, which method is used for measurement of the reactive power (Q) transported from busL to busR. Positive measured value means that power is transmitted from busL to busR, negative value means the opposite.</p> <ul style="list-style-type: none"> • NONE: Reactive power from the busL is not measured. <div style="background-color: #f0f0f0; padding: 5px; margin: 10px 0;"> <p>NOTE: It is possible to perform import/export load control without reactive power measurement, i.e. based on active power measurement only. The gen-sets group power factor will be maintained at constant level given by #SysPwrFactor setpoint. However, this kind of operation in certain conditions may cause bad power factor values.</p> </div> <ul style="list-style-type: none"> • CT INPUTS: Reactive power from the mains is calculated from the busL L-N voltages and busL currents measured at the controller CT terminals. • ANALOG INPUT: Rective power from the busL is measured by an

	<p>external device and passed the controller via analog input MPF:I/E-QbL.</p> <p>NOTE: If the reactive power is measured, then the measurement method should match the method used for active power measurement, i.e. if the setpoint I/E-PbL meas is set to CT INPUTS, the I/E-QbL meas should not be set to ANALOG INPUT and vice versa.</p>
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12.2.1.7 Setpoint: Synchro enable

Group	Process Control
Range [units]	NONE, L->R, R->L, BOTH [-]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>The setpoint is used for enable/disable left to right and right to left synchronization.</p> <ul style="list-style-type: none"> • NONE: No synchronization is enabled. • L->R: Synchronization of busL to busR is enabled (i.e. if busL is connected to the Mains and on BusR there are is voltage from gen-set group the synchronization process will not start). If both Buses are connected to Mains, controller tries to synchronize if it is allowed by the setpoint Mains coupling. • R->L: Synchronization of busR to busL is enabled (i.e. if busR is connected to the Mains and on BusL there are is voltage from gen-set group the synchronization process will not start). If both Buses are connected to Mains, controller tries to synchronize if it is allowed by the setpoint Mains coupling. • BOTH: Synchronization of both buses is allowed. The default bus which will be synchronized is busL (i.e. genset group on the busL is influenced by synchronization process). If busL is connected to the Mains than busR is synchronized. If both Buses are connected to Mains, controller tries to synchronize if it is allowed by the setpoint Mains coupling. <p>NOTE: See setpoint DeadBusClosing for information on BTB closing to dead bus.</p>

12.2.1.8 Setpoint: Mains coupling

Group	Process Control
Range [units]	ENABLED, DISABLED [-]

Related FW	standard v3.2.0						
Force value possible	YES						
Description	<p>This setpoint selects how the IM-NT cooperates with other IM-NT in systems where one common busbar is supplied from many mains incomers, which are controlled by many IM-NT controllers.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="background-color: #cccccc; width: 20%;">ENABLED</td> <td>The IM-NT allows a closing of the BTB even in the case that both buses (busL and busR) are connected to different mains incomers. If synchronization is successful BTB is closed.</td> </tr> <tr> <td colspan="2" style="background-color: #cccccc;">NOTE: Sometimes it is not possible to connect two mains incomers together. Than this setpoint should be set to DISABLE (see below) and "synchronization" (see note below) will not start since the closing BTB command is not issued.</td> </tr> <tr> <td style="background-color: #cccccc;">DISABLED</td> <td>The IM-NT will not close BTB if there are two different mains incomers connected to the bus.</td> </tr> </table> <p style="background-color: #cccccc; margin-top: 10px;">NOTE: Passive phase/voltage check is performed before mains coupling.</p> <p style="background-color: #cccccc; margin-top: 10px;">NOTE: The information about busL and busR being connected to mains is provided by other IM-NTs connected on CAN and controlling corresponding MCBs and MGCBs.</p>	ENABLED	The IM-NT allows a closing of the BTB even in the case that both buses (busL and busR) are connected to different mains incomers. If synchronization is successful BTB is closed.	NOTE: Sometimes it is not possible to connect two mains incomers together. Than this setpoint should be set to DISABLE (see below) and "synchronization" (see note below) will not start since the closing BTB command is not issued.		DISABLED	The IM-NT will not close BTB if there are two different mains incomers connected to the bus.
ENABLED	The IM-NT allows a closing of the BTB even in the case that both buses (busL and busR) are connected to different mains incomers. If synchronization is successful BTB is closed.						
NOTE: Sometimes it is not possible to connect two mains incomers together. Than this setpoint should be set to DISABLE (see below) and "synchronization" (see note below) will not start since the closing BTB command is not issued.							
DISABLED	The IM-NT will not close BTB if there are two different mains incomers connected to the bus.						

12.2.1.9 Setpoint: DeadBusClosing

Group	Process Control
Range [units]	NONE, L->, R->, BOTH [-]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint switches between various BTB closing modes. See the table

	below.
NONE	Closing to dead bus is disabled. Controller in AUT mode does not closes breaker unless there is voltage on both sides.
L->R	Closing to dead bus is enabled if there is healthy voltage on busL (i.e. dead busR). Controller in AUT mode does not closes breaker unless there is healthy voltage on busL or on both sides.
R->L	Closing to dead bus is enabled if there is healthy voltage on busR (i.e. dead busL). Controller in AUT mode does not closes breaker unless there is healthy voltage on busR or on both sides.
BOTH	BTB closing if both buses are dead is enabled. Closing of one healthy and one dead bus is also enabled (see above) for both sides. Controller in AUT mode does not closes breaker unless there is healthy voltage on one or both of the buses.

12.2.1.10 Setpoint: AUT ctrl mode

Group	Process Control				
Range [units]	NORMAL, COX(FOLLOW) [-]				
Related FW	standard v3.2.0				
Force value possible	YES				
Description	This setpoint selects how the BTB is handled in AUT mode. <table border="1"> <tr> <td>NORMAL</td> <td>The BTB is controlled by IM-NT and it's internal sequences and adjusted timers.</td> </tr> <tr> <td>COX(FOLLOW)</td> <td>The BTB is expected to be controlled by an external device (e.g. a PLC) and the IM-NT only follows it's position. Synchronizing can be activated by the input Force sync.</td> </tr> </table>	NORMAL	The BTB is controlled by IM-NT and it's internal sequences and adjusted timers.	COX(FOLLOW)	The BTB is expected to be controlled by an external device (e.g. a PLC) and the IM-NT only follows it's position. Synchronizing can be activated by the input Force sync .
NORMAL	The BTB is controlled by IM-NT and it's internal sequences and adjusted timers.				
COX(FOLLOW)	The BTB is expected to be controlled by an external device (e.g. a PLC) and the IM-NT only follows it's position. Synchronizing can be activated by the input Force sync .				

12.2.1.11 Setpoint: BTB opening

Group	ProcessControl
Range [units]	DISABLED, ENABLED [-]

Related FW	standard v3.2.0				
Force value possible	YES				
Description	<p>This setpoint adjusts the behavior of BTB when both sides of the bus are dead (have unhealthy voltage).</p> <table border="1"> <tr> <td>DISABLED</td> <td>The behavior of the controller remains unchanged (BTB is opened in AUT mode when both sides of bus are dead).</td> </tr> <tr> <td>ENABLED</td> <td>The controller will not open BTB even though the both sides of the bus are dead.</td> </tr> </table>	DISABLED	The behavior of the controller remains unchanged (BTB is opened in AUT mode when both sides of bus are dead).	ENABLED	The controller will not open BTB even though the both sides of the bus are dead.
DISABLED	The behavior of the controller remains unchanged (BTB is opened in AUT mode when both sides of bus are dead).				
ENABLED	The controller will not open BTB even though the both sides of the bus are dead.				

12.2.1.12 Setpoint: Watched Contr

Group	Process Control
Range [units]	0 .. 16 [min]
Related FW	standard v3.2.0
Description	<p>This setpoint is used at redundant controller to specify the address of the related main controller in CAN-based redundant systems. Adjust this setpoint to 0 if the controller is not used as redundant or if wired redundancy system is used.</p> <p>NOTE: Learn more about redundant systems in the chapter Redundant controllers.</p>

12.2.2 Group: Basic settings

12.2.2.1 Setpoint: VbL VT ratio

Group	Basic Settings
Range [units]	0.10 .. 500.00 [V/V]
Related FW	standard v3.2.0
Description	<p>The setpoint is used to adjust the busL voltage transformers ratio.</p> <p>NOTE: Adjust the setpoint to the value of 1.00 if the busL voltage is connected directly to the controller terminals, i.e. without transformers.</p>

	<p>NOTE: Example: if you have transformers with ratio 6000/100V adjust the setpoint to the value of 60.00.</p>
	<p>NOTE: The range of the busL voltage inputs must be adjusted properly. See the setpoint VbL InpRangeSel.</p>

12.2.2.2 Setpoint: VbL InpRangeSel

Group	Basic settings
Range [units]	277V, 120V [-]
Related FW	standard v3.2.0
Description	<p>This setpoint selects the range of the busL voltage terminals. The 120V range is available only in IM-NTC hardware. The IM-NT has the range adjusted fixedly to 277V regardless of this setpoint.</p> <p>NOTE: The 277V range is suitable for both European (230V) and American (277V) measurement. The range 120V is intended for high-voltage applications where voltage transformers with 100V secondary range are used or for alternative American (120V) measurement.</p>

12.2.2.3 Setpoint: BusR VT ratio

Group	Basic Settings
Range [units]	0.10 .. 500.00 [V/V]
Related FW	standard v3.2.0
Description	<p>The setpoint is used to adjust the busR voltage transformers ratio.</p> <p>NOTE: Adjust the setpoint to the value of 1.00 if the busR voltage is connected directly to the controller terminals, i.e. without transformers.</p> <p>NOTE: Example: if you have transformers with ratio 6000/100V adjust the setpoint to the value of 60.00.</p> <p>NOTE:</p>

	The range of the busR voltage inputs must be adjusted properly. See the setpoint VbR InpRangeSel .
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12.2.2.4 Setpoint: VbRInpRangeSel

Group	Basic settings
Range [units]	277V, 120V [-]
Related FW	standard v3.2.0
Description	<p>This setpoint selects the range of the busR voltage terminals. The 120V range is available only in IM-NTC hardware. The IM-NT has the range adjusted fixedly to 277V regardless of this setpoint.</p> <p>NOTE: The 277V range is suitable for both European (230V) and American (277V) measurement. The range 120V is intended for high-voltage applications where voltage transformers with 100V secondary range are used or for alternative American (120V) measurement.</p>

12.2.2.5 Setpoint: BusLNomV

Group	Basic Settings
Range [units]	10 .. 30000 [V]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to adjust the nominal mains voltage (phase to neutral). If you do not know the phase-neutral nominal voltage, you can adjust the phase-phase nominal voltage busLNomVph-ph. The controller will then recalculate the phase-neutral nominal voltage automatically.</p> <p>NOTE: The actual setpoint units and range depend on setting of the Power format in GenConfig.</p> <p>NOTE: If different voltage on BusL and on BusR is required the following procedure is required: Both setpoints (BusRNomV and BusLNomV) must be adjusted to the same values according to the value of actual BusL or BusR nominal voltage. E.g. BusR nominal is 231 V but BusL nominal is 240 V. In this case both setpoints need to be adjusted to 231 V and setpoints of corresponding protections for BusL need to be set assymmetrically.</p>

	For 240 V on BusL it is typical to open BTB when voltage reaches 254 V or 225 V. Since the setpoint is adjusted to 231 V corresponding protection setpoints need to be adjusted to <i>BusRight >V</i> = 106% and <i>BusRight <V</i> = 97 % (hence the desired values are reached).
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12.2.2.6 Setpoint: BusLNomVph-ph

Group	Basic Settings
Range [units]	17 .. 60000 [V]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the nominal mains voltage (phase to phase). This setpoint is also recalculated automatically when the phase-neutral nominal voltage <i>busLNomV</i> is changed.</p> <p>This setpoint can be used if you know the phase-phase nominal voltage only. The controller will recalculate the phase-neutral nominal voltage automatically when this setpoint is changed.</p> <p>NOTE: The actual setpoint units and range depend on setting of the Power format in GenConfig.</p> <p>NOTE: If different voltage on BusL and on BusR is required the following procedure is required: Both setpoints (<i>BusLNomVph-ph</i> and <i>BusRNomVph-ph</i>) must be adjusted to the same values according to the value of actual BusL or BusR nominal voltage. E.g. BusR nominal is 400 V but BusL nominal is 415 V. In this case both setpoints need to be adjusted to 400 V and setpoints of corresponding protections for BusL need to be set assymmetrically. For 415 V on BusL it is typical to open BTB when voltage reaches 440 V or 390 V. Since the setpoint is adjusted to 400 V corresponding protection setpoints need to be adjusted to <i>BusRight >V</i> = 106% and <i>BusRight <V</i> = 97 % (hence the desired values are reached).</p>

12.2.2.7 Setpoint: BusRNomV

Group	Basic Settings
Range [units]	10 .. 30000 [V]
Related FW	standard v3.2.0
Force value possible	YES

Description	<p>This setpoint is used to adjust the nominal busR voltage (phase to neutral). If you do not know the phase-neutral nominal voltage, you can adjust the phase-phase nominal voltage busRNomVph-ph. The controller will then recalculate the phase-neutral nominal voltage automatically.</p> <p>NOTE: The actual setpoint units and range depend on setting of the Power format in GenConfig.</p> <p>NOTE: If different voltage on BusL and on BusR is required the following procedure is required: Both setpoints (BusRNomV and BusLNomV) must be adjusted to the same values according to the value of actual BusL or BusR nominal voltage. E.g. BusR nominal is 231 V but BusL nominal is 240 V. In this case both setpoints need to be adjusted to 231 V and setpoints of corresponding protections for BusL need to be set assymmetrically. For 240 V on BusL it is typical to open BTB when voltage reaches 254 V or 225 V. Since the setpoint is adjusted to 231 V corresponding protection setpoints need to be adjusted to BusRight >V = 106% and BusRight <V = 97 % (hence the desired values are reached).</p>
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12.2.2.8 Setpoint: [BusRNomVph-ph](#)

Group	Basic settings
Range [units]	17 .. 60000 [V]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the nominal busR voltage (phase to phase). This setpoint is also recalculated automatically when the phase-neutral nominal voltage busRNomV is changed.</p> <p>This setpoint can be used if you know the phase-phase nominal voltage only. The controller will recalculate the phase-neutral nominal voltage automatically when this setpoint is changed.</p> <p>NOTE: The actual setpoint units and range depend on setting of the Power format in GenConfig.</p> <p>NOTE: If different voltage on BusL and on BusR is required the following procedure is required: Both setpoints (BusLNomVph-ph and BusRNomVph-ph) must be adjusted to the same values according to the value of actual BusL or BusR nominal voltage. E.g. BusR nominal is 400 V but BusL nominal is 415 V. In this case both setpoints need to be adjusted to 400 V and setpoints of corresponding protections for BusL need to be set assymmetrically. For 415 V on BusL it is typical to open BTB when voltage reaches 440 V or 390 V. Since the setpoint is adjusted to 400 V corresponding protection</p>

	setpoints need to be adjusted to BusRight >V = 106% and BusRight <V = 97 % (hence the desired values are reached).
--	--

12.2.2.9 Setpoint: Nomin current

Group	Basic Settings
Range [units]	1 .. 10000 [A]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used for adjusting the maximal allowed current at the busL.</p> <p>The nominal current is used as the basis (100%) for busL thermal-overcurrent protection (2POvrdStEvDeI), and for short current protection (BusL2Inom deI).</p> <p>NOTE: The setpoints BusLeftCTprim and BusLeftCTsec must be adjusted properly to obtain correct busL current readings.</p> <p>CAUTION! The maximum measurable input current to the controller current terminals is 11A.</p> <p>WARNING! Do not disconnect the CT terminals from the controller while there is nonzero current in the CT primary circuit!</p>

12.2.2.10 Setpoint: NominBusLImp

Group	Basic Settings
Range [units]	1 .. 32000 [kW]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used for adjusting the maximal allowed power transferred from the busL to busR. It is used as the 100% for the IDMT overload protection (BusL2PovrdProt) as well as for some regulation loops.</p>

	<p>NOTE: The actual setpoint units and range depend on setting of the Power format in GenConfig.</p>
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12.2.2.11 Setpoint: BusLeftCTprim

Group	Basic Settings
Range [units]	1 .. 15000 [A]
Related FW	standard v3.2.0
Description	Nominal current of the primary side of the busL current transformers. The secondary side is adjusted by setpoint BusLeftCTsec .

12.2.2.12 Setpoint: BusLeftCTsec

Group	Basic settings
Range [units]	/5A, /1A [-]
Related FW	standard v3.2.0
Description	Nominal current of the secondary side of the busL current transformers. The primary side is adjusted by setpoint BusLeftCTprim .
	<p>NOTE: The CT secondary nominal current is adjustable only in IM-NTC. The IM-NT has the CT secondary nominal current adjusted fixedly to 5A regardless of this setpoint.</p>

12.2.2.13 Setpoint: AuxCurrCTprim

Group	Basic settings
Range [units]	1 .. 15000 [A]
Related FW	standard v3.2.0
Description	Auxiliaries Current Transformer ratio – primary side.

12.2.2.14 Setpoint: AuxCurrCTsec

Group	Basic settings
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Range [units]	/1A, /5A [A]
Related FW	standard v3.2.0
Description	Auxiliaries Current Transformer ratio – secondary side. NOTE: Restricted to selection of /5A or /1A.

12.2.2.15 Setpoint: FixVoltProtSelect

Group	Basic settings				
Range [units]	PHASE-NEUTRAL, PHASE-PHASE [-]				
Related FW	standard v3.2.0				
Description	<table border="1" style="width: 100%;"> <tr> <td style="background-color: #cccccc;">PHASE-NEUTRAL</td> <td>The busL/busR voltage protections are based on phase-to-neutral voltages.</td> </tr> <tr> <td style="background-color: #cccccc;">PHASE-PHASE</td> <td>The busL/busR voltage protections are based on phase-to-phase voltages.</td> </tr> </table>	PHASE-NEUTRAL	The busL/busR voltage protections are based on phase-to-neutral voltages.	PHASE-PHASE	The busL/busR voltage protections are based on phase-to-phase voltages.
PHASE-NEUTRAL	The busL/busR voltage protections are based on phase-to-neutral voltages.				
PHASE-PHASE	The busL/busR voltage protections are based on phase-to-phase voltages.				

12.2.2.16 Setpoint: Nominal Freq

Group	Basic Settings
Range [units]	50 Hz, 60 Hz [-]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>The setpoint adjusts nominal system frequency (choose 50 Hz or 60 Hz).</p> <p>Setpoint Nom frq offset is used for setting offset to the chosen nominal frequency (-2 to +2 Hz with step 0.01 Hz). Controller regulates to the Nominal Freq + Nom frq offset frequency.</p> <p>The value Nominal Freq + Nom frq offset is used as 100% for frequency protections.</p>

12.2.2.17 Setpoint: ControllerMode

Group	Basic settings						
Range [units]	OFF, MAN, AUT [-]						
Related FW	standard v3.2.0						
Description	<p>This setpoint can be used to select the controller mode. It is equivalent to selecting the mode by the buttons on the front panel or IntelliVision. Currently active mode is displayed on the controller main screen.</p> <p>NOTE: If any of the mode forcing inputs Remote OFF, Remote MAN or Remote AUT is active, then the currently active mode can be different than the mode selected by the setpoint (resp. panel buttons).</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="background-color: #cccccc; width: 10%; text-align: center;">OFF</td> <td>All regulations are switched off. Switching to OFF mode causes opening of BTB regardless of the settings.</td> </tr> <tr> <td style="background-color: #cccccc; text-align: center;">MAN</td> <td> <p>It is possible to close/open BTB manually under supervision of IM-NT controller which doesn't allow to close the breaker if the bus voltages are not in phase (synchronization starts upon pushing BTB close/open button).</p> <p style="padding-left: 20px;">Pressing BTB ON/OFF button closes/opens BTB if it is allowed by</p> <ul style="list-style-type: none"> setpoints Synchro enable, Mains coupling, DeadBusClosing binary input BTB disable </td> </tr> <tr> <td style="background-color: #cccccc; text-align: center;">AUT</td> <td> <p>Controller closes automatically BTB if</p> <ul style="list-style-type: none"> bus voltages are within the limits (Phase window, Voltage window) there is voltage on one of the buses and closing to dead bus is enabled by DeadBusClosing binary input BTB disable is not closed it is enabled by setting of Synchro enable, Mains coupling setpoints </td> </tr> </table>	OFF	All regulations are switched off. Switching to OFF mode causes opening of BTB regardless of the settings.	MAN	<p>It is possible to close/open BTB manually under supervision of IM-NT controller which doesn't allow to close the breaker if the bus voltages are not in phase (synchronization starts upon pushing BTB close/open button).</p> <p style="padding-left: 20px;">Pressing BTB ON/OFF button closes/opens BTB if it is allowed by</p> <ul style="list-style-type: none"> setpoints Synchro enable, Mains coupling, DeadBusClosing binary input BTB disable 	AUT	<p>Controller closes automatically BTB if</p> <ul style="list-style-type: none"> bus voltages are within the limits (Phase window, Voltage window) there is voltage on one of the buses and closing to dead bus is enabled by DeadBusClosing binary input BTB disable is not closed it is enabled by setting of Synchro enable, Mains coupling setpoints
OFF	All regulations are switched off. Switching to OFF mode causes opening of BTB regardless of the settings.						
MAN	<p>It is possible to close/open BTB manually under supervision of IM-NT controller which doesn't allow to close the breaker if the bus voltages are not in phase (synchronization starts upon pushing BTB close/open button).</p> <p style="padding-left: 20px;">Pressing BTB ON/OFF button closes/opens BTB if it is allowed by</p> <ul style="list-style-type: none"> setpoints Synchro enable, Mains coupling, DeadBusClosing binary input BTB disable 						
AUT	<p>Controller closes automatically BTB if</p> <ul style="list-style-type: none"> bus voltages are within the limits (Phase window, Voltage window) there is voltage on one of the buses and closing to dead bus is enabled by DeadBusClosing binary input BTB disable is not closed it is enabled by setting of Synchro enable, Mains coupling setpoints 						

12.2.2.18 Setpoint: ContrInitMode

Group	Basic settings
Range [units]	PREVIOUS, OFF, MAN, AUT, [-]

Related FW	standard v3.2.0
Description	This setpoint adjusts which mode will be activated when the controllers is powered on.

12.2.2.19 Setpoint: Local buttons

Group	Basic settings						
Range [units]	PANEL, EXTBUTTONS, BOTH [-]						
Related FW	standard v3.2.0						
Description	<p>The setpoint selects which set of control buttons is currently active. Its function depends on which type of controller is used. Please refer to the section which suits your controller/display version.</p> <ul style="list-style-type: none"> • First section deals with the case of IGS-NT with built-in monochrome display. • Second section deals with the case of IGS-NT-BB with IV5 display. • Third section deals with the case of IGS-NT-BB with IV8. <p>NOTE: If you have IGS-NT (built-in display) and you use additional IV display all the sections may be relevant (depending on the type of additional displays).</p> <p>IGS-NT (built-in monochrome display)</p> <table border="1"> <tr> <td>PANEL</td> <td>The built-in buttons on the controller front panel (IG-NT) or terminal #1 (IS-NT) are enabled, the binary inputs for external buttons are disabled.</td> </tr> <tr> <td>EXTBUTTONS</td> <td>The built-in buttons are disabled and the binary inputs for external buttons are enabled.</td> </tr> <tr> <td>BOTH</td> <td>Both built-in buttons and binary inputs for external buttons are enabled.</td> </tr> </table> <p>NOTE: In case that additional IV display is connected to a controller it behaves in the way described below.</p> <p>NOTE: The binary inputs for external buttons may be the following: GCBButton,</p>	PANEL	The built-in buttons on the controller front panel (IG-NT) or terminal #1 (IS-NT) are enabled, the binary inputs for external buttons are disabled.	EXTBUTTONS	The built-in buttons are disabled and the binary inputs for external buttons are enabled.	BOTH	Both built-in buttons and binary inputs for external buttons are enabled.
PANEL	The built-in buttons on the controller front panel (IG-NT) or terminal #1 (IS-NT) are enabled, the binary inputs for external buttons are disabled.						
EXTBUTTONS	The built-in buttons are disabled and the binary inputs for external buttons are enabled.						
BOTH	Both built-in buttons and binary inputs for external buttons are enabled.						

MCBButton, FaultResButton, HornResButton, StartButton, StopButton etc.

IGS-NT-BB with IV-5 display

These settings are applicable to IV5 or IV8 connected as NT terminal 1 only.

Situation is depicted in the following figure.

- Buttons in red box are inactive when EXTBUTTONS option is selected and active when PANEL or BOTH option is selected.
- Buttons in green box are active when any option is selected.
- Behavior of buttons in orange box depends on functions assigned to each button individually. If any function in the list in the note below is assigned to these buttons then it behaves as buttons in the red box, if any other function is assigned to these buttons it behaves as buttons in the green box.
- The binary inputs for external buttons are affected in the same way as in the case of IGS-NT (built-in monochrome display) by this setpoint.



NOTE:

In the case that more IV displays are connected they all behave the same (they are all clones of each other).

NOTE:

The binary inputs for external buttons may be the following (depending on used application): *GCBButton*, *MCBButton*, *MGCBButton*, *FDRButton*, *BTBButton*, *FaultResButton*, *HornResButton*, *StartButton*, *StopButton* etc.

IGS-NT-BB with IV-8 display

These settings are applicable to IV5 or IV8 connected as NT terminal 1 only.

Situation is depicted in the following figure.

- Buttons in red box are inactive when EXTBUTTONS option is selected and active when PANEL or BOTH option is selected.
- Buttons in green box are active when any option is selected.
- Behavior of buttons in orange box depends on functions assigned to each button individually. If any function in the list in the note below is assigned to these buttons then it behaves as buttons in the red box, if any other function is assigned to these buttons it behaves as buttons in the green box.
- The binary inputs for external buttons are affected in the same way as in the case of IGS-NT (built-in monochrome display) by this setpoint.



NOTE:

In the case that more IV displays are connected they all behave the same (they are all clones of each other).

NOTE:

The binary inputs for external buttons may be the following (depending on used application): *GCBButton*, *MCBButton*, *MGCBButton*, *FDRButton*, *BTBButton*, *FaultResButton*, *HornResButton*, *StartButton*, *StopButton* etc.

12.2.2.20 Setpoint: DispBaklightTO

Group	Basic settings				
Range [units]	OFF, 1-240 min, NO TIMEOUT [min]				
Related FW	standard v3.2.0				
Force value possible	YES				
Description	<p>This setpoint adjusts timeout after which the display (internal display or IS display #1) backlight is switched off.</p> <p>NOTE: When IntelliVision is used this setpoint does not adjust its behavior. Its backlight is adjusted by internal IntelliVision "setpoint".</p> <table border="1"> <tr> <td>OFF</td> <td>The backlight is off all the time</td> </tr> <tr> <td>NO TIMEOUT</td> <td>The backlight is on all the time</td> </tr> </table>	OFF	The backlight is off all the time	NO TIMEOUT	The backlight is on all the time
OFF	The backlight is off all the time				
NO TIMEOUT	The backlight is on all the time				

12.2.2.21 Setpoint: UserBtn pulse

Group	Basic settings
Range [units]	0.2 .. 10.0 [s]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint adjusts the duration of User Button 1..16 pulse. For more information read the description of LBO User Button 1.</p>

12.2.2.22 Setpoint: ImpCountDef1-4

Group	Basic settings
Range [units]	0 .. 65535 [-]
Related FW	standard v3.2.0
Force value possible	YES

Description	This setpoint adjusts the value to which the corresponding Impulse counter statistic is set when the binary input ImpCountSet1-4 .
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12.2.2.23 Setpoint: ConvCoefPulse1

Group	Basic settings
Range [units]	1 .. 65000 [/X]
Related FW	standard v3.2.0
Description	<p>The conversion ratio between incoming pulses at binary inputs PulseCounter 1/2/3/4 and output statistic values PulseCounter 1/2/3/4. The ratio defines how many pulses (rising edges) have to be sensed at the input in order to increase the output value. Unfinished “invisible” parts are stored in the controller even in the case of power supply failure. Physical unit of the output statistic value has to correspond to the ratio unit “/X”.</p> <p>NOTE:</p> <p>Pulse width (both high/low levels) must be at least 100 ms in order to be correctly sensed! Conversion ratio can be selected using the setpoints ConvCoefPulse1/2/3/4. The converted values are visible in statistics – values PulseCounter 1/2/3/4. These values can be reset using Statistics window in IntelliMonitor.</p>

12.2.2.24 Setpoint: ConvCoefPulse2

Group	Basic settings
Range [units]	1 .. 65000 [/X]
Related FW	standard v3.2.0
Description	<p>The conversion ratio between incoming pulses at binary inputs PulseCounter 1/2/3/4 and output statistic values PulseCounter 1/2/3/4. The ratio defines how many pulses (rising edges) have to be sensed at the input in order to increase the output value. Unfinished “invisible” parts are stored in the controller even in the case of power supply failure. Physical unit of the output statistic value has to correspond to the ratio unit “/X”.</p> <p>NOTE:</p> <p>Pulse width (both high/low levels) must be at least 100 ms in order to be correctly sensed! Conversion ratio can be selected using the setpoints ConvCoefPulse1/2/3/4. The converted values are visible in statistics – values PulseCounter 1/2/3/4. These values can be reset using Statistics window in IntelliMonitor.</p>

12.2.2.25 Setpoint: ConvCoefPulse3

Group	Basic settings
Range [units]	1 .. 65000 [/X]
Related FW	standard v3.2.0
Description	<p>The conversion ratio between incoming pulses at binary inputs PulseCounter 1/2/3/4 and output statistic values PulseCounter 1/2/3/4. The ratio defines how many pulses (rising edges) have to be sensed at the input in order to increase the output value. Unfinished “invisible” parts are stored in the controller even in the case of power supply failure. Physical unit of the output statistic value has to correspond to the ratio unit “/X”.</p> <p>NOTE:</p> <p>Pulse width (both high/low levels) must be at least 100 ms in order to be correctly sensed! Conversion ratio can be selected using the setpoints ConvCoefPulse1/2/3/4. The converted values are visible in statistics – values PulseCounter 1/2/3/4. These values can be reset using Statistics window in IntelliMonitor.</p>

12.2.2.26 Setpoint: ConvCoefPulse4

Group	Basic settings
Range [units]	1 .. 65000 [/X]
Related FW	standard v3.2.0
Description	<p>The conversion ratio between incoming pulses at binary inputs PulseCounter 1/2/3/4 and output statistic values PulseCounter 1/2/3/4. The ratio defines how many pulses (rising edges) have to be sensed at the input in order to increase the output value. Unfinished “invisible” parts are stored in the controller even in the case of power supply failure. Physical unit of the output statistic value has to correspond to the ratio unit “/X”.</p> <p>NOTE:</p> <p>Pulse width (both high/low levels) must be at least 100 ms in order to be correctly sensed! Conversion ratio can be selected using the setpoints ConvCoefPulse1/2/3/4. The converted values are visible in statistics – values PulseCounter 1/2/3/4. These values can be reset using Statistics window in IntelliMonitor.</p>

12.2.3 Group: Comms settings

12.2.3.1 Setpoint: Controller name

Group	Comms settings
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This setpoint is intended for a custom name of the controller, which is used for identification of the controller in saved archives or remote connections. Maximal length of the name is 15 characters.</p> <p>The setpoint can't be modified via the IG-NT built-in terminal.</p>

12.2.3.2 Setpoint: LB/UART Log

Group	Comms settings
Range [units]	DISABLED, ENABLED
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>The setpoint enables/disables logging of remote communication activity. If logging is enabled connection and disconnection of each remote terminal as well as entering access code are recorded into the history.</p> <p>NOTE: The terminal is disconnected automatically after 5 min of inactivity and next communication request from the same terminal is considered as a new connection. When logging is enabled in certain conditions the history may be filled up with large number of records related to the communication and important records may be overwritten quite fast.</p>

12.2.3.3 Setpoint: Contr. address

Group	Comms settings
Range [units]	1 .. 32 [-]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the address of the particular controller at the CAN2 and/or RS485 bus. Each gen-set connected to the same bus must have unique address.</p>

	<p>If the setpoint CANnegotiation is in AUT position, the address is assigned automatically. The setpoint Contr. address is preferred then, however if it is in conflict with other controller present on the CAN2 bus other address will be assigned to avoid address collision.</p> <p>NOTE: Address 1 is recommended for standalone gen-sets.</p> <p>NOTE: If you are connecting to the controller remotely you have to adjust the proper controller address in connection settings of the remote client (InteliMonitor, GenConfig, Modbus client etc.)</p> <p>NOTE: Address of the controller is also used for Modbus communication via RS485 etc. Address adjusted by this setpoint is therefore universal address of the controller.</p>
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12.2.3.4 Setpoint: RS232(1) mode

Group	Comms settings				
Range [units]	DIRECT, MODEM (HW), MODEM (SW), MODBUS-DIRECT, MODBUS-MDM(HW), ECU LINK [-]				
Related FW	standard v3.2.0				
Description	<p>This setpoint selects the connection type for the serial port COM1.</p> <ul style="list-style-type: none"> • Available as RS232 in all controller types. • Available also as RS485 in the IG-NT if the external display bus is not used. Selectable by the setpoint RS485(1) conv. (not available in IG-NT-BB, IG-NTC-BB, IS-NTC-BB and IS-NT - see RS485(1) conv.). <p>See the diagram of all related terminals in the chapter Communication.</p> <table border="1" style="width: 100%; margin-top: 10px;"> <tr> <td style="background-color: #cccccc;">DIRECT</td> <td>Connection to a local PC via RS232 or RS485 (with internal or external converter) interface. Use this option also for IG-IB connected via RS232 cable. The internal RS485 converter is enabled/disabled by the setpoint RS485(1) conv.</td> </tr> <tr> <td style="background-color: #cccccc;">MODEM (HW)</td> <td>Modem point-to-point connection to a remote PC with hardware data flow control using signals RTS/CTS. Full modem cable is required</td> </tr> </table>	DIRECT	Connection to a local PC via RS232 or RS485 (with internal or external converter) interface. Use this option also for IG-IB connected via RS232 cable. The internal RS485 converter is enabled/disabled by the setpoint RS485(1) conv.	MODEM (HW)	Modem point-to-point connection to a remote PC with hardware data flow control using signals RTS/CTS. Full modem cable is required
DIRECT	Connection to a local PC via RS232 or RS485 (with internal or external converter) interface. Use this option also for IG-IB connected via RS232 cable. The internal RS485 converter is enabled/disabled by the setpoint RS485(1) conv.				
MODEM (HW)	Modem point-to-point connection to a remote PC with hardware data flow control using signals RTS/CTS. Full modem cable is required				

		for this option.
	MODEM (SW)	Modem point-to-point connection to a remote PC with software data flow control. 3-wire cable (RX, TX, GND) is sufficient for this option. Use this option only if your modem does not provide RTS/CTS signals.
	MODBUS	Modbus RTU connection in slave mode via RS232 or RS485 (with internal or external converter) interface. The internal RS485 converter is enabled/disabled by the setpoint RS485(1) conv. , the communication speed is adjustable by the setpoint RS232(1)MBCSpd. See the latest communication guide for more information about MODBUS protocol.
	MODBUS-MDM(HW)	Modbus RTU connection in slave mode via modem with hardware data flow control. The communication speed is adjustable by the setpoint RS232(1)MBCSpd. See the latest communication guide for more information about MODBUS protocol.
	ECU-LINK	Connection to an electronic-controlled engine which uses non-J1939 ECU. The proper ECU type must be also configured with GenConfig.

12.2.3.5 Setpoint: RS232(2) mode

Group	Comms settings		
Range [units]	DIRECT, MODEM (HW), MODEM (SW), MODBUS-DIRECT, MODBUS-MDM(HW), ECU LINK [-]		
Related FW	standard v3.2.0		
Description	<p>This setpoint selects the connection type for the serial port COM2.</p> <ul style="list-style-type: none"> • Available as RS232 or RS485 in the IG-NTC and IS-NT controllers. Selectable by the setpoint RS485(2) conv.. • Available only as RS485 in the IG-NTC-BB and IS-NTC-BB controllers. • Not available in IG-NT. <p>See the diagram of all related terminals in the chapter Communication.</p>		
	<table border="1"> <tr> <td>DIRECT</td> <td>Connection to a local PC via RS232 or RS485 (with internal or external converter) interface. Use this option also for IG-IB connected via RS232 cable. The internal RS485 converter is</td> </tr> </table>	DIRECT	Connection to a local PC via RS232 or RS485 (with internal or external converter) interface. Use this option also for IG-IB connected via RS232 cable. The internal RS485 converter is
DIRECT	Connection to a local PC via RS232 or RS485 (with internal or external converter) interface. Use this option also for IG-IB connected via RS232 cable. The internal RS485 converter is		

		enabled/disabled by the setpoint RS485(2) conv.
	MODEM (HW)	Modem point-to-point connection to a remote PC with hardware data flow control using signals RTS/CTS. Full modem cable is required for this option.
	MODEM (SW)	Modem point-to-point connection to a remote PC with software data flow control. 3-wire cable (RX, TX, GND) is sufficient for this option. Use this option only if your modem does not provide RTS/CTS signals.
	MODBUS	Modbus RTU connection in slave mode via RS232 or RS485 (with internal or external converter) interface. The internal RS485 converter is enabled/disabled by the setpoint RS485(2) conv. , the communication speed is adjustable by the setpoint RS232(2)MBCSpd. See the latest communication guide for more information about MODBUS protocol.
	MODBUS-MDM(HW)	Modbus RTU connection in slave mode via modem with hardware data flow control. The communication speed is adjustable by the setpoint RS232(2)MBCSpd. See the latest communication guide for more information about MODBUS protocol.
	ECU-LINK	Connection to an electronic-controlled engine which uses non-J1939 ECU. The proper ECU type must be also configured with GenConfig.
NOTE: The COM2 prot is not available in the basic IG-NT version.		
NOTE: The RS232 connector is no more available in hardware version 2.0 and above. The COM2 port is redirected to the RS485(2) terminals all the time. That means modem is not supported at COM2 in these hardware versions. For modem use the COM1 port instead.		

12.2.3.6 Setpoint: RS232(1)MBCSpd

Group	Comms settings
Range [units]	9600, 19200, 38400, 57600 [bps]

Related FW	standard v3.2.0
Description	The setpoint adjusts the communication speed on the COM1 connector when it is switched to MODBUS or MODBUS-MDM(HW) mode. See also the setpoint RS232(1) mode .

