AGC-4 Mk II

M-Logic internal logic controller

Application notes

DEIF Improve Tomorrow
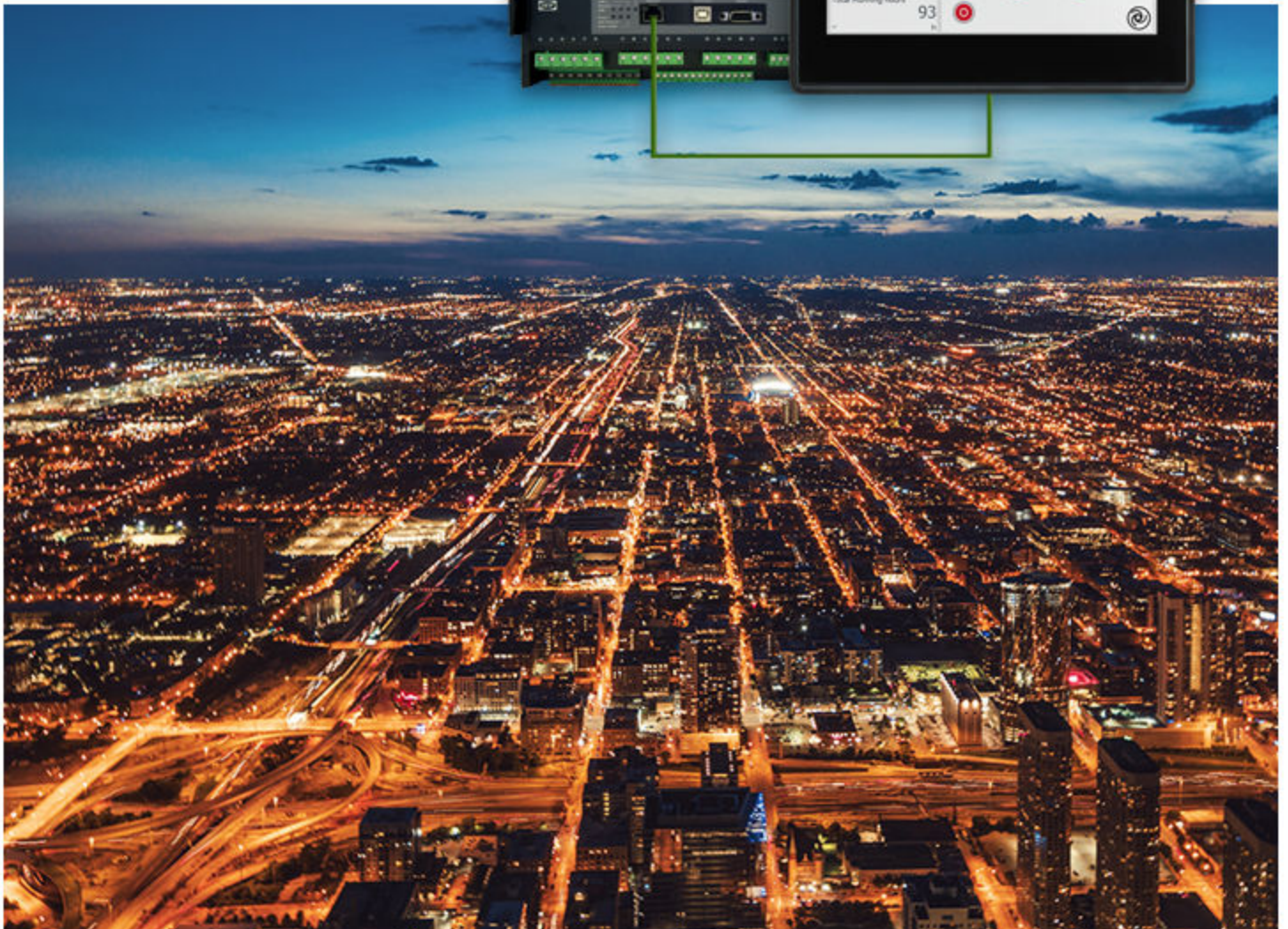
1. General information

1.1   About the Application notes

1.1.1   General purpose

This document includes application notes about M-Logic for DEIF's AGC-4 Mk II, software version 6.11.

1.1.2   Intended users

The application notes are mainly aimed at the person responsible for designing AGC systems, typically a panel builder designer, but other users might also find useful information.