12.2.3.7 Setpoint: RS232(2)MBCSpd

Group	Comms settings
Range [units]	9600, 19200, 38400, 57600 [bps]
Related FW	standard v3.2.0
Description	The setpoint adjusts the communication speed on the COM2 connector when it is switched to MODBUS or MODBUS-MDM(HW) mode. See also the setpoint RS232(2) mode .

12.2.3.8 Setpoint: RS232(1)Mdmlni

Group	Comms settings
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This setpoint can be used to add extra AT commands at the end of the initialization sequence of the modem connected to the COM1 port. The command can be entered with as well as without the "AT" prefix, are separated with semicolon and maximal length is 31 characters.</p> <p>The setpoint can't be modified via the IG-NT built-in terminal.</p>

12.2.3.9 Setpoint: RS232(2)Mdmlni

Group	Comms settings
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This setpoint can be used to add extra AT commands at the end of the initialization sequence of the modem connected to the COM2 port. The command can be entered with as well as without the "AT" prefix, are separated with semicolon and maximal length is 31 characters.</p> <p>The setpoint can't be modified via the IG-NT built-in terminal.</p> <p>Using a modem at the COM2 port is not supported since the hardware</p>

	version 2.0. For modem use the COM1 port instead.
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12.2.3.10 Setpoint: RS485(1) conv.

Group	Comms settings				
Range [units]	DISABLED, ENABLED [-]				
Related FW	standard v3.2.0				
Description	<p>This setpoint selects function of the built-in RS485(1) converter.</p> <table border="1"> <tr> <td>ENABLED</td> <td>The communication port COM1 is redirected to the integrated RS485(1) converter. The RS232(1) connector has no function and the external display interface is not available.</td> </tr> <tr> <td>DISABLED</td> <td>The communication port COM1 is present at the RS232(1) connector and the RS485(1) connector is used for the external display interface.</td> </tr> </table> <p>NOTE: The redirection is applied only for DIRECT, MODBUS and ECU-LINK modes. See the setpoint RS232(1) mode.</p> <p>NOTE: This setpoint must be set to DISABLED at controllers that do not have internal display. i.e. IntelliVision-5 or IntelliVision-8 is connected to the RS485(1) terminals.</p>	ENABLED	The communication port COM1 is redirected to the integrated RS485(1) converter. The RS232(1) connector has no function and the external display interface is not available.	DISABLED	The communication port COM1 is present at the RS232(1) connector and the RS485(1) connector is used for the external display interface.
ENABLED	The communication port COM1 is redirected to the integrated RS485(1) converter. The RS232(1) connector has no function and the external display interface is not available.				
DISABLED	The communication port COM1 is present at the RS232(1) connector and the RS485(1) connector is used for the external display interface.				

12.2.3.11 Setpoint: RS485(2) conv.

Group	Comms settings
Range [units]	DISABLED, ENABLED [-]
Related FW	standard v3.2.0
Description	This setpoint selects function of the built-in RS485(2) converter.

ENABLED	The communication port COM2 is redirected to the integrated RS485(2) converter. The RS232(2) connector has no function.
DISABLED	The communication port COM2 is present at the RS232(2) connector.
NOTE: The redirection is applied only for DIRECT, MODBUS and ECU-LINK modes. See the setpoint RS232(2) mode .	
NOTE: This setpoint has no function for IG-NT(C)-BB and IS-NTC-BB as this controller modifications do not provide the RS232 connector at the COM2 port. The port is redirected to the RS485 interface all the time regardless of this setpoint.	

12.2.3.12 Setpoint: CAN bus mode

Group	Comms settings
Range [units]	32C,8C [-]
Related FW	standard v3.2.0
Description	<p>CAN bus speed selection.</p> <ul style="list-style-type: none"> • 32C: High speed CAN (250 kbps) applicable up to 32 controllers, CAN bus length limited up to 200 meters. • 8C: Low speed CAN (50 kbps) applicable up to 8 controllers, CAN bus length limited up to 900 meters. <p>Change of this setpoint is applied after the controller is switched off and on again.</p> <p>NOTE: Use low speed for long distance connection only. Set all connected controllers to the same speed.</p>

12.2.3.13 Setpoint: CAN2emptDetect

Group	Comms settings
Range [units]	DISABLED, ENABLED [-]

Related FW	standard v3.2.0
Force value possible	YES
Description	Enables the detection of missing other controllers on the CAN2 bus. If the setpoint is in ENABLED position and there aren't any other controllers detected on the CAN2 bus (the complete bus, not only within the logical group) the alarm <i>CAN2Empty</i> is issued.

12.2.3.14 Setpoint: SHxOcol detect

Group	Comms settings
Range [units]	DISABLED, ENABLED [-]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to enable/disable evaluation of collisions of virtual shared peripheral modules. A collision means that there is more than one source (shared outputs module) active on the CAN2 bus.</p> <p>NOTE: In certain situations multiple sites with bus tie breakers may need to have more shared outputs sources as the CAN bus line is in some points interrupted according to bus tie breakers position. Normally a collision would be indicated if there were more sources on the bus and this setpoint can be used to disable the evaluation of collisions in this special case.</p>

12.2.3.15 Setpoint: CANAddrSwitch1

Group	Comms settings				
Range [units]	[-]				
Related FW	standard v3.2.0				
Description	<p>The setpoint selects function of the terminal address 122 at the CAN2 line. See the latest communication guide for details about this topic.</p> <table border="1"> <tr> <td>MODEM</td> <td>The address is used for modem connection via I-LB</td> </tr> <tr> <td>OTHER</td> <td>The address is used for direct connection to any other device as e.g. IV8 or I-RD.</td> </tr> </table>	MODEM	The address is used for modem connection via I-LB	OTHER	The address is used for direct connection to any other device as e.g. IV8 or I-RD.
MODEM	The address is used for modem connection via I-LB				
OTHER	The address is used for direct connection to any other device as e.g. IV8 or I-RD.				

12.2.3.16 Setpoint: CANAddrSwitch2

Group	Comms settings				
Range [units]	[-]				
Related FW	standard v3.2.0				
Description	<p>The setpoint selects function of the terminal address 125 at the CAN2 line. See the latest communication guide for details about this topic.</p> <table border="1"> <tr> <td>MODEM</td> <td>The address is used for modem connection via I-LB</td> </tr> <tr> <td>OTHER</td> <td>The address is used for direct connection to any other device as e.g. IV8 or I-RD</td> </tr> </table>	MODEM	The address is used for modem connection via I-LB	OTHER	The address is used for direct connection to any other device as e.g. IV8 or I-RD
MODEM	The address is used for modem connection via I-LB				
OTHER	The address is used for direct connection to any other device as e.g. IV8 or I-RD				

12.2.3.17 Setpoint: CANnegotiation

Group	Comm settings				
Range [units]	OFF, AUT [-]				
Related FW	standard v3.2.0				
Description	<p>This setpoint defines if CAN address is used in the standard way or CAN addresses are reconfigured internally.</p> <table border="1"> <tr> <td>OFF</td> <td>The control unit has the same address which is necessary for communication. The address can be changed only from IntelliMonitor or controller screen.</td> </tr> <tr> <td>AUT</td> <td> <p>Controllers can change their addresses when are interconnected via CAN2 bus to prevent CAN bus collision. Controller address is set up to different address if another unit with the same address is detected on the CAN bus.</p> <p>CAUTION! Make sure all controllers have this setpoint set to AUT. It does not work properly if there are controllers with this setpoint adjusted to OFF and others with AUT setting.</p> <p>CAUTION! This function is not designed to cooperate with controllers which do not support it. Make sure it is adjusted to OFF if there are other controllers on the CAN without this setpoint.</p> </td> </tr> </table>	OFF	The control unit has the same address which is necessary for communication. The address can be changed only from IntelliMonitor or controller screen.	AUT	<p>Controllers can change their addresses when are interconnected via CAN2 bus to prevent CAN bus collision. Controller address is set up to different address if another unit with the same address is detected on the CAN bus.</p> <p>CAUTION! Make sure all controllers have this setpoint set to AUT. It does not work properly if there are controllers with this setpoint adjusted to OFF and others with AUT setting.</p> <p>CAUTION! This function is not designed to cooperate with controllers which do not support it. Make sure it is adjusted to OFF if there are other controllers on the CAN without this setpoint.</p>
OFF	The control unit has the same address which is necessary for communication. The address can be changed only from IntelliMonitor or controller screen.				
AUT	<p>Controllers can change their addresses when are interconnected via CAN2 bus to prevent CAN bus collision. Controller address is set up to different address if another unit with the same address is detected on the CAN bus.</p> <p>CAUTION! Make sure all controllers have this setpoint set to AUT. It does not work properly if there are controllers with this setpoint adjusted to OFF and others with AUT setting.</p> <p>CAUTION! This function is not designed to cooperate with controllers which do not support it. Make sure it is adjusted to OFF if there are other controllers on the CAN without this setpoint.</p>				

12.2.3.18 Setpoint: IP Addr mode

Group	Comms settings				
Range [units]	[-]				
Related FW	standard v3.2.0				
Description	<p>The setpoint is used to select the method how the ethernet connection is adjusted.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="background-color: #cccccc; width: 20%;">FIXED</td> <td> <p>The ethernet connection is adjusted fixedly according to the setpoints IP address, Net mask, Gateway IP, DNS IP .</p> <p>This method should be used for classic ethernet or Internet connection. When this type of connection is opening the controller is specified by it's IP address. That means it would be inconvenient if the IP address were not fixed (static).</p> </td> </tr> <tr> <td style="background-color: #cccccc;">AUTOMATIC</td> <td> <p>The ethernet connection settings is obtained automatically from the DHCP server. The obtained settings is then copied to the related setpoints (it is not possible to set those setpoints manually in this setting, for more information please see the following setpoints: IP address, Net mask, Gateway IP and DNS IP). If the process of obtaining the settings from DHCP server is not successful the value <code>000.000.000.000</code> is copied to the setpoint IP address and the module continues trying to obtain the settings.</p> <p>This method is beneficial for AirGate connection as it makes the connection very easy, in fact "plug and play". When this type of connection is opening the controller is specified by it's AirGate ID and the IP address does not play any role.</p> </td> </tr> </table> <p style="color: purple; margin-top: 10px;">CAUTION! If you need to use fixed ethernet settings you should consult the proper setting with your IT specialist.</p>	FIXED	<p>The ethernet connection is adjusted fixedly according to the setpoints IP address, Net mask, Gateway IP, DNS IP .</p> <p>This method should be used for classic ethernet or Internet connection. When this type of connection is opening the controller is specified by it's IP address. That means it would be inconvenient if the IP address were not fixed (static).</p>	AUTOMATIC	<p>The ethernet connection settings is obtained automatically from the DHCP server. The obtained settings is then copied to the related setpoints (it is not possible to set those setpoints manually in this setting, for more information please see the following setpoints: IP address, Net mask, Gateway IP and DNS IP). If the process of obtaining the settings from DHCP server is not successful the value <code>000.000.000.000</code> is copied to the setpoint IP address and the module continues trying to obtain the settings.</p> <p>This method is beneficial for AirGate connection as it makes the connection very easy, in fact "plug and play". When this type of connection is opening the controller is specified by it's AirGate ID and the IP address does not play any role.</p>
FIXED	<p>The ethernet connection is adjusted fixedly according to the setpoints IP address, Net mask, Gateway IP, DNS IP .</p> <p>This method should be used for classic ethernet or Internet connection. When this type of connection is opening the controller is specified by it's IP address. That means it would be inconvenient if the IP address were not fixed (static).</p>				
AUTOMATIC	<p>The ethernet connection settings is obtained automatically from the DHCP server. The obtained settings is then copied to the related setpoints (it is not possible to set those setpoints manually in this setting, for more information please see the following setpoints: IP address, Net mask, Gateway IP and DNS IP). If the process of obtaining the settings from DHCP server is not successful the value <code>000.000.000.000</code> is copied to the setpoint IP address and the module continues trying to obtain the settings.</p> <p>This method is beneficial for AirGate connection as it makes the connection very easy, in fact "plug and play". When this type of connection is opening the controller is specified by it's AirGate ID and the IP address does not play any role.</p>				

12.2.3.19 Setpoint: IP address

Group	Comms settings
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Range [units]	[-]
Related FW	standard v3.2.0
Description	<ul style="list-style-type: none"> In fixed settings mode 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. In Automatic settings mode this setpoint is used to display the IP address, which has been assigned by the DHCP server. It is not possible to change the setpoint value manually in this setting (the value is immediately reverted back by controller communication module IB-COM).

12.2.3.20 Setpoint: Net mask

Group	Comms settings
Range [units]	[-]
Related FW	standard v3.2.0
Description	<ul style="list-style-type: none"> In fixed settings mode this setpoint is used to adjust the network mask of the network segment where the controller is connected. In Automatic settings mode this setpoint is used to display the network mask which has been assigned by the DHCP server. It is not possible to change the setpoint value manually in this setting (the value is immediately reverted back by controller communication module IB-COM).

12.2.3.21 Setpoint: Gateway IP

Group	Comms settings
Range [units]	[-]
Related FW	standard v3.2.0
Description	<ul style="list-style-type: none"> In fixed settings mode this setpoint is used to adjust the IP address of the gateway of the network segment where the controller is connected. In Automatic settings mode this setpoint is used to display the gateway IP address which has been assigned by the DHCP server. It is not possible to change the setpoint value manually in this setting (the value is immediately reverted back by controller communication module IB-COM). <p>A gateway is a device which connects the respective segment with the other</p>

	segments and/or Internet.
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12.2.3.22 Setpoint: ComApProtoPort

Group	Comms settings
Range [units]	1 .. 255 [-]
Related FW	standard v3.2.0
Description	This setpoint is used to adjust the port, which is used for ethernet connection to a PC with any of ComAp PC program (i.e. IntelliMonitor, GenConfig). This setpoint should be adjusted to 23 , which is the default port used by all ComAp PC programs. A different value should be used only in special situations as e.g. sharing one public IP address among many controllers or to overcome a firewall restrictions.

12.2.3.23 Setpoint: AirGate

Group	Comms settings				
Range [units]	DISABLED, ENABLED [-]				
Related FW	standard v3.2.0				
Description	<p>This setpoint selects the ethernet connection mode.</p> <table border="1"> <tr> <td style="background-color: #cccccc;">DISABLED</td> <td>This is a standard mode, in which the controller listens to the incoming traffic and answers the TCP/IP queries addressed to him. This mode requires the controller to be accessible from the remote device (PC), i.e. it must be accessible at a public and static IP address if you want to connect to it from the Internet.</td> </tr> <tr> <td style="background-color: #cccccc;">ENABLED</td> <td>This mode uses the "AirGate" service, which hides all the issues with static/public address into a black box and you do not need to take care about it. You just need only a connection to the Internet. The AirGate server address is adjusted by the setpoint AirGate addr.</td> </tr> </table>	DISABLED	This is a standard mode, in which the controller listens to the incoming traffic and answers the TCP/IP queries addressed to him. This mode requires the controller to be accessible from the remote device (PC), i.e. it must be accessible at a public and static IP address if you want to connect to it from the Internet.	ENABLED	This mode uses the "AirGate" service, which hides all the issues with static/public address into a black box and you do not need to take care about it. You just need only a connection to the Internet. The AirGate server address is adjusted by the setpoint AirGate addr.
DISABLED	This is a standard mode, in which the controller listens to the incoming traffic and answers the TCP/IP queries addressed to him. This mode requires the controller to be accessible from the remote device (PC), i.e. it must be accessible at a public and static IP address if you want to connect to it from the Internet.				
ENABLED	This mode uses the "AirGate" service, which hides all the issues with static/public address into a black box and you do not need to take care about it. You just need only a connection to the Internet. The AirGate server address is adjusted by the setpoint AirGate addr.				

12.2.3.24 Setpoint: AirGate IP

Group	Comms settings
Range [units]	max. 32 characters [-]

Related FW	standard v3.2.0
Description	This setpoint is used for entering the domain name or IP address of the AirGate server. Use the free AirGate server provided by ComAp at address airgate.comap.cz if your company does not operate it's own AirGate server.

12.2.3.25 Setpoint: SMTP authent

Group	Comms settings
Range [units]	DISABLED, ENABLED [-]
Related FW	standard v3.2.0
Description	Switch this setpoint to ENABLED position if your SMTP server requires authenticated access. You have also adjust SMTP user name and SMTP password . Ask your internet provider or IT manager for this information. NOTE: Most of public free SMTP servers require authentication. You will get instructions when you register to the freemail service.

12.2.3.26 Setpoint: SMTP user name

Group	Comms settings
Range [units]	max. 32 characters [-]
Related FW	standard v3.2.0
Description	Use this setpoint to enter the user name for the SMTP server if SMTP authentication is enabled.

12.2.3.27 Setpoint: SMTP password

Group	Comms settings
Range [units]	max. 32 characters [-]
Related FW	standard v3.2.0
Description	Use this setpoint to enter the password for the SMTP server if SMTP authentication is enabled.

12.2.3.28 Setpoint: SMTP address

Group	Comms settings
Range [units]	max. 32 characters
Related FW	standard v3.2.0
Description	<p>CAUTION! Proper setting of SMTP-related setpoints as well as controller mailbox are essential for sending alerts via e-mails.</p> <p>This setpoint is used for entering the domain name (e.g. <i>smtp.yourprovider.com</i>) or IP address (e.g. 74.125.39.109) of the SMTP server. Please ask your internet provider or IT manager for this information.</p> <p>NOTE: You may also use one of free SMTP servers, e.g. <i>smtp.gmail.com</i>. However, please note that some free SMTP servers may cause delays (in hours..) when sending e-mails.</p> <p>NOTE: If you do not want to send active e-mails, you may leave this setpoint blank, as well as other setpoints related to SMTP server and e-mail settings.</p>

12.2.3.29 Setpoint: Contr mailbox

Group	Comms settings
Range [units]	max. 32 characters [-]
Related FW	standard v3.2.0
Description	<p>Enter an existing e-mail address into this setpoint. This address will be used as sender address in active e-mails that will be sent from the controller. Do not enter your or other recipient's e-mail address. Recipient's addresses are to be entered into the setpoints AcallCH1-Addr, AcallCH2-Addr and AcallCH3-Addr.</p> <p>NOTE: Most of SMTP server will reject sending e-mails that contain nonexisting address in the sender address field.</p>

12.2.3.30 Setpoint: Time zone

Group	Comms settings
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Range [units]	- [-]
Related FW	standard v3.2.0
Description	<p>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 the windows task bar) if you are not sure about your time zone.</p> <p>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.</p>

12.2.3.31 Setpoint: DNS IP

Group	Comms settings
Range [units]	[-]
Related FW	standard v3.2.0
Description	<ul style="list-style-type: none"> In <i>fixed settings mode</i> this setpoint is used to adjust the domain name server (DNS), which is needed to translate domain names in e-mail addresses and server names into correct IP addresses. In <i>Automatic settings mode</i> this setpoint is used to display DNS server, which has been assigned by the DHCP server. It is not possible to change the setpoint value manually in this setting (the value is immediately reverted back by controller communication module IB-COM).

12.2.4 Group: ComProtSetting

12.2.4.1 Setpoint: Horn Timeout

Group	Engine Protect
Range [units]	OFF, 1s - 3600s, NO TIMEOUT [-]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint adjusts time after which the <i>Horn</i> output is automatically deactivated although the alarms still haven't been reset. If the setpoint is adjusted to OFF the horn output is not activated at all, the NO TIMEOUT

	position means the horn output is not deactivated until the alarms are reset.
--	---

12.2.4.2 Setpoint: BinInp delay 1

Group	ComProtSetting
Range [units]	0.0 .. 600.0 [s]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the delay #1 which can be assigned to an input configured as alarm input (protection).</p> <p>NOTE: Protections configured at a binary inputs can have either fixed 0.5s evaluation delay or there are three independent delay setpoints and one of them can be assigned to each particular binary input protection.</p>

12.2.4.3 Setpoint: BinInp delay 2

Group	ComProtSetting
Range [units]	0.0 .. 600.0 [s]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the delay #2 which can be assigned to an input configured as alarm input (protection).</p> <p>NOTE: Protections configured at a binary inputs can have either fixed 0.5s evaluation delay or there are three independent delay setpoints and one of them can be assigned to each particular binary input protection.</p>

12.2.4.4 Setpoint: BinInp delay 3

Group	ComProtSetting
Range [units]	0.0 .. 600.0 [s]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint adjusts the delay #3 which can be assigned to an input

	<p>configured as alarm input (protection).</p> <p>NOTE: Protections configured at a binary inputs can have either fixed 0.5s evaluation delay or there are three independent delay setpoints and one of them can be assigned to each particular binary input protection.</p>
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12.2.4.5 Setpoint: ForceBlockDel1

Group	ComProtSetting
Range [units]	0.0 .. 60.0 [s]
Related FW	standard v3.2.0
Description	This setpoint adjusts the delay after the binary input Force block 1 has been deactivated, when the alarms configured as <i>Force block #1</i> are started to be evaluated.

12.2.4.6 Setpoint: ForceBlockDel2

Group	ComProtSetting
Range [units]	0.0 .. 60.0 [s]
Related FW	standard v3.2.0
Description	This setpoint adjusts the delay after the binary input Force block 2 has been deactivated, when the alarms configured as <i>Force block #2</i> are started to be evaluated.

12.2.4.7 Setpoint: ForceBlockDel3

Group	ComProtSetting
Range [units]	0.0 .. 60.0 [s]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint adjusts the delay after the binary input Force block 3 has been deactivated, when the alarms configured as <i>Force block #3</i> are started to be evaluated.

12.2.4.8 Setpoint: ResetActAlarms

Group	ComProtSetting				
Range [units]	[-]				
Related FW	standard v3.2.0				
Description	<table border="1" style="width: 100%;"> <tr> <td style="background-color: #cccccc;">DISABLED</td> <td>Pressing of the fault reset button (at any terminal or external button) resets only inactive alarms. Active alarms remain in the alarmlist unchanged and must be reset again when they become inactive.</td> </tr> <tr> <td style="background-color: #cccccc;">ENABLED</td> <td>Pressing of the fault reset button (at any terminal or external button) resets all alarms that are currently present in the alarm list. Inactive alarms disappear from the alarm list immediately, active alarms are changed to "confirmed" state and disappear when the alarm condition disappear or the alarm starts to be blocked.</td> </tr> </table> <p>NOTE: ENABLED position corresponds to the method how the IG-classic and IS-classic controllers handled the alarms.</p>	DISABLED	Pressing of the fault reset button (at any terminal or external button) resets only inactive alarms. Active alarms remain in the alarmlist unchanged and must be reset again when they become inactive.	ENABLED	Pressing of the fault reset button (at any terminal or external button) resets all alarms that are currently present in the alarm list. Inactive alarms disappear from the alarm list immediately, active alarms are changed to "confirmed" state and disappear when the alarm condition disappear or the alarm starts to be blocked.
DISABLED	Pressing of the fault reset button (at any terminal or external button) resets only inactive alarms. Active alarms remain in the alarmlist unchanged and must be reset again when they become inactive.				
ENABLED	Pressing of the fault reset button (at any terminal or external button) resets all alarms that are currently present in the alarm list. Inactive alarms disappear from the alarm list immediately, active alarms are changed to "confirmed" state and disappear when the alarm condition disappear or the alarm starts to be blocked.				

12.2.5 Group: Analog protect

12.2.5.1 Setpoint: Batt >V

Group	Analog protect
Range [units]	8.0 .. 40.0 [V]
Related FW	standard v3.2.0
Description	This setpoint adjusts the warning level for battery overvoltage alarm.

12.2.5.2 Setpoint: Batt <V

Group	Analog protect
Range [units]	8.0 .. 40.0 [V]
Related FW	standard v3.2.0

Description	This setpoint adjusts the warning level for battery undervoltage alarm.
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12.2.5.3 Setpoint: Batt volt del

Group	Analog protect
Range [units]	0 .. 600 [s]
Related FW	standard v3.2.0
Description	This setpoint adjusts the delay for battery overvoltage and undervoltage alarms.

12.2.6 Group: BusL protect

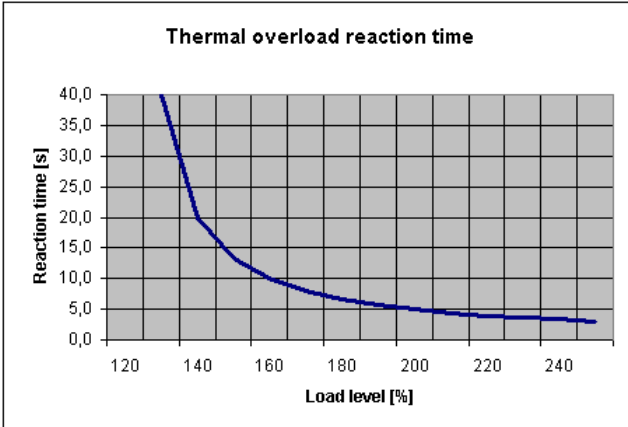
12.2.6.1 Setpoint: BusL2POvrlDPro

Group	BusL protect
Range [units]	DISABLED, ENABLED [-]
Related FW	standard v3.2.0
Force value possible	YES
Description	Enables or disables the busL overload (IDMT) protection. This protection is evaluated with variable delay. For more information see setpoint 2POvrlDStEvDel .

12.2.6.2 Setpoint: OverldStrtEval

Group	BusL Protect
Range [units]	100 .. 200 [%]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint specifies the power level relative to the NominBusLImp , where the busL overload (IDMT) protection starts to be evaluated. See the setpoint 2PovrlDStEvDel for more information about the busL overload (IDMT) protection.

12.2.6.3 Setpoint: 2POvrdStEvDel

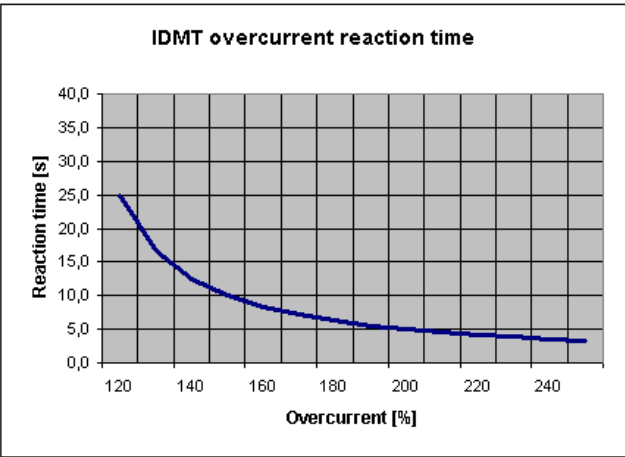
Group	BusL Protect																																						
Range [units]	0.0 .. 600.0 [s]																																						
Related FW	standard v3.2.0																																						
Description	<p>This setpoint adjusts the reaction time of the busL overload (IDMT) protection if the load level is 200% of the base level given by the setpoint OverIdStrtEval.</p> <p>The reaction time of the thermal overload protection is not fixed; it depends on how much is the load above the limit (base level). The higher is the load the shorter the reaction time will be.</p> <div style="border: 1px solid black; padding: 5px;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Load level</td> <td style="width: 15%;">Reaction time</td> <td></td> </tr> <tr> <td style="font-size: small;">[% of P_{nom}]</td> <td style="font-size: small;">[s]</td> <td></td> </tr> </table> <p>Example: 2POvrdStEvDel = <input type="text" value="5"/> s OverIdStrtEval = <input type="text" value="120"/> %</p> $\text{REACTION TIME [s]} = \frac{2POvrdStEvDel \text{ [s]} * (200 - \text{OverIdStrtEval} \text{ [%]})}{\text{Engine load} \text{ [%]} - \text{OverIdStrtEval} \text{ [%]}}$ <table border="1" style="width: 100%; border-collapse: collapse; font-size: small;"> <tr><td>100</td><td>no alarm</td></tr> <tr><td>110</td><td>no alarm</td></tr> <tr><td>120</td><td>3600,0</td></tr> <tr><td>130</td><td>40,0</td></tr> <tr><td>140</td><td>20,0</td></tr> <tr><td>150</td><td>13,3</td></tr> <tr><td>160</td><td>10,0</td></tr> <tr><td>170</td><td>8,0</td></tr> <tr><td>180</td><td>6,7</td></tr> <tr><td>190</td><td>5,7</td></tr> <tr><td>200</td><td>5,0</td></tr> <tr><td>210</td><td>4,4</td></tr> <tr><td>220</td><td>4,0</td></tr> <tr><td>230</td><td>3,6</td></tr> <tr><td>240</td><td>3,3</td></tr> <tr><td>250</td><td>3,1</td></tr> </table> <div style="text-align: center;">  <p>Thermal overload reaction time</p> </div> </div> <p style="text-align: center; font-size: small;">EXAMPLE OF THERMAL OVERLOAD PROTECTION CURVE</p> <p>NOTE: When the IDMT protection is activated the BTB is opened and the event is recorded in the Alarmlist and History. The further BTB closing is blocked until Fault Reset has been pressed to clear the alarm (i.e. this is BOR type protection).</p>	Load level	Reaction time		[% of P _{nom}]	[s]		100	no alarm	110	no alarm	120	3600,0	130	40,0	140	20,0	150	13,3	160	10,0	170	8,0	180	6,7	190	5,7	200	5,0	210	4,4	220	4,0	230	3,6	240	3,3	250	3,1
Load level	Reaction time																																						
[% of P _{nom}]	[s]																																						
100	no alarm																																						
110	no alarm																																						
120	3600,0																																						
130	40,0																																						
140	20,0																																						
150	13,3																																						
160	10,0																																						
170	8,0																																						
180	6,7																																						
190	5,7																																						
200	5,0																																						
210	4,4																																						
220	4,0																																						
230	3,6																																						
240	3,3																																						
250	3,1																																						

12.2.6.4 Setpoint: BusL2Inom prot

Group	BusL protect
Range [units]	DISABLED, ENABLED [-]

Related FW	standard v3.2.0
Description	Enables or disables the busL overcurrent (IDMT) protection. This protection is evaluated with variable delay. For more information see setpoint BusL2Inom del .

12.2.6.5 Setpoint: BusL2Inom del

Group	BusL protect																																
Range [units]	0.0 .. 60.0 [-]																																
Related FW	standard v3.2.0																																
Force value possible	YES																																
Description	<p>This setpoint adjusts the reaction time of the IDMT overcurrent protection if the overcurrent level is 200% of the nominal current.</p> <p>The reaction time of the IDMT overcurrent protection is not fixed; it depends on how much is the actual current above the limit (nominal). The higher is the overcurrent the shorter the reaction time will be.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>Overcurrent [% of I_{nom}] Reaction time [s]</p> <p>Example: 2Inom del = 5 s REACTION TIME [s] = $\frac{2Inom\ del\ [s] * 100}{Overcurrent\ [\%] - 100\ [\%]}$</p> <table border="1" style="display: inline-table; margin-right: 20px;"> <tr><td>100</td><td>no alarm</td></tr> <tr><td>110</td><td>50,0</td></tr> <tr><td>120</td><td>25,0</td></tr> <tr><td>130</td><td>16,7</td></tr> <tr><td>140</td><td>12,5</td></tr> <tr><td>150</td><td>10,0</td></tr> <tr><td>160</td><td>8,3</td></tr> <tr><td>170</td><td>7,1</td></tr> <tr><td>180</td><td>6,3</td></tr> <tr><td>190</td><td>5,6</td></tr> <tr><td>200</td><td>5,0</td></tr> <tr><td>210</td><td>4,5</td></tr> <tr><td>220</td><td>4,2</td></tr> <tr><td>230</td><td>3,8</td></tr> <tr><td>240</td><td>3,6</td></tr> <tr><td>250</td><td>3,3</td></tr> </table>  </div> <p style="text-align: center; margin-top: 10px;">EXAMPLE OF IDMT OVERCURRENT PROTECTION CURVE</p> <div style="background-color: #f0f0f0; padding: 5px; margin-top: 10px;"> <p>NOTE:</p> <p>When the IDMT protection is activated the BTB is opened and the event is recorded in the Alarmlist and History. The further BTB closing is blocked until</p> </div>	100	no alarm	110	50,0	120	25,0	130	16,7	140	12,5	150	10,0	160	8,3	170	7,1	180	6,3	190	5,6	200	5,0	210	4,5	220	4,2	230	3,8	240	3,6	250	3,3
100	no alarm																																
110	50,0																																
120	25,0																																
130	16,7																																
140	12,5																																
150	10,0																																
160	8,3																																
170	7,1																																
180	6,3																																
190	5,6																																
200	5,0																																
210	4,5																																
220	4,2																																
230	3,8																																
240	3,6																																
250	3,3																																

	Fault Reset has been pressed to clear the alarm (i.e. this is BOR type protection).
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12.2.6.6 Setpoint: BusL Volt prot

Group	BusL protect
Range [units]	ENABLED, DISABLED [-]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint enables or disables BusL voltage protection. For more information on this protection see setpoints BusLeft >V, BusLeft <V and BusLeft V del.</p> <p>NOTE: If both voltage and frequency protections (see also setpoint BusLfreq prot) are disabled there is no way for the controller to decide whether the busL is healthy or not. In this case busL is considered healthy if there is any voltage.</p>

12.2.6.7 Setpoint: BusLeft >V

Group	BusL protect
Range [units]	BusLeft <V .. 150 [%]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint adjusts threshold for busL overvoltage protection.</p> <p>NOTE: This protection is <i>History record</i> type - for more information on protection types please refer to alarm types section.</p> <p>NOTE: It is possible to disable this protection through setpoint BusL Volt prot.</p>

12.2.6.8 Setpoint: BusLeft <V

Group	BusL protect
Range [units]	50 .. BusLeft >V [%]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint adjusts threshold for busL undervoltage protection.</p> <p>NOTE: This protection is <i>History record</i> type - for more information on protection types please refer to alarm types section.</p> <p>NOTE: It is possible to disable this protection through setpoint BusL Volt prot.</p>

12.2.6.9 Setpoint: BusLeft V del

Group	BusL protect
Range [units]	0.00 .. 600.00 [s]
Related FW	standard v3.2.0
Description	<p>The setpoint adjusts the delay for busL under- and overvoltage protections. The thresholds for these protections are adjusted by setpoints BusLeft >V and BusLeft <V.</p> <p>NOTE: Although the resolution of this setpoint is 0.01s, in fact the adjusted delay is rounded to the next higher multiple of the period of the mains voltage. The period is either 0.02s for 50Hz systems or 0.0166s for 60Hz systems. E.g. if the delay is set to 0.03s at 50Hz system the real delay will be 0.04s.</p>

12.2.6.10 Setpoint: BusLfreq prot

Group	BusL protect
Range [units]	ENABLED, DISABLED [-]
Related FW	standard v3.2.0
Description	<p>This setpoint enables or disables BusL frequency protection. For more information on this protection see setpoints BusLeft >f, BusLeft <f and</p>

	<p><i>BusLeft f del.</i></p> <p>NOTE: If both voltage and frequency protections (see also setpoint <i>BusLVolt prot</i>) are disabled there is no way for the controller to decide whether the busL is healthy or not. In this case busL is considered healthy if there is any voltage.</p>
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12.2.6.11 Setpoint: BusLeft >f

Group	BusL Protect
Range [units]	<i>BusLeft <f</i> .. 150 [%]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the threshold level for the busL overfrequency protection. The threshold is adjusted in % of the buses' system frequency which is given by <i>Nominal Freq</i> and its offset <i>Nom frq offset</i>.</p> <p>The protection activates if the frequency in phase L3 gets over the threshold for time longer than <i>BusLeft f del.</i></p> <p>NOTE: The busL overfrequency protection is <i>History record</i> type - for more information on protection types please refer to alarm types section.</p>

12.2.6.12 Setpoint: BusLeft <f

Group	BusL Protect
Range [units]	50 .. <i>BusLeft >f</i> [%]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the threshold level for the busL underfrequency protection. The threshold is adjusted in % of the buses' system frequency which is given by <i>Nominal Freq</i> and its offset <i>Nom frq offset</i>.</p> <p>The protection activates if the frequency in phase L3 drops below the threshold for time longer than <i>BusLeft f del.</i></p> <p>NOTE: The busL underfrequency protection is <i>History record</i> type - for more information on protection types please refer to alarm types section.</p>

12.2.6.13 Setpoint: BusLeft f del

Group	BusL protect
Range [units]	0.00 .. 600.00 [s]
Related FW	standard v3.2.0
Description	<p>This setpoints determines the delay for busL under- (defined by BusLeft <f) and overfrequency (defined by BusLeft >f) protections.</p> <p>NOTE: Although the resolution of this setpoint is 0.01s, in fact the adjusted delay is rounded to the next higher multiple of the period of the generator voltage. The period is either 0.02s for 50Hz systems or 0.0166s for 60Hz systems. E.g. if the delay is set to 0.03s at 50Hz system the real delay will be 0.04s.</p>

12.2.6.14 Setpoint: BusMeasErrLR

Group	BusL protect				
Range [units]	DISABLED, ENABLED [-]				
Related FW	standard v3.2.0				
Force value possible	YES				
Description	<p>NOTE: Although this setpoint is located in <i>BusL protect</i> it is valid for both busL and busR.</p> <table border="1"> <tr> <td>DISABLED</td> <td>Bus measure error protection is disabled.</td> </tr> <tr> <td>ENABLED</td> <td> <p>Bus measure error protection is enable. Bus measure error is detected in BTB application when the voltage on controller's busL or busR terminals is out of limits for 20 seconds under these conditions:</p> <ul style="list-style-type: none"> • BTB (feedback) was closed in AUT mode. • Any GCB in power management group (on CAN bus) was closed. The alarm is activated after 20 s, however the BTB closing is blocked immediately for safety reasons. The GCBs at "left" and "right" sides are evaluated independently. </td> </tr> </table>	DISABLED	Bus measure error protection is disabled.	ENABLED	<p>Bus measure error protection is enable. Bus measure error is detected in BTB application when the voltage on controller's busL or busR terminals is out of limits for 20 seconds under these conditions:</p> <ul style="list-style-type: none"> • BTB (feedback) was closed in AUT mode. • Any GCB in power management group (on CAN bus) was closed. The alarm is activated after 20 s, however the BTB closing is blocked immediately for safety reasons. The GCBs at "left" and "right" sides are evaluated independently.
DISABLED	Bus measure error protection is disabled.				
ENABLED	<p>Bus measure error protection is enable. Bus measure error is detected in BTB application when the voltage on controller's busL or busR terminals is out of limits for 20 seconds under these conditions:</p> <ul style="list-style-type: none"> • BTB (feedback) was closed in AUT mode. • Any GCB in power management group (on CAN bus) was closed. The alarm is activated after 20 s, however the BTB closing is blocked immediately for safety reasons. The GCBs at "left" and "right" sides are evaluated independently. 				