1.2   Introduction to M-Logic

M-Logic is a small logic controller in the AGC controller. M-Logic is like a limited-function PLC and can be used for simpler tasks.

M-Logic can only use binary control functions. Analogue reading and/or control functions are not possible.

M-Logic can be programmed from the free PC tool, DEIF Utility Software (USW3). The utility software can be downloaded from www.deif.com/software

The M-Logic configuration consists of command lines. There are 40 lines. Each line includes up to three events, two operators, one output, and an optional timer.

If two operators are not enough, virtual events can be used to pass the control on to another line. This allows building larger event-based controls.

> **How to create M-Logic**
> See our tutorial on How to create M-Logic on AGC-4 for help and guidance.

1.3   Warnings, safety and legal information

1.3.1   Symbols for hazard statements

⚠️ **DANGER!**
This shows dangerous situations. If the guidelines are not followed, these situations will result in death, serious personal injury, and equipment damage or destruction.

⚠️ **WARNING**
This shows potentially dangerous situations. If the guidelines are not followed, these situations could result in death, serious personal injury, and equipment damage or destruction.

⚠️ CAUTION

⚠️ **This shows low level risk situation.**

If the guidelines are not followed, these situations could result in minor or moderate injury.

NOTICE

🛈 **This shows an important notice**

Make sure to read this information.

1.3.2 Symbols for general notes

NOTE This shows general information.

📖 **More information**
This shows where you can find more information.

✏️ **Example**

This shows an example.

▶️ **How to ...**
This shows a link to a video for help and guidance.

1.3.3 Safety during installation and operation

When you install and operate the equipment, you may have to work with dangerous currents and voltages. The installation must only be carried out by authorised personnel who understand the risks involved in working with electrical equipment.

⚠️ DANGER!

⚡ **Hazardous live currents and voltages**

Do not touch any terminals, especially the AC measurement inputs and the relay terminals, as this could lead to injury or death.

1.3.4 Factory settings

The unit is delivered from the factory with default settings. These are not necessarily correct for the engine/generator set. Check all the settings before running the engine/generator set.

1.3.5 Legal information and disclaimer

DEIF takes no responsibility for installation or operation of the generator set. If there is any doubt about how to install or operate the engine/generator controlled by the AGC, the company responsible for installation or operation of the set must be contacted.

The controller is not to be opened by unauthorised personnel. If opened anyway, the warranty will be lost.

Disclaimer

DEIF A/S reserves the right to change any of the contents of this document without prior notice.

The English version of this document always contains the most recent and up-to-date information about the product. DEIF does not take responsibility for the accuracy of translations, and translations might not be updated at the same time as the English document. If there is a discrepancy, the English version prevails.

2. Overview

2.1 Starting

2.1.1 Starting the M-Logic

Open the utility software. In the left menu, under *Tools*, select *M-Logic & AOP*.

Click the *Read* icon to load the M-Logic from the controller. The following screen appears:
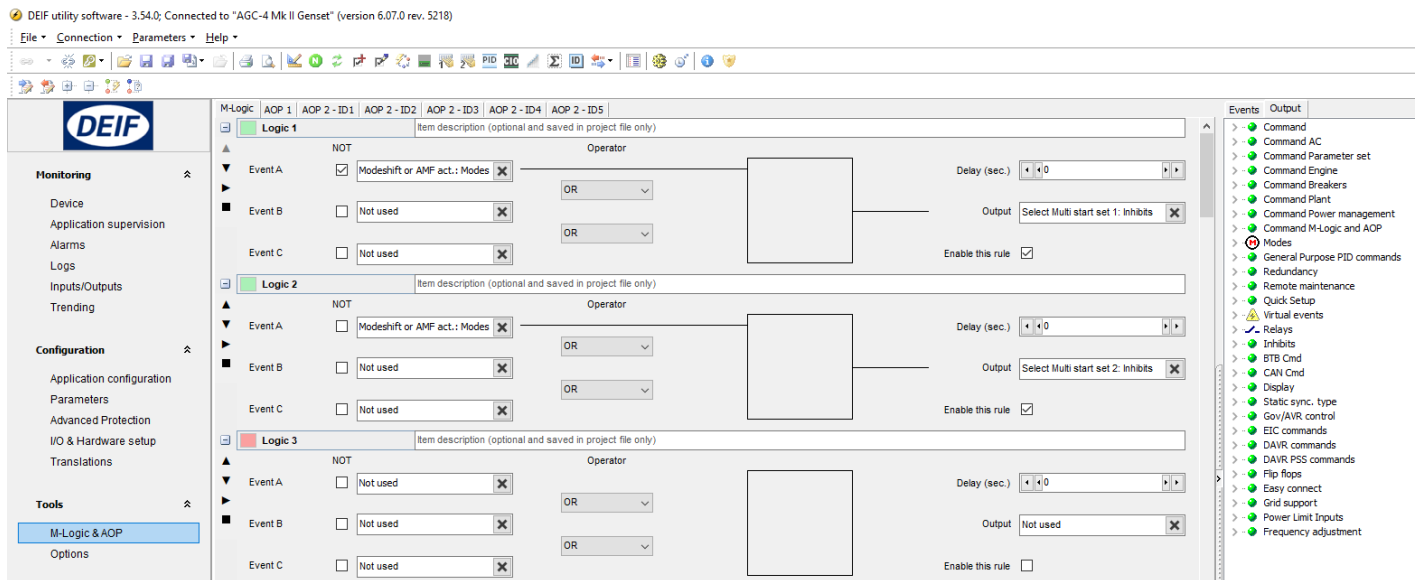
2.1.2 Read/write