12.2.6.15 Setpoint: BusL V unbal

Group	BusL protect
Range [units]	0 .. 200 [%]
Related FW	standard v3.2.0
Description	This setpoint defines the threshold level for busL voltage unbalance protection. The voltage unbalance is calculated as a maximum difference between phase voltages. This protection is evaluated with delay given by BusL Vunb del.

12.2.6.16 Setpoint: BusL Vunb del

Group	BusL protect
Range [units]	0.0 .. 600.0 [s]
Related FW	standard v3.2.0
Description	This setpoint adjusts delay for busL voltage unbalance alarm (see BusL V unbal).

12.2.6.17 Setpoint: BusL I unbal

Group	BusL protect
Range [units]	0 .. 200 [%]
Related FW	standard v3.2.0
Description	This setpoint adjusts threshold for busL current asymmetry (unbalance). The current unbalance is calculated as a maximum difference between phase currents. This condition is evaluated with delay adjusted by BusL Iunb del.

12.2.6.18 Setpoint: BusL Iunb del

Group	BusL protect
Range [units]	0.0 .. 600.0 [s]
Related FW	standard v3.2.0
Description	Delay for BusL current asymmetry (unbalance). This protection threshold is adjusted by BusL I unbal

12.2.7 Group: BusR protect

12.2.7.1 Setpoint: BusRVolt prot

Group	BusR protect
Range [units]	ENABLED, DISABLED [-]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint enables or disables BusR voltage protection. For more information on this protection see setpoints BusRight >V, BusRight <V and BusRight V del.</p> <p>NOTE: If both voltage and frequency protections (see also setpoint BusRfreq prot) are disabled there is no way for the controller to decide whether the BusR is healthy or not. In this case BusR is considered healthy if there is any voltage.</p>

12.2.7.2 Setpoint: BusRight >V

Group	BusR protect
Range [units]	BusRight <V .. 150 [%]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint determines treshold for busR overvoltage protection. This protection is evaluated with delay given by setpoint BusRight V del. Protection type is history record.</p> <p>NOTE: All three phases are checked for busR voltage detection. Maximum out of those three is used. For high voltage applications, the BusRNomVph-ph can be used for nominal voltage setting.</p>

12.2.7.3 Setpoint: BusRight <V

Group	BusR protect
Range [units]	50 .. BusRight >V [%]

Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint determines treshold for busR undervoltage protection. This protection is evaluated with delay given by setpoint BusRight V del. Protection type is history record.</p> <p>NOTE:</p> <p>All three phases are checked for busR voltage detection. Minimum out of those three is used. For high voltage applications, the BusRNomVph-ph can be used for nominal voltage setting.</p>

12.2.7.4 Setpoint: BusRight V del

Group	BusR protect
Range [units]	0.00 .. 600.00 [s]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts delay for busR under- (BusRight <V) and overvoltage (BusRight >V) protections.</p> <p>NOTE:</p> <p>Although the resolution of this setpoint is 0.01s, in fact the adjusted delay is rounded to the next higher multiple of the period of the bus voltage. The period is either 0.02s for 50Hz systems or 0.0166s for 60Hz systems. E.g. if the delay is set to 0.03s at 50Hz system the real delay will be 0.04s.</p>

12.2.7.5 Setpoint: BusRfreq prot

Group	BusR protect
Range [units]	ENABLED, DISABLED [-]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint enables or disables BusR frequency protection. For more information on this protection see setpoints BusRight >f, BusRight <f and BusRight f del.</p>

<p>NOTE: If both voltage and frequency protections (see also setpoint BusRVolt prot) are disabled there is no way for the controller to decide whether the busR is healthy or not. In this case busR is considered healthy if there is any voltage.</p>
--

12.2.7.6 Setpoint: BusRight >f

Group	BusR protect
Range [units]	BusRight <f .. 150.0 [%]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint determines the treshhold for busR overfrequency protection. This protection is evaluated with delay given by setpoint BusRight f del and it is history record type.

12.2.7.7 Setpoint: BusRight <f

Group	BusR protect
Range [units]	50.0 .. BusRight >f [%]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint determines the treshhold for busR underfrequency protection. This protection is evaluated with delay given by setpoint BusRight f del and it is history record type.

12.2.7.8 Setpoint: BusRight f del

Group	BusR protect
Range [units]	0.00 .. 600.00 [s]
Related FW	standard v3.2.0
Description	This setpoint adjusts delay for busR under- (BusRight <f) and overfrequency (BusRight >f) protections.
	<p>NOTE: Although the resolution of this setpoint is 0.01s, in fact the adjusted delay is</p>

	rounded to the next higher multiple of the period of the bus voltage. The period is either 0.02s for 50Hz systems or 0.0166s for 60Hz systems. E.g. if the delay is set to 0.03s at 50Hz system the real delay will be 0.04s.
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12.2.7.9 Setpoint: BusR V unbal

Group	BusR protect
Range [units]	0 .. 200 [%]
Related FW	standard v3.2.0
Description	This setpoint adjusts threshold for busR voltage unbalance alarm. The voltage unbalance is calculated as a maximum difference between phase voltages. This protection is history record type and its delay is set by the setpoint BusR Vunb del .

12.2.7.10 Setpoint: BusR Vunb del

Group	BusR protect
Range [units]	0.0 .. 600.0 [s]
Related FW	standard v3.2.0
Description	This setpoint determines the delay which is used in evaluation of BusR V unbal protection (threshold for this protection is set by the setpoint BusR V unbal).

12.2.8 Group: Pwr management

12.2.8.1 Setpoint: #Pwr mgmt mode

Group	Pwr management
Range [units]	ABS(kW), ABS(kVA), REL (%) [-]
Related FW	standard v3.2.0
Description	<div style="border: 1px solid black; padding: 5px; display: inline-block; margin-bottom: 5px;"> ABS (kW) </div> The power management is based on actual sum of active power of gen-sets participating in the power management in particular control group (<i>TotRunPact</i>) and sum of active

	nominal power of gen-sets participating in the power management in particular control group (TotRunPnom). Setpoints #LoadResStrt X (e.g. LoadResStrt 1) and #LoadResStop X (e.g. LoadResStop 1) are set in absolute values in kW.
ABS (κVA)	The power management is based on actual sum of apparent power of gen-sets participating in the power management in particular control group (given by <i>TotRunPact</i> and total reactive power, $S^2 = P^2 + Q^2$) and sum of apparent nominal power of gen-sets participating in the power management in particular control group (this value is given for each gen-set as <i>Nomin current</i> multiplied by <i>GenNomV</i>). Setpoints #LoadResStrt X (e.g. LoadResStrt 1) and #LoadResStop X (e.g. LoadResStop 1) are set in absolute values in kVA.
REL (%)	The power management is based on the relative load, i.e. ratio active power to nominal power. Setpoints #%LdResStrt X (e.g. %LdResStrt 1) and #%LdResStop X (e.g. %LdResStop 1) are set in relative values in %. Minimum allowable relative power reserve is evaluated from nominal power of all running gen-sets combined in %.
NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.	

12.2.8.2 Setpoint: #PriorAutoSwap

Group	Pwr management				
Range [units]	DISABLED, RUN HOURS EQU, LD DEMAND SWAP [-]				
Related FW	standard v3.2.0				
Description	<p>This setpoint selects the method of optimization of priorities</p> <table border="1"> <tr> <td>DISABLED</td> <td>IM-NT does not provide the AutoSwap functions for other controllers. Priorities in gen-set controllers have their original values which do not change.</td> </tr> <tr> <td>RUN HOURS EQU</td> <td>Running Hours Equalization mode. All gen-sets in the logical group are kept to work approximately the same number of running hours. See also setpoints RunHoursBase (e.g.</td> </tr> </table>	DISABLED	IM-NT does not provide the AutoSwap functions for other controllers. Priorities in gen-set controllers have their original values which do not change.	RUN HOURS EQU	Running Hours Equalization mode. All gen-sets in the logical group are kept to work approximately the same number of running hours. See also setpoints RunHoursBase (e.g.
DISABLED	IM-NT does not provide the AutoSwap functions for other controllers. Priorities in gen-set controllers have their original values which do not change.				
RUN HOURS EQU	Running Hours Equalization mode. All gen-sets in the logical group are kept to work approximately the same number of running hours. See also setpoints RunHoursBase (e.g.				

	IGS-MINT application) and RunHrsMaxDiff . Up to 32 engines can cooperate in this mode. For more information on this function please refer to running hours equalization .
LD DEMAND SWAP	For different sized engines, this mode allows to optimally select the running engines according to the actual site load. Up to 3 engines can cooperate in this mode (if more gen-sets are needed, please use IGS-NT-PSC firmware in additional controller - more information about this FW can be found on our webpages www.comap.cz). Note that this priority swapping function may be used only if #Pwr mgmt mode is set to ABS (kW).
EFFICIENCY	For different sized engines, this mode automatically select optimum running gen-sets. This function supports up to 32 gen-sets (or less based on how many other controllers are used in the installation). Not all combinations of gen-sets are considered.

NOTE:

Setpoint Priority in gen-set controllers is not actually changed by AutoSwap functions - the priority is changed only locally during AutoSwap function is enabled. Note that after RHE is activated any changes in the actual priority setpoints need to be confirmed by disabling and enabling RHE again to take effect.

NOTE:

If the optimization is enabled at least one gen-set in the group must be set as the master for the optimization ([Priority ctrl](#) = MASTER). It is possible to have more than one master, the one with lowest CAN address will play the role of the master and if it is switched off the next one will take the master role.

NOTE:

sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.

CAUTION!

If the controller which is set to MASTER in PriorAutoSwap function is in [Emerg. manual](#), priority autoswapping will not work and no other controller will assume MASTER role.

12.2.8.3 Setpoint: Priority ctrl

Group	Pwr management				
Range [units]	DISABLED, MASTER [-]				
Related FW	standard v3.2.0				
Force value possible	YES				
Description	<table border="1"> <tr> <td>DISABLED</td> <td>IM-NT does not provide the AutoSwap functions for other controllers.</td> </tr> <tr> <td>MASTER</td> <td>At least one controller in the logical group has to be selected as MASTER if some PriorityAuto Swapping mode is enabled. Only the controller with lowest CAN address becomes an active master, the other are ignored by SLAVE controllers. The MASTER controller evaluates the Priority changing for all other controllers in the group and sends them the “forced” Priority values.</td> </tr> </table>	DISABLED	IM-NT does not provide the AutoSwap functions for other controllers.	MASTER	At least one controller in the logical group has to be selected as MASTER if some PriorityAuto Swapping mode is enabled. Only the controller with lowest CAN address becomes an active master, the other are ignored by SLAVE controllers. The MASTER controller evaluates the Priority changing for all other controllers in the group and sends them the “forced” Priority values.
DISABLED	IM-NT does not provide the AutoSwap functions for other controllers.				
MASTER	At least one controller in the logical group has to be selected as MASTER if some PriorityAuto Swapping mode is enabled. Only the controller with lowest CAN address becomes an active master, the other are ignored by SLAVE controllers. The MASTER controller evaluates the Priority changing for all other controllers in the group and sends them the “forced” Priority values.				

12.2.8.4 Setpoint: #SysAMFstrtdel

Group	Pwr management
Range [units]	0 .. 600 [s]
Related FW	standard v3.2.0
Description	<p>System start delay between input Sys start/stop closing and start of Power Management System. When input Sys start/stop is controlled by mains decoupling relay, this setpoint adjusts the delay among the mains failure and the emergency start of the gen-sets. If the MCB feedback is closed, Power management is started with 1s delay after the input Sys start/stop closing - parallel operation with the mains.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.5 Setpoint: #SysAMFstopdel

Group	Pwr management
Range [units]	0 .. 600 [s]
Related FW	standard v3.2.0

InteliMains^{NT}, SW version 3.2.0

Description	<p>System stop delay between input Sys start/stop opening and Power Management System deactivation. When input Sys start/stop is controlled by mains decoupling relay, this is a delay among the end of mains failure and opening of GCB. If the MCB feedback is closed, gen-sets are unloaded to mains prior to GCB opening.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>
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12.2.8.6 Setpoint: #LoadResStrt 1

Group	Pwr Management
Range [units]	-32000 .. LoadResStop 1 [kX]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the load reserve for start in absolute mode. i.e. Pwr mgmt mode = ABS (kW) or ABS (kVA) if the reserve set #1 is active. Learn more about reserves in the chapter Reserves, minimal running power.</p> <p>The currently active reserve set is selected by binary inputs Load res 2, Load res 3 and Load res 4. If none of these inputs is active the set #1 is selected.</p> <p>NOTE: If the absolute power management is selected, this setpoint (or the setpoints LoadResStrt 2, LoadResStrt 3 or LoadResStrt 4 depending on which load reserve set is selected) determines also the number of gensets (that are part of the power management) which will start (according to their priority and nominal power).</p> <p>NOTE: There is a possibility to assign this setpoint negative number. This can be used in some situations to allow genset start after Sys Start/Stop gets active. It is not destined for normal operation. Please refer to the Troubleshooting guide for more information (chapter "MGCB is not closed although gensets are running").</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.7 Setpoint: #LoadResStop 1

Group	Pwr Management
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Range [units]	LoadResStrt 1 .. 32000 [kX]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the load reserve for stop in absolute mode. i.e. Pwr mgmt mode = ABS (kW) or ABS (kVA) if the reserve set #1 is active. Learn more about reserves in the chapter Reserves, minimal running power.</p> <p>The currently active reserve set is selected by binary inputs Load res 2, Load res 3 and Load res 4. If none of these inputs is active the set #1 is selected.</p> <p>NOTE: The reserve for stop must be always adjusted higher than the reserve for start.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.8 Setpoint: #LoadResStrt 2

Group	Pwr Management
Range [units]	-32000 .. LoadResStop 2 [kX]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the load reserve for start in absolute mode. i.e. Pwr mgmt mode = ABS (kW) or ABS (kVA) if the reserve set #2 is active. Learn more about reserves in the chapter Reserves, minimal running power.</p> <p>The currently active reserve set is selected by binary inputs Load res 2, Load res 3 and Load res 4. If none of these inputs is active the set #1 is selected.</p> <p>NOTE: If the absolute power management is selected, this setpoint (or the setpoints LoadResStrt 1, LoadResStrt 3 or LoadResStrt 4 depending on which load reserve set is selected) determines also the number of gensets (that are part of the power management) which will start (according to their priority and nominal power).</p> <p>NOTE: There is a possibility to assign this setpoint negative number. This can be used in some situations to allow genset start after Sys Start/Stop gets active. It is not destined for normal operation. Please refer to the Troubleshooting guide for more information (chapter "MGCB is not closed although gensets are running").</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among</p>

	all controllers connected by CAN2 bus.
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12.2.8.9 Setpoint: #LoadResStop 2

Group	Pwr Management
Range [units]	LoadResStrt 2 .. 32000 [kX]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the load reserve for stop in absolute mode. i.e. Pwr mgmt mode = ABS (kW) or ABS (kVA) if the reserve set #2 is active. Learn more about reserves in the chapter Reserves, minimal running power.</p> <p>The currently active reserve set is selected by binary inputs Load res 2, Load res 3 and Load res 4. If none of these inputs is active the set #1 is selected.</p> <p>NOTE: The reserve for stop must be always adjusted higher than the reserve for start.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.10 Setpoint: #LoadResStrt 3

Group	Pwr Management
Range [units]	-32000 .. LoadResStop 3 [kX]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the load reserve for start in absolute mode. i.e. Pwr mgmt mode = ABS (kW) or ABS (kVA) if the reserve set #3 is active. Learn more about reserves in the chapter Reserves, minimal running power.</p> <p>The currently active reserve set is selected by binary inputs Load res 2, Load res 3 and Load res 4. If none of these inputs is active the set #1 is selected.</p> <p>NOTE: If the absolute power management is selected, this setpoint (or the setpoints LoadResStrt 1, LoadResStrt 2 or LoadResStrt 4 depending on which load reserve set is selected) determines also the number of gensets (that are part of the power management) which will start (according to their priority and nominal power).</p>

	<p>NOTE:</p> <p>There is a possibility to assign this setpoint negative number. This can be used in some situations to allow genset start after Sys Start/Stop gets active. It is not destined for normal operation. Please refer to the Troubleshooting guide for more information (chapter "MGCB is not closed although gensets are running").</p>
	<p>NOTE:</p> <p># sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.11 Setpoint: #LoadResStop 3

Group	Pwr Management
Range [units]	LoadResStrt 3 .. 32000 [kX]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the load reserve for stop in absolute mode. i.e. Pwr mgmt mode = ABS (kW) or ABS (kVA) if the reserve set #3 is active. Learn more about reserves in the chapter Reserves, minimal running power.</p> <p>The currently active reserve set is selected by binary inputs Load res 2, Load res 3 and Load res 4. If none of these inputs is active the set #1 is selected.</p> <p>NOTE:</p> <p>The reserve for stop must be always adjusted higher than the reserve for start.</p> <p>NOTE:</p> <p># sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.12 Setpoint: #LoadResStrt 4

Group	Pwr Management
Range [units]	-32000 .. LoadResStop 4 [kX]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the load reserve for start in absolute mode. i.e. Pwr mgmt mode = ABS (kW) or ABS (kVA) if the reserve set #4 is active. Learn more about reserves in the chapter Reserves, minimal running power.</p> <p>The currently active reserve set is selected by binary inputs Load res 2, Load</p>

	<p>res 3 and Load res 4. If none of these inputs is active the set #1 is selected.</p> <p>NOTE: If the absolute power management is selected, this setpoint (or the setpoints LoadResStrt 1, LoadResStrt 2 or LoadResStrt 3 depending on which load reserve set is selected) determines also the number of gensets (that are part of the power management) which will start (according to their priority and nominal power).</p> <p>NOTE: There is a possibility to assign this setpoint negative number. This can be used in some situations to allow genset start after Sys Start/Stop gets active. It is not destined for normal operation. Please refer to the Troubleshooting guide for more information (chapter "MGCB is not closed although gensets are running").</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>
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12.2.8.13 Setpoint: #LoadResStop 4

Group	Pwr Management
Range [units]	LoadResStrt 4 .. 32000 [kX]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the load reserve for stop in absolute mode. i.e. Pwr mgmt mode = ABS (kW) or ABS (kVA) if the reserve set #4 is active. Learn more about reserves in the chapter Reserves, minimal running power.</p> <p>The currently active reserve set is selected by binary inputs Load res 2, Load res 3 and Load res 4. If none of these inputs is active the set #1 is selected.</p> <p>NOTE: The reserve for stop must be always adjusted higher than the reserve for start.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.14 Setpoint: #%LdResStrt 1

Group	Pwr Management
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Range [units]	0 .. %LdResStop 1 [%]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the load reserve for start in relative mode. i.e. Pwr mgmt mode = REL (%) if the reserve set #1 is active. Learn more about reserves in the chapter Reserves, minimal running power.</p> <p>The currently active reserve set is selected by binary inputs Load res 2, Load res 3 and Load res 4. If none of these inputs is active the set #1 is selected.</p> <p>NOTE: If the relative power management is selected, this setpoint (or the setpoints %LdResStrt 2, %LdResStrt 3 or %LdResStrt 4 depending on which load reserve set is selected) determines also the number of gensets (that are part of the power management) which will start (according to their priority and nominal power).</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.15 Setpoint: #%LdResStop 1

Group	Pwr Management
Range [units]	%LdResStrt 1 .. 110 [%]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the load reserve for stop in relative mode. i.e. Pwr mgmt mode = REL (%) if the reserve set #1 is active. Learn more about reserves in the chapter Reserves, minimal running power.</p> <p>The currently active reserve set is selected by binary inputs Load res 2, Load res 3 and Load res 4. If none of these inputs is active the set #1 is selected.</p> <p>NOTE: The reserve for stop must be always adjusted higher than the reserve for start.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.16 Setpoint: #%LdResStrt 2

Group	Pwr Management
Range [units]	0 .. %LdResStop 2 [%]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the load reserve for start in relative mode. i.e. Pwr mgmt mode = REL (%) if the reserve set #2 is active. Learn more about reserves in the chapter Reserves, minimal running power.</p> <p>The currently active reserve set is selected by binary inputs Load res 2, Load res 3 and Load res 4. If none of these inputs is active the set #1 is selected.</p> <p>NOTE: If the relative power management is selected, this setpoint (or the setpoints %LdResStrt 1, %LdResStrt 3 or %LdResStrt 4 depending on which load reserve set is selected) determines also the number of gensets (that are part of the power management) which will start (according to their priority and nominal power).</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.17 Setpoint: #%LdResStop 2

Group	Pwr Management
Range [units]	%LdResStrt 2 .. 110 [%]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the load reserve for stop in relative mode. i.e. Pwr mgmt mode = REL (%) if the reserve set #2 is active. Learn more about reserves in the chapter Reserves, minimal running power.</p> <p>The currently active reserve set is selected by binary inputs Load res 2, Load res 3 and Load res 4. If none of these inputs is active the set #1 is selected.</p> <p>NOTE: The reserve for stop must be always adjusted higher than the reserve for start.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.18 Setpoint: #%LdResStrt 3

Group	Pwr Management
Range [units]	0 .. %LdResStop 3 [%]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the load reserve for start in relative mode. i.e. Pwr mgmt mode = REL (%) if the reserve set #3 is active. Learn more about reserves in the chapter Reserves, minimal running power.</p> <p>The currently active reserve set is selected by binary inputs Load res 2, Load res 3 and Load res 4. If none of these inputs is active the set #1 is selected.</p> <p>NOTE: If the relative power management is selected, this setpoint (or the setpoints %LdResStrt 1, %LdResStrt 2 or %LdResStrt 4 depending on which load reserve set is selected) determines also the number of gensets (that are part of the power management) which will start (according to their priority and nominal power).</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.19 Setpoint: #%LdResStop 3

Group	Pwr Management
Range [units]	%LdResStrt 3 .. 110 [%]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the load reserve for stop in relative mode. i.e. Pwr mgmt mode = REL (%) if the reserve set #3 is active. Learn more about reserves in the chapter Reserves, minimal running power.</p> <p>The currently active reserve set is selected by binary inputs Load res 2, Load res 3 and Load res 4. If none of these inputs is active the set #1 is selected.</p> <p>NOTE: The reserve for stop must be always adjusted higher than the reserve for start.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.20 Setpoint: #%LdResStrt 4

Group	Pwr Management
Range [units]	0 .. %LdResStop 4 [%]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the load reserve for start in relative mode. i.e. Pwr mgmt mode = REL (%) if the reserve set #4 is active. Learn more about reserves in the chapter Reserves, minimal running power.</p> <p>The currently active reserve set is selected by binary inputs Load res 2, Load res 3 and Load res 4. If none of these inputs is active the set #1 is selected.</p> <p>NOTE: If the relative power management is selected, this setpoint (or the setpoints %LdResStrt 1, %LdResStrt 2 or %LdResStrt 3 depending on which load reserve set is selected) determines also the number of gensets (that are part of the power management) which will start (according to their priority and nominal power).</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.21 Setpoint: #%LdResStop 4

Group	Pwr Management
Range [units]	%LdResStrt 4 .. 110 [%]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the load reserve for stop in relative mode. i.e. Pwr mgmt mode = REL (%) if the reserve set #4 is active. Learn more about reserves in the chapter Reserves, minimal running power.</p> <p>The currently active reserve set is selected by binary inputs Load res 2, Load res 3 and Load res 4. If none of these inputs is active the set #1 is selected.</p> <p>NOTE: The reserve for stop must be always adjusted higher than the reserve for start.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.22 Setpoint: #NextStrt Del

Group	Pwr Management
Range [units]	0 .. 3600 [s]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the delay of starting the next gen-set when the actual load reserve drops below the adjusted reserve for start, but the group is still not overloaded.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.23 Setpoint: #OverldNext Del

Group	Pwr Management
Range [units]	0 .. 3600 [s]
Related FW	standard v3.2.0
Description	<p>If the system reserve drops below the start limit for next gen-set the delay #NextStrt del will begin to count down. But if the load raises too quickly it might happen that the system gets overloaded already before the delay #NextStrt del reaches zero.</p> <p>This setpoint is used to prevent this situation. If the #NextStrt del timer is already counting down (i.e. the condition for starting of next gen-set based on reserves is fullfiled), the total load of running gen-sets reach 90% of their nominal capacity and the remaining time of the running timer is higher than #OverldNextDel, the running timer is shortened to the value of #OverldNextDel to speed up the start-up of the next gen-set.</p> <p>NOTE: The setpoint takes place only in island operation.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.24 Setpoint: #NextStopDel

Group	Pwr Management
Range [units]	0 .. 3600 [s]

Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust the delay of stopping the next gen-set when the actual load reserve rises above the adjusted load reserve for stop.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.25 Setpoint: #SlowStopDel

Group	Pwr Management
Range [units]	0 .. 600 [s]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust how long the particular gen-set will suppress it's own <i>Slow stop</i> alarm to give chance to another gen-set to start and replace the defective one.</p> <p>If there isn't any available gen-set to start, the alarm is not suppressed.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.26 Setpoint: #MinRunPower 1

Group	Power Management
Range [units]	0 .. 65000 [kW]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust certain minimum value of the sum of nominal power of all running gen-sets. If the function is active, then the gen-sets would not be stopped, although the reserve for stop is fulfilled, if the total remaining nominal power dropped below this minimal value.</p> <p>There are 3 different <i>MinRunPower</i> setpoints, this particular one is activated by the input <i>MinRun power 1</i> which is in MINT application (in IntelliMains it is for compatibility purposes only).</p> <p>NOTE: When more than one binary input <i>MinRunPower</i> is activated then <i>MinRunPower</i> with the highest number is active.</p> <p>NOTE:</p>

	# sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.
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12.2.8.27 Setpoint: #MinRunPower 2

Group	Power Management
Range [units]	0 .. 65000 [kW]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust certain minimum value of the sum of nominal power of all running gen-sets. If the function is active, then the gen-sets would not be stopped, although the reserve for stop is fulfilled, if the total remaining nominal power dropped below this minimal value.</p> <p>There are 3 different <i>MinRunPower</i> setpoints, this particular one is activated by the input MinRun power 2 which is in MINT application (in IntelliMains it is for compatibility purposes only).</p> <p>NOTE: When more than one binary input MinRunPower is activated then MinRunPower with the highest number is active.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.28 Setpoint: #MinRunPower 3

Group	Power Management
Range [units]	0 .. 65000 [kW]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to adjust certain minimum value of the sum of nominal power of all running gen-sets. If the function is active, then the gen-sets would not be stopped, although the reserve for stop is fulfilled, if the total remaining nominal power dropped below this minimal value.</p> <p>There are 3 different <i>MinRunPower</i> setpoints, this particular one is activated by the input MinRun power 3 which is in MINT application (in IntelliMains it is for compatibility purposes only).</p> <p>NOTE: When more than one binary input MinRunPower is activated then MinRunPower with the highest number is active.</p>

	<p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>
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12.2.8.29 Setpoint: #RunHrsMaxDiff

Group	Pwr management
Range [units]	0 .. 65000 [h]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the "deadband" for the running hours equalization function. The priorities are swapped not until the relative engine hours (RHE) difference is higher than this deadband.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.30 Setpoint: #PwrBandContr 1

Group	Pwr management
Range [units]	1, 2, 1+2, 3, 1+3, 2+3, 1+2+3 [-]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to select the gen-sets which will run within the power band #1 if the optimization according to gen-set size is active. Learn more about this topic in the chapter Gen-set size optimization.</p> <p>NOTE: The combinations of gensets must be created so, that the total nominal power of the Power band #1 < #2 < #3 < #4.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.31 Setpoint: #PwrBandContr 2

Group	Pwr management
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Range [units]	1, 2, 1+2, 3, 1+3, 2+3, 1+2+3 [-]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to select the gen-sets which will run within the power band #2 if the optimization according to gen-set size is active. Learn more about this topic in the chapter Gen-set size optimization.</p> <p>NOTE: The combinations of gensets must be created so, that the total nominal power of the Power band #1 < #2 < #3 < #4.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.32 Setpoint: #PwrBandContr 3

Group	Pwr management
Range [units]	1, 2, 1+2, 3, 1+3, 2+3, 1+2+3 [-]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to select the gen-sets which will run within the power band #3 if the optimization according to gen-set size is active. Learn more about this topic in the chapter Gen-set size optimization.</p> <p>NOTE: The combinations of gensets must be created so, that the total nominal power of the Power band #1 < #2 < #3 < #4.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.33 Setpoint: #PwrBandContr 4

Group	Pwr management
Range [units]	1, 2, 1+2, 3, 1+3, 2+3, 1+2+3 [-]
Related FW	standard v3.2.0
Description	<p>This setpoint is used to select the gen-sets which will run within the power band #4 if the optimization according to gen-set size is active. Learn more</p>

	<p>about this topic in the chapter Gen-set size optimization.</p> <p>NOTE: The combinations of gensets must be created so, that the total nominal power of the Power band #1 < #2 < #3 < #4.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>
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12.2.8.34 Setpoint: #PwrBnChngDIUp

Group	Pwr management
Range [units]	0 .. 3600 [s]
Related FW	standard v3.2.0
Description	<p>This setpoint is used for adjusting the delay of changing the power band if the load demand rose above the upper limit of the current power band. Learn more about this topic in the chapter Gen-set size optimization.</p> <p>NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.8.35 Setpoint: GroupLinkLeft

Group	Pwr management
Range [units]	COMMON (=1), 2 .. 32 [-]
Related FW	standard v3.2.0
Description	<p>NOTE: In MCB/MGCB application both GroupLinkLeft and GroupLinkRight should be set to 1 (=COMMON).</p> <p>If the input GroupLink of this particular controller is used to provide the "group link" information for two logical groups, then this setpoint is used to select which group is located at the left side of the group link breaker (bus tie breaker). If this particular controller is not used for the group link function adjust this setpoint to 1 (COMMON).</p>

12.2.8.36 Setpoint: GroupLinkRight

Group	Pwr management
Range [units]	COMMON (=1), 2 .. 32 [-]
Related FW	standard v3.2.0
Description	<p>NOTE: In MCB/MGCB application both GroupLinkLeft and GroupLinkRight should be set to 1 (=COMMON).</p> <p>If the input GroupLink of this particular controller is used to provide the "group link" information for two logical groups, then this setpoint is used to select which group is located at the right side of the group link breaker (bus tie breaker). If this particular controller is not used for the group link function adjust this setpoint to 1 (COMMON).</p>

12.2.9 Group: Sync ctrl

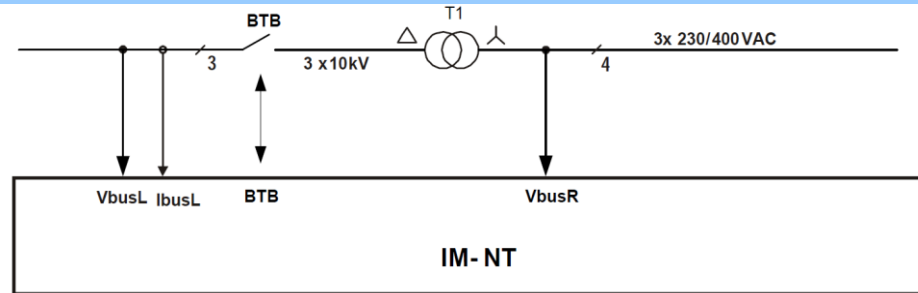
12.2.9.1 Setpoint: Voltage window

Group	Sync ctrl
Range [units]	0.0 .. 100.0 [%]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint adjusts maximum difference between busL and busR voltage in respective phases for voltage matching during synchronizing.

12.2.9.2 Setpoint: BRtoBLAngleReq

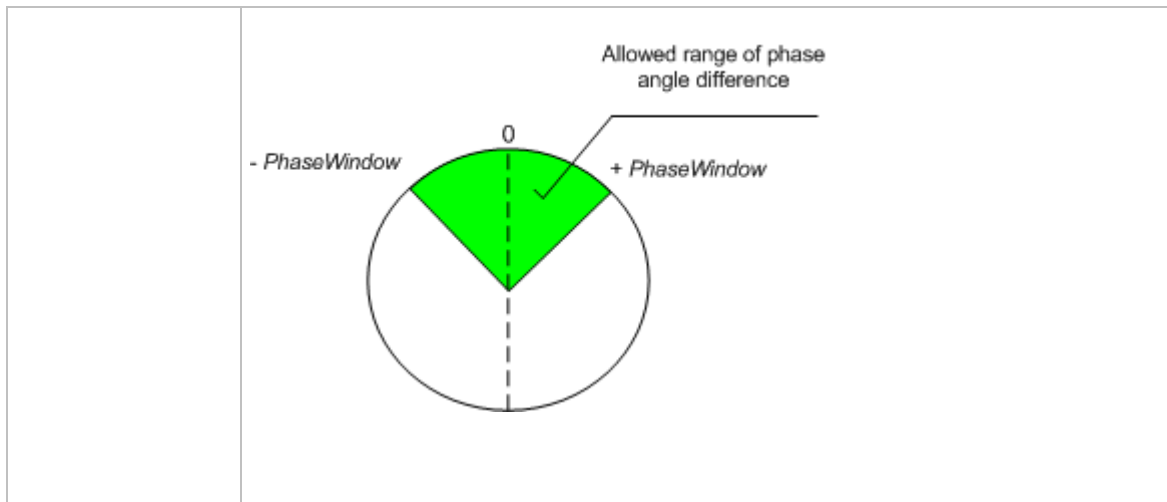
Group	Sync ctrl
Range [units]	-45 .. 45 [°]
Related FW	standard v3.2.0
Description	<p>Requested phase difference between busR and busL voltage during synchronizing. Use this setpoint for phase correction of potential transformers connection.</p> <p>EXAMPLE: Bellow there is an example of the controller connection to a high voltage system.</p>

T1 shifts phase +30° and no shift is on T2.
 BtoM AngleReq = +30° needs to be set for this example.



12.2.9.3 Setpoint: Phase window

Group	Sync ctrl
Range [units]	0 .. 90 [°]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint adjusts maximum absolute value of difference between actual phase angle between the busR and busL voltages for synchronizing.</p> <p>NOTE: To disable issuing the breaker close command (i.e. for test purpose) adjust this setpoint to 0. Synchronizing will continue until timeout occurs or the breaker is closed externally.</p> <p>NOTE: The setpoint works as a window surrounding the BRtoBLAngleReq setpoint. E.g. for BRtoBLAngleReq = +30° and Phase window = 5°, the breaker closure is allowed for phases +25° to +35°. If you want to lock out the breaker closing during synchronizing control loop test, set Phase window = 0. This allows the control loop setpoints to be tuned while actual breaker closing is blocked.</p>



12.2.9.4 Setpoint: Dwell time

Group	Sync ctrl
Range [units]	0.1s .. 25.0 [s]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint adjusts the period of time that the phase angle difference must stay within \pm -Phase Window and voltage difference within Voltage Window before the respective breaker, which is actually being synchronized, is closed.

12.2.9.5 Setpoint: Freq gain

Group	Sync ctrl				
Range [units]	0.0 .. 200.0 [%]				
Related FW	standard v3.2.0				
Description	This setpoint adjusts the gain factor (P-factor) of the frequency control PI loop. The integration factor (I-factor) for the frequency loop is adjusted by the setpoint Freq int .				
	<table border="1" style="width: 100%; background-color: #f0f0f0;"> <thead> <tr> <th style="background-color: #cccccc;">APPLICATION</th> <th style="background-color: #cccccc;">FREQ GAIN AND FREQ INT SETPOINTS ARE ACTIVE DURING:</th> </tr> </thead> <tbody> <tr> <td>BTB</td> <td>synchronization between “left” and “right” buses</td> </tr> </tbody> </table>	APPLICATION	FREQ GAIN AND FREQ INT SETPOINTS ARE ACTIVE DURING:	BTB	synchronization between “left” and “right” buses
APPLICATION	FREQ GAIN AND FREQ INT SETPOINTS ARE ACTIVE DURING:				
BTB	synchronization between “left” and “right” buses				

	<p>NOTE:</p> <p>When this setpoint is set to zero, the corresponding control loop is switched OFF.</p>
	<p>NOTE:</p> <p>See the chapter Regulation loops overview for general information about regulation loops and their adjustment.</p>

12.2.9.6 Setpoint: Freq int

Group	Sync ctrl				
Range [units]	0 .. 100 [%]				
Related FW	standard v3.2.0				
Description	<p>This setpoint adjusts the relative integration factor (I-factor) of the frequency control PI loop. The gain factor (P-factor) for the frequency loop is adjusted by the setpoint Freq gain.</p> <table border="1"> <thead> <tr> <th>APPLICATION</th> <th>FREQ GAIN AND FREQ INT SETPOINTS ARE ACTIVE DURING:</th> </tr> </thead> <tbody> <tr> <td>BTB</td> <td>synchronization between “left” and “right” buses</td> </tr> </tbody> </table> <p>NOTE:</p> <p>See the chapter Regulation loops overview for general information about regulation loops and their adjustment.</p>	APPLICATION	FREQ GAIN AND FREQ INT SETPOINTS ARE ACTIVE DURING:	BTB	synchronization between “left” and “right” buses
APPLICATION	FREQ GAIN AND FREQ INT SETPOINTS ARE ACTIVE DURING:				
BTB	synchronization between “left” and “right” buses				

12.2.9.7 Setpoint: Angle Gain

Group	Sync ctrl
Range [units]	0.0 .. 200.0 [%]
Related FW	standard v3.2.0
Description	This setpoint is used for adjusting of the gain factor (P-factor) of the phase

	<p>angle P-control loop.</p> <p>The synchronizing process contains two following steps:</p> <ol style="list-style-type: none"> 1. The first step is to match the busR frequency to the busL frequency. 2. The following step is to match the phase angle difference of the busR and busL voltages to the setpoint BRtoBLAngleReq. The angle regulation loop is active in this step. <p>As soon as the phase angle difference stays within the window adjusted by Phase window and the voltage difference stays in the Voltage window, both for period Dwell time, the circuit breaker closing command is issued.</p> <p>NOTE: See the chapter Regulation loops overview for general information about regulation loops and their adjustment.</p>
--	---

12.2.9.8 Setpoint: Sync timeout

Group	Sync Ctrl
Range [units]	1 .. 1800, NO TIMEOUT [s]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the maximum duration of synchronization. If the synchronizing is not successful within this period of time, the <i>Sync Timeout</i> alarm will be issued.</p> <p>NOTE: If the synchronizing is not successful within 1/10 of the <i>Sync timeout</i> or 60s (if <i>Sync timeout</i> <600s) the synchronization process is automatically restarted again, i.e. the speed governor output is reset to bias value in gen-set controllers and then frequency regulation loop is started again. If NO TIMEOUT is selected the automatic restart occurs every 180s. This method helps to synchronize successfully even in difficult conditions.</p>

12.2.10 Group: Volt ctrl

12.2.10.1 Setpoint: Voltage gain

Group	Volt Ctrl
Range [units]	0.0 .. 200.0 [%]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the gain factor (P-factor) of the voltage control PI loop. The integration factor (I-factor) for the voltage control loop is adjusted by the</p>

	setpoint Voltage int .				
	NOTE: If this setpoint is set to 0 the regulation loop is disabled.				
	<table border="1"> <thead> <tr> <th style="background-color: #cccccc;">APPLICATION</th> <th style="background-color: #cccccc;">VOLTAGE GAIN AND VOLTAGE INT SETPOINTS ARE ACTIVE DURING:</th> </tr> </thead> <tbody> <tr> <td>BTB</td> <td>synchronization between “left” and “right” buses</td> </tr> </tbody> </table>	APPLICATION	VOLTAGE GAIN AND VOLTAGE INT SETPOINTS ARE ACTIVE DURING:	BTB	synchronization between “left” and “right” buses
APPLICATION	VOLTAGE GAIN AND VOLTAGE INT SETPOINTS ARE ACTIVE DURING:				
BTB	synchronization between “left” and “right” buses				
	NOTE: When this setpoint is set to zero, the corresponding control loop is switched OFF.				
	NOTE: See the chapter Regulation loops overview for general information about regulation loops and their adjustment.				

12.2.10.2 Setpoint: Voltage Int

Group	Volt Ctrl				
Range [units]	0 .. 100 [%]				
Related FW	standard v3.2.0				
Description	<p>This setpoint adjusts the relative integration factor (I-factor) of the voltage control PI loop. The gain factor (P-factor) for the voltage control loop is adjusted by the setpoint Voltage gain.</p> <table border="1"> <thead> <tr> <th style="background-color: #cccccc;">APPLICATION</th> <th style="background-color: #cccccc;">VOLTAGE GAIN AND VOLTAGE INT SETPOINTS ARE ACTIVE DURING:</th> </tr> </thead> <tbody> <tr> <td>BTB</td> <td>synchronization between “left” and “right” buses</td> </tr> </tbody> </table> <p>NOTE: See the chapter Regulation loops overview for general information about regulation loops and their adjustment.</p>	APPLICATION	VOLTAGE GAIN AND VOLTAGE INT SETPOINTS ARE ACTIVE DURING:	BTB	synchronization between “left” and “right” buses
APPLICATION	VOLTAGE GAIN AND VOLTAGE INT SETPOINTS ARE ACTIVE DURING:				
BTB	synchronization between “left” and “right” buses				

12.2.11 Group: Force value

12.2.11.1 Setpoint: Force value 1

Group	Force value
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This is one of the 16 setpoints reserved for using as alternative setpoints for the force value functions. The alternative setpoint is to be assigned to a particular force value function and renamed in GenConfig.</p> <p>See also the input Force value 1.</p> <p>NOTE: It is not obligatory to use one of these reserved setpoints for a force value function. It is possible to use also any other setpoint or value with matching dimension and decimal resolution.</p> <p>NOTE: There isn't any relation between the default names of the force value function blocks, associated binary inputs and the default names of the reserved setpoints. In other words, the setpoint with default name <i>Force value 3</i> is not related to the <i>Force value 3</i> function block.</p>

12.2.11.2 Setpoint: Force value 2

Group	Force value
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This is one of the 16 setpoints reserved for using as alternative setpoints for the force value functions. The alternative setpoint is to be assigned to a particular force value function and renamed in GenConfig.</p> <p>NOTE: It is not obligatory to use one of these reserved setpoints for a force value function. It is possible to use also any other setpoint or value with matching dimension and decimal resolution.</p> <p>NOTE: There isn't any relation between the default names of the force value function blocks, associated binary inputs and the default names of the reserved setpoints. In other words, the setpoint with default name <i>Force value 3</i> is not</p>

	related to the <i>Force value 3</i> function block.
--	--

12.2.11.3 Setpoint: Force value 3

Group	Force value
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This is one of the 16 setpoints reserved for using as alternative setpoints for the force value functions. The alternative setpoint is to be assigned to a particular force value function and renamed in GenConfig.</p> <p>See also the input Force value 1.</p> <p>NOTE: It is not obligatory to use one of these reserved setpoints for a force value function. It is possible to use also any other setpoint or value with matching dimension and decimal resolution.</p> <p>NOTE: There isn't any relation between the default names of the force value function blocks, associated binary inputs and the default names of the reserved setpoints. In other words, the setpoint with default name <i>Force value 3</i> is not related to the <i>Force value 3</i> function block.</p>

12.2.11.4 Setpoint: Force value 4

Group	Force value
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This is one of the 16 setpoints reserved for using as alternative setpoints for the force value functions. The alternative setpoint is to be assigned to a particular force value function and renamed in GenConfig.</p> <p>See also the input Force value 1.</p> <p>NOTE: It is not obligatory to use one of these reserved setpoints for a force value function. It is possible to use also any other setpoint or value with matching dimension and decimal resolution.</p> <p>NOTE:</p>

	<p>There isn't any relation between the default names of the force value function blocks, associated binary inputs and the default names of the reserved setpoints. In other words, the setpoint with default name <i>Force value 3</i> is not related to the <i>Force value 3</i> function block.</p>
--	---

12.2.11.5 Setpoint: Force value 5

Group	Force value
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This is one of the 16 setpoints reserved for using as alternative setpoints for the force value functions. The alternative setpoint is to be assigned to a particular force value function and renamed in GenConfig.</p> <p>See also the input Force value 1.</p> <p>NOTE: It is not obligatory to use one of these reserved setpoints for a force value function. It is possible to use also any other setpoint or value with matching dimension and decimal resolution.</p> <p>NOTE: There isn't any relation between the default names of the force value function blocks, associated binary inputs and the default names of the reserved setpoints. In other words, the setpoint with default name <i>Force value 3</i> is not related to the <i>Force value 3</i> function block.</p>

12.2.11.6 Setpoint: Force value 6

Group	Force value
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This is one of the 16 setpoints reserved for using as alternative setpoints for the force value functions. The alternative setpoint is to be assigned to a particular force value function and renamed in GenConfig.</p> <p>See also the input Force value 1.</p> <p>NOTE: It is not obligatory to use one of these reserved setpoints for a force value function. It is possible to use also any other setpoint or value with matching dimension and decimal resolution.</p>

	<p>NOTE:</p> <p>There isn't any relation between the default names of the force value function blocks, associated binary inputs and the default names of the reserved setpoints. In other words, the setpoint with default name <i>Force value 3</i> is not related to the <i>Force value 3</i> function block.</p>
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12.2.11.7 Setpoint: Force value 7

Group	Force value
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This is one of the 16 setpoints reserved for using as alternative setpoints for the force value functions. The alternative setpoint is to be assigned to a particular force value function and renamed in GenConfig.</p> <p>See also the input Force value 1.</p> <p>NOTE:</p> <p>It is not obligatory to use one of these reserved setpoints for a force value function. It is possible to use also any other setpoint or value with matching dimension and decimal resolution.</p> <p>NOTE:</p> <p>There isn't any relation between the default names of the force value function blocks, associated binary inputs and the default names of the reserved setpoints. In other words, the setpoint with default name <i>Force value 3</i> is not related to the <i>Force value 3</i> function block.</p>

12.2.11.8 Setpoint: Force value 8

Group	Force value
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This is one of the 16 setpoints reserved for using as alternative setpoints for the force value functions. The alternative setpoint is to be assigned to a particular force value function and renamed in GenConfig.</p> <p>See also the input Force value 1.</p> <p>NOTE:</p> <p>It is not obligatory to use one of these reserved setpoints for a force value</p>

	<p>function. It is possible to use also any other setpoint or value with matching dimension and decimal resolution.</p> <p>NOTE: There isn't any relation between the default names of the force value function blocks, associated binary inputs and the default names of the reserved setpoints. In other words, the setpoint with default name <i>Force value 3</i> is not related to the <i>Force value 3</i> function block.</p>
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12.2.11.9 Setpoint: Force value 9

Group	Force value
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This is one of the 16 setpoints reserved for using as alternative setpoints for the force value functions. The alternative setpoint is to be assigned to a particular force value function and renamed in GenConfig.</p> <p>See also the input Force value 1.</p> <p>NOTE: It is not obligatory to use one of these reserved setpoints for a force value function. It is possible to use also any other setpoint or value with matching dimension and decimal resolution.</p> <p>NOTE: There isn't any relation between the default names of the force value function blocks, associated binary inputs and the default names of the reserved setpoints. In other words, the setpoint with default name <i>Force value 3</i> is not related to the <i>Force value 3</i> function block.</p>

12.2.11.10 Setpoint: Force value 10

Group	Force value
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This is one of the 16 setpoints reserved for using as alternative setpoints for the force value functions. The alternative setpoint is to be assigned to a particular force value function and renamed in GenConfig.</p>

	<p>See also the input Force value 1.</p> <p>NOTE: It is not obligatory to use one of these reserved setpoints for a force value function. It is possible to use also any other setpoint or value with matching dimension and decimal resolution.</p> <p>NOTE: There isn't any relation between the default names of the force value function blocks, associated binary inputs and the default names of the reserved setpoints. In other words, the setpoint with default name <i>Force value 3</i> is not related to the <i>Force value 3</i> function block.</p>
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12.2.11.11 Setpoint: Force value 11

Group	Force value
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This is one of the 16 setpoints reserved for using as alternative setpoints for the force value functions. The alternative setpoint is to be assigned to a particular force value function and renamed in GenConfig.</p> <p>See also the input Force value 1.</p> <p>NOTE: It is not obligatory to use one of these reserved setpoints for a force value function. It is possible to use also any other setpoint or value with matching dimension and decimal resolution.</p> <p>NOTE: There isn't any relation between the default names of the force value function blocks, associated binary inputs and the default names of the reserved setpoints. In other words, the setpoint with default name <i>Force value 3</i> is not related to the <i>Force value 3</i> function block.</p>

12.2.11.12 Setpoint: Force value 12

Group	Force value
Range [units]	[-]
Related FW	standard v3.2.0
Description	This is one of the 16 setpoints reserved for using as alternative setpoints for

	<p>the force value functions. The alternative setpoint is to be assigned to a particular force value function and renamed in GenConfig.</p> <p>See also the input Force value 1.</p> <p>NOTE: It is not obligatory to use one of these reserved setpoints for a force value function. It is possible to use also any other setpoint or value with matching dimension and decimal resolution.</p> <p>NOTE: There isn't any relation between the default names of the force value function blocks, associated binary inputs and the default names of the reserved setpoints. In other words, the setpoint with default name <i>Force value 3</i> is not related to the <i>Force value 3</i> function block.</p>
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12.2.11.13 Setpoint: Force value 13

Group	Force value
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This is one of the 16 setpoints reserved for using as alternative setpoints for the force value functions. The alternative setpoint is to be assigned to a particular force value function and renamed in GenConfig.</p> <p>See also the input Force value 1.</p> <p>NOTE: It is not obligatory to use one of these reserved setpoints for a force value function. It is possible to use also any other setpoint or value with matching dimension and decimal resolution.</p> <p>NOTE: There isn't any relation between the default names of the force value function blocks, associated binary inputs and the default names of the reserved setpoints. In other words, the setpoint with default name <i>Force value 3</i> is not related to the <i>Force value 3</i> function block.</p>

12.2.11.14 Setpoint: Force value 14

Group	Force value
Range [units]	[-]

Related FW	standard v3.2.0
Description	<p>This is one of the 16 setpoints reserved for using as alternative setpoints for the force value functions. The alternative setpoint is to be assigned to a particular force value function and renamed in GenConfig.</p> <p>See also the input Force value 1.</p> <p>NOTE: It is not obligatory to use one of these reserved setpoints for a force value function. It is possible to use also any other setpoint or value with matching dimension and decimal resolution.</p> <p>NOTE: There isn't any relation between the default names of the force value function blocks, associated binary inputs and the default names of the reserved setpoints. In other words, the setpoint with default name <i>Force value 3</i> is not related to the <i>Force value 3</i> function block.</p>

12.2.11.15 Setpoint: Force value 15

Group	Force value
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This is one of the 16 setpoints reserved for using as alternative setpoints for the force value functions. The alternative setpoint is to be assigned to a particular force value function and renamed in GenConfig.</p> <p>See also the input Force value 1.</p> <p>NOTE: It is not obligatory to use one of these reserved setpoints for a force value function. It is possible to use also any other setpoint or value with matching dimension and decimal resolution.</p> <p>NOTE: There isn't any relation between the default names of the force value function blocks, associated binary inputs and the default names of the reserved setpoints. In other words, the setpoint with default name <i>Force value 3</i> is not related to the <i>Force value 3</i> function block.</p>

12.2.11.16 Setpoint: Force value 16

Group	Force value
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Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This is one of the 16 setpoints reserved for using as alternative setpoints for the force value functions. The alternative setpoint is to be assigned to a particular force value function and renamed in GenConfig.</p> <p>See also the input Force value 1.</p> <p>NOTE: It is not obligatory to use one of these reserved setpoints for a force value function. It is possible to use also any other setpoint or value with matching dimension and decimal resolution.</p> <p>NOTE: There isn't any relation between the default names of the force value function blocks, associated binary inputs and the default names of the reserved setpoints. In other words, the setpoint with default name <i>Force value 3</i> is not related to the <i>Force value 3</i> function block.</p>

12.2.11.17 Setpoint: ExtValue1LoLim

Group	Force value
Range [units]	-32000 .. ExtValue1HiLim [X]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the low limit of the value of <i>ExtValue 1</i> if the value is lowered/raised by the binary inputs ExtValue1 up and ExtValue1 down. The <i>ExtValue 1</i> is never lowered below this limit.</p> <p>NOTE: This limit is not taken into account if the value <i>ExtValue 1</i> is written remotely from a terminal using the appropriate command <i>ExtValue #n</i>.</p>

12.2.11.18 Setpoint: ExtValue2LoLim

Group	Force value
Range [units]	-32000 .. ExtValue2HiLim [X]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the low limit of the value of <i>ExtValue 2</i> if the value is lowered/raised by the binary inputs ExtValue2 up and ExtValue2 down. The</p>

	<p><i>ExtValue 2</i> is never lowered below this limit.</p> <p>NOTE: This limit is not taken into account if the value <i>ExtValue 2</i> is written remotely from a terminal using the appropriate command <i>ExtValue #n</i>.</p>
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12.2.11.19 Setpoint: ExtValue3LoLim

Group	Force value
Range [units]	-32000 .. ExtValue3HiLim [X]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the low limit of the value of <i>ExtValue 3</i> if the value is lowered/raised by the binary inputs ExtValue3 up and ExtValue3 down. The <i>ExtValue 3</i> is never lowered below this limit.</p> <p>NOTE: This limit is not taken into account if the value <i>ExtValue 3</i> is written remotely from a terminal using the appropriate command <i>ExtValue #n</i>.</p>

12.2.11.20 Setpoint: ExtValue4LoLim

Group	Force value
Range [units]	-32000 .. ExtValue4HiLim [X]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the low limit of the value of <i>ExtValue 4</i> if the value is lowered/raised by the binary inputs ExtValue4 up and ExtValue4 down. The <i>ExtValue 4</i> is never lowered below this limit.</p> <p>NOTE: This limit is not taken into account if the value <i>ExtValue 4</i> is written remotely from a terminal using the appropriate command <i>ExtValue #n</i>.</p>

12.2.11.21 Setpoint: ExtValue1HiLim

Group	Force value
Range [units]	ExtValue1LoLim .. 32000 [X]
Related FW	standard v3.2.0

Description	<p>This setpoint adjusts the high limit of the value of <i>ExtValue 1</i> if the value is lowered/raised by the binary inputs ExtValue1 up and ExtValue1 down. The <i>ExtValue 1</i> is never raised over this limit.</p> <p>NOTE: This limit is not taken into account if the value <i>ExtValue 1</i> is written remotely from a terminal using the appropriate command <i>ExtValue #n</i>.</p>
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12.2.11.22 Setpoint: ExtValue2HiLim

Group	Force value
Range [units]	ExtValue2LoLim .. 32000 [X]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the high limit of the value of <i>ExtValue 2</i> if the value is lowered/raised by the binary inputs ExtValue2 up and ExtValue2 down. The <i>ExtValue 2</i> is never raised over this limit.</p> <p>NOTE: This limit is not taken into account if the value <i>ExtValue 2</i> is written remotely from a terminal using the appropriate command <i>ExtValue #n</i>.</p>

12.2.11.23 Setpoint: ExtValue3HiLim

Group	Force value
Range [units]	ExtValue3LoLim .. 32000 [X]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the high limit of the value of <i>ExtValue 3</i> if the value is lowered/raised by the binary inputs ExtValue3 up and ExtValue3 down. The <i>ExtValue 3</i> is never raised over this limit.</p> <p>NOTE: This limit is not taken into account if the value <i>ExtValue 3</i> is written remotely from a terminal using the appropriate command <i>ExtValue #n</i>.</p>

12.2.11.24 Setpoint: ExtValue4HiLim

Group	Force value
Range [units]	ExtValue4LoLim .. 32000 [X]

Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the high limit of the value of <i>ExtValue 4</i> if the value is lowered/raised by the binary inputs ExtValue4 up and ExtValue4 down. The <i>ExtValue 4</i> is never raised over this limit.</p> <p>NOTE: This limit is not taken into account if the value <i>ExtValue 4</i> is written remotely from a terminal using the appropriate command <i>ExtValue #n</i>.</p>

12.2.11.25 Setpoint: ExtValue1 rate

Group	Force value
Range [units]	1 .. 10000 [X/s]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint adjusts the rate per second at which the <i>ExtValue 1</i> is being changed while the input ExtValue1 up or ExtValue1 down is active.

12.2.11.26 Setpoint: ExtValue2 rate

Group	Force value
Range [units]	1 .. 10000 [X/s]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint adjusts the rate per second at which the <i>ExtValue 2</i> is being changed while the input ExtValue2 up or ExtValue2 down is active.

12.2.11.27 Setpoint: ExtValue3 rate

Group	Force value
Range [units]	1 .. 10000 [X/s]
Related FW	standard v3.2.0
Force value	YES

possible	
Description	This setpoint adjusts the rate per second at which the <i>ExtValue 3</i> is being changed while the input ExtValue3 up or ExtValue3 down is active.

12.2.11.28 Setpoint: ExtValue4 rate

Group	Force value
Range [units]	1 .. 10000 [X/s]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint adjusts the rate per second at which the <i>ExtValue 4</i> is being changed while the input ExtValue4 up or ExtValue4 down is active.

12.2.11.29 Setpoint: ExtValue1deflt

Group	Force value
Range [units]	-32000 .. 32000 [x]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint adjusts the reset (initial) value of the <i>ExtValue 1</i> . This initial value is applied either when the controller is powered-on or when the <i>ExtValue 1</i> is reset by the binary input ExtValue1reset .

12.2.11.30 Setpoint: ExtValue2deflt

Group	Force value
Range [units]	-32000 .. 32000 [x]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint adjusts the reset (initial) value of the <i>ExtValue 2</i> . This initial value is applied either when the controller is powered-on or when the

	<i>ExtValue 2</i> is reset by the binary input ExtValue2reset .
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12.2.11.31 Setpoint: ExtValue3deflt

Group	Force value
Range [units]	-32000 .. 32000 [x]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint adjusts the reset (initial) value of the <i>ExtValue 3</i> . This initial value is applied either when the controller is powered-on or when the <i>ExtValue 3</i> is reset by the binary input ExtValue3reset .

12.2.11.32 Setpoint: ExtValue4deflt

Group	Force value
Range [units]	-32000 .. 32000 [x]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint adjusts the reset (initial) value of the <i>ExtValue 4</i> . This initial value is applied either when the controller is powered-on or when the <i>ExtValue 4</i> is reset by the binary input ExtValue4reset .

12.2.12 Group: Load shedding

12.2.12.1 Setpoint: Ld shed mode

Group	Load shedding
Range [units]	PWR ONLY, FRQ ONLY [-]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint adjusts which type of load shedding is active. When PWR ONLY is selected the load shedding is based on active power. If FRQ ONLY

	is selected the load shedding is based on frequency.
	NOTE: Learn more about load shedding in the separate chapter Load shedding .

12.2.12.2 Setpoint: Ld shedStages

Group	Load shedding
Range [units]	1 .. 3 [-]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint adjusts the number of load shedding stages that are used in load shedding. EXAMPLE: If 1 load shedding stage is selected the controller will perform one load shedding stage and rest of the load shedding stages will be omitted.

12.2.12.3 Setpoint: Ld shedLevel1

Group	Load shedding
Range [units]	Ld reconLevel1 .. 200 [%]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint is used to adjust the relative load level for load shedding stage 1 (in % of total power transferred from busL to busR - NominBusLImp). When the power transferred through BTB exceeds this level for more than Ld shedDelay1 time the next load shedding output is closed. NOTE: Learn more about load shedding in the separate chapter Load shedding .

12.2.12.4 Setpoint: Ld shedLevel2

Group	Load shedding
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Range [units]	Ld reconLevel2 .. 200 [%]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to adjust the relative load level for load shedding stage 2 (in % of total power transferred from busL to busR - NominBusLImp). When the power transferred through BTB exceeds this level for more than Ld shedDelay2 time the next load shedding output is closed.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>

12.2.12.5 Setpoint: Ld shedLevel3

Group	Load shedding
Range [units]	Ld reconLevel3 .. 200 [%]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to adjust the relative load level for load shedding stage 3 (in % of total power transferred from busL to busR - NominBusLImp). When the power transferred through BTB exceeds this level for more than Ld shedDelay3 time the next load shedding output is closed.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>

12.2.12.6 Setpoint: Ld shed f lvl1

Group	Load shedding
Range [units]	50 .. LdRecon f lvl1 [%]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to adjust the relative frequency level for load shedding stage 1 (in % of nominal system frequency given by setpoints Nominal Freq and Nom frq offset). When the frequency goes below this level for more than</p>

	<p>Ld shedDelay1 time the next load shedding output is closed.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>
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12.2.12.7 Setpoint: Ld shed f lvl2

Group	Load shedding
Range [units]	50 .. LdRecon f lvl2 [%]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to adjust the relative frequency level for load shedding stage 2 (in % of nominal system frequency given by setpoints Nominal Freq and Nom frq offset). When the frequency goes below this level for more than Ld shedDelay2 time the next load shedding output is closed.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>

12.2.12.8 Setpoint: Ld shed f lvl3

Group	Load shedding
Range [units]	50 .. LdRecon f lvl3 [%]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to adjust the relative frequency level for load shedding stage 3 (in % of nominal system frequency given by setpoints Nominal Freq and Nom frq offset). When the frequency goes below this level for more than Ld shedDelay3 time the next load shedding output is closed.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>

12.2.12.9 Setpoint: Ld shedDelay1

Group	Load shedding
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Range [units]	0.0 .. 600.0 [s]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to adjust time period for load shedding stage 1, that the power transferred through BTB must be above the Ld shed level limit to close the next load shedding output.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>

12.2.12.10 Setpoint: Ld shedDelay2

Group	Load shedding
Range [units]	0.0 .. 600.0 [s]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to adjust time period for the load shedding stage 2, that the power transferred through BTB must be above the Ld shedLevel2 limit to close the next load shedding output.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>

12.2.12.11 Setpoint: Ld shedDelay3

Group	Load shedding
Range [units]	0.0 .. 600.0 [s]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to adjust time period for the load shedding stage 3, that the power transferred through BTB must be above the Ld shedLevel3 limit to close the next load shedding output.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>

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12.2.12.12 Setpoint: Ld reconLevel1

Group	Load shedding
Range [units]	0 .. Ld shedLevel1 [%]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to adjust the relative load level for load shedding stage 1 (in % of total power transferred from busL to busR - NominBusLImp). When the power transferred through BTB drops below this level for more than Ld reconDelay1 time the next load can be reconnected back.</p> <p>The appropriate load shedding output is either opened automatically when the condition above is fulfilled (AutoLd recon = ENABLED) or manually by activation of the input ManuallDRecon.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>

12.2.12.13 Setpoint: Ld reconLevel2

Group	Load shedding
Range [units]	0 .. Ld shedLevel2 [%]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to adjust the relative load level for load shedding stage 2 (in % of total power transferred from busL to busR - NominBusLImp). When the power transferred through BTB drops below this level for more than Ld reconDelay2 time the next load can be reconnected back.</p> <p>The appropriate load shedding output is either opened automatically when the condition above is fulfilled (AutoLd recon = ENABLED) or manually by activation of the input ManuallDRecon.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>

12.2.12.14 Setpoint: Ld reconLevel3

Group	Load shedding
Range [units]	0 .. Ld shedLevel3 [%]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to adjust the relative load level for load shedding stage 3 (in % of total power transferred from busL to busR - NominBusLimp). When the power transferred through BTB drops below this level for more than Ld reconDelay3 time the next load can be reconnected back.</p> <p>The appropriate load shedding output is either opened automatically when the condition above is fulfilled (AutoLd recon = ENABLED) or manually by activation of the input ManualLdRecon.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>

12.2.12.15 Setpoint: LdRecon f lvl1

Group	Load shedding
Range [units]	Ld shed f lvl1 .. 200 [%]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to adjust the relative frequency level for load shedding stage 1 (in % of nominal system frequency given by setpoints Nominal Freq and Nom frq offset). When the frequency exceeds this level for more than Ld reconDelay1 time the next load shedding output is opened.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>

12.2.12.16 Setpoint: LdRecon f lvl2

Group	Load shedding
Range [units]	Ld shed f lvl2 .. 200 [%]
Related FW	standard v3.2.0

Force value possible	YES
Description	<p>This setpoint is used to adjust the relative frequency level for load shedding stage 2 (in % of nominal system frequency given by setpoints Nominal Freq and Nom frq offset). When the frequency exceeds this level for more than Ld reconDelay2 time the next load shedding output is opened.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>

12.2.12.17 Setpoint: LdRecon f lvl3

Group	Load shedding
Range [units]	Ld shed f lvl3 .. 200 [%]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to adjust the relative frequency level for load shedding stage 3 (in % of nominal system frequency given by setpoints Nominal Freq and Nom frq offset). When the frequency exceeds this level for more than Ld reconDelay3 time the next load shedding output is opened.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>

12.2.12.18 Setpoint: Ld reconDelay1

Group	Load shedding
Range [units]	0 .. 600 [s]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to adjust time period for load shedding stage1, that the power transferred through BTB must be below the Ld reconLevel1 limit to allow reconnection of next load group.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>

12.2.12.19 Setpoint: Ld reconDelay2

Group	Load shedding
Range [units]	0 .. 600 [s]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to adjust time period for the load shedding stage 2, that the power transferred through BTB must be below the Ld reconLevel2 limit to allow reconnection of next load group.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>

12.2.12.20 Setpoint: Ld reconDelay3

Group	Load shedding
Range [units]	0 .. 600 [s]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to adjust time period for the load shedding stage 3, that the power transferred through BTB must be below the Ld reconLevel3 limit to allow reconnection of next load group.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>

12.2.12.21 Setpoint: AutoLd recon

Group	Engine Protect
Range [units]	DISABLED, ENABLED [-]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint selects whether the reconnection of the load occurs automatically when the power transferred through BTB stays below the</p>

	<p>reconnection limit for a period of the reconnection delay or the reconnection must be initiated manually by the input ManualLdRecon.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>
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12.2.13 Group: Timer settings

12.2.13.1 Setpoint: Timer channel 1

Group	Timer settings
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the mode of the <i>Timer channel #1</i>. Output from this channel is available in the combined output TimerAct 1-4.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

12.2.13.2 Setpoint: Timer channel 2

Group	Timer settings
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the mode of the <i>Timer channel #2</i>. Output from this channel is available in the combined output TimerAct 1-4.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

12.2.13.3 Setpoint: Timer channel 3

Group	Timer settings
Range [units]	[-]
Related FW	standard v3.2.0

Description	<p>This setpoint adjusts the mode of the <i>Timer channel #3</i>. Output from this channel is available in the combined output TimerAct 1-4.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>
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12.2.13.4 Setpoint: Timer channel 4

Group	Timer settings
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the mode of the <i>Timer channel #4</i>. Output from this channel is available in the combined output TimerAct 1-4.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

12.2.13.5 Setpoint: Timer channel 5

Group	Timer settings
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the mode of the <i>Timer channel #5</i>. Output from this channel is available in the combined output TimerAct 5-8.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

12.2.13.6 Setpoint: Timer channel 6

Group	Timer settings
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the mode of the <i>Timer channel #6</i>. Output from this channel is available in the combined output TimerAct 5-8.</p> <p>NOTE:</p>

	See the chapter Timers for more details about timers.
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12.2.13.7 Setpoint: Timer channel 7

Group	Timer settings
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the mode of the <i>Timer channel #7</i>. Output from this channel is available in the combined output TimerAct 5-8.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

12.2.13.8 Setpoint: Timer channel 8

Group	Timer settings
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the mode of the <i>Timer channel #8</i>. Output from this channel is available in the combined output TimerAct 5-8.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

12.2.13.9 Setpoint: Timer channel 9

Group	Timer settings
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the mode of the <i>Timer channel #9</i>. Output from this channel is available in the combined output TimerAct 9-12.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

12.2.13.10 Setpoint: Timer channel 10

Group	Timer settings
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the mode of the <i>Timer channel #10</i>. Output from this channel is available in the combined output TimerAct 9-12.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

12.2.13.11 Setpoint: Timer channel 11

Group	Timer settings
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the mode of the <i>Timer channel #11</i>. Output from this channel is available in the combined output TimerAct 9-12.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

12.2.13.12 Setpoint: Timer channel 12

Group	Timer settings
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the mode of the <i>Timer channel #12</i>. Output from this channel is available in the combined output TimerAct 9-12.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

12.2.13.13 Setpoint: Timer channel 13

Group	Timer settings
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Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the mode of the <i>Timer channel #13</i>. Output from this channel is available in the combined output TimerAct 13-16.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

12.2.13.14 Setpoint: Timer channel 14

Group	Timer settings
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the mode of the <i>Timer channel #14</i>. Output from this channel is available in the combined output TimerAct 13-16.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

12.2.13.15 Setpoint: Timer channel 15

Group	Timer settings
Range [units]	[-]
Related FW	standard v3.2.0
Description	<p>This setpoint adjusts the mode of the <i>Timer channel #15</i>. Output from this channel is available in the combined output TimerAct 13-16.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

12.2.13.16 Setpoint: Timer channel 16

Group	Timer settings
Range [units]	[-]
Related FW	standard v3.2.0

Description	<p>This setpoint adjusts the mode of the <i>Timer channel #16</i>. Output from this channel is available in the combined output TimerAct 13-16.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>
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12.2.14 Group: Act. calls/SMS

12.2.14.1 Setpoint: History record

Group	Act. calls/SMS
Range [units]	DISABLED, ENABLED [-]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to enable sending SMS and/or e-mail alerts when a "protection" configured as <i>History record</i> occurs. See the chapter Alarm management for more information about protection types.</p> <p>NOTE: As the <i>History record</i> protection does not appear in the alarmlist, the SMS or e-mail may contain empty alarmlist.</p>

12.2.14.2 Setpoint: Alarm only

Group	Act. calls/SMS
Range [units]	DISABLED, ENABLED [-]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to enable sending SMS and/or e-mail alerts when a "protection" configured as <i>Alarm only</i> occurs. See the chapter Alarm management for more information about protection types.</p>

12.2.14.3 Setpoint: Warning

Group	Act. calls/SMS
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Range [units]	DISABLED, ENABLED [-]
Related FW	standard v3.2.0
Force value possible	YES
Force value possible	YES
Description	This setpoint is used to enable sending SMS and/or e-mail alerts when a <i>warning</i> -type protection occurs. See the chapter Alarm management for more information about protection types.

12.2.14.4 Setpoint: Mains protect

Group	Act. calls/SMS
Range [units]	DISABLED, ENABLED [-]
Related FW	standard v3.2.0
Force value possible	YES
Description	<p>This setpoint is used to enable sending SMS and/or e-mail alerts when a "protection" configured as <i>Mains protect</i> occurs. See the chapter Alarm management for more information about protection types.</p> <p>NOTE: As the <i>Mains protect</i> protection does not appear in the alarmlist, the SMS or e-mail may contain empty alarmlist.</p>

12.2.14.5 Setpoint: MainsP w/Reset

Group	Act. calls/SMS
Range [units]	DISABLED, ENABLED [-]
Related FW	standard v3.2.0
Force value possible	YES
Description	This setpoint is used to enable sending SMS and/or e-mail alerts when a <i>MainsP w/Reset</i> -type alarm occurs. See the chapter Alarm management for more information about protection types.

12.2.14.6 Setpoint: AcallCH1-Type

Group	Act. calls/SMS
Range [units]	[-]
Related FW	standard v3.2.0
Force value possible	YES
Description	The setpoint is used to specify the alert type of the active calls - channel 1. See the chapter Alarm messaging for more details.

12.2.14.7 Setpoint: AcallCH1-Addr

Group	Act. calls/SMS
Range [units]	[-]
Related FW	standard v3.2.0
Description	The setpoint is used to specify the recipient address for the active calls - channel 1. The content of the address must correspond to the selected alert type (e.g. it must contain e-mail address if the alert type is e-mail). See the chapter Alarm messaging for more details.

12.2.14.8 Setpoint: AcallCH2-Type

Group	Act. calls/SMS
Range [units]	[-]
Related FW	standard v3.2.0
Force value possible	YES
Description	The setpoint is used to specify the alert type of the active calls - channel 2. See the chapter Alarm messaging for more details.

12.2.14.9 Setpoint: AcallCH2-Addr

Group	Act. calls/SMS
Range [units]	[-]
Related FW	standard v3.2.0

Description	The setpoint is used to specify the recipient address for the active calls - channel 2. The content of the address must correspond to the selected alert type (e.g. it must contain e-mail address if the alert type is e-mail). See the chapter Alarm messaging for more details.
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12.2.14.10 Setpoint: AcallCH3-Type

Group	Act. calls/SMS
Range [units]	[-]
Related FW	standard v3.2.0
Force value possible	YES
Description	The setpoint is used to specify the alert type of the active calls - channel 3. See the chapter Alarm messaging for more details.

12.2.14.11 Setpoint: AcallCH3-Addr

Group	Act. calls/SMS
Range [units]	[-]
Related FW	standard v3.2.0
Description	The setpoint is used to specify the recipient address for the active calls - channel 2. The content of the address must correspond to the selected alert type (e.g. it must contain e-mail address if the alert type is e-mail). See the chapter Alarm messaging for more details.

12.2.14.12 Setpoint: AcallCH4-Type

Group	Act. calls/SMS
Range [units]	[-]
Related FW	standard v3.2.0
Force value possible	YES
Description	The setpoint is used to specify the alert type of the active calls - channel 4. See the chapter Alarm messaging for more details.

12.2.14.13 Setpoint: AcallCH4-Addr

Group	Act. calls/SMS
Range [units]	[-]
Related FW	standard v3.2.0
Description	The setpoint is used to specify the recipient address for the active calls - channel 4. The content of the address must correspond to the selected alert type (e.g. it must contain e-mail address if the alert type is e-mail). See the chapter Alarm messaging for more details.

12.2.14.14 Setpoint: AcallCH5-Type

Group	Act. calls/SMS
Range [units]	[-]
Related FW	standard v3.2.0
Force value possible	YES
Description	The setpoint is used to specify the alert type of the active calls - channel 5. See the chapter Alarm messaging for more details.

12.2.14.15 Setpoint: AcallCH5-Addr

Group	Act. calls/SMS
Range [units]	[-]
Related FW	standard v3.2.0
Description	The setpoint is used to specify the recipient address for the active calls - channel 5. The content of the address must correspond to the selected alert type (e.g. it must contain e-mail address if the alert type is e-mail). See the chapter Alarm messaging for more details.

12.2.14.16 Setpoint: NumberRings AA

Group	Act. calls/SMS
Range [units]	1 .. 30 [-]
Related FW	standard v3.2.0

Description	<p>This setpoint is used to adjust the number of rings after which the modem, which is attached to the controller, answers the incoming call.</p> <p>Number of rings prior to answering the modem connection from PC to controller.</p> <p>NOTE: Any change of this setpoint is applied first after next switching the controller or modem off and on or after disconnecting the modem from the controller and connecting it back.</p>
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12.2.14.17 Setpoint: ActCallAttempt

Group	Act. calls/SMS
Range [units]	1 .. 250 [-]
Related FW	standard v3.2.0
Description	This setpoint is used to adjust the maximum number of consequent attempts to perform an active data call. The next attempt is performed 120s after the previous unsuccessful attempt.

12.2.14.18 Setpoint: Acall+SMS lang

Group	Act. calls/SMS
Range [units]	1 .. 7 [-]
Related FW	standard v3.2.0
Description	The setpoint specifies in which language the active SMS and e-mail messages are issued. Adjust the setpoint to the index of the required language. The index can be obtained from the tab Languages in GenConfig. Index 1 is always english.

12.2.15 Group: Date/Time

12.2.15.1 Setpoint: Time stamp act

Group	Date/Time
Range [units]	DISABLED, CONDITION, ALWAYS [-]
Related FW	standard v3.2.0

Description	The setpoint selects the <i>Time stamp</i> function mode.	
	DISABLED	The function is disabled.
	CONDITION	While the binary input Time stamp act is active the <i>Time stamps</i> records are recorded into the history log with period adjusted by setpoint Time Stamp Per .
	ALWAYS	The <i>Time stamps</i> records are recorded into the history log with period adjusted by setpoint Time Stamp Per all the time while the controller is switched on.

12.2.15.2 Setpoint: Time Stamp Per

Group	Date/Time
Range [units]	1 .. 240 [min]
Related FW	standard v3.2.0
Description	The setpoint adjusts the time interval for <i>Time stamp</i> records. See also the setpoint Time stamp act .

12.2.15.3 Setpoint: #SummerTimeMod

Group	Date/Time	
Range [units]	DISABLED, WINTER, SUMMER, WINTER-S, SUMMER-S [-]	
Related FW	standard v3.2.0	
Description	The setpoint is used to select the mode of automatic daylight saving time change.	
	DISABLED	The automatic change to daylight saving time and back is disabled.
	WINTER	The automatic change is enabled, the current season is winter and the controller is located in the northern hemisphere.
	SUMMER	The automatic change is enabled, the current season is summer and the controller is located in the northern hemisphere.

WINTER-S	The automatic change is enabled, the current season is winter and the controller is located in the southern hemisphere.
SUMMER-S	The automatic change is enabled, the current season is summer and the controller is located in the southern hemisphere.
NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.	

12.2.15.4 Setpoint: #Time

Group	Date/Time
Range [units]	[HH:MM:SS]
Related FW	standard v3.2.0
Description	<p>The setpoint shows the current time from the internal RTC clock of the controller and can be also used to readjust it.</p> <p style="background-color: #cccccc;">NOTE: If the controller is connected to other controllers via the CAN2 bus, the setpoints #Time and #Date are automatically synchronized each hour with the controller that has lowest address. If date/time is changed at one controller it is automatically updated also in all other controllers in the group.</p> <p style="background-color: #cccccc;">NOTE: # sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.</p>

12.2.15.5 Setpoint: #Date

Group	Date/Time
Range [units]	[dd.mm.yyyy]
Related FW	standard v3.2.0
Description	<p>The setpoint shows the date from the internal RTC clock of the controller and can be also used to readjust it.</p> <p style="background-color: #cccccc;">NOTE:</p>

If the controller is connected to other controllers via the CAN2 bus, the setpoints #Time and #Date are automatically synchronized each hour with the controller that has lowest address. If date/time is changed at one controller it is automatically updated also in all other controllers in the group.

NOTE:

sign in the name of this setpoint marks that this setpoint is shared among all controllers connected by CAN2 bus.

13 Values

13.1 Table of values

13.1.1 Group: BusL values

13.1.1.1 Value: BusLImport

Group	BusL values
Units	kW
Related FW	standard v3.2.0
Description	This value shows actual power flowing from busL to busR. This value is used for various purposes (e.g. load shedding etc.).

13.1.1.2 Value: BLP L1

Group	BusL values
Units	kW
Related FW	standard v3.2.0
Description	BusL active power in phase L1.

13.1.1.3 Value: BLP L2

Group	BusL values
Units	kW
Related FW	standard v3.2.0
Description	BusL active power in phase L2.

13.1.1.4 Value: BLP L3

Group	BusL values
Units	kW
Related FW	standard v3.2.0

Description	BusL active power in phase L3.
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13.1.1.5 Value: BusL Q

Group	BusL values
Units	kVAr
Related FW	standard v3.2.0
Description	BusL total reactive power.

13.1.1.6 Value: BLQ L1

Group	BusL values
Units	kVAr
Related FW	standard v3.2.0
Description	BusL reactive power in phase L1.

13.1.1.7 Value: BLQ L2

Group	BusL values
Units	kVAr
Related FW	standard v3.2.0
Description	BusL reactive power in phase L2.

13.1.1.8 Value: BLQ L3

Group	BusL values
Units	kVAr
Related FW	standard v3.2.0
Description	BusL reactive power in phase L3.

13.1.1.9 Value: BusL A

Group	BusL values
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Units	kVA
Related FW	standard v3.2.0
Description	BusL total apparent power.

13.1.1.10 Value: BLA L1

Group	BusL values
Units	kVA
Related FW	standard v3.2.0
Description	BusL apparent power in phase L1.

13.1.1.11 Value: BLA L2

Group	BusL values
Units	kVA
Related FW	standard v3.2.0
Description	BusL apparent power in phase L2.

13.1.1.12 Value: BLA L3

Group	BusL values
Units	kVA
Related FW	standard v3.2.0
Description	BusL apparent power in phase L3.

13.1.1.13 Value: BusL PF

Group	BusL values
Units	-
Related FW	standard v3.2.0
Description	BusL cos-phi factor.
	NOTE:

	<p>The "cos-phi" factor is widely used instead of power factor for pure harmonic waveforms, because a simplified method can be used for calculation of it's value. However, if this simplified method is used for significantly distorted waveforms, it may provide inaccurate results. This fact causes the controller "power factor" value may be different from a value measured by another true-rms measurement device if the waveform contains significant portion of higher harmonic frequencies.</p>
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13.1.1.14 Value: *BusL Ld char*

Group	BusL values
Units	-
Related FW	standard v3.2.0
Description	Character of the BusL load. "L" means inductive load, "C" is capacitive and "R" is resistive load (power factor = 1).

13.1.1.15 Value: *BLPf L1*

Group	BusL values
Units	-
Related FW	standard v3.2.0
Description	BusL power factor in phase L1.

13.1.1.16 Value: *BL Ld char L1*

Group	BusL values
Units	-
Related FW	standard v3.2.0
Description	Character of the BusL load in the L1 phase. "L" means inductive load, "C" is capacitive and "R" is resistive load (power factor = 1).

13.1.1.17 Value: *BLPf L2*

Group	BusL values
Units	-
Related FW	standard v3.2.0

Description	BusL power factor in phase L2.
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13.1.1.18 Value: *BL Ld char L2*

Group	BusL values
Units	-
Related FW	standard v3.2.0
Description	Character of the BusL load in the L2 phase. "L" means inductive load, "C" is capacitive and "R" is resistive load (power factor = 1).

13.1.1.19 Value: *BLPf L3*

Group	BusL values
Units	-
Related FW	standard v3.2.0
Description	BusL power factor in phase L3.

13.1.1.20 Value: *BL Ld char L3*

Group	BusL values
Units	-
Related FW	standard v3.2.0
Description	Character of the BusL load in the L3 phase. "L" means inductive load, "C" is capacitive and "R" is resistive load (power factor = 1).

13.1.1.21 Value: *BusL freq*

Group	BusL values
Units	Hz
Related FW	standard v3.2.0
Description	BusL frequency. The frequency is measured in the phase L3.

13.1.1.22 Value: BusL V L1-N

Group	BusL values
Units	V
Related FW	standard v3.2.0
Description	<p>BusL voltage in phase L1.</p> <p>NOTE: The ratio between the voltage measured at the input terminals and the displayed voltage is adjusted by the setpoint VbL VT ratio.</p>

13.1.1.23 Value: BusL V L2-N

Group	BusL values
Units	V
Related FW	standard v3.2.0
Description	<p>BusL voltage in phase L2.</p> <p>NOTE: The ratio between the voltage measured at the input terminals and the displayed voltage is adjusted by the setpoint VbL VT ratio.</p>

13.1.1.24 Value: BusL V L3-N

Group	BusL values
Units	V
Related FW	standard v3.2.0
Description	<p>BusL voltage in phase L3.</p> <p>NOTE: The ratio between the voltage measured at the input terminals and the displayed voltage is adjusted by the setpoint VbL VT ratio.</p>

13.1.1.25 Value: BusL V

Group	BusL values
Units	V
Related FW	standard v3.2.0
Description	<p>BusL voltage. Average from all three phases.</p> <p>NOTE: The ratio between the voltage measured at the input terminals and the displayed voltage is adjusted by the setpoint VbL VT ratio.</p>

13.1.1.26 Value: BusL V L1-L2

Group	BusL values
Units	V
Related FW	standard v3.2.0
Description	<p>BusL voltage between phase L1 and phase L2.</p> <p>NOTE: The ratio between the voltage measured at the input terminals and the displayed voltage is adjusted by the setpoint VbL VT ratio.</p>

13.1.1.27 Value: BusL V L2-L3

Group	BusL values
Units	V
Related FW	standard v3.2.0
Description	<p>BusL voltage between phase L2 and phase L3.</p> <p>NOTE: The ratio between the voltage measured at the input terminals and the displayed voltage is adjusted by the setpoint VbL VT ratio.</p>

13.1.1.28 Value: *BusL V L3-L1*

Group	BusL values
Units	V
Related FW	standard v3.2.0
Description	<p>BusL voltage between phase L3 and phase L1.</p> <p>NOTE: The ratio between the voltage measured at the input terminals and the displayed voltage is adjusted by the setpoint VbL VT ratio.</p>

13.1.1.29 Value: *BusL curr L1*

Group	BusL values
Units	A
Related FW	standard v3.2.0
Description	<p>BusL current in phase L1.</p> <p>NOTE: The ratio between the current measured at the input terminals and the displayed current is adjusted by the setpoints BusLeftCTprim and BusLeftCTsec.</p>

13.1.1.30 Value: *BusL curr L2*

Group	BusL values
Units	A
Related FW	standard v3.2.0
Description	<p>BusL current in phase L2.</p> <p>NOTE: The ratio between the current measured at the input terminals and the displayed current is adjusted by the setpoints BusLeftCTprim and BusLeftCTsec.</p>

13.1.1.31 Value: *BusL curr L3*

Group	BusL values
Units	A
Related FW	standard v3.2.0
Description	<p>BusL current in phase L3.</p> <p>NOTE: The ratio between the current measured at the input terminals and the displayed current is adjusted by the setpoints BusLeftCTprim and BusLeftCTsec.</p>

13.1.1.32 Value: *BusL V unbal*

Group	BusL values
Units	%
Related FW	standard v3.2.0
Description	<p>BusL voltage unbalance. The value is calculated as maximal difference of two phase voltages at one moment and expressed in % of the nominal voltage.</p> <p>NOTE: This value can be used for creating the BusL voltage unbalance protection using the "universal analog protections".</p>

13.1.1.33 Value: *BusL I unbal*

Group	BusL values
Units	V
Related FW	standard v3.2.0
Description	<p>BusL current unbalance. The value is calculated as maximal difference of two phase currents at one moment and expressed in % of the nominal current.</p> <p>NOTE: This value can be used for creating the BusL current unbalance protection using the "universal analog protections".</p>

13.1.1.34 Value: BusL V [kV]

Group	BusL values
Units	kV
Related FW	standard v3.2.0
Description	This value shows measured BusL voltage in kV.

13.1.2 Group: BusR values

13.1.2.1 Value: BusR freq

Group	BusR values
Units	Hz
Related FW	standard v3.2.0
Description	BusR frequency. The frequency is measured in the phase L3.

13.1.2.2 Value: BusR V L1-N

Group	BusR values
Units	V
Related FW	standard v3.2.0
Description	<p>BusR voltage in phase L1.</p> <p>NOTE: The ratio between the voltage measured at the input terminals and the displayed voltage is adjusted by the setpoint BusR VT ratio.</p>

13.1.2.3 Value: BusR V L2-N

Group	BusR values
Units	V
Related FW	standard v3.2.0
Description	BusR voltage in phase L2.

	<p>NOTE:</p> <p>The ratio between the voltage measured at the input terminals and the displayed voltage is adjusted by the setpoint BusR VT ratio.</p>
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13.1.2.4 Value: BusR V L3-N

Group	BusR values
Units	V
Related FW	standard v3.2.0
Description	<p>BusR voltage in phase L3.</p> <p>NOTE:</p> <p>The ratio between the voltage measured at the input terminals and the displayed voltage is adjusted by the setpoint BusR VT ratio.</p>

13.1.2.5 Value: BusR V

Group	BusR values
Units	V
Related FW	standard v3.2.0
Description	<p>BusR voltage. Average from all three phases.</p> <p>NOTE:</p> <p>The ratio between the voltage measured at the input terminals and the displayed voltage is adjusted by the setpoint BusR VT ratio.</p>

13.1.2.6 Value: BusR V L1-L2

Group	BusR values
Units	V
Related FW	standard v3.2.0
Description	BusR voltage phase L1 to L2.

13.1.2.7 Value: BusR V L2-L3

Group	BusR values
Units	V
Related FW	standard v3.2.0
Description	BusR voltage phase L2 to L3.

13.1.2.8 Value: BusR V L3-L1

Group	BusR values
Units	V
Related FW	standard v3.2.0
Description	BusR voltage phase L3 to L1.

13.1.2.9 Value: BusR V unbal

Group	BusR values
Units	V
Related FW	standard v3.2.0
Description	BusR voltage unbalance. The value is calculated as maximal difference of two phase voltages at one moment and expressed in % of the bus nominal voltage.

13.1.2.10 Value: I Aux

Group	BusR values
Units	A
Related FW	standard v3.2.0
Description	This value shows actual current measured at auxiliar terminals.

13.1.2.11 Value: Slip freq

Group	BusR values
Units	Hz

Related FW	standard v3.2.0
Description	Differential frequency between the busR and the busL.

13.1.2.12 Value: Angle

Group	BusR values
Units	°
Related FW	standard v3.2.0
Description	The angle between the phasors of the busR and busL voltage.

13.1.2.13 Value: BusR V [kV]

Group	BusR values
Units	kV
Related FW	standard v3.2.0
Description	This value shows measured busR voltage in kV.

13.1.3 Group: Gen-sets values

13.1.3.1 Value: Gen-set1 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist or function on the CAN bus) value "#####" is displayed.

13.1.3.2 Value: Gen-set2 pwr

Group	Gen-sets
Units	kW

Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.3 Value: Gen-set3 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.4 Value: Gen-set4 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.5 Value: Gen-set5 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.6 Value: Gen-set6 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.7 Value: Gen-set7 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.8 Value: Gen-set8 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.9 Value: Gen-set9 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with

	corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.
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13.1.3.10 Value: Gen-set10 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.11 Value: Gen-set11 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.12 Value: Gen-set12 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.13 Value: Gen-set13 pwr

Group	Gen-sets
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Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.14 Value: Gen-set14 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.15 Value: Gen-set15 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.16 Value: Gen-set16 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.17 Value: Gen-set17 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.18 Value: Gen-set18 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.19 Value: Gen-set19 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.20 Value: Gen-set20 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with

	corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.
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13.1.3.21 Value: Gen-set21 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.22 Value: Gen-set22 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.23 Value: Gen-set23 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.24 Value: Gen-set24 pwr

Group	Gen-sets
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Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.25 Value: Gen-set25 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.26 Value: Gen-set26 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.27 Value: Gen-set27 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.28 Value: Gen-set28 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.29 Value: Gen-set29 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.30 Value: Gen-set30 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.3.31 Value: Gen-set31 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with

	corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.
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13.1.3.32 Value: Gen-set32 pwr

Group	Gen-sets
Units	kW
Related FW	standard v3.2.0
Description	This value shows the actual power of corresponding genset (i.e. power of genset with CAN address 1 is shown in Gen-set1 pwr). If genset with corresponding address is not available (does not exist of function on the CAN bus) value "#####" is displayed.

13.1.4 Group: Control loops

13.1.4.1 Value: LSO

Group	Control loops
Units	%
Related FW	standard v3.2.0
Description	Control loop for active power in percentage.

13.1.4.2 Value: VSO

Group	Control loops
Units	%
Related FW	standard v3.2.0
Description	Control loop for reactive power in percentage.

13.1.5 Group: Power management

13.1.5.1 Value: TotAvlbPnom

Group	Pwr management
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Units	kW
Related FW	standard v3.2.0
Description	<p>This value shows the sum of nominal powers of all gensets that are available for power management (in any state - stopped, running etc.). See also values TotRunPnomAll and TotRunPnom. This value is active only when BTB is closed.</p> <p>For more information on power management please refer to the chapter Power management.</p>

13.1.5.2 Value: TotRunPnom

Group	Pwr management
Units	kW
Related FW	standard v3.2.0
Description	<p>This value shows the sum of nominal powers of all running gensets that are participating in power management. See also values TotRunPnomAll and TotAvlbPnom. This value is active only when BTB is closed.</p> <p>For more information on power management please refer to the chapter Power management.</p>

13.1.5.3 Value: Act Reserve

Group	Pwr management
Units	-
Related FW	standard v3.2.0
Description	<p>Actual absolute reserve. This value is active only when BTB is closed. In BTB, it can be used in two-level load shedding.</p>

13.1.5.4 Value: LoadRes Start

Group	Pwr management
Units	kX
Related FW	standard v3.2.0
Description	<p>If the actual absolute reserve is lower than this value the next gen-set which is about to be started in power management is started. This value is the exact copy of setpoint <code>#LoadResStrt X</code>.</p>

13.1.5.5 Value: Reserve Stp

Group	Pwr management
Units	kX
Related FW	standard v3.2.0
Description	Actual absolute reserve - when the reserve is higher than this value the last started gen-set (the gen-set with the highest priority) is stopped. This value contains the following: #LoadResStop plus <i>Nominal power</i> of the genset which is first to stop. #LoadResStop is used from the currently selected reserve set .

13.1.5.6 Value: ActRes rel

Group	Power management
Units	%
Related FW	standard v3.2.0
Description	Actual relative reserve . This value is active only when BTB is closed.

13.1.5.7 Value: ResStart rel

Group	Power management
Units	%
Related FW	standard v3.2.0
Description	If the actual relative reserve is lower than this value the next gen-set which is about to be started in power managment is started. This value is the exact copy of setpoint #LdResStrt X.

13.1.5.8 Value: ResStp rel

Group	Power management
Units	%
Related FW	standard v3.2.0
Description	Actual relative reserve - when the relative reserve is higher than this value the last started gen-set (the gen-set with the highest priority) is stopped. This value contains the following:

$$ResStp\ rel = \frac{P_n + \frac{\%LdRes.}{100}}{\sum_{i=1}^n}$$

P_n is the nominal power of the gen-set which is next to be stopped, the upper sum is the sum of the rest of the gen-sets running in power management. The lower sum is the sum of all the gen-sets currently running in power management.

#%LdResStop is used from the currently selected [reserve set](#).

13.1.6 Group: Force value

13.1.6.1 Value: ExtValue1

Group	Force value
Units	-
Related FW	standard v3.2.0
Description	<p>in BTB application many load control and power management functions does not play active role!</p> <p>This data object is intended for remote control of the gen-set via the communication if some kind of data is to be passed into the controller.</p> <p>This object can be written via the communication (e.g. Modbus) without any limitation. Use GenConfig function Generate Cfg Image to get the communication object number or register number of this particular value object. Below is a typical example of using this object.</p> <p>EXAMPLE: The gen-set group is required to be running in parallel-to-mains mode at constant load level (baseload), however the system baseload level is adjusted from a supervisory PLC system via Modbus.</p> <p>CAUTION! It is not allowed to solve this task by cyclic writing of the baseload setpoint from the supervisory device. The EEPROM memory may become damaged when any setpoint is written repeatedly with a short period.</p> <p>The proper solution is following:</p>

	<ol style="list-style-type: none"> 1. Go to GenConfig, download the configuration from the controller, select the LAI tab and configure the logical analog input <i>MLC:AnExSysBld</i> onto the <i>ExtValue1</i>, which is located in the <i>Force value</i> group. If you do not see the LAI tab you have to switch the GenConfig to "advanced" mode. Then upload the configuration into the controller. 2. Go to IntelliMonitor and change the setpoint <i>MLoad ctrl PtM</i> to ANEXSYSBLD->LS. 3. Now you have to program your PLC to write requested gen-set baseload into the Modbus register <i>ExtValue1</i> (register number 40392 for IG/IS-NT-2.4).
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13.1.6.2 Value: ExtValue2

Group	Force value
Units	-
Related FW	standard v3.2.0
Description	<p>This data object is intended for remote control of the IntelliMains via the communication if some kind of data is to be passed into the controller.</p> <p>This object can be written via the communication (e.g. Modbus) without any limitation. Use GenConfig function Generate Cfg Image to get the communication object number or register number of this particular value object. See an example at the object ExtValue1.</p>

13.1.6.3 Value: ExtValue3

Group	Force value
Units	-
Related FW	standard v3.2.0
Description	<p>This data object is intended for remote control of the IntelliMains via the communication if some kind of data is to be passed into the controller.</p> <p>This object can be written via the communication (e.g. Modbus) without any limitation. Use GenConfig function Generate Cfg Image to get the communication object number or register number of this particular value object. See an example at the object ExtValue1.</p>

13.1.6.4 Value: ExtValue4

Group	Force value
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Units	X
Related FW	standard v3.2.0
Description	<p>This data object is intended for remote control of the IntelliMains via the communication if some kind of data is to be passed into the controller.</p> <p>This object can be written via the communication (e.g. Modbus) without any limitation. Use GenConfig function <code>Generate Cfg Image</code> to get the communication object number or register number of this particular value object. See an example at the object ExtValue1.</p>

13.1.7 Group: Load shedding

13.1.7.1 Value: StatLdShed

Group	Load shedding
Units	-
Related FW	standard v3.2.0
Description	The value indicates the current load shedding stage. 0 indicates that the load shedding is not active. See the chapter Load shedding for more details.

13.1.8 Group: Analog CU

13.1.8.1 Value: UBat

Group	Analog CU
Units	V
Related FW	standard v3.2.0
Description	Voltage at the controller power supply terminals.

13.1.8.2 Value: CPU Temp

Group	Analog CU
Units	°C
Related FW	standard v3.2.0
Description	Temperature inside the controller (on the CPU).

13.1.8.3 Value: AIN CU-1

Group	Analog CU
Units	configurable
Related FW	standard v3.2.0
Description	This is the value of the analog input 1 of the controller. Analog inputs are fully configurable so the name and units depend on configuration. In the default configuration the input is used for oil pressure measurement.

13.1.8.4 Value: AIN CU-2

Group	Analog CU
Units	configurable
Related FW	standard v3.2.0
Description	This is the value of the analog input 2 of the controller. Analog inputs are fully configurable so the name and units depend on configuration. In the default configuration the input is used for water temperature measurement.

13.1.8.5 Value: AIN CU-3

Group	Analog CU
Units	configurable
Related FW	standard v3.2.0
Description	This is the value of the analog input 3 of the controller. Analog inputs are fully configurable so the name and units depend on configuration. In the default configuration the input is used for fuel level measurement.

13.1.8.6 Value: AIN CU-4

Group	Analog CU
Units	configurable
Related FW	standard v3.2.0
Description	This is the value of the analog input 4 of the controller. Analog inputs are fully configurable so the name and units depend on configuration. In the default configuration the input is used for fuel level measurement.

13.1.9 Group: Bin inputs CU

13.1.9.1 Value: BIN

Group	Bin inputs CU
Units	-
Related FW	standard v3.2.0
Description	<p>This is a bit array containing status of physical binary inputs of the controller. Bit0 represents BI1, bit1 represents BI2 etc..</p> <p>NOTE:</p> <p>All terminals display binary values in "human-readable" form - from left to right. That means the bit 0 is displayed in the most left position. This is different from common use in computer science, where binary values are displayed from right to left.</p> <p>NOTE:</p> <p>Click on button with "... " to get a clear list of BI names with their corresponding values.</p>

13.1.10 Group: Bin outputs CU

13.1.10.1 Value: BOUT

Group	Bin outputs CU
Units	-
Related FW	standard v3.2.0
Description	<p>This is a bit array containing status of physical binary outputs of the controller. Bit0 represents BO1, bit1 represents BO2 etc..</p> <p>NOTE:</p> <p>All terminals display binary values in "human-readable" form - from left to right. That means the bit 0 is displayed in the most left position. This is different from common use in computer science, where binary values are displayed from right to left.</p> <p>NOTE:</p> <p>Click on button with "... " to get a clear list of BI names with their corresponding values.</p>

13.1.11 Group: Log Bout

13.1.11.1 Value: LogBout 1

Group	Log bout
Units	-
Related FW	standard v3.2.0
Description	<p>This is a bit array containing status of logical binary outputs 1-16 of the controller. Bit0 represents LBO1, bit1 represents LBO2 etc..</p> <p>NOTE:</p> <p>All terminals display binary values in "human-readable" form - from left to right. That means the bit 0 is displayed in the most left position. This is different from common use in computer science, where binary values are displayed from right to left.</p> <p>NOTE:</p> <p>Click on button with "... " to get a clear list of BI names with their corresponding values.</p>

13.1.11.2 Value: LogBout 2

Group	Log bout
Units	-
Related FW	standard v3.2.0
Description	<p>This is a bit array containing status of logical binary outputs 17-32 of the controller. Bit0 represents LBO17, bit1 represents LBO18 etc..</p> <p>NOTE:</p> <p>All terminals display binary values in "human-readable" form - from left to right. That means the bit 0 is displayed in the most left position. This is different from common use in computer science, where binary values are displayed from right to left.</p> <p>NOTE:</p> <p>Click on button with "... " to get a clear list of BI names with their corresponding values.</p>

13.1.11.3 Value: LogBout 3

Group	Log bout
Units	-
Related FW	standard v3.2.0
Description	<p>This is a bit array containing status of logical binary outputs 33-48 of the controller. Bit0 represents LBO33, bit1 represents LBO34 etc..</p> <p>NOTE:</p> <p>All terminals display binary values in "human-readable" form - from left to right. That means the bit 0 is displayed in the most left position. This is different from common use in computer science, where binary values are displayed from right to left.</p> <p>NOTE:</p> <p>Click on button with "... " to get a clear list of BI names with their corresponding values.</p>

13.1.11.4 Value: LogBout 4

Group	Log bout
Units	-
Related FW	standard v3.2.0
Description	<p>This is a bit array containing status of logical binary outputs 49-64 of the controller. Bit0 represents LBO49, bit1 represents LBO50 etc..</p> <p>NOTE:</p> <p>All terminals display binary values in "human-readable" form - from left to right. That means the bit 0 is displayed in the most left position. This is different from common use in computer science, where binary values are displayed from right to left.</p> <p>NOTE:</p> <p>Click on button with "... " to get a clear list of BI names with their corresponding values.</p>

13.1.11.5 Value: LogBout 5

Group	Log bout
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Units	-
Related FW	standard v3.2.0
Description	<p>This is a bit array containing status of logical binary outputs 65-80 of the controller. Bit0 represents LBO65, bit1 represents LBO66 etc..</p> <p>NOTE: All terminals display binary values in "human-readable" form - from left to right. That means the bit 0 is displayed in the most left position. This is different from common use in computer science, where binary values are displayed from right to left.</p> <p>NOTE: Click on button with "..." to get a clear list of BI names with their corresponding values.</p>

13.1.11.6 Value: LogBout 6

Group	Log bout
Units	-
Related FW	standard v3.2.0
Description	<p>This is a bit array containing status of logical binary outputs 81-96 of the controller. Bit0 represents LBO81, bit1 represents LBO82 etc..</p> <p>NOTE: All terminals display binary values in "human-readable" form - from left to right. That means the bit 0 is displayed in the most left position. This is different from common use in computer science, where binary values are displayed from right to left.</p> <p>NOTE: Click on button with "..." to get a clear list of BI names with their corresponding values.</p>

13.1.11.7 Value: LogBout 7

Group	Log bout
Units	-
Related FW	standard v3.2.0

Description	<p>This is a bit array containing status of logical binary outputs 97-113 of the controller. Bit0 represents LBO97, bit1 represents LBO98 etc..</p> <p>NOTE:</p> <p>All terminals display binary values in "human-readable" form - from left to right. That means the bit 0 is displayed in the most left position. This is different from common use in computer science, where binary values are displayed from right to left.</p> <p>NOTE:</p> <p>Click on button with "... " to get a clear list of BI names with their corresponding values.</p>
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13.1.11.8 Value: RemoteControls

Group	Log bout
Units	-
Related FW	standard v3.2.0
Description	<p>This is a bit array containing status of the binary outputs Remote controll ... Remote control8.</p> <p>NOTE:</p> <p>Click on button with "... " to get a clear list of BI names with their corresponding values.</p>

13.1.11.9 Value: ModbusSw1

Group	Log Bout
Units	-
Related FW	standard v3.2.0
Description	<p>This value mirrors the content of what has been written in Modbus register 46337. The same information decomposed to bits can be obtained in logical binary outputs from ModbusSw 1 to ModbusSw 16.</p>

13.1.11.10 Value: ModbusSw2

Group	Log Bout
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Units	-
Related FW	standard v3.2.0
Description	This value mirrors the content of what has been written in Modbus register 46338. The same information decomposed to bits can be obtained in logical binary outputs from ModbusSw 17 to ModbusSw 32 .

13.1.12 Group: Info

13.1.12.1 Value: Controller mode

Group	Info
Units	-
Related FW	standard v3.2.0
Description	This value contains actual controller mode. The controller mode is selected by the setpoint Controller mode but the setpoint position can be overridden by binary inputs Remote OFF , Remote MAN , Remote AUT or Remote TEST .

13.1.12.2 Value: SW Version

Group	Info
Units	-
Related FW	standard v3.2.0
Description	Major and minor firmware version number. E.g. value "2,4" means version 2.4. Release version number is not included.

13.1.12.3 Value: Application

Group	Info
Units	-
Related FW	standard v3.2.0
Description	Code of the application type. E.g. 1 for SPtM, 2 for SPI, 3 for MINT etc. The value is intended for diagnostic purposes.

13.1.12.4 Value: SW Branch

Group	Info
Units	-
Related FW	standard v3.2.0
Description	Firmware branch code. Contains 1 in case of standard branches.

13.1.12.5 Value: PasswordDecode

Group	Info
Units	-
Related FW	standard v3.2.0
Description	This value contains encrypted serial number of the controller and administrator password and is intended for retrieving of the lost password. Send this number together with controller serial number to your distributor if you need to retrieve your password.

13.1.12.6 Value: CAN16

Group	Info
Units	-
Related FW	standard v3.2.0
Description	<p>Bits of this value show "1" if the controller receives messages from the controller which has address corresponding with the bit position. Bit 0 represents address 1 etc. This value contains information about controllers with addresses 1-16.</p> <p>NOTE: The bit which corresponds to the own controller is always set to "1".</p>

13.1.12.7 Value: CAN32

Group	Info
Units	-
Related FW	standard v3.2.0
Description	Bits of this value show "1" if the controller receives messages from the controller which has address corresponding with the bit position. Bit 0

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	<p>represents address 17 etc. This value contains information about controllers with addresses 17-32.</p> <p>NOTE: The bit which corresponds to the own controller is always set to "1".</p>
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13.1.12.8 Value: Reg16

Group	Info
Units	-
Related FW	standard v3.2.0
Description	Bits of this value show "1" if the controller which has address corresponding with the bit position plays active role in the power management. Bit 0 represents address 1 etc. This value contains information about controllers with addresses 1-16.

13.1.12.9 Value: Reg32

Group	Info
Units	-
Related FW	standard v3.2.0
Description	Bits of this value show "1" if the controller which has address corresponding with the bit position plays active role in the power management. Bit 0 represents address 17 etc. This value contains information about controllers with addresses 17-32.

13.1.12.10 Value: GL16

Group	Info
Units	-
Related FW	standard v3.2.0
Description	Bits of this value show "1" if the controller which has address corresponding with the bit position has GCB closed. Bit 0 represents address 1 etc. This value contains information about controllers with addresses 1-16.

13.1.12.11 Value: GL32

Group	Info
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Units	-
Related FW	standard v3.2.0
Description	Bits of this value show "1" if the controller which has address corresponding with the bit position has GCB closed. Bit 0 represents address 1 etc. This value contains information about controllers with addresses 17-32.

13.1.12.12 Value: Breaker state

Group	Info
Units	-
Related FW	standard v3.2.0
Description	Code of the current state of the breaker control. The text representation of each code can be obtained by the procedure described at the value Timer text .

13.1.12.13 Value: Timer text

Group	Info
Units	-
Related FW	standard v3.2.0
Description	<p>Code of the currently running system process timer.</p> <p>The list of this value can be found in the cfg image which can be generated using GenConfing (open archive which you want to inspect and click on <i>File-Generate Cfg Image-Generate Cfg Image (Comm. objects)...</i>). Text file is generated, open it and find the communication object of your interest. According type of the list is found next to the name of the communication object. Search for the name of the list (e.g. LIST#3) and in the lower part of document there is a list of corresponding values included in that particular list.</p> <p>NOTE: Remaining time of the timer is available in the value Timer val.</p>

13.1.12.14 Value: Timer val

Group	Info
Units	-

Related FW	standard v3.2.0
Description	The value contains remaining time of the currently running system process timer. The name of the timer is available in the value Timer text .

13.1.12.15 Value: NextTime1-4

Group	Info
Units	-
Related FW	standard v3.2.0
Description	This value contains time of next activation of the timer block 1-4 (i.e. of the output TimerAct 1-4). The related date is available in the value NextDate1-4 . NOTE: More information about timers is available in the chapter General purpose timers .

13.1.12.16 Value: NextDate1-4

Group	Info
Units	-
Related FW	standard v3.2.0
Description	This value contains date of next activation of the timer block 1-4 (i.e. of the output TimerAct 1-4). The related time is available in the value NextTime1-4 . NOTE: More information about timers is available in the chapter General purpose timers .

13.1.12.17 Value: NextTime5-8

Group	Info
Units	-
Related FW	standard v3.2.0
Description	This value contains time of next activation of the timer block 5-8 (i.e. of the output TimerAct 5-8). The related date is available in the value NextDate5-8 . NOTE: More information about timers is available in the chapter General purpose timers .

	timers.
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13.1.12.18 Value: NextDate5-8

Group	Info
Units	-
Related FW	standard v3.2.0
Description	<p>This value contains date of next activation of the timer block 5-8 (i.e. of the output TimerAct 5-8). The related time is available in the value NextTime5-8.</p> <p>NOTE: More information about timers is available in the chapter General purpose timers.</p>

13.1.12.19 Value: NextTime9-12

Group	Info
Units	-
Related FW	standard v3.2.0
Description	<p>This value contains time of next activation of the timer block 9-12 (i.e. of the output TimerAct 9-12). The related date is available in the value NextDate9-12.</p> <p>NOTE: More information about timers is available in the chapter General purpose timers.</p>

13.1.12.20 Value: NextDate9-12

Group	Info
Units	-
Related FW	standard v3.2.0
Description	<p>This value contains date of next activation of the timer block 9-12 (i.e. of the output TimerAct 9-12). The related time is available in the value NextTime9-12.</p> <p>NOTE:</p>

	More information about timers is available in the chapter General purpose timers .
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13.1.12.21 Value: NextTime13-16

Group	Info
Units	-
Related FW	standard v3.2.0
Description	<p>This value contains time of next activation of the timer block 13-16 (i.e. of the output TimerAct 13-16). The related date is available in the value NextDate13-16.</p> <p>NOTE: More information about timers is available in the chapter General purpose timers.</p>

13.1.12.22 Value: NextDate13-16

Group	Info
Units	-
Related FW	standard v3.2.0
Description	<p>This value contains date of next activation of the timer block 13-16 (i.e. of the output TimerAct 13-16). The related time is available in the value NextTime13-16.</p> <p>NOTE: More information about timers is available in the chapter General purpose timers.</p>

13.1.12.23 Value: AirGate ID

Group	Info
Units	-
Related FW	standard v3.2.0
Description	<p>If the controller is connected to an AirGate server this value displays the ID string assigned by the server. This ID string is to be used in ComAp PC tools (e.g. IntelliMonitor) to specify the respective controller when the connection is</p>

	opened.
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13.1.12.24 Value: AirGate status

Group	Info												
Units	-												
Related FW	standard v3.2.0												
Description	<p>This value displays actual status of the connection to the AirGate server.</p> <table border="1"> <tr> <td>0</td> <td>Not connected to AirGate.</td> </tr> <tr> <td>1</td> <td>Connected, registered, waiting for authorization.</td> </tr> <tr> <td>2</td> <td>Registration denied.</td> </tr> <tr> <td>3</td> <td>Can not register, no free capacity in the server.</td> </tr> <tr> <td>4</td> <td>Can not register, other reason.</td> </tr> <tr> <td>5</td> <td>Connected, registered, authorized.</td> </tr> </table>	0	Not connected to AirGate.	1	Connected, registered, waiting for authorization.	2	Registration denied.	3	Can not register, no free capacity in the server.	4	Can not register, other reason.	5	Connected, registered, authorized.
0	Not connected to AirGate.												
1	Connected, registered, waiting for authorization.												
2	Registration denied.												
3	Can not register, no free capacity in the server.												
4	Can not register, other reason.												
5	Connected, registered, authorized.												

13.1.12.25 Value: Latitude

Group	Info
Units	-
Related FW	standard v3.2.0
Description	<p>This value contains latitude of the controller. This value is obtained from connected IB-NT with active GPS. Time is automatically synchronized as well when succesfull GPS fix is established. If no valid value is available from InternetBridge-NT, value ##### is displayed.</p>

13.1.12.26 Value: Longitude

Group	Info
Units	-
Related FW	standard v3.2.0

Description	This value contains longitude of the controller. This value is obtained from connected IB-NT with active GPS. Time is automatically synchronized as well when succesfull GPS fix is established. If no valid value is available from InternetBridge-NT, value ##### is displayed.
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13.1.13 Group: Statistics

13.1.13.1 Value: Sum MWh

Group	Statistics
Units	MWh
Related FW	standard v3.2.0
Description	<p>In BTB - this value shows always 0.</p> <p>This value shows the total sum of MWh counted from all the genset in the according control group. If two separate control groups are connected by group link this value shows sum of MWh from both connected control groups.</p> <p>NOTE: The counter can be readjusted/reset from IntelliMonitor menu Monitor -> Set statistics.</p>

13.1.13.2 Value: Sum MVAhr

Group	Statistics
Units	-
Related FW	standard v3.2.0
Description	<p>In BTB - this value shows always 0.</p> <p>This value shows the total sum of MVAhr counted from all the genset in the according control group. If two separate control groups are connected by group link this value shows sum of MVAhr from both connected control groups.</p> <p>NOTE: The counter can be readjusted/reset from IntelliMonitor menu Monitor -> Set statistics.</p>

13.1.13.3 Value: BL kWh

Group	Statistics
Units	kWh
Related FW	standard v3.2.0
Description	<p>This value shows the sum of kWh transferred from the busL to busR.</p> <p>NOTE: The counter can be readjusted/reset from IntelliMonitor menu Monitor -> Set statistics.</p>

13.1.13.4 Value: BusL kVAhr

Group	Statistics
Units	-
Related FW	standard v3.2.0
Description	<p>This value shows the sum of kVAhr transferred from the busL to busR.</p> <p>NOTE: The counter can be readjusted/reset from IntelliMonitor menu Monitor -> Set statistics.</p>

13.1.13.5 Value: Bus kVAh

Group	Statistics
Units	kVAh
Related FW	standard v3.2.0
Description	This value shows sum of kVAh that were tranferred through CB.

13.1.13.6 Value: BR kWh

Group	Statistics
Units	kWh
Related FW	standard v3.2.0

Description	<p>This value shows the sum of kWh transferred from the busR to busL.</p> <p>NOTE: The counter can be readjusted/reset from IntelliMonitor menu Monitor -> Set statistics.</p>
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13.1.13.7 Value: M kVAhr E

Group	Statistics
Units	-
Related FW	standard v3.2.0
Description	<p>This value shows the sum of kVAhr transferred from the busR to busL.</p> <p>NOTE: The counter can be readjusted/reset from IntelliMonitor menu Monitor -> Set statistics.</p>

13.1.13.8 Value: PulseCounter 1

Group	Statistics
Units	-
Related FW	standard v3.2.0
Description	<p>This is the value of <i>PulseCounter #1</i> module. See the binary input PulseCounter 1.</p>

13.1.13.9 Value: PulseCounter 2

Group	Statistics
Units	-
Related FW	standard v3.2.0
Description	<p>This is the value of <i>PulseCounter #2</i> module. See the binary input PulseCounter 2.</p>

13.1.13.10 Value: PulseCounter 3

Group	Statistics
Units	-
Related FW	standard v3.2.0
Description	This is the value of <i>PulseCounter #3</i> module. See the binary input PulseCounter 3 .

13.1.13.11 Value: PulseCounter 4

Group	Statistics
Units	-
Related FW	standard v3.2.0
Description	This is the value of <i>PulseCounter #4</i> module. See the binary input PulseCounter 4 .

14 Binary input functions

14.1 Virtual and physical modules

Number of I/O can be extended and project wiring can be reduced using the following extension and virtual modules.

MODULE NAME	BIN	BOUT	AIN	AOUT	NOTE	NUMBER OF MODULES SUPPORTED BY CONTROLLER
Controllers						
IM-NT(C)-BB controller	12	12	3	1	Controller I/O.	-
IM-NT controller	6	6	-	-	Controller I/O.	-
Extension modules						
IGS-PTM	8	8	4	1	Standard I/O extension module.	4
IS-AIN8	-	-	8	-	Standard I/O extension module.	10
I-AOUT8	-	-	-	8	Standard I/O extension module.	4
IS-BIN16/8	16	8	-	-	Standard I/O extension module.	6
IGL-RA15	-	15	-	-	15 Green, Red, Yellow LED panel.	4
Inteli-AIN8	-	-	8+1	-	Standard I/O extension module. One Frequency/Pulse input.	10
Inteli-AIN8TC	-	-	8	-	Standard I/O extension module	10
Inteli-IO8/8	8	8	-	2	Standard I/O extension module	12
Inteli-IO16/0	16	-	-	2	Standard I/O extension module	6
Virtual modules						
VPIO	8	8	-	-	Virtual periphery I/O module.	4
SHBIN	8	-	-	-	SHared (virtual) Binary INput module	6
SHBOUT	-	8	-	-	SHared (virtual) Binary OUTput module	6
SHAIN	-	-	4	-	Shared (virtual) Analog Input module	2

SHAOUT	-	-	-	4	Shared (virtual) Analog OUTput module	2
PLC	x	x	x	x	Programmable (internal) logic module.	1

NOTE:

Maximum number of configured modules (both extension and virtual) is given by available addresses. The numbers in the table are valid in the case that no other modules are configured.

14.2 Table of binary input functions

14.2.1.1 Binary input: BTB feedback

Related FW	standard v3.2.0
Description	<p>This input is used for connection of the normally open feedback contact from the bus tie circuit breaker or contactor. If the input is active, the controller will consider the BTB as closed and vice versa.</p> <ul style="list-style-type: none"> • If the feedback does not respond to a change of the control output BTB close/open within 2s, the alarm <i>BTB Fail</i> will be issued. • If the feedback indicates the BTB has unexpectedly closed without any command given by the control output, the alarm <i>BTB Fail</i> will be issued immediately. • If the feedback indicates the BTB has unexpectedly opened without any command given by the control output, the controller will accept this situation and the following behavior will depend on busL and busR conditions (e.g. if both buses are dead than no alarm is issued).

14.2.1.2 Binary input: BTB fdb neg

Related FW	standard v3.2.0
Description	<p>This input is used for connection of the normally closed feedback contact from the bus tie breaker or contactor. This input is optional and if it is configured, it must be always in inverse position to the normally open input BTB feedback. Maximal allowed time the both inputs are in the same position is 500ms, after this time the alarm <i>BTB Fail</i> is issued.</p>

14.2.1.3 Binary input: REMOTE: Remote OFF

Related FW	standard v3.2.0
Description	<p>The controller is forced into OFF mode while this input is active. The controller will return into the previous mode after the input is deactivated.</p> <p>Use this input if you need to disable the controller temporarily for any reason (maintenance, control from a higher-level automation system etc.).</p>

14.2.1.4 Binary input: REMOTE: Remote MAN

Related FW	standard v3.2.0
Description	<p>The controller is forced into MAN mode while this input is active.</p> <p>NOTE: Programming of firmware and/or configuration is disabled while this input is active, as the programming is allowed in OFF mode only and GenConfig is</p>

	not able to switch the controller to OFF mode while MAN mode is forced by this input.
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14.2.1.5 Binary input: REMOTE: Remote AUT

Related FW	standard v3.2.0
Description	<p>The controller is forced into AUT mode while this input is active.</p> <p>NOTE: Programming of firmware and/or configuration is disabled while this input is active, as the programming is allowed in OFF mode only and GenConfig is not able to switch the controller to OFF mode while AUT mode is forced by this input.</p>

14.2.1.6 Binary input: REMOTE: Remote OFF

Related FW	standard v3.2.0
Description	<p>The controller is forced into OFF mode while this input is active. The controller will return into the previous mode after the input is deactivated.</p> <p>Use this input if you need to disable the controller temporarily for any reason (maintenance, control from a higher-level automation system etc..).</p>

14.2.1.7 Binary input: REMOTE: Remote MAN

Related FW	standard v3.2.0
Description	<p>The controller is forced into MAN mode while this input is active.</p> <p>NOTE: Programming of firmware and/or configuration is disabled while this input is active, as the programming is allowed in OFF mode only and GenConfig is not able to switch the controller to OFF mode while MAN mode is forced by this input.</p>

14.2.1.8 Binary input: REMOTE: Remote AUT

Related FW	standard v3.2.0
Description	<p>The controller is forced into AUT mode while this input is active.</p> <p>NOTE: Programming of firmware and/or configuration is disabled while this input is active, as the programming is allowed in OFF mode only and GenConfig is not able to switch the controller to OFF mode while AUT mode is forced by</p>

	this input.
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14.2.1.9 Binary input: REMOTE: Remote OFF

Related FW	standard v3.2.0
Description	<p>The controller is forced into OFF mode while this input is active. The controller will return into the previous mode after the input is deactivated.</p> <p>Use this input if you need to disable the controller temporarily for any reason (maintenance, control from a higher-level automation system etc..).</p>

14.2.1.10 Binary input: REMOTE: Remote MAN

Related FW	standard v3.2.0
Description	<p>The controller is forced into MAN mode while this input is active.</p> <p>NOTE: Programming of firmware and/or configuration is disabled while this input is active, as the programming is allowed in OFF mode only and GenConfig is not able to switch the controller to OFF mode while MAN mode is forced by this input.</p>

14.2.1.11 Binary input: REMOTE: Remote AUT

Related FW	standard v3.2.0
Description	<p>The controller is forced into AUT mode while this input is active.</p> <p>NOTE: Programming of firmware and/or configuration is disabled while this input is active, as the programming is allowed in OFF mode only and GenConfig is not able to switch the controller to OFF mode while AUT mode is forced by this input.</p>

14.2.1.12 Binary input: AccessLock int

Related FW	standard v3.2.0
Description	<p>This input forces the controller built-in terminal into monitoring mode.</p> <ul style="list-style-type: none"> • Setpoints changes are disabled. • Using control buttons on the panel is disabled even if the controller is in MAN mode.

	<ul style="list-style-type: none"> • Change of controller mode is disabled. <p>NOTE: As the IS-NT and IGS-NT-BB do not have built-in terminal, this input is assigned to the terminal or IntelliVision (display) #1, which is supposed to be directly attached to the controller or mounted close to it.</p>
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14.2.1.13 Binary input: AccessLock D#2

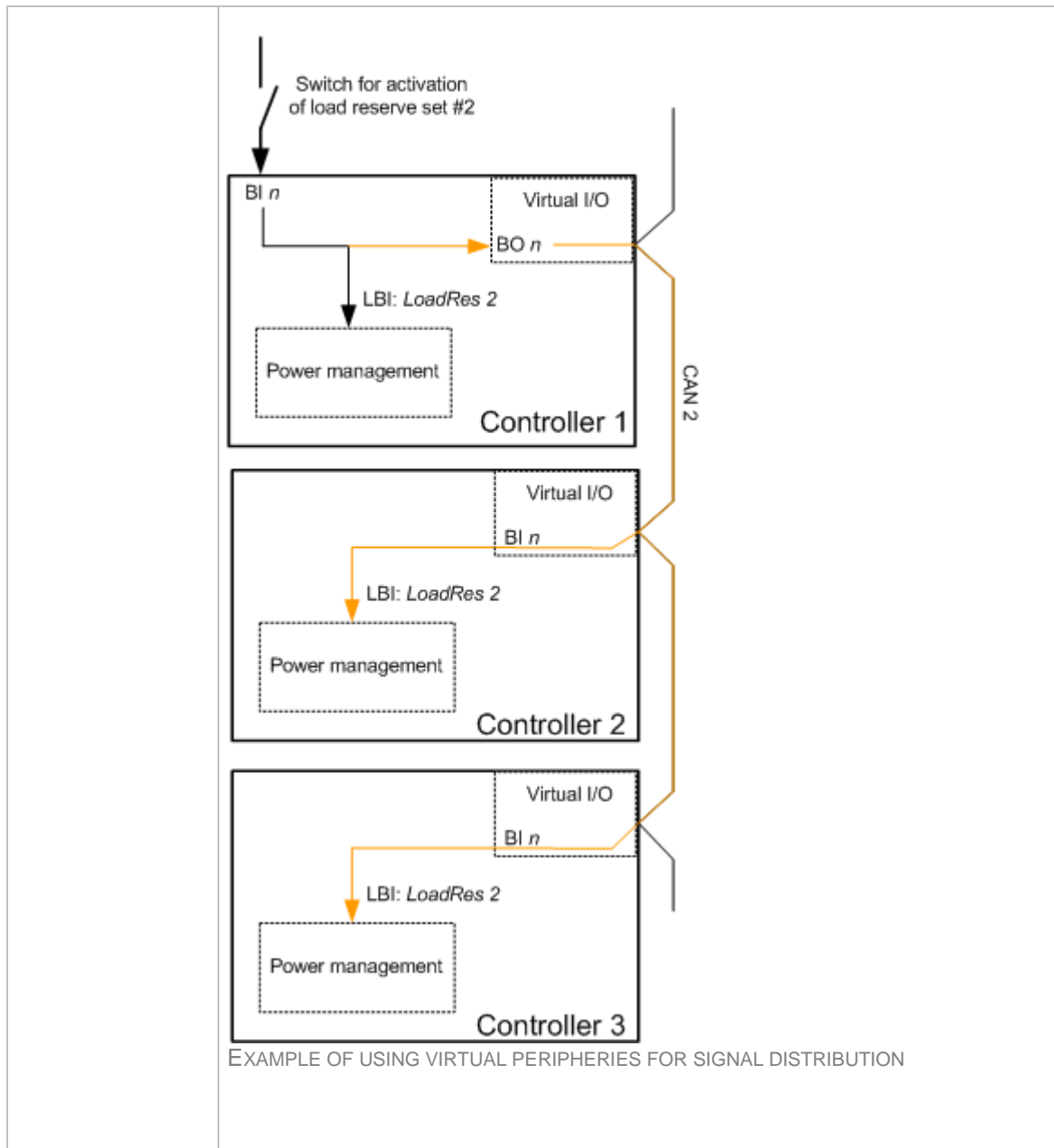
Related FW	standard v3.2.0
Description	<p>This input forces the external local terminal or IntelliVision (display) #2 into monitoring mode.</p> <p>NOTE: Local display means that it is connected to dedicated RS485. There is possibility to connect up to 2 external displays in IG-NT-BB or 1 in IG-NT. It is possible to connect up to 3 external displays in IS-NT-BB and in IS-NT.</p> <ul style="list-style-type: none"> • Setpoints changes are disabled. • Using control buttons on the panel is disabled even if the controller is in MAN mode. • Change of controller mode is disabled.

14.2.1.14 Binary input: AccessLock ext

Related FW	standard v3.2.0
Description	<p>This input forces all external remote terminals into monitoring mode.</p> <ul style="list-style-type: none"> • Setpoints changes are disabled. • Executing commands is disabled. • Change of controller mode is disabled. <p>An external remote terminal is any device, which reads and/or writes data from/into the controller and is connected to the controller via any other communication bus than the dedicated terminal RS485 bus.</p> <p>NOTE: An example of such terminal is a PC with IntelliMonitor, any kind of remote display connected via CAN2 or a PLC connected to the RS485 and communicating via MODBUS.</p>

14.2.1.15 Binary input: Load res 2

Related FW	standard v3.2.0
Description	<p>This input is used to activate the load reserve set #2 instead of the set #1, which is active by default. The set #2 is adjusted by setpoints:</p> <ul style="list-style-type: none"> • #LoadResStrt 2 and #LoadResStop 2 if the power management is switched to absolute mode • #%LdResStrt 2 and #%LdResStop 2 if the power management is switched to relative mode. <p>CAUTION! All controllers cooperating together in Power management must have the same load reserve set selected.</p> <p>NOTE: It is possible to use <i>virtual peripheries</i> for distribution of the binary signal from one physical switch connected to one controller to all other controllers over the CAN bus.</p>



14.2.1.16 Binary input: Load res 3

Related FW	standard v3.2.0
Description	<p>This input is used to activate the load reserve set #3 instead of the set #1, which is active by default. The set #3 is adjusted by setpoints:</p> <ul style="list-style-type: none"> • #LoadResStrt 3 and #LoadResStop 3 if the power management is switched to absolute (kW-based) mode • #%LdResStrt 3 and #%LdResStop 3 if the power management is switched to relative (%Pnom-based) mode. <p>CAUTION! All controllers cooperating together in Power management must have the same load reserve set selected.</p>

	<p>NOTE:</p> <p>It is possible to use <i>virtual peripheries</i> for distribution of the binary signal from one physical switch connected to one controller to all other controllers over the CAN bus. See example in the description of the input Load res 2.</p>
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14.2.1.17 Binary input: Load res 4

Related FW	standard v3.2.0
Description	<p>This input is used to activate the load reserve set #4 instead of the set #1, which is active by default. The set #4 is adjusted by setpoints:</p> <ul style="list-style-type: none"> • #LoadResStrt 4 and #LoadResStop 4 if the power management is switched to absolute (kW-based) mode • #%LdResStrt 4 and #%LdResStop 4 if the power management is switched to relative (%Pnom-based) mode. <p>CAUTION! All controllers cooperating together in Power management must have the same load reserve set selected.</p> <p>NOTE:</p> <p>It is possible to use <i>virtual peripheries</i> for distribution of the binary signal from one physical switch connected to one controller to all other controllers over the CAN bus. See example in the description of the input Load res 2.</p>

14.2.1.18 Binary input: BTB disable

Related FW	standard v3.2.0
Description	<p>The input is used to disable issuing the BTB closing command.</p> <ul style="list-style-type: none"> • If the input is active during synchronizing, the controller will keep Bus Left synchronized with the Bus Right without issuing the BTB closing command until the input is deactivated or Sync timeout is elapsed. • If the input is active and the BTB button is pressed in MAN mode to close the BTB to dead bus, the BTB will not be closed until the input is deactivated and the BTB button pressed again. • If the input is active and the BTB is to be closed to dead bus automatically, the BTB will not be closed until the input is deactivated.

14.2.1.19 Binary input: ManualLdRecon

Related FW	standard v3.2.0
Description	<p>This input is used for manual reconnection of the last disconnected part of the load, if the load has dropped below the setpoint Ld recon level.</p> <p>This input works only if automatic reconnection is disabled, i.e. the setpoint AutoLd recon is set to DISABLED.</p>

14.2.1.20 Binary input: FaultResButton

Related FW	standard v3.2.0
Description	<p>This input is used for an external FAULT RESET button mounted on the switchboard. The function of the input is identical as function of the fault reset button on the controller front panel.</p> <p>The input is enabled only if the setpoint Local Button is set to position EXTBUTTONS or BOTH.</p>

14.2.1.21 Binary input: HornResButton

Related FW	standard v3.2.0
Description	<p>This input is used for an external HORN RESET button mounted on the switchboard. The function of the input is identical as function of the horn reset button on the controller front panel.</p> <p>The input is enabled only if the setpoint Local Button is set to position EXTBUTTONS or BOTH.</p>

14.2.1.22 Binary input: BTBButton

Related FW	standard v3.2.0
Description	<p>This input is used for an external BTB button mounted on the switchboard. The function of the input is identical as function of the BTB button on the controller front panel.</p> <p>The input is enabled only if the setpoint Local Button is set to position EXTBUTTONS or BOTH.</p>

14.2.1.23 Binary input: GroupLink

Related FW	standard v3.2.0
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Description	<p>This input can be mainly used in BTB application. Nonetheless, any IM-NT or IGS-NT controller can be used for group link function even if bus tie breaker is controlled manually or by third party device (only proper feedback from BTB is required).</p> <p>If this input is configured, the group linking function is active, i.e. this controller becomes the status server for two groups of gen-sets and informs them about the BTB status. Closing of this input indicates closing of BTB (i.e. two groups are linked together). Opening of this input indicates opening of BTB (i.e. two groups are working separately).</p> <p>NOTE: This input is intended for connecting to the BTB feedback.</p> <p>For more information see setpoints GroupLinkLeft and GroupLinkRight and the chapter logical groups.</p>
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14.2.1.24 Binary input: Force sync

Related FW	standard v3.2.0
Description	<p>The controller will react on this input only if the setpoint AUT ctrl mode is set to COX(FOLLOW) mode and the controller is in AUT mode.</p> <p>If the input is closed, controller will start to synchronize to the voltages measured at BusL and BusR terminals. The controller keeps BusL and BusR synchronized until this input gets deactivated (Sync timeout does not apply) or the breaker is closed externally. Controller will not close the breaker on itself even though the conditions of synchronism are fulfilled.</p> <p>NOTE: The synchronization will start only if it is allowed by other settings that change synchronization behavior.</p>

14.2.1.25 Binary input: Emerg. manual

Related FW	standard v3.2.0
Description	<p>CAUTION! Since IntelliMains deactivates its regulation loops, it is not possible to use Emerg. manual when IntelliMains has both its breakers closed and the system is running in parallel to Mains. If Emerg. manual needs to be used when the system is in parallel to Mains, make sure that the setpoint SysLdCtrl PtM is set to BASELOAD to prevent gen-sets from running unregulated.</p> <p>CAUTION! Running Hours Equalization and Load Demand Swapping are not active in IntelliMains and if IntelliMains is set to MASTER for these function, no other controller will assume its role eventhough IntelliMains is in Emerg. manual.</p>

The controller is accepting manual control of breakers and other controlled components when the Emerg. manual is active. It deactivates all outputs. This function is also used in case of [redundancy](#) to disable redundant controller.

Controller opens following binary inputs (or if already opened these outputs stay inactive):

BINARY OUTPUTS FOR START AND STOP OF GEN-SET GROUP	Sys start/stop
BINARY OUTPUTS FOR BREAKER CONTROL	MCB close/open, MCB ON coil, MCB OFF coil, MCB UV coil, MGCB ON coil, MGCB OFF coil, MGCB UV coil, BTB close/open, BTB ON coil, BTB OFF coil, BTB UV coil, LCB close/open, LCB ON coil, LCB OFF coil, LCB UV coil
OTHER BINARY OUTPUTS	In synchronism, ReverseSynchro, ForwardSynchro, EnginesSwapped

The output terminals that are configured with inversion are closed. Voltage, current and power measurement is active all the time, regardless of the actual state of the mains. It is possible to influence breaker under IM-NT supervision without Wrn MCB fail or Wrn MGCB fail.

After the binary input EMERG. MANUAL is open again, the controller recovers to the previous mode and behaves according to the actual situation.

Function is active in any controller mode and activation of this input is written to history.

NOTE:

The function is intended especially for Marine gen-sets which are supposed to be started manually while the controller has no power supply. To recover successfully from this state, only the signals MCB ON/OFF coil should be used for mains and breaker control, as the other outputs are continuously active during Mains operation and it is not possible to switch them between more control sources.

	<p>NOTE:</p> <p>In IntelliMains informational outputs SystReady, Syst res OK and other outputs related to the power management are still active in Emerg. manual mode even though IntelliMains does not play active role in power management and load sharing. If there are any user defined functions based on these outputs, blocking those functions (e.g. in PLC) in Emerg. manual mode should be considered.</p>
	<p>CAUTION!</p> <p>Be aware that all outputs related to PLC functions remain functional!</p>

14.2.1.26 Binary input: Alt brightness

Related FW	standard v3.2.0
Description	<p>This input is used to switch the IG-NT built-in terminal (display) to the alternative backlight intensity mode (e.g. "night mode"). The alternative intensity level is adjusted using the display buttons (see the operator guide for details) while this input is active and is stored in the nonvolatile memory.</p> <p>NOTE: A binary input with identical function (not configurable) is located in the power connector of the external IG-Display and IS-Display modules.</p>

14.2.1.27 Binary input: PulseCounter 1

Related FW	standard v3.2.0
Description	<p>This is the input of the <i>PulseCounter #1</i> module. The module counts pulses at the input and if the input pulses counter reaches value given by the setpoint ConvCoefPulse1, the counter value PulseCounter 1 (in the group <i>Statistic</i>) is increased by 1 and input pulses counter is reset to 0. Both counter value and input pulses counter are stored in the nonvolatile memory.</p> <p>The <i>PulseCounter</i> modules are intended e.g. for connecting external energy or fuel meters with pulse outputs.</p> <p>NOTE: Minimal pulse width as well as minimal pause between two successive pulses is 100ms.</p> <p>NOTE: The counter value can be reset in the IntelliMonitor statistics window.</p>

14.2.1.28 Binary input: PulseCounter 2

Related FW	standard v3.2.0
Description	<p>This is the input of the <i>PulseCounter #2</i> module. The module counts pulses at the input and if the input pulses counter reaches value given by the setpoint ConvCoefPulse2, the counter value PulseCounter 2 (in the group <i>Statistic</i>) is increased by 1 and input pulses counter is reset to 0. Both counter value and input pulses counter are stored in the nonvolatile memory.</p> <p>The <i>PulseCounter</i> modules are intended e.g. for connecting external energy or fuel meters with pulse outputs.</p> <p>NOTE: Minimal pulse width as well as minimal pause between two successive pulses is 100ms.</p> <p>NOTE: The counter value can be reset in the IntelliMonitor statistics window.</p>

14.2.1.29 Binary input: PulseCounter 3

Related FW	standard v3.2.0
Description	<p>This is the input of the <i>PulseCounter #3</i> module. The module counts pulses at the input and if the input pulses counter reaches value given by the setpoint ConvCoefPulse3, the counter value PulseCounter 3 (in the group <i>Statistic</i>) is increased by 1 and input pulses counter is reset to 0. Both counter value and input pulses counter are stored in the nonvolatile memory.</p> <p>The <i>PulseCounter</i> modules are intended e.g. for connecting external energy or fuel meters with pulse outputs.</p> <p>NOTE: Minimal pulse width as well as minimal pause between two successive pulses is 100ms.</p> <p>NOTE: The counter value can be reset in the IntelliMonitor statistics window.</p>

14.2.1.30 Binary input: PulseCounter 4

Related FW	standard v3.2.0
Description	<p>This is the input of the <i>PulseCounter #4</i> module. The module counts pulses at the input and if the input pulses counter reaches value given by the setpoint ConvCoefPulse4, the counter value PulseCounter 4 (in the group <i>Statistic</i>) is increased by 1 and input pulses counter is reset to 0. Both counter</p>

	<p>value and input pulses counter are stored in the nonvolatile memory.</p> <p>The <i>PulseCounter</i> modules are intended e.g. for connecting external energy or fuel meters with pulse outputs.</p> <p>NOTE: Minimal pulse width as well as minimal pause between two successive pulses is 100ms.</p> <p>NOTE: The counter value can be reset in the IntelliMonitor statistics window.</p>
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14.2.1.31 Binary input: Timer block 1

Related FW	standard v3.2.0
Description	<p>This input is used to disable temporarily the output from the <i>Timer channel #1</i>.</p> <p>NOTE: See also the setpoint TimerChannel 1 and output TimerAct 1-4.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

14.2.1.32 Binary input: Timer block 2

Related FW	standard v3.2.0
Description	<p>This input is used to disable temporarily the output from the <i>Timer channel #2</i>.</p> <p>NOTE: See also the setpoint TimerChannel 2 and output TimerAct 1-4.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

14.2.1.33 Binary input: Timer block 3

Related FW	standard v3.2.0
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Description	<p>This input is used to disable temporarily the output from the <i>Timer channel #3</i>.</p> <p>NOTE: See also the setpoint TimerChannel 3 and output TimerAct 1-4.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>
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14.2.1.34 Binary input: Timer block 4

Related FW	standard v3.2.0
Description	<p>This input is used to disable temporarily the output from the <i>Timer channel #4</i>.</p> <p>NOTE: See also the setpoint TimerChannel 4 and output TimerAct 1-4.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

14.2.1.35 Binary input: Timer block 5

Related FW	standard v3.2.0
Description	<p>This input is used to disable temporarily the output from the <i>Timer channel #5</i>.</p> <p>NOTE: See also the setpoint TimerChannel 5 and output TimerAct 5-8.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

14.2.1.36 Binary input: Timer block 6

Related FW	standard v3.2.0
Description	<p>This input is used to disable temporarily the output from the <i>Timer channel #6</i>.</p> <p>NOTE:</p>

	See also the setpoint TimerChannel 6 and output TimerAct 5-8 .
	NOTE: See the chapter Timers for more details about timers.

14.2.1.37 Binary input: Timer block 7

Related FW	standard v3.2.0
Description	This input is used to disable temporarily the output from the <i>Timer channel #7</i> . NOTE: See also the setpoint TimerChannel 7 and output TimerAct 5-8 . NOTE: See the chapter Timers for more details about timers.

14.2.1.38 Binary input: Timer block 8

Related FW	standard v3.2.0
Description	This input is used to disable temporarily the output from the <i>Timer channel #8</i> . NOTE: See also the setpoint TimerChannel 8 and output TimerAct 5-8 . NOTE: See the chapter Timers for more details about timers.

14.2.1.39 Binary input: Timer block 9

Related FW	standard v3.2.0
Description	This input is used to disable temporarily the output from the <i>Timer channel #9</i> . NOTE: See also the setpoint TimerChannel 9 and output TimerAct 9-12 .

	<p>NOTE: See the chapter Timers for more details about timers.</p>
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14.2.1.40 Binary input: Timer block 10

Related FW	standard v3.2.0
Description	<p>This input is used to disable temporarily the output from the <i>Timer channel #10</i>.</p> <p>NOTE: See also the setpoint TimerChannel 10 and output TimerAct 9-12.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

14.2.1.41 Binary input: Timer block 11

Related FW	standard v3.2.0
Description	<p>This input is used to disable temporarily the output from the <i>Timer channel #11</i>.</p> <p>NOTE: See also the setpoint TimerChannel 11 and output TimerAct 9-12.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

14.2.1.42 Binary input: Timer block 12

Related FW	standard v3.2.0
Description	<p>This input is used to disable temporarily the output from the <i>Timer channel #12</i>.</p> <p>NOTE: See also the setpoint TimerChannel 12 and output TimerAct 9-12.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

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14.2.1.43 Binary input: Timer block 13

Related FW	standard v3.2.0
Description	<p>This input is used to disable temporarily the output from the <i>Timer channel</i> #13.</p> <p>NOTE: See also the setpoint TimerChannel 13 and output TimerAct 13-16.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

14.2.1.44 Binary input: Timer block 14

Related FW	standard v3.2.0
Description	<p>This input is used to disable temporarily the output from the <i>Timer channel</i> #14.</p> <p>NOTE: See also the setpoint TimerChannel 14 and output TimerAct 13-16.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

14.2.1.45 Binary input: Timer block 15

Related FW	standard v3.2.0
Description	<p>This input is used to disable temporarily the output from the <i>Timer channel</i> #15.</p> <p>NOTE: See also the setpoint TimerChannel 15 and output TimerAct 13-16.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

14.2.1.46 Binary input: Timer block 16

Related FW	standard v3.2.0
Description	<p>This input is used to disable temporarily the output from the <i>Timer channel #16</i>.</p> <p>NOTE: See also the setpoint TimerChannel 16 and output TimerAct 13-16.</p> <p>NOTE: See the chapter Timers for more details about timers.</p>

14.2.1.47 Binary input: ExtValue 1 up

Related FW	standard v3.2.0
Description	<p>While this input is active the value of <i>ExtValue 1</i> is continuously being increased at the rate of ExtValue1 rate until it reaches ExtValue1HiLim.</p> <p>NOTE: If this input is used (configured), the <i>ExtValue 1</i> can't be written remotely from a remote terminal using the command <i>ExtValue 1</i>.</p>

14.2.1.48 Binary input: ExtValue 1 down

Related FW	standard v3.2.0
Description	<p>While this input is active the value of <i>ExtValue 1</i> is continuously being decreased at the rate of ExtValue1 rate until it reaches ExtValue1LoLim.</p> <p>NOTE: If this input is used (configured), the <i>ExtValue 1</i> can't be written remotely from a remote terminal using the command <i>ExtValue 1</i>.</p>

14.2.1.49 Binary input: ExtValue 2 up

Related FW	standard v3.2.0
Description	<p>While this input is active the value of <i>ExtValue 2</i> is continuously being increased at the rate of ExtValue2 rate until it reaches ExtValue2HiLim.</p> <p>NOTE: If this input is used (configured), the <i>ExtValue 2</i> can't be written remotely from a remote terminal using the command <i>ExtValue 2</i>.</p>

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14.2.1.50 Binary input: ExtValue2 down

Related FW	standard v3.2.0
Description	<p>While this input is active the value of <i>ExtValue 2</i> is continuously being decreased at the rate of ExtValue2 rate until it reaches ExtValue2LoLim.</p> <p>NOTE: If this input is used (configured), the <i>ExtValue 2</i> can't be written remotely from a remote terminal using the command <i>ExtValue 2</i>.</p>

14.2.1.51 Binary input: ExtValue3 up

Related FW	standard v3.2.0
Description	<p>While this input is active the value of <i>ExtValue 3</i> is continuously being increased at the rate of ExtValue3 rate until it reaches ExtValue3HiLim.</p> <p>NOTE: If this input is used (configured), the <i>ExtValue 3</i> can't be written remotely from a remote terminal using the command <i>ExtValue 3</i>.</p>

14.2.1.52 Binary input: ExtValue3 down

Related FW	standard v3.2.0
Description	<p>While this input is active the value of <i>ExtValue 3</i> is continuously being decreased at the rate of ExtValue3 rate until it reaches ExtValue3LoLim.</p> <p>NOTE: If this input is used (configured), the <i>ExtValue 3</i> can't be written remotely from a remote terminal using the command <i>ExtValue 3</i>.</p>

14.2.1.53 Binary input: ExtValue4 up

Related FW	standard v3.2.0
Description	<p>While this input is active the value of <i>ExtValue 4</i> is continuously being increased at the rate of ExtValue4 rate until it reaches ExtValue4HiLim.</p> <p>NOTE: If this input is used (configured), the <i>ExtValue 4</i> can't be written remotely from a remote terminal using the command <i>ExtValue 4</i>.</p>

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14.2.1.54 Binary input: ExtValue4 down

Related FW	standard v3.2.0
Description	<p>While this input is active the value of <i>ExtValue 4</i> is continuously being decreased at the rate of ExtValue4 rate until it reaches ExtValue4LoLim.</p> <p>NOTE: If this input is used (configured), the <i>ExtValue 4</i> can't be written remotely from a remote terminal using the command <i>ExtValue 4</i>.</p>

14.2.1.55 Binary input: ExtValue1reset

Related FW	standard v3.2.0
Description	<p>The <i>ExtValue 1</i> is reset to its default value when this input is activated and held there until the input is deactivated. The default value is given by the setpoint ExtValue1deflt.</p> <p>While the reset input is active:</p> <ul style="list-style-type: none"> • The value does not respond to up and down inputs. • The value does not accept new data that are written remotely from a remote terminal using the <i>ExtValue</i> command. <p>NOTE: Configuring of the reset input does not block writing the <i>ExtValue</i> remotely, in comparison to the up and down inputs, which does. However, if the reset input is active, the remotely written data are not accepted.</p>

14.2.1.56 Binary input: ExtValue2reset

Related FW	standard v3.2.0
Description	<p>The <i>ExtValue 2</i> is reset to its default value when this input is activated and held there until the input is deactivated. The default value is given by the setpoint ExtValue2deflt.</p> <p>While the reset input is active:</p> <ul style="list-style-type: none"> • The value does not respond to up and down inputs. • The value does not accept new data that are written remotely from a remote terminal using the <i>ExtValue</i> command. <p>NOTE: Configuring of the reset input does not block writing the <i>ExtValue</i> remotely, in</p>

	comparison to the up and down inputs, which does. However, if the reset input is active, the remotely written data are not accepted.
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14.2.1.57 Binary input: ExtValue3reset

Related FW	standard v3.2.0
Description	<p>The <i>ExtValue 3</i> is reset to its default value when this input is activated and held there until the input is deactivated. The default value is given by the setpoint ExtValue3defilt.</p> <p>While the reset input is active:</p> <ul style="list-style-type: none"> • The value does not respond to up and down inputs. • The value does not accept new data that are written remotely from a remote terminal using the <i>ExtValue</i> command. <p>NOTE: Configuring of the reset input does not block writing the ExtValue remotely, in comparison to the up and down inputs, which does. However, if the reset input is active, the remotely written data are not accepted.</p>

14.2.1.58 Binary input: ExtValue4reset

Related FW	standard v3.2.0
Description	<p>The <i>ExtValue 4</i> is reset to its default value when this input is activated and held there until the input is deactivated. The default value is given by the setpoint ExtValue4defilt.</p> <p>While the reset input is active:</p> <ul style="list-style-type: none"> • The value does not respond to up and down inputs. • The value does not accept new data that are written remotely from a remote terminal using the <i>ExtValue</i> command. <p>NOTE: Configuring of the reset input does not block writing the ExtValue remotely, in comparison to the up and down inputs, which does. However, if the reset input is active, the remotely written data are not accepted.</p>

14.2.1.59 Binary input: IssueActCallC1

Related FW	standard v3.2.0
Description	This input forces the controller to issue an active call/e-mail/SMS via the

	<p>channel #1. Type of the channel is to be adjusted by the setpoint AcallCH1-Type.</p> <p>This input can be used to inform a remote user about a specific non-alarm situation, e.g. mains failure and/or mains return:</p> <ol style="list-style-type: none"> 1. Select a binary signal in the controller, which indicates, that the particular situation occurred, about which you want to be informed remotely. There are many predefined binary informations provided directly by the controller or use PLC functions to create the desired binary signal. 2. Configure an universal protection block to the binary signal mentioned above and select protection type <i>AL indication</i>. 3. Configure the binary signal mentioned above onto the logical binary input <i>IssueActCallC1</i>.
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14.2.1.60 Binary input: IssueActCallC2

Related FW	standard v3.2.0
Description	<p>This input forces the controller to issue an active call/e-mail/SMS via the channel #2. Type of the channel is to be adjusted by the setpoint AcallCH2-Type.</p> <p>This input can be used to inform a remote user about a specific non-alarm situation, e.g. mains failure and/or mains return:</p> <ol style="list-style-type: none"> 1. Select a binary signal in the controller, which indicates, that the particular situation occurred, about which you want to be informed remotely. There are many predefined binary informations provided directly by the controller or use PLC functions to create the desired binary signal. 2. Configure an universal protection block to the binary signal mentioned above and select protection type <i>AL indication</i>. 3. Configure the binary signal mentioned above onto the logical binary input <i>IssueActCallC2</i>.

14.2.1.61 Binary input: IssueActCallC3

Related FW	standard v3.2.0
Description	<p>This input forces the controller to issue an active call/e-mail/SMS via the channel #3. Type of the channel is to be adjusted by the setpoint AcallCH3-Type.</p> <p>This input can be used to inform a remote user about a specific non-alarm situation, e.g. mains failure and/or mains return:</p> <ol style="list-style-type: none"> 1. Select a binary signal in the controller, which indicates, that the particular situation occurred, about which you want to be informed remotely. There are many predefined binary informations provided directly by the controller or use PLC functions to create the desired

	binary signal. 2. Configure an universal protection block to the binary signal mentioned above and select protection type <i>AL indication</i> . 3. Configure the binary signal mentioned above onto the logical binary input <i>IssueActCallC3</i> .
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14.2.1.62 Binary input: Time stamp act

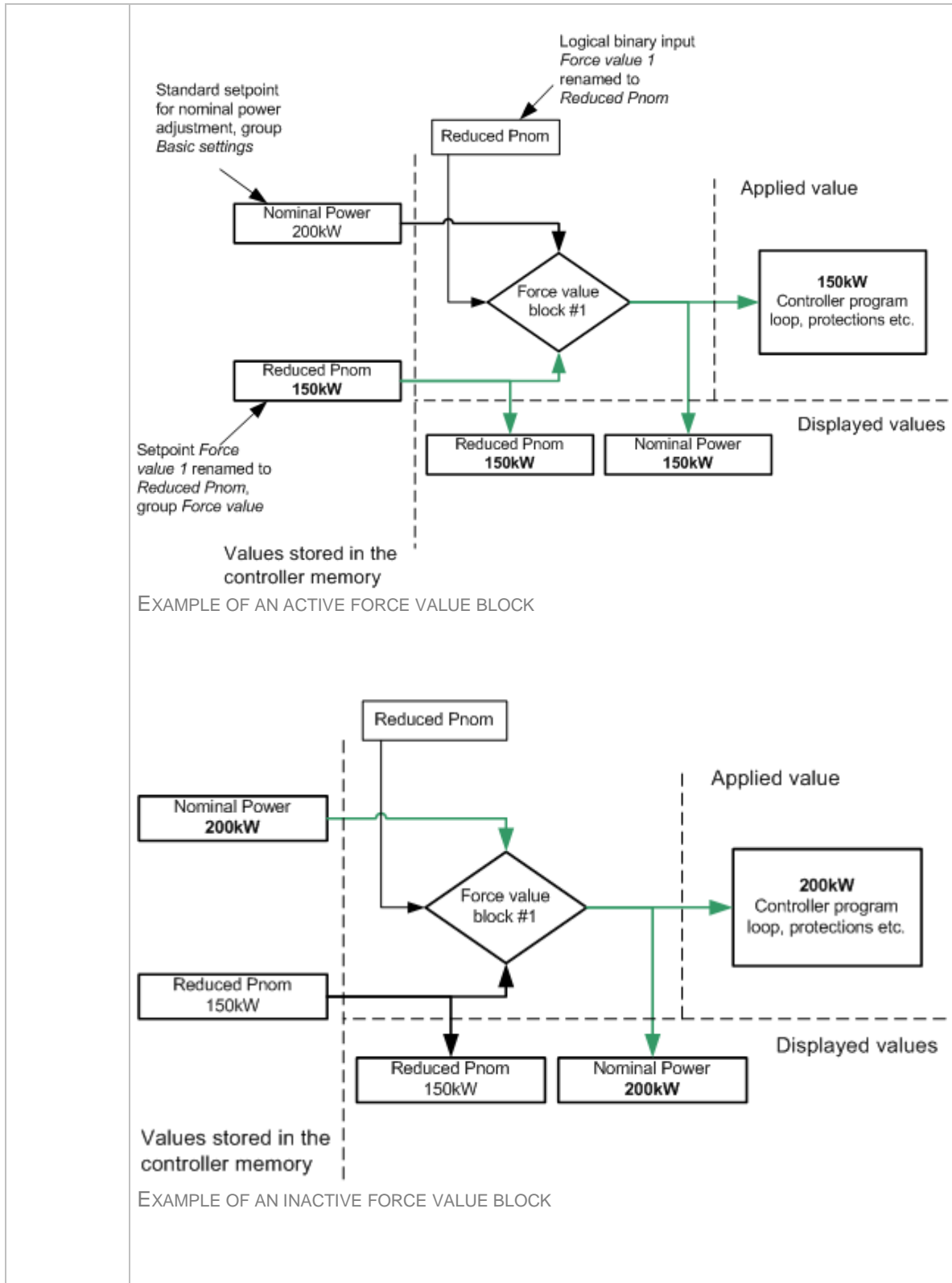
Related FW	standard v3.2.0
Description	Binary input activates time stamp writing to history depending on Date/Time: Time stamp act and Time Stamp Per setpoints.

14.2.1.63 Binary input: CtrlHBeat sens

Related FW	standard v3.2.0
Description	<p>This input is used at a redundant controller to sense the "heart beat" from the main controller. The input is to be connected to the output CtrlHeartBeat of the main controller.</p> <p>If the redundant controller does not sense the heart beat from the main one, it will activate the binary output CtrlHBeat FD, which has to be wired in such a way, that it disconnects the dead main controller, connects the redundant controller instead and activates it.</p> <p>NOTE: Learn more about redundancy in separate chapter Redundant controllers.</p>

14.2.1.64 Binary input: ForceValueIn 1

Related FW	standard v3.2.0
Description	<p>This input activates the <i>Force value #1</i> block. If the input is active, the value of the setpoint, to which the Force value #1 block is configured, will be overridden by value of the alternative setpoint assigned to the Force value #1 block.</p> <p>NOTE: If there are more than one force value blocks configured onto one setpoint then the highest priority has the block with the lowest index (i.e. the first active block according to the list displayed in GenConfig in the Force value window at the related setpoint).</p> <p>NOTE: Watch a training video about force value function here: http://www.comap.cz/support/training/training-videos/.</p>



14.2.1.65 Binary input: ForceValueIn 2

Related FW	standard v3.2.0
Description	This input activates the <i>Force value #2</i> block. If the input is active, the value

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	<p>of the setpoint, to which the Force value #2 block is configured, will be overridden by value of the alternative setpoint assigned to the Force value #2 block.</p> <p>NOTE: If there are more than one force value blocks configured onto one setpoint then the highest priority has the block with the lowest index (i.e. the first active block according to the list displayed in GenConfig in the Force value window at the related setpoint).</p> <p>NOTE: Watch a training video about force value function here: http://www.comap.cz/support/training/training-videos/.</p> <p>NOTE: See an example in the description of the binary input Force value 1.</p>
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14.2.1.66 Binary input: ForceValueIn 3

Related FW	standard v3.2.0
Description	<p>This input activates the <i>Force value #3</i> block. If the input is active, the value of the setpoint, to which the Force value #3 block is configured, will be overridden by value of the alternative setpoint assigned to the Force value #3 block.</p> <p>NOTE: If there are more than one force value blocks configured onto one setpoint then the highest priority has the block with the lowest index (i.e. the first active block according to the list displayed in GenConfig in the Force value window at the related setpoint).</p> <p>NOTE: Watch a training video about force value function here: http://www.comap.cz/support/training/training-videos/.</p> <p>NOTE: See an example in the description of the binary input Force value 1.</p>

14.2.1.67 Binary input: ForceValueIn 4

Related FW	standard v3.2.0
Description	<p>This input activates the <i>Force value #4</i> block. If the input is active, the value of the setpoint, to which the Force value #4 block is configured, will be</p>

	<p>overridden by value of the alternative setpoint assigned to the Force value #4 block.</p> <p>NOTE: If there are more than one force value blocks configured onto one setpoint then the highest priority has the block with the lowest index (i.e. the first active block according to the list displayed in GenConfig in the Force value window at the related setpoint).</p> <p>NOTE: Watch a training video about force value function here: http://www.comap.cz/support/training/training-videos/.</p> <p>NOTE: See an example in the description of the binary input Force value 1.</p>
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14.2.1.68 Binary input: ForceValueIn 5

Related FW	standard v3.2.0
Description	<p>This input activates the <i>Force value #5</i> block. If the input is active, the value of the setpoint, to which the Force value #5 block is configured, will be overridden by value of the alternative setpoint assigned to the Force value #5 block.</p> <p>NOTE: If there are more than one force value blocks configured onto one setpoint then the highest priority has the block with the lowest index (i.e. the first active block according to the list displayed in GenConfig in the Force value window at the related setpoint).</p> <p>NOTE: Watch a training video about force value function here: http://www.comap.cz/support/training/training-videos/.</p> <p>NOTE: See an example in the description of the binary input Force value 1.</p>

14.2.1.69 Binary input: ForceValueIn 6

Related FW	standard v3.2.0
Description	<p>This input activates the <i>Force value #6</i> block. If the input is active, the value of the setpoint, to which the Force value #6 block is configured, will be overridden by value of the alternative setpoint assigned to the Force value #6</p>

	<p>block.</p> <p>NOTE: If there are more than one force value blocks configured onto one setpoint then the highest priority has the block with the lowest index (i.e. the first active block according to the list displayed in GenConfig in the Force value window at the related setpoint).</p> <p>NOTE: Watch a training video about force value function here: http://www.comap.cz/support/training/training-videos/.</p> <p>NOTE: See an example in the description of the binary input Force value 1.</p>
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14.2.1.70 Binary input: ForceValueIn 7

Related FW	standard v3.2.0
Description	<p>This input activates the <i>Force value #7</i> block. If the input is active, the value of the setpoint, to which the Force value #7 block is configured, will be overridden by value of the alternative setpoint assigned to the Force value #7 block.</p> <p>NOTE: If there are more than one force value blocks configured onto one setpoint then the highest priority has the block with the lowest index (i.e. the first active block according to the list displayed in GenConfig in the Force value window at the related setpoint).</p> <p>NOTE: Watch a training video about force value function here: http://www.comap.cz/support/training/training-videos/.</p> <p>NOTE: See an example in the description of the binary input Force value 1.</p>

14.2.1.71 Binary input: ForceValueIn 8

Related FW	standard v3.2.0
Description	<p>This input activates the <i>Force value #8</i> block. If the input is active, the value of the setpoint, to which the Force value #8 block is configured, will be overridden by value of the alternative setpoint assigned to the Force value #8</p>

	<p>block.</p> <p>NOTE: If there are more than one force value blocks configured onto one setpoint then the highest priority has the block with the lowest index (i.e. the first active block according to the list displayed in GenConfig in the Force value window at the related setpoint).</p> <p>NOTE: Watch a training video about force value function here: http://www.comap.cz/support/training/training-videos/.</p> <p>NOTE: See an example in the description of the binary input Force value 1.</p>
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14.2.1.72 Binary input: ForceValueIn 9

Related FW	standard v3.2.0
Description	<p>This input activates the <i>Force value #9</i> block. If the input is active, the value of the setpoint, to which the Force value #9 block is configured, will be overridden by value of the alternative setpoint assigned to the Force value #9 block.</p> <p>NOTE: If there are more than one force value blocks configured onto one setpoint then the highest priority has the block with the lowest index (i.e. the first active block according to the list displayed in GenConfig in the Force value window at the related setpoint).</p> <p>NOTE: Watch a training video about force value function here: http://www.comap.cz/support/training/training-videos/.</p> <p>NOTE: See an example in the description of the binary input Force value 1.</p>

14.2.1.73 Binary input: ForceValueIn10

Related FW	standard v3.2.0
Description	<p>This input activates the <i>Force value #10</i> block. If the input is active, the value of the setpoint, to which the Force value #10 block is configured, will be overridden by value of the alternative setpoint assigned to the Force value #10</p>

	<p>block.</p> <p>NOTE: If there are more than one force value blocks configured onto one setpoint then the highest priority has the block with the lowest index (i.e. the first active block according to the list displayed in GenConfig in the Force value window at the related setpoint).</p> <p>NOTE: Watch a training video about force value function here: http://www.comap.cz/support/training/training-videos/.</p> <p>NOTE: See an example in the description of the binary input Force value 1.</p>
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14.2.1.74 Binary input: ForceValueIn11

Related FW	standard v3.2.0
Description	<p>This input activates the <i>Force value #11</i> block. If the input is active, the value of the setpoint, to which the Force value #11 block is configured, will be overridden by value of the alternative setpoint assigned to the Force value #11 block.</p> <p>NOTE: If there are more than one force value blocks configured onto one setpoint then the highest priority has the block with the lowest index (i.e. the first active block according to the list displayed in GenConfig in the Force value window at the related setpoint).</p> <p>NOTE: Watch a training video about force value function here: http://www.comap.cz/support/training/training-videos/.</p> <p>NOTE: See an example in the description of the binary input Force value 1.</p>

14.2.1.75 Binary input: ForceValueIn12

Related FW	standard v3.2.0
Description	<p>This input activates the <i>Force value #12</i> block. If the input is active, the value of the setpoint, to which the Force value #12 block is configured, will be overridden by value of the alternative setpoint assigned to the Force value #12</p>

	<p>block.</p> <p>NOTE: If there are more than one force value blocks configured onto one setpoint then the highest priority has the block with the lowest index (i.e. the first active block according to the list displayed in GenConfig in the Force value window at the related setpoint).</p> <p>NOTE: Watch a training video about force value function here: http://www.comap.cz/support/training/training-videos/.</p> <p>NOTE: See an example in the description of the binary input Force value 1.</p>
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14.2.1.76 *Binary input: ForceValueIn13*

Related FW	standard v3.2.0
Description	<p>This input activates the <i>Force value #13</i> block. If the input is active, the value of the setpoint, to which the Force value #13 block is configured, will be overridden by value of the alternative setpoint assigned to the Force value #13 block.</p> <p>NOTE: If there are more than one force value blocks configured onto one setpoint then the highest priority has the block with the lowest index (i.e. the first active block according to the list displayed in GenConfig in the Force value window at the related setpoint).</p> <p>NOTE: Watch a training video about force value function here: http://www.comap.cz/support/training/training-videos/.</p> <p>NOTE: See an example in the description of the binary input Force value 1.</p>

14.2.1.77 *Binary input: ForceValueIn14*

Related FW	standard v3.2.0
Description	<p>This input activates the <i>Force value #14</i> block. If the input is active, the value of the setpoint, to which the Force value #14 block is configured, will be overridden by value of the alternative setpoint assigned to the Force value #14</p>

	<p>block.</p> <p>NOTE: If there are more than one force value blocks configured onto one setpoint then the highest priority has the block with the lowest index (i.e. the first active block according to the list displayed in GenConfig in the Force value window at the related setpoint).</p> <p>NOTE: Watch a training video about force value function here: http://www.comap.cz/support/training/training-videos/.</p> <p>NOTE: See an example in the description of the binary input Force value 1.</p>
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14.2.1.78 Binary input: ForceValueIn15

Related FW	standard v3.2.0
Description	<p>This input activates the <i>Force value #15</i> block. If the input is active, the value of the setpoint, to which the Force value #15 block is configured, will be overridden by value of the alternative setpoint assigned to the Force value #15 block.</p> <p>NOTE: If there are more than one force value blocks configured onto one setpoint then the highest priority has the block with the lowest index (i.e. the first active block according to the list displayed in GenConfig in the Force value window at the related setpoint).</p> <p>NOTE: Watch a training video about force value function here: http://www.comap.cz/support/training/training-videos/.</p> <p>NOTE: See an example in the description of the binary input Force value 1.</p>

14.2.1.79 Binary input: ForceValueIn16

Related FW	standard v3.2.0
Description	<p>This input activates the <i>Force value #16</i> block. If the input is active, the value of the setpoint, to which the Force value #16 block is configured, will be overridden by value of the alternative setpoint assigned to the Force value #16</p>

	<p>block.</p> <p>NOTE: If there are more than one force value blocks configured onto one setpoint then the highest priority has the block with the lowest index (i.e. the first active block according to the list displayed in GenConfig in the Force value window at the related setpoint).</p> <p>NOTE: Watch a training video about force value function here: http://www.comap.cz/support/training/training-videos/.</p> <p>NOTE: See an example in the description of the binary input Force value 1.</p>
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14.2.1.80 *Binary input: Force block 1*

Related FW	standard v3.2.0
Description	This is one of three binary inputs used for user-defined blocking of protections. If the input is active, all the protections that have <i>Protection block type</i> configured as <i>Force block 1</i> block type are blocked (i.e. temporarily disabled).

14.2.1.81 *Binary input: Force block 2*

Related FW	standard v3.2.0
Description	This is one of three binary inputs used for user-defined blocking of protections. If the input is active, all the protections that have <i>Protection block type</i> configured as <i>Force block 2</i> block type are blocked (i.e. temporarily disabled).

14.2.1.82 *Binary input: Force block 3*

Related FW	standard v3.2.0
Description	This is one of three binary inputs used for user-defined blocking of protections. If the input is active, all the protections that have <i>Protection block type</i> configured as <i>Force block 3</i> block type are blocked (i.e. temporarily disabled).

14.2.1.83 Binary input: Lang sel int A

Related FW	standard v3.2.0																																				
Description	<p>This is one of three binary inputs Lang sel int A, Lang sel int B, Lang sel int C, used for selecting language of the built-in IG-NT terminal (display). As the IS-NT does not have built-in terminal, this input is assigned to the terminal (display) #1, which is supposed to be directly attached to the controller or mounted close to it.</p> <p>NOTE: Using these inputs for language selection is an option only. If the inputs are not configured, the language can be selected using the menus on the terminal.</p> <p>ENCODING TABLE</p> <table border="1"> <thead> <tr> <th>LANGUAGE INDEX</th> <th>INPUT A</th> <th>INPUT B</th> <th>INPUT C</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>2</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>3</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>4</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>5</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>6</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>7</td><td>1</td><td>1</td><td>1</td></tr> </tbody> </table> <p>NOTE: "0" in the table means the input is not active or not configured.</p> <p>NOTE: Language index 0 selects the default language of the terminal, i.e. the language, which is adjusted in the terminal using it's menus.</p> <p>NOTE: The reaction on changes of these inputs is delayed about 1 sec to ensure the new combination is valid (e.g. if a rotary selector switch is used).</p> <p>CAUTION!</p>	LANGUAGE INDEX	INPUT A	INPUT B	INPUT C	0	0	0	0	1	1	0	0	2	0	1	0	3	1	1	0	4	0	0	1	5	1	0	1	6	0	1	1	7	1	1	1
LANGUAGE INDEX	INPUT A	INPUT B	INPUT C																																		
0	0	0	0																																		
1	1	0	0																																		
2	0	1	0																																		
3	1	1	0																																		
4	0	0	1																																		
5	1	0	1																																		
6	0	1	1																																		
7	1	1	1																																		

	Each language change causes the reinitialization of the display. Function of the controller is not influenced.
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14.2.1.84 Binary input: Lang sel int B

Related FW	standard v3.2.0																																				
Description	<p>This is one of three binary inputs Lang sel int A, Lang sel int B, Lang sel int C, used for selecting language of the built-in IG-NT terminal (display). As the IS-NT does not have built-in terminal, this input is assigned to the terminal (display) #1, which is supposed to be directly attached to the controller or mounted close to it.</p> <p>NOTE: Using these inputs for language selection is an option only. If the inputs are not configured, the language can be selected using the menus on the terminal.</p> <p>ENCODING TABLE</p> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr style="background-color: #cccccc;"> <th>LANGUAGE INDEX</th> <th>INPUT A</th> <th>INPUT B</th> <th>INPUT C</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>2</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>3</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>4</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>5</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>6</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>7</td><td>1</td><td>1</td><td>1</td></tr> </tbody> </table> <p>NOTE: "0" in the table means the input is not active or not configured.</p> <p>NOTE: Language index 0 selects the default language of the terminal, i.e. the language, which is adjusted in the terminal using it's menus.</p>	LANGUAGE INDEX	INPUT A	INPUT B	INPUT C	0	0	0	0	1	1	0	0	2	0	1	0	3	1	1	0	4	0	0	1	5	1	0	1	6	0	1	1	7	1	1	1
LANGUAGE INDEX	INPUT A	INPUT B	INPUT C																																		
0	0	0	0																																		
1	1	0	0																																		
2	0	1	0																																		
3	1	1	0																																		
4	0	0	1																																		
5	1	0	1																																		
6	0	1	1																																		
7	1	1	1																																		

NOTE:
The reaction on changes of these inputs is delayed about 1 sec to ensure the new combination is valid (e.g. if a rotary selector switch is used).
CAUTION!
Each language change causes the reinitialization of the display. Function of the controller is not influenced.

14.2.1.85 Binary input: Lang sel int C

Related FW	standard v3.2.0																																				
Description	<p>This is one of three binary inputs Lang sel int A, Lang sel int B, Lang sel int C, used for selecting language of the built-in IG-NT terminal (display). As the IS-NT does not have built-in terminal, this input is assigned to the terminal (display) #1, which is supposed to be directly attached to the controller or mounted close to it.</p> <p style="background-color: #e0e0e0;">NOTE: Using these inputs for language selection is an option only. If the inputs are not configured, the language can be selected using the menus on the terminal.</p> <p>ENCODING TABLE</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #e0e0e0;"> <th>LANGUAGE INDEX</th> <th>INPUT A</th> <th>INPUT B</th> <th>INPUT C</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>2</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>3</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>4</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>5</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>6</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>7</td><td>1</td><td>1</td><td>1</td></tr> </tbody> </table> <p style="background-color: #e0e0e0;">NOTE: "0" in the table means the input is not active or not configured.</p>	LANGUAGE INDEX	INPUT A	INPUT B	INPUT C	0	0	0	0	1	1	0	0	2	0	1	0	3	1	1	0	4	0	0	1	5	1	0	1	6	0	1	1	7	1	1	1
LANGUAGE INDEX	INPUT A	INPUT B	INPUT C																																		
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5	1	0	1																																		
6	0	1	1																																		
7	1	1	1																																		

	<p>NOTE: Language index 0 selects the default language of the terminal, i.e. the language, which is adjusted in the terminal using it's menus.</p> <p>NOTE: The reaction on changes of these inputs is delayed about 1 sec to ensure the new combination is valid (e.g. if a rotary selector switch is used).</p> <p>CAUTION! Each language change causes the reinitialization of the display. Function of the controller is not influenced.</p>
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14.2.1.86 Binary input: Lang sel D#2 A

Related FW	standard v3.2.0																																				
Description	<p>This is one of three binary inputs Lang sel D#2 A, Lang sel D#2 B, Lang sel D#2 C, used for selecting language of the external local terminal #2.</p> <p>NOTE: Using these inputs for language selection is an option only. If the inputs are not configured, the language can be selected using the menus on the terminal.</p> <p>ENCODING TABLE</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #cccccc;"> <th>LANGUAGE INDEX</th> <th>INPUT A</th> <th>INPUT B</th> <th>INPUT C</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>2</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>3</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>4</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>5</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>6</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>7</td><td>1</td><td>1</td><td>1</td></tr> </tbody> </table>	LANGUAGE INDEX	INPUT A	INPUT B	INPUT C	0	0	0	0	1	1	0	0	2	0	1	0	3	1	1	0	4	0	0	1	5	1	0	1	6	0	1	1	7	1	1	1
LANGUAGE INDEX	INPUT A	INPUT B	INPUT C																																		
0	0	0	0																																		
1	1	0	0																																		
2	0	1	0																																		
3	1	1	0																																		
4	0	0	1																																		
5	1	0	1																																		
6	0	1	1																																		
7	1	1	1																																		

	<p>NOTE:</p> <p>"0" in the table means the input is not active or not configured.</p>
	<p>NOTE:</p> <p>Language index 0 selects the default language of the terminal, i.e. the language, which is adjusted in the terminal using it's menus.</p>
	<p>NOTE:</p> <p>The reaction on changes of these inputs is delayed about 1 sec to ensure the new combination is valid (e.g. if a rotary selector switch is used).</p>
	<p>CAUTION!</p> <p>Each language change causes the reinitialization of the display. Function of the controller is not influenced.</p>

14.2.1.87 Binary input: Lang sel D#2 B

Related FW	standard v3.2.0																												
Description	<p>This is one of three binary inputs Lang sel D#2 A, Lang sel D#2 B, Lang sel D#2 C, used for selecting language of the external local terminal #2.</p> <p>NOTE: Using these inputs for language selection is an option only. If the inputs are not configured, the language can be selected using the menus on the terminal.</p> <p>ENCODING TABLE</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #cccccc;"> <th>LANGUAGE INDEX</th> <th>INPUT A</th> <th>INPUT B</th> <th>INPUT C</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>2</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>3</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>4</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>5</td><td>1</td><td>0</td><td>1</td></tr> </tbody> </table>	LANGUAGE INDEX	INPUT A	INPUT B	INPUT C	0	0	0	0	1	1	0	0	2	0	1	0	3	1	1	0	4	0	0	1	5	1	0	1
LANGUAGE INDEX	INPUT A	INPUT B	INPUT C																										
0	0	0	0																										
1	1	0	0																										
2	0	1	0																										
3	1	1	0																										
4	0	0	1																										
5	1	0	1																										

6	0	1	1
7	1	1	1

NOTE:
"0" in the table means the input is not active or not configured.

NOTE:
Language index 0 selects the default language of the terminal, i.e. the language, which is adjusted in the terminal using it's menus.

NOTE:
The reaction on changes of these inputs is delayed about 1 sec to ensure the new combination is valid (e.g. if a rotary selector switch is used).

CAUTION!
Each language change causes the reinitialization of the display. Function of the controller is not influenced.

14.2.1.88 Binary input: Lang sel D#2 C

Related FW	standard v3.2.0																				
Description	<p>This is one of three binary inputs Lang sel D#2 A, Lang sel D#2 B, Lang sel D#2 C, used for selecting language of the external local terminal #2.</p> <p>NOTE: Using these inputs for language selection is an option only. If the inputs are not configured, the language can be selected using the menus on the terminal.</p> <p>ENCODING TABLE</p> <table border="1"> <thead> <tr> <th>LANGUAGE INDEX</th> <th>INPUT A</th> <th>INPUT B</th> <th>INPUT C</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>2</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>3</td> <td>1</td> <td>1</td> <td>0</td> </tr> </tbody> </table>	LANGUAGE INDEX	INPUT A	INPUT B	INPUT C	0	0	0	0	1	1	0	0	2	0	1	0	3	1	1	0
LANGUAGE INDEX	INPUT A	INPUT B	INPUT C																		
0	0	0	0																		
1	1	0	0																		
2	0	1	0																		
3	1	1	0																		

4	0	0	1
5	1	0	1
6	0	1	1
7	1	1	1

NOTE:
"0" in the table means the input is not active or not configured.

NOTE:
Language index 0 selects the default language of the terminal, i.e. the language, which is adjusted in the terminal using it's menus.

NOTE:
The reaction on changes of these inputs is delayed about 1 sec to ensure the new combination is valid (e.g. if a rotary selector switch is used).

CAUTION!
Each language change causes the reinitialization of the display. Function of the controller is not influenced.

14.2.1.89 Binary input: ImpCountSet1-4

Related FW	standard v3.2.0
Description	This binary input sets the according impulse counter to a value in setpoint ImpCountDef .

15 Binary output functions

15.1 Virtual and physical modules

Number of I/O can be extended and project wiring can be reduced using the following extension and virtual modules.

MODULE NAME	BIN	BOUT	AIN	AOUT	NOTE	NUMBER OF MODULES SUPPORTED BY CONTROLLER
Controllers						
IM-NT(C)-BB controller	12	12	3	1	Controller I/O.	-
IM-NT controller	6	6	-	-	Controller I/O.	-
Extension modules						
IGS-PTM	8	8	4	1	Standard I/O extension module.	4
IS-AIN8	-	-	8	-	Standard I/O extension module.	10
I-AOUT8	-	-	-	8	Standard I/O extension module.	4
IS-BIN16/8	16	8	-	-	Standard I/O extension module.	6
IGL-RA15	-	15	-	-	15 Green, Red, Yellow LED panel.	4
Inteli-AIN8	-	-	8+1	-	Standard I/O extension module. One Frequency/Pulse input.	10
Inteli-AIN8TC	-	-	8	-	Standard I/O extension module	10
Inteli-IO8/8	8	8	-	2	Standard I/O extension module	12
Inteli-IO16/0	16	-	-	2	Standard I/O extension module	6
Virtual modules						
VPIO	8	8	-	-	Virtual periphery I/O module.	4
SHBIN	8	-	-	-	SHared (virtual) Binary INput module	6
SHBOUT	-	8	-	-	SHared (virtual) Binary OUTput module	6

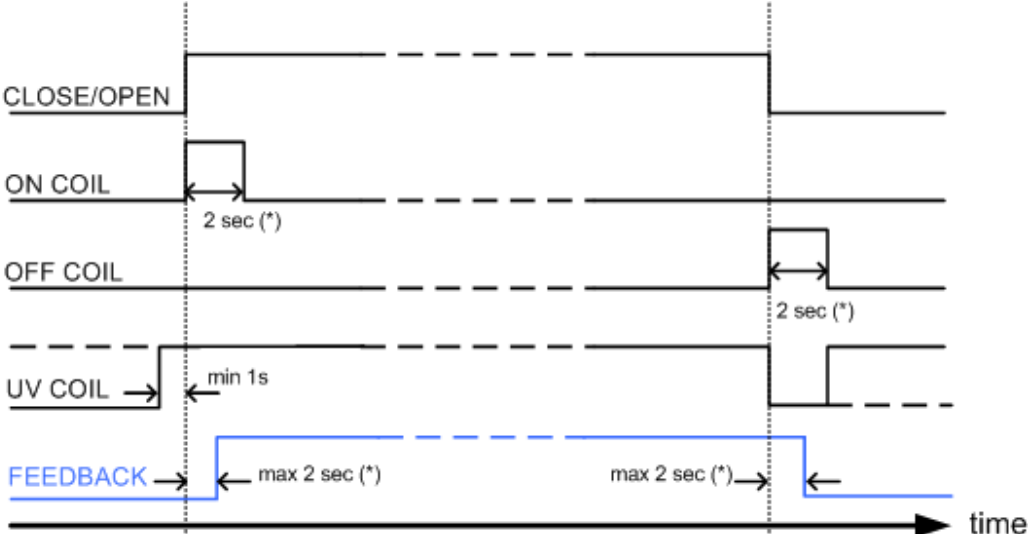
SHAIN	-	-	4	-	Shared (virtual) Analog Input module	2
SHAOUT	-	-	-	4	Shared (virtual) Analog OUTput module	2
PLC	x	x	x	x	Programmable (internal) logic module.	1

NOTE:

Maximum number of configured modules (both extension and virtual) is given by available addresses. The numbers in the table are valid in the case that no other modules are configured.

15.2 Table of binary output functions

15.2.1.1 Binary output: BTB Close/Open

Related FW	standard v3.2.0
Description	<p>This output is intended for control of the BTB if a contactor is used as BTB. The output provides continuous signal while the BTB has to be closed. See timing diagram of all available breaker control outputs at the bottom of this description.</p> <p>NOTE: Use <i>invert</i> function when configuring the output in GenConfig to obtain inverted function of the output, i.e. output is closed while the BTB has to be open.</p> <p>There are also other outputs available for BTB control:</p> <ul style="list-style-type: none"> • BTB ON coil • BTB OFF coil • BTB UV coil  <p>(*) 5 sec if synchronizing with the particular breaker is disabled.</p> <p>TIMING OF BREAKER CONTROL OUTPUTS</p>

15.2.1.2 Binary output: BTB ON Coil

Related FW	standard v3.2.0
Description	<p>This output is intended for closing of the BTB using ON coil if a circuit breaker is used as BTB. The output provides 2 sec pulse when the BTB has to close. If synchronizing is disabled with the particular breaker, the pulse</p>

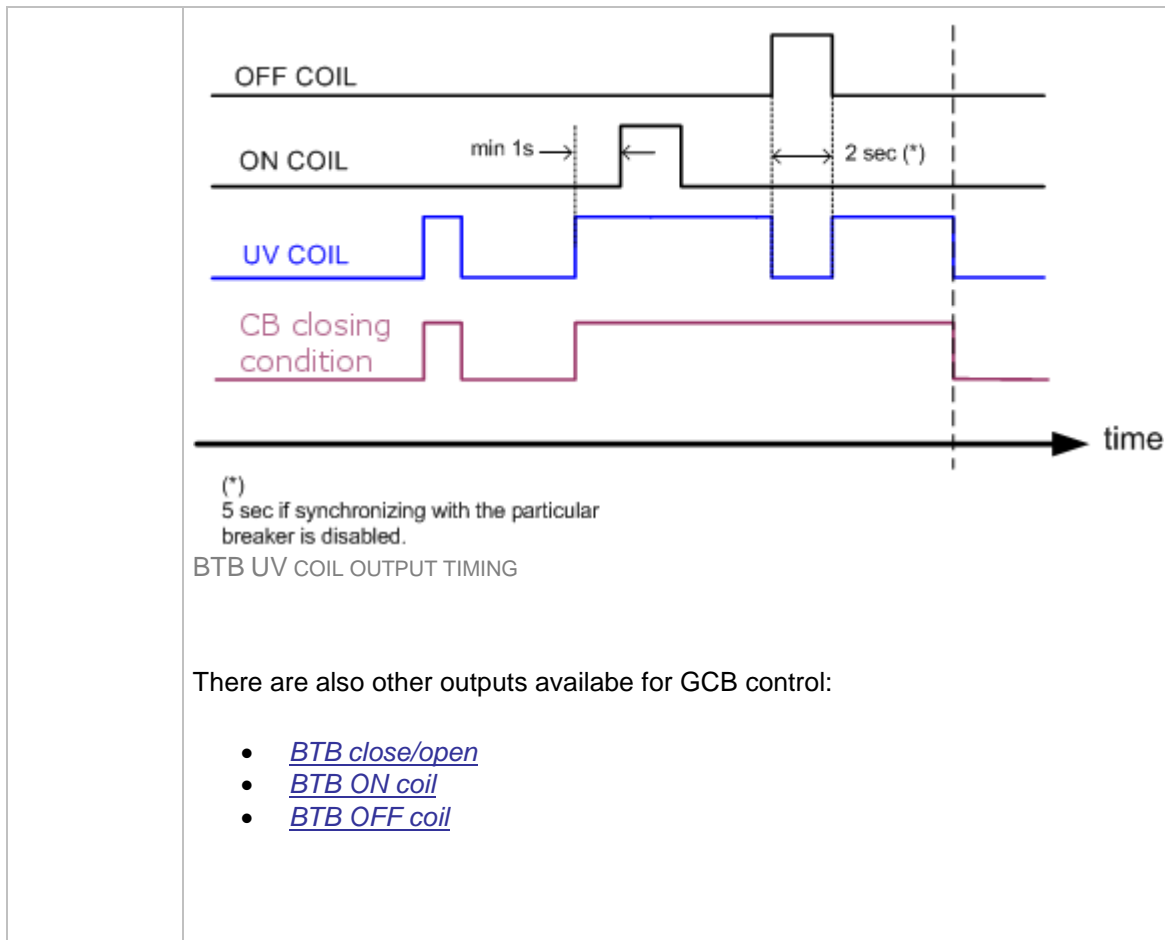
	<p>length is extended to 5sec. See timing diagram of all available breaker control outputs in the description of the BTB close/open output.</p> <p>There are also other outputs available for BTB control:</p> <ul style="list-style-type: none"> • BTB close/open • BTB OFF coil • BTB UV coil
--	--

15.2.1.3 Binary output: BTB OFF Coil

Related FW	standard v3.2.0
Description	<p>This output is intended for opening of the BTB using OFF coil if a circuit breaker is used as BTB. The output provides 2 sec pulse when the BTB has to open. If synchronizing is disabled with the particular breaker, the pulse length is extended to 5sec. See timing diagram of all available breaker control outputs in the description of the BTB close/open output.</p> <p>There are also other outputs available for BTB control:</p> <ul style="list-style-type: none"> • BTB close/open • BTB ON coil • BTB UV coil

15.2.1.4 Binary output: BTB UV Coil

Related FW	standard v3.2.0
Description	<p>This output is intended for opening of the BTB using an undervoltage coil if a circuit breaker is used as BTB.</p> <ul style="list-style-type: none"> • The output is closed while mains values are within limits. BTB closing command is blocked for 1 sec after the UV coil has been closed to allow the breaker mechanical system getting ready for closing. • The output is opened for 2 sec when the BTB has to open. If synchronizing is disabled with the particular breaker, the length of the inverse pulse is extended to 5sec.



15.2.1.5 Binary output: VbusL <>

Related FW	standard v3.2.0
Description	The output is closed while the <i>busL over/under voltage</i> alarm is present in the alarm list.

15.2.1.6 Binary output: VbusR <>

Related FW	standard v3.2.0
Description	The output is closed while the <i>busR over/under voltage</i> alarm is present in the alarm list.

15.2.1.7 Binary output: fbusL <>

Related FW	standard v3.2.0
Description	The output is closed while the <i>busL over/under frequency</i> alarm is present in the alarm list.

15.2.1.8 Binary output: fbusR <>

Related FW	standard v3.2.0
Description	The output is closed while the <i>busR over/under frequency</i> alarm is present in the alarm list.

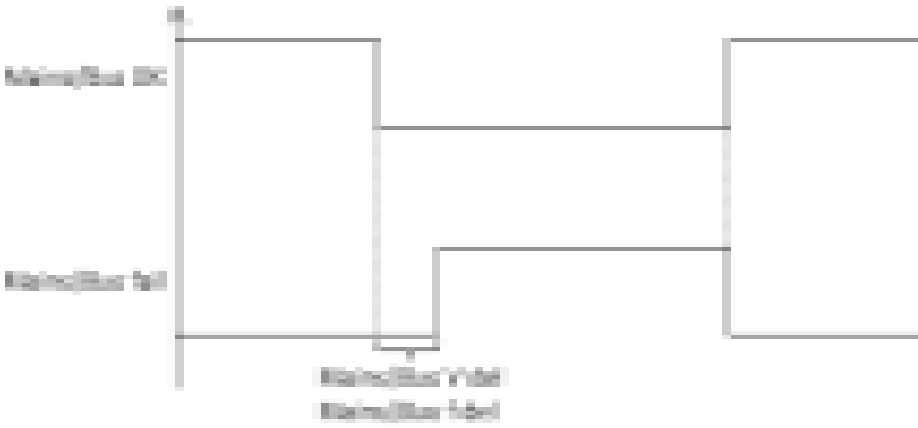
15.2.1.9 Binary output: BusL OK

Related FW	standard v3.2.0
Description	The output is closed if healthy busL voltage is present. It opens immediately if busL voltage or frequency gets out of the limits.

15.2.1.10 Binary output: BusR OK

Related FW	standard v3.2.0
Description	The output is closed if healthy busR voltage is present. It opens immediately if busR voltage or frequency gets out of the limits.

15.2.1.11 Binary output: BusL fail

Related FW	standard v3.2.0
Description	<p>The output is open if healthy BusL voltage is present. It closes with a delay given by BusL protections if BusL voltage or frequency gets out of the limits.</p> 

15.2.1.12 Binary output: BusR fail

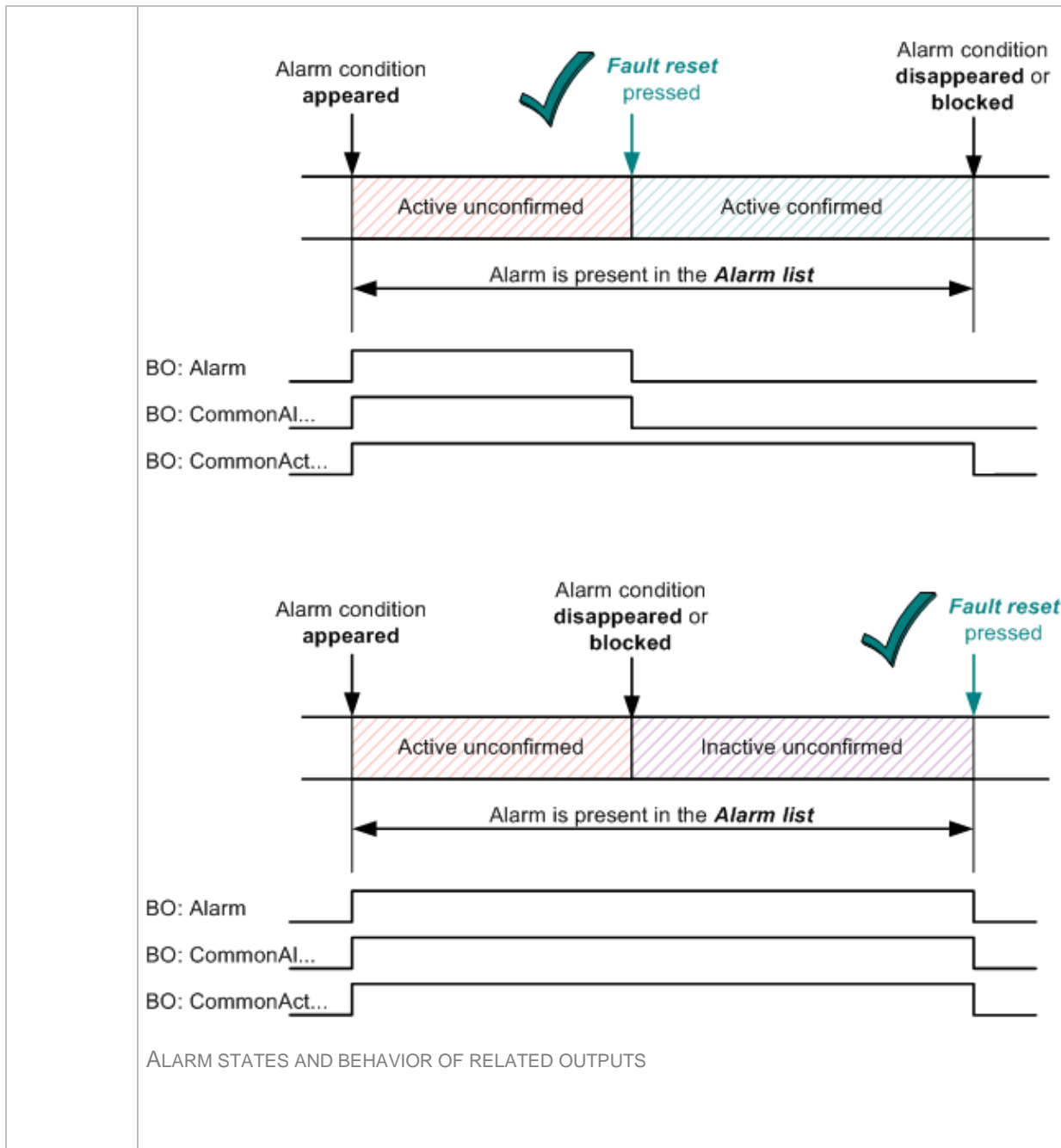
Related FW	standard v3.2.0
Description	<p>The output is open if healthy busR voltage is present. It closes with a delay given by busR protections if busR voltage or frequency gets out of the limits.</p> <p>For example see BusL fail.</p>

15.2.1.13 Binary output: Horn

Related FW	standard v3.2.0
Description	<p>The output closes together with the output Alarm. It opens when the output Alarm is opened or <i>Horn reset</i> button is pressed or Horn timeout has elapsed.</p>

15.2.1.14 Binary output: Alarm

Related FW	standard v3.2.0
Description	<p>The output is closed if there is at least one unconfirmed alarm in the alarm list.</p> <p>NOTE: Some alarm types as e.g. <i>Off load, History record, Low power, Mains protection</i> do not require confirmation, they disappear from the alarm list automatically when the alarm condition disappears. That means the <i>Alarm</i> output is not activated by alarms of these types.</p>



15.2.1.15 Binary output: SystReady

Related FW	standard v3.2.0
Description	<p>The output is closed while the group of gen-sets has enough capacity to fulfil the requested power reserve. If this output is not closed it means the system has not enough capacity to fulfil the reserve even if all the gen-sets will run.</p> <p>NOTE: <i>Fulfilled reserve</i> means the actual reserve is above the requested reserve for start.</p>

	<p>NOTE: This output do not indicate the requested reserve has been already fulfilled. It only indicates whether the system is able to fulfil it or not.</p>
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15.2.1.16 Binary output: Syst res OK

Related FW	standard v3.2.0
Description	The output is closed while the actual reserve is above the selected reserve for start.

15.2.1.17 Binary output: Syst res 1 OK

Related FW	standard v3.2.0
Description	The output is closed while the actual reserve is above the reserve for start from the reserve set #1 .

15.2.1.18 Binary output: Syst res 2 OK

Related FW	standard v3.2.0
Description	The output is closed while the actual reserve is above the reserve for start from the reserve set #2 .

15.2.1.19 Binary output: Syst res 3 OK

Related FW	standard v3.2.0
Description	The output is closed while the actual reserve is above the reserve for start from the reserve set #3 .

15.2.1.20 Binary output: Syst res 4 OK

Related FW	standard v3.2.0
Description	The output is closed while the actual reserve is above the reserve for start from the reserve set #4 .

15.2.1.21 Binary output: Common Wrn

Related FW	standard v3.2.0
Description	The output is closed while there is at least one alarm of the <i>Warning</i> type present in the alarm list. The alarm can be in any state, i.e. active unconfirmed, active confirmed or inactive unconfirmed. See the chapter Alarm management for more information.

15.2.1.22 Binary output: Common Fls

Related FW	standard v3.2.0
Description	The output is closed while there is at least one alarm of the <i>Sensor fail</i> type present in the alarm list. The alarm can be in any state , i.e. active unconfirmed, active confirmed or inactive unconfirmed. See the chapter Alarm management for more information.

15.2.1.23 Binary output: Common BOp

Related FW	standard v3.2.0
Description	This output closes if any "Breaker Open" type alarm appears. The output opens if no BO type alarm is active (pressing of fault reset button is not required).

15.2.1.24 Binary output: Common BOR

Related FW	standard v3.2.0
Description	This output closes if any "Breaker Open with fault reset" type alarm appears. The output opens if no BOR type alarm is active (pressing of fault reset button is required).

15.2.1.25 Binary output: Common Al

Related FW	standard v3.2.0
Description	The output is closed while there is at least one alarm of the <i>Alarm only</i> type present in the alarm list. The alarm can be in any state, i.e. active unconfirmed, active confirmed or inactive unconfirmed. See the chapter Alarm management for more information.

15.2.1.26 Binary output: Common Hst

Related FW	standard v3.2.0
Description	The output is closed for 1s when any alarm of <i>History record</i> type appears. See the chapter Alarm management for more information.

15.2.1.27 Binary output: CommonActLev 1

Related FW	standard v3.2.0
Description	The output is closed while there is at least one 1st level (yellow) alarm present in the alarm list. The alarm can be in any state , i.e. active unconfirmed, active confirmed or inactive unconfirmed. See the chapter Alarm management for more information.

15.2.1.28 Binary output: CommonALlev 1

Related FW	standard v3.2.0
Description	This output is active if there is at least one unconfirmed 1st-level (yellow) alarm present in the alarm list. See the chapter Alarm management for more information.

15.2.1.29 Binary output: CommonActLev 2

Related FW	standard v3.2.0
Description	The output is closed while there is at least one 2nd level (red) alarm present in the alarm list. The alarm can be in any state , i.e. active unconfirmed, active confirmed or inactive unconfirmed. See the chapter Alarm management for more information.

15.2.1.30 Binary output: CommonALlev 2

Related FW	standard v3.2.0
Description	This output is active if there is at least one unconfirmed 2nd-level (red) alarm present in the alarm list. See the chapter Alarm management for more information.

15.2.1.31 Binary output: Alarm flashing

Related FW	standard v3.2.0
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Description	This is the flashing alternative of the output Alarm , i.e. the output flashes with period 1s/1s while the output Alarm is closed.
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15.2.1.32 Binary output: Horn flashing

Related FW	standard v3.2.0
Description	This is the flashing alternative of the output Horn , i.e. the output flashes with period 1s/1s while the output Horn is closed.

15.2.1.33 Binary output: FltResButnEcho

Related FW	standard v3.2.0
Description	<p>This output provides 1s pulse when:</p> <ul style="list-style-type: none"> • <i>Fault reset</i> button is pressed on the controller front panel or • <i>Fault reset</i> button is pressed on any of external local/remote terminals or • <i>fault reset</i> command is received via communication line or • the input FaultResButton is activated.

15.2.1.34 Binary output: HrnResButnEcho

Related FW	standard v3.2.0
Description	<p>This output provides 1s pulse when:</p> <ul style="list-style-type: none"> • <i>Horn reset</i> button is pressed on the controller front panel or • <i>Horn reset</i> button is pressed on any of external local/remote terminals or • <i>horn reset</i> command is received via communication line or • the input HornResButton is activated.

15.2.1.35 Binary output: BTBButnEcho

Related FW	standard v3.2.0
Description	<p>This output provides 1s pulse when:</p> <ul style="list-style-type: none"> • <i>BTB</i> button is pressed on the controller front panel or • <i>BTB</i> button is pressed on any of external local/remote terminals or

	<ul style="list-style-type: none"> • <i>BTB close/open</i> command is received via communication line or • the input BTBButton is activated.
--	--

15.2.1.36 *Binary output: MODES: Off mode*

Related FW	standard v3.2.0
Description	The output is closed while the controller is currently in OFF mode (either switched by the mode selector on the front panel or by the input Remote OFF).

15.2.1.37 *Binary output: MODES: Man mode*

Related FW	standard v3.2.0
Description	The output is closed while the controller is currently in MAN mode (either switched by the mode selector on the front panel or by the input Remote MAN).

15.2.1.38 *Binary output: MODES: Aut mode*

Related FW	standard v3.2.0
Description	The output is closed while the controller is currently in AUT mode (either switched by the mode selector on the front panel or by the input Remote AUT).

15.2.1.39 *Binary output: MODES: Off mode*

Related FW	standard v3.2.0
Description	The output is closed while the controller is currently in OFF mode (either switched by the mode selector on the front panel or by the input Remote OFF).

15.2.1.40 *Binary output: MODES: Man mode*

Related FW	standard v3.2.0
Description	The output is closed while the controller is currently in MAN mode (either switched by the mode selector on the front panel or by the input Remote MAN).

15.2.1.41 Binary output: MODES: Aut mode

Related FW	standard v3.2.0
Description	The output is closed while the controller is currently in AUT mode (either switched by the mode selector on the front panel or by the input Remote AUT).

15.2.1.42 Binary output: MODES: Off mode

Related FW	standard v3.2.0
Description	The output is closed while the controller is currently in OFF mode (either switched by the mode selector on the front panel or by the input Remote OFF).

15.2.1.43 Binary output: MODES: Man mode

Related FW	standard v3.2.0
Description	The output is closed while the controller is currently in MAN mode (either switched by the mode selector on the front panel or by the input Remote MAN).

15.2.1.44 Binary output: MODES: Aut mode

Related FW	standard v3.2.0
Description	The output is closed while the controller is currently in AUT mode (either switched by the mode selector on the front panel or by the input Remote AUT).

15.2.1.45 Binary output: BusL Params OK

Related FW	standard v3.2.0
Description	This output indicates that the BusL is healthy. The output is closed while all BusL electrical parameters are in limits. If BTB is closed, the output deactivates after the the delay for fixed voltage or frequency protections elapses. If BTB is opened, the output deactivates immediately after electrical parameters get out of limit (e.g. frequency, voltage, voltage unbalance etc.).

15.2.1.46 Binary output: BusR Params OK

Related FW	standard v3.2.0
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Description	This output indicates that the BusR is healthy. The output is closed while all BusR electrical parameters are in limits. If BTB is closed, the output deactivates after the the delay for fixed voltage or frequency protections elapses. If BTB is opened, the output deactivates immediately after electrical parameters get out of limit (e.g. frequency, voltage, voltage unbalance etc.).
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15.2.1.47 Binary output: TimerAct 1-4

Related FW	standard v3.2.0
Description	This is combined output from timer channels 1-4. The output is closed if at least one of the channels is active. NOTE: See the chapter Timers for more details about timers.

15.2.1.48 Binary output: TimerAct 5-8

Related FW	standard v3.2.0
Description	This is combined output from timer channels 5-8. The output is closed if at least one of the channels is active. NOTE: See the chapter Timers for more details about timers.

15.2.1.49 Binary output: TimerAct 9-12

Related FW	standard v3.2.0
Description	This is combined output from timer channels 9-12. The output is closed if at least one of the channels is active. NOTE: See the chapter Timers for more details about timers.

15.2.1.50 Binary output: TimerAct 13-16

Related FW	standard v3.2.0
Description	This is combined output from timer channels 13-16. The output is closed if at least one of the channels is active. NOTE:

	See the chapter Timers for more details about timers.
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15.2.1.51 Binary output: TimerActiveCom

Related FW	standard v3.2.0
Description	This is combined output from all timer channels. The output is active if at least one timer channel is active.

15.2.1.52 Binary output: Synchro

Related FW	standard v3.2.0
Description	<p>The output is closed during reverse synchronizing and opens when the output BTB status is activated (= BTB was closed).</p> <p>NOTE: The output can be used for external synchronizing module control.</p>

15.2.1.53 Binary output: In synchronization

Related FW	standard v3.2.0
Description	<p>This output is closed during synchronization when all synchro conditions have been fulfilled. The output is opened either when:</p> <ul style="list-style-type: none"> • the synchro conditions are lost or • the corresponding breaker has been closed or • the synchronizing was interrupted or timed out. <p>Synchro conditions are following:</p> <ul style="list-style-type: none"> • Slip frequency is lower than 0.25 Hz • Phase shift between mains and bus (BusLeft and BusRight - in BTB application) voltage must be within range of \pmPhase window for period longer than Dwell time. • Voltage difference between mains and bus (BusLeft and BusRight - in BTB application) voltage (in all phases) must be lower or equal to Voltage window for period longer than Dwell time. <p>The output is intended for manual synchronization. Automatic closing of BTB must be disabled for this case. Use the input BTB disable.</p>

15.2.1.54 Binary output: CtrlHeartBeat

Related FW	standard v3.2.0
Description	<p>The output provides alternating signal with rate 500ms active / 500ms inactive while the controller is operational, i.e. it has passed all checks after startup and no failure was detected.</p> <p>If the output does not provide the alternating signal it may indicate following:</p> <ul style="list-style-type: none"> • controller is switched off or • controller is damaged or • incorrect/missing firmware and/or application or • corrupted setpoints <p>The output is intended for using in wired redundancy systems at the main controller. Learn more about redundancy in separate chapter Redundant controllers.</p>

15.2.1.55 Binary output: BTB status

Related FW	standard v3.2.0
Description	<p>This output indicates the BTB position, how it is internally considered in the controller. The position is based on BTB feedback input and optionally also on the BTB fdb neg input.</p> <ul style="list-style-type: none"> • If only the positive feedback input is used the output mirrors the feedback. • If both feedbacks are used and they match each other the output indicates the BTB position according to the feedbacks. • If both feedbacks are used, however they do not match each other, the output remains in previous position when they matched. <p>The output can be used for indication of the BTB position.</p>

15.2.1.56 Binary output: LdShed stage 1

Related FW	standard v3.2.0
Description	<p>This output is used for control of first load group. This is the group which is disconnected as first one when the load shedding function becomes active. Connect least important loads to this group.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>

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15.2.1.57 Binary output: LdShed stage 2

Related FW	standard v3.2.0
Description	<p>This output is used for control of second load group. This group is disconnected as second one when the first group is already disconnected and the condition for disconnecting of next group is still fulfilled.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>

15.2.1.58 Binary output: LdShed stage 3

Related FW	standard v3.2.0
Description	<p>This output is used for control of third load group. This group is disconnected as last one when the first two groups are already disconnected and the condition for disconnecting of next group is still fulfilled.</p> <p>NOTE: Learn more about load shedding in the separate chapter Load shedding.</p>

15.2.1.59 Binary output: CtrlHeartBeat

Related FW	standard v3.2.0
Description	<p>The output provides alternating signal with rate 500ms active / 500ms inactive while the controller is operational, i.e. it has passed all checks after startup and no failure was detected.</p> <p>If the output does not provide the alternating signal it may indicate following:</p> <ul style="list-style-type: none"> • controller is switched off or • controller is damaged or • incorrect/missing firmware and/or application or • corrupted setpoints <p>The output is intended for using in wired redundancy systems at the main controller. Learn more about redundancy in separate chapter Redundant controllers.</p>

15.2.1.60 Binary output: CtrlHBeat FD

Related FW	standard v3.2.0
Description	<p>This output is used at a redundant controller to disconnect the main controller, connect the redundant one instead and activate it.</p> <p>The output is closed:</p> <ul style="list-style-type: none"> • If the input CtrlHBeat sens is configured onto any input terminal and the redundancy controller does not sense the "heart beat" signal from the main controller at that terminal. • If the redundant controller has not received two consequent messages from the main controller. The address of the main controller for the particular redundant one is selected by the the setpoint Watched Contr <p>NOTE: Learn more about redundancy in separate chapter Redundant controllers.</p>

15.2.1.61 Binary output: Engines swapped

Related FW	standard v3.2.0
Description	<p>This output is activated by the master controller for 100 ms pulse when the priority of two gen-sets was swapped by the Running hours equalization function.</p>

15.2.1.62 Binary output: Logical 0

Related FW	standard v3.2.0
Description	<p>This output is always opened. It may be used in functions (e.g. ECU outputs or PLC modules inputs) where a binary value is required, however it has to be continuously inactive.</p>

15.2.1.63 Binary output: Logical 1

Related FW	standard v3.2.0
Description	<p>This output is always closed. It may be used in functions (e.g. ECU outputs or PLC modules inputs) where continuously active binary value is required.</p>

15.2.1.64 Binary output: PeriphCommErr

Related FW	standard v3.2.0
Description	The output is closed while there is an error in the communication with any peripheral unit (e.g. IS-AIN8, IGS-PTM, ...).

15.2.1.65 Binary output: WrongPhSeq

Related FW	standard v3.2.0
Description	Binary output WrongPhSeq is active when at least one of the following conditions is fulfilled: BusL/BusR phase is inverted or wrong BusL/BusR phase sequence or opposed BusL/BusR phase sequence is detected.

15.2.1.66 Binary output: User Button 1

Related FW	standard v3.2.0										
Description	<p>This output can be specified for example on buttons on IV-5/8 or in SCADA diagram in IntelliMonitor. Its state depends on function assigned to the related button.</p> <p>It is possible to lock UserButton commands in configuration to specific user level. Buttons 1-8 and 9-16 are locked separately.</p> <table border="1"> <tr> <td>ON</td> <td>Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.</td> </tr> <tr> <td>OFF</td> <td>Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.</td> </tr> <tr> <td>ON/OFF</td> <td>Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).</td> </tr> <tr> <td>PULSE ON</td> <td>Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse.</td> </tr> <tr> <td colspan="2">NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.</td> </tr> </table>	ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.	OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.	ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).	PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse .	NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.	
ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.										
OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.										
ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).										
PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse .										
NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.											

15.2.1.67 Binary output: User Button 2

Related FW	standard v3.2.0										
Description	<p>This output can be specified for example on buttons on IV-5/8 or in SCADA diagram in IntelliMonitor. Its state depends on function assigned to the related button.</p> <p>It is possible to lock UserButton commands in configuration to specific user level. Buttons 1-8 and 9-16 are locked separately.</p> <table border="1"> <tr> <td>ON</td> <td>Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.</td> </tr> <tr> <td>OFF</td> <td>Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.</td> </tr> <tr> <td>ON/OFF</td> <td>Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).</td> </tr> <tr> <td>PULSE ON</td> <td>Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse.</td> </tr> <tr> <td colspan="2"> <p>NOTE:</p> <p>Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.</p> </td> </tr> </table>	ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.	OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.	ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).	PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse .	<p>NOTE:</p> <p>Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.</p>	
ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.										
OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.										
ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).										
PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse .										
<p>NOTE:</p> <p>Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.</p>											

15.2.1.68 Binary output: User Button 3

Related FW	standard v3.2.0				
Description	<p>This output can be specified for example on buttons on IV-5/8 or in SCADA diagram in IntelliMonitor. Its state depends on function assigned to the related button.</p> <p>It is possible to lock UserButton commands in configuration to specific user level. Buttons 1-8 and 9-16 are locked separately.</p> <table border="1"> <tr> <td>ON</td> <td>Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.</td> </tr> <tr> <td>OFF</td> <td>Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and</td> </tr> </table>	ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.	OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and
ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.				
OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and				

		the button is pressed state is not changed.
	ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).
	PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse . NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.

15.2.1.69 Binary output: User Button 4

Related FW	standard v3.2.0	
Description	<p>This output can be specified for example on buttons on IV-5/8 or in SCADA diagram in InteliMonitor. Its state depends on function assigned to the related button.</p> <p>It is possible to lock UserButton commands in configuration to specific user level. Buttons 1-8 and 9-16 are locked separately.</p>	
	ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.
	OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.
	ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).
	PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse . NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.

15.2.1.70 Binary output: User Button 5

Related FW	standard v3.2.0										
Description	<p>This output can be specified for example on buttons on IV-5/8 or in SCADA diagram in IntelliMonitor. Its state depends on function assigned to the related button.</p> <p>It is possible to lock UserButton commands in configuration to specific user level. Buttons 1-8 and 9-16 are locked separately.</p> <table border="1"> <tr> <td>ON</td> <td>Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.</td> </tr> <tr> <td>OFF</td> <td>Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.</td> </tr> <tr> <td>ON/OFF</td> <td>Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).</td> </tr> <tr> <td>PULSE ON</td> <td>Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse.</td> </tr> <tr> <td colspan="2"> <p>NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.</p> </td> </tr> </table>	ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.	OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.	ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).	PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse .	<p>NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.</p>	
ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.										
OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.										
ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).										
PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse .										
<p>NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.</p>											

15.2.1.71 Binary output: User Button 6

Related FW	standard v3.2.0				
Description	<p>This output can be specified for example on buttons on IV-5/8 or in SCADA diagram in IntelliMonitor. Its state depends on function assigned to the related button.</p> <p>It is possible to lock UserButton commands in configuration to specific user level. Buttons 1-8 and 9-16 are locked separately.</p> <table border="1"> <tr> <td>ON</td> <td>Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.</td> </tr> <tr> <td>OFF</td> <td>Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and</td> </tr> </table>	ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.	OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and
ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.				
OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and				

		the button is pressed state is not changed.
	ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).
	PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse . NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.

15.2.1.72 Binary output: User button 7

Related FW	standard v3.2.0	
Description	<p>This output can be specified for example on buttons on IV-5/8 or in SCADA diagram in InteliMonitor. Its state depends on function assigned to the related button.</p> <p>It is possible to lock UserButton commands in configuration to specific user level. Buttons 1-8 and 9-16 are locked separately.</p>	
	ON	Pressing the button changes the state of log. binary output User button X to closed. When the output is closed and the button is pressed state is not changed.
	OFF	Pressing the button changes the state of log. binary output User button X to opened. When the output is opened and the button is pressed state is not changed.
	ON/OFF	Pressing the button changes the state of log. binary output User button X to opened or closed depending on previous state (it is changed to the opposite state).
	PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse . NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.

15.2.1.73 Binary output: User Button 8

Related FW	standard v3.2.0										
Description	<p>This output can be specified for example on buttons on IV-5/8 or in SCADA diagram in IntelliMonitor. Its state depends on function assigned to the related button.</p> <p>It is possible to lock UserButton commands in configuration to specific user level. Buttons 1-8 and 9-16 are locked separately.</p> <table border="1"> <tr> <td>ON</td> <td>Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.</td> </tr> <tr> <td>OFF</td> <td>Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.</td> </tr> <tr> <td>ON/OFF</td> <td>Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).</td> </tr> <tr> <td>PULSE ON</td> <td>Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse.</td> </tr> <tr> <td colspan="2"> <p>NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.</p> </td> </tr> </table>	ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.	OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.	ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).	PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse .	<p>NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.</p>	
ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.										
OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.										
ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).										
PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse .										
<p>NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.</p>											

15.2.1.74 Binary output: User Button 9

Related FW	standard v3.2.0				
Description	<p>This output can be specified for example on buttons on IV-5/8 or in SCADA diagram in IntelliMonitor. Its state depends on function assigned to the related button.</p> <p>It is possible to lock UserButton commands in configuration to specific user level. Buttons 1-8 and 9-16 are locked separately.</p> <table border="1"> <tr> <td>ON</td> <td>Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.</td> </tr> <tr> <td>OFF</td> <td>Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and</td> </tr> </table>	ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.	OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and
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OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and				

		the button is pressed state is not changed.
	ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).
	PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse . NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.

15.2.1.75 Binary output: User Button 10

Related FW	standard v3.2.0	
Description	<p>This output can be specified for example on buttons on IV-5/8 or in SCADA diagram in InteliMonitor. Its state depends on function assigned to the related button.</p> <p>It is possible to lock UserButton commands in configuration to specific user level. Buttons 1-8 and 9-16 are locked separately.</p>	
	ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.
	OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.
	ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).
	PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse . NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.

15.2.1.76 Binary output: User Button 11

Related FW	standard v3.2.0										
Description	<p>This output can be specified for example on buttons on IV-5/8 or in SCADA diagram in IntelliMonitor. Its state depends on function assigned to the related button.</p> <p>It is possible to lock UserButton commands in configuration to specific user level. Buttons 1-8 and 9-16 are locked separately.</p> <table border="1"> <tr> <td>ON</td> <td>Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.</td> </tr> <tr> <td>OFF</td> <td>Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.</td> </tr> <tr> <td>ON/OFF</td> <td>Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).</td> </tr> <tr> <td>PULSE ON</td> <td>Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse.</td> </tr> <tr> <td colspan="2"> <p>NOTE:</p> <p>Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.</p> </td> </tr> </table>	ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.	OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.	ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).	PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse .	<p>NOTE:</p> <p>Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.</p>	
ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.										
OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.										
ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).										
PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse .										
<p>NOTE:</p> <p>Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.</p>											

15.2.1.77 Binary output: User Button 12

Related FW	standard v3.2.0				
Description	<p>This output can be specified for example on buttons on IV-5/8 or in SCADA diagram in IntelliMonitor. Its state depends on function assigned to the related button.</p> <p>It is possible to lock UserButton commands in configuration to specific user level. Buttons 1-8 and 9-16 are locked separately.</p> <table border="1"> <tr> <td>ON</td> <td>Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.</td> </tr> <tr> <td>OFF</td> <td>Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and</td> </tr> </table>	ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.	OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and
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OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and				

		the button is pressed state is not changed.
	ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).
	PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse . NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.

15.2.1.78 Binary output: User Button 13

Related FW	standard v3.2.0								
Description	<p>This output can be specified for example on buttons on IV-5/8 or in SCADA diagram in InteliMonitor. Its state depends on function assigned to the related button.</p> <p>It is possible to lock UserButton commands in configuration to specific user level. Buttons 1-8 and 9-16 are locked separately.</p>								
	<table border="1"> <tr> <td>ON</td> <td>Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.</td> </tr> <tr> <td>OFF</td> <td>Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.</td> </tr> <tr> <td>ON/OFF</td> <td>Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).</td> </tr> <tr> <td>PULSE ON</td> <td>Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse. NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.</td> </tr> </table>	ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.	OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.	ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).	PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse . NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.
ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.								
OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.								
ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).								
PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse . NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.								

15.2.1.79 Binary output: User Button 14

Related FW	standard v3.2.0										
Description	<p>This output can be specified for example on buttons on IV-5/8 or in SCADA diagram in IntelliMonitor. Its state depends on function assigned to the related button.</p> <p>It is possible to lock UserButton commands in configuration to specific user level. Buttons 1-8 and 9-16 are locked separately.</p> <table border="1"> <tr> <td>ON</td> <td>Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.</td> </tr> <tr> <td>OFF</td> <td>Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.</td> </tr> <tr> <td>ON/OFF</td> <td>Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).</td> </tr> <tr> <td>PULSE ON</td> <td>Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse.</td> </tr> <tr> <td colspan="2"> <p>NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.</p> </td> </tr> </table>	ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.	OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.	ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).	PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse .	<p>NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.</p>	
ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.										
OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.										
ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).										
PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse .										
<p>NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.</p>											

15.2.1.80 Binary output: User Button 15

Related FW	standard v3.2.0				
Description	<p>This output can be specified for example on buttons on IV-5/8 or in SCADA diagram in IntelliMonitor. Its state depends on function assigned to the related button.</p> <p>It is possible to lock UserButton commands in configuration to specific user level. Buttons 1-8 and 9-16 are locked separately.</p> <table border="1"> <tr> <td>ON</td> <td>Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.</td> </tr> <tr> <td>OFF</td> <td>Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and</td> </tr> </table>	ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.	OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and
ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.				
OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and				

		the button is pressed state is not changed.
	ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).
	PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse . NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.

15.2.1.81 Binary output: User Button 16

Related FW	standard v3.2.0	
Description	<p>This output can be specified for example on buttons on IV-5/8 or in SCADA diagram in InteliMonitor. Its state depends on function assigned to the related button.</p> <p>It is possible to lock UserButton commands in configuration to specific user level. Buttons 1-8 and 9-16 are locked separately.</p>	
	ON	Pressing the button changes the state of log. binary output User Button X to closed. When the output is closed and the button is pressed state is not changed.
	OFF	Pressing the button changes the state of log. binary output User Button X to opened. When the output is opened and the button is pressed state is not changed.
	ON/OFF	Pressing the button changes the state of log. binary output User Button X to opened or closed depending on previous state (it is changed to the opposite state).
	PULSE ON	Pressing the button issues log. binary output User Button X to close for time given by setpoint UserBtn pulse . NOTE: Repeated pressing of button during the closed period causes issuing another puls to be generated from the moment of button pushing.

15.2.1.82 Binary output: Initialized

Related FW	standard v3.2.0
Description	This LBO indicates that the controller finished the reboot after the restart. It can be used in internal PLC for blocking some binary inputs to avoid the hazards after restart of the controller.

15.2.1.83 Binary output: Start Blocked

Related FW	standard v3.2.0
Description	<p>Activation of this logical binary output indicates that the start of the engine is blocked. This can be caused by conditions given by setpoints in ProcessControl group (Island enable, ParalEnable, Synchro enable, MFStart enable, MGCBparalClose - where aplicable).</p> <p>EXAMPLE: The start of the gen-set is blocked when Mains is not OK and Island enable is set to NO. Therefore this output is activated and letting you know that the gen-set will not start because the island operation is not allowed.</p>

15.2.1.84 Binary output: RemoteControl1

Related FW	standard v3.2.0
Description	<p>This is a general purpose output, which can be closed and opened remotely, e.g. from IntelliMonitor using the "Remote switches" tool or via MODBUS using the register #46361 and command #26.</p> <p>NOTE: See the <i>Remote switches</i> chapter in the IntelliMonitor help for details about how to control the output from IntelliMonitor and the Modbus chapter in the latest communication guide for information about control the output using Modbus.</p>

15.2.1.85 Binary output: RemoteControl2

Related FW	standard v3.2.0
Description	<p>This is a general purpose output, which can be closed and opened remotely, e.g. from IntelliMonitor using the "Remote switches" tool or via MODBUS using the register #46361 and command #26.</p> <p>NOTE: See the <i>Remote switches</i> chapter in the IntelliMonitor help for details about how to control the output from IntelliMonitor and the Modbus chapter in the latest communication guide for information about control the output using</p>

	Modbus.
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15.2.1.86 Binary output: RemoteControl3

Related FW	standard v3.2.0
Description	<p>This is a general purpose output, which can be closed and opened remotely, e.g. from IntelliMonitor using the "Remote switches" tool or via MODBUS using the register #46361 and command #26.</p> <p>NOTE: See the <i>Remote switches</i> chapter in the IntelliMonitor help for details about how to control the output from IntelliMonitor and the Modbus chapter in the latest communication guide for information about control the output using Modbus.</p>

15.2.1.87 Binary output: RemoteControl4

Related FW	standard v3.2.0
Description	<p>This is a general purpose output, which can be closed and opened remotely, e.g. from IntelliMonitor using the "Remote switches" tool or via MODBUS using the register #46361 and command #26.</p> <p>NOTE: See the <i>Remote switches</i> chapter in the IntelliMonitor help for details about how to control the output from IntelliMonitor and the Modbus chapter in the latest communication guide for information about control the output using Modbus.</p>

15.2.1.88 Binary output: RemoteControl5

Related FW	standard v3.2.0
Description	<p>This is a general purpose output, which can be closed and opened remotely, e.g. from IntelliMonitor using the "Remote switches" tool or via MODBUS using the register #46361 and command #26.</p> <p>NOTE: See the <i>Remote switches</i> chapter in the IntelliMonitor help for details about how to control the output from IntelliMonitor and the Modbus chapter in the latest communication guide for information about control the output using Modbus.</p>

15.2.1.89 Binary output: RemoteControl6

Related FW	standard v3.2.0
Description	<p>This is a general purpose output, which can be closed and opened remotely, e.g. from IntelliMonitor using the "Remote switches" tool or via MODBUS using the register #46361 and command #26.</p> <p>NOTE: See the <i>Remote switches</i> chapter in the IntelliMonitor help for details about how to control the output from IntelliMonitor and the Modbus chapter in the latest communication guide for information about control the output using Modbus.</p>

15.2.1.90 Binary output: RemoteControl7

Related FW	standard v3.2.0
Description	<p>This is a general purpose output, which can be closed and opened remotely, e.g. from IntelliMonitor using the "Remote switches" tool or via MODBUS using the register #46361 and command #26.</p> <p>NOTE: See the <i>Remote switches</i> chapter in the IntelliMonitor help for details about how to control the output from IntelliMonitor and the Modbus chapter in the latest communication guide for information about control the output using Modbus.</p>

15.2.1.91 Binary output: RemoteControl8

Related FW	standard v3.2.0
Description	<p>This is a general purpose output, which can be closed and opened remotely, e.g. from IntelliMonitor using the "Remote switches" tool or via MODBUS using the register #46361 and command #26.</p> <p>NOTE: See the <i>Remote switches</i> chapter in the IntelliMonitor help for details about how to control the output from IntelliMonitor and the Modbus chapter in the latest communication guide for information about control the output using Modbus.</p>

15.2.1.92 Binary output: ModbusSw 1

Related FW	standard v3.2.0
Description	This logical binary output gets activated when the corresponding bit is written

	<p>to the Modbus register number 46337. The mirror of the written value can be also seen in the value ModbusSw1.</p> <p>EXAMPLE: If value 255 is written in the Modbus register number 46337, first eight ModbusSw logical binary outputs get activated.</p>
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15.2.1.93 Binary output: ModbusSw 17

Related FW	standard v3.2.0
Description	<p>This logical binary output gets activated when the corresponding bit is written to the Modbus register number 46338. The mirror of the written value can be also seen in the value ModbusSw2.</p> <p>EXAMPLE: If value 255 is written in the Modbus register number 46338, first eight ModbusSw logical binary outputs get activated.</p>

16 Analog Input functions

16.1 Virtual and physical modules

Number of I/O can be extended and project wiring can be reduced using the following extension and virtual modules.

MODULE NAME	BIN	BOUT	AIN	AOUT	NOTE	NUMBER OF MODULES SUPPORTED BY CONTROLLER
Controllers						
IM-NT(C)-BB controller	12	12	3	1	Controller I/O.	-
IM-NT controller	6	6	-	-	Controller I/O.	-
Extension modules						
IGS-PTM	8	8	4	1	Standard I/O extension module.	4
IS-AIN8	-	-	8	-	Standard I/O extension module.	10
I-AOUT8	-	-	-	8	Standard I/O extension module.	4
IS-BIN16/8	16	8	-	-	Standard I/O extension module.	6
IGL-RA15	-	15	-	-	15 Green, Red, Yellow LED panel.	4
Inteli-AIN8	-	-	8+1	-	Standard I/O extension module. One Frequency/Pulse input.	10
Inteli-AIN8TC	-	-	8	-	Standard I/O extension module	10
Inteli-IO8/8	8	8	-	2	Standard I/O extension module	12
Inteli-IO16/0	16	-	-	2	Standard I/O extension module	6
Virtual modules						
VPIO	8	8	-	-	Virtual periphery I/O module.	4
SHBIN	8	-	-	-	SHared (virtual) Binary INput module	6
SHBOUT	-	8	-	-	SHared (virtual) Binary OUTput module	6

SHAIN	-	-	4	-	Shared (virtual) Analog Input module	2
SHAOUT	-	-	-	4	Shared (virtual) Analog OUTput module	2
PLC	x	x	x	x	Programmable (internal) logic module.	1

NOTE:

Maximum number of configured modules (both extension and virtual) is given by available addresses. The numbers in the table are valid in the case that no other modules are configured.

16.2 Table of analog input functions

16.2.1.1 Analog input: MLC:I/E-PbL

Related FW	standard v3.2.0
Description	This functional input is used for connecting of an external device, which measures the active power transferred from the busL to the busR. The device is connected to the controller via an analog input (e.g. -20 .. 20mA). The setpoint I/E-PbL meas must be set to the ANALOG INPUT position for this case.

16.2.1.2 Analog input: MPF:I/E-QbL

Related FW	standard v3.2.0
Description	This functional input is used for connecting of an external device, which measures the reactive power transferred from the busL to the busR. The device is connected to the controller via an analog input (e.g. -20 .. 20mA). The setpoint I/E-QbL meas must be set to the ANALOG INPUT position for this case.

16.2.1.3 Analog input: LCD brightness

Related FW	standard v3.2.0
Description	This functional input is used to adjust the backlight intensity of the IG-NT built-in terminal (display) by an analog input (e.g. a potentiometer). If this input is configured to a physical analog input or other value, the brightness adjusted by buttons at the terminal is overridden by this analog input.

16.2.1.4 Analog input: Cold temp 1

Related FW	standard v3.2.0
Description	<p>If there is an additional terminal board between a thermocouple and the IS-AIN8 module and there is a significant temperature difference between this terminal board and the module, it is necessary to measure the temperature at this terminal board and use this temperature for the thermocouple compensation instead of the internal temperature of the module.</p> <p>This analog input is intended for measurement of this thermocouple compensation temperature for the IS-AIN8 module with index #1.</p> <p>NOTE: Thermocouples without internal compensation "Thermo(nc)..." must be used for this case.</p>

16.2.1.5 Analog input: Cold temp 2

Related FW	standard v3.2.0
Description	<p>If there is an additional terminal board between a thermocouple and the IS-AIN8 module and there is a significant temperature difference between this terminal board and the module, it is necessary to measure the temperature at this terminal board and use this temperature for the thermocouple compensation instead of the internal temperature of the module.</p> <p>This analog input is intended for measurement of this thermocouple compensation temperature for the IS-AIN8 module with index #2.</p> <p>NOTE: Thermocouples without internal compensation "Thermo(nc)..." must be used for this case.</p>

16.2.1.6 Analog input: Cold temp 3

Related FW	standard v3.2.0
Description	If there is an additional terminal board between a thermocouple and the IS-

	<p>AIN8 module and there is a significant temperature difference between this terminal board and the module, it is necessary to measure the temperature at this terminal board and use this temperature for the thermocouple compensation instead of the internal temperature of the module.</p> <p>This analog input is intended for measurement of this thermocouple compensation temperature for the IS-AIN8 module with index #3.</p> <p>NOTE: Thermocouples without internal compensation "Thermo(nc)..." must be used for this case.</p>
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16.2.1.7 Analog input: Cold temp 4

Related FW	standard v3.2.0
Description	<p>If there is an additional terminal board between a thermocouple and the IS-AIN8 module and there is a significant temperature difference between this terminal board and the module, it is necessary to measure the temperature at this terminal board and use this temperature for the thermocouple compensation instead of the internal temperature of the module.</p> <p>This analog input is intended for measurement of this thermocouple compensation temperature for the IS-AIN8 module with index #4.</p> <p>NOTE: Thermocouples without internal compensation "Thermo(nc)..." must be used for this case.</p>

17 User Notes