When the M-Logic screen is shown, the M-Logic toolbar appears at the top of the screen. The toolbar has two buttons which are used to write and read the M-Logic configuration to and from the controller:

 Press this button to read the M-Logic* settings from the controller to the USW.

 Press this button to write the M-Logic* settings from the USW to the controller.

NOTE: * You can select the setting(s) to read (or to write).

The M-Logic configuration can also be saved/opened to/from a file using the default save/open buttons.

2.1.3   Save/open

 Press this button to save the M-Logic configuration to a file (part of the general configuration file ".USW").

 Press this button to open a previously saved M-Logic file.

2.2   Basic functions

2.2.1   Basic functions

The M-Logic consists of a number of lines, Logic 1, Logic 2 and so on. Each of these lines have:

- Three **event** settings
- Two **operator** settings
- One **enable** tick box
- One **output** setting

The Logic line can be collapsed or expanded with the button (1). When collapsed, the Item description (2) is still visible. The Item description is stored in the .usw file, but not in the product itself.

2.2.2 Event settings

Events A, B and C are used to trigger the logic. For each event, the function NOT can be selected to get an inverted function.

The event groups in the *Events* window depend on the controller type and its options. Each event group contains a number of events. See the *List of events* chapter for details.

2.2.3 Operators

Two operators are available:

- OR (any operator activates the function output)
- AND (all activated operators must have status ON to activate the function output)

2.2.4 Enable this rule

Select this tick box to activate the logic line.

2.2.5 Output settings

The output defines the reaction from the system, when the function is activated. A delay time can be set for a function (no delay, if set to 0 s).

The groups in the *Output* window depend on the controller type and its options. Each group contains a number of outputs. See the *List of outputs* chapter for details.

> **NOTE** If a relay output is chosen, this relay must be configured as a limit relay output in *I/O setup* or in the parameter list.

2.3 Definitions for true and false

TRUE state

A TRUE state of an input/event will be detected, if the condition defined in the input event is met. For example:

- Digital input is TRUE when activated (12/24V DC applied).
- Alarm condition is TRUE when the alarm is present.
- Mode condition is TRUE when the mode is selected.

FALSE state

A FALSE state of an input event will be detected, if the condition defined in the input event is **not** met. For example:

- Digital input is FALSE when deactivated (12/24V DC not applied).
- Alarm condition is FALSE when the alarm is not present.
- Mode condition is FALSE when the mode is not selected.

2.4 Comparison of general output functions

M-Logic contains a number of general output functions. These outputs can be used as inputs in multiple lines of logic.

Function	Number	Output	Applications
CAN Cmd	16	Continuous	This shares logic with all the other controllers in a power management system.
Virtual toggle events	96	Pulse	This can be activated using Modbus, and then used as a pulse input.
Virtual switch events	32	Continuous	This can be activated using Modbus. As long as the Modbus function is activated, this function remains activated.
Flip flops	16	Continuous	This can be used as a continuous input.
Oneshots	16	Pulse	This can be used as a single pulse input.

2.5 Examples

By using the events, rules can be made for the use of the M-Logic.

2.5.1 Virtual toggle events

Virtual toggle events are used to expand the number of events in a logic sequence. For example, the output of Logic 1 can be used to continue the sequence in Logic 2.
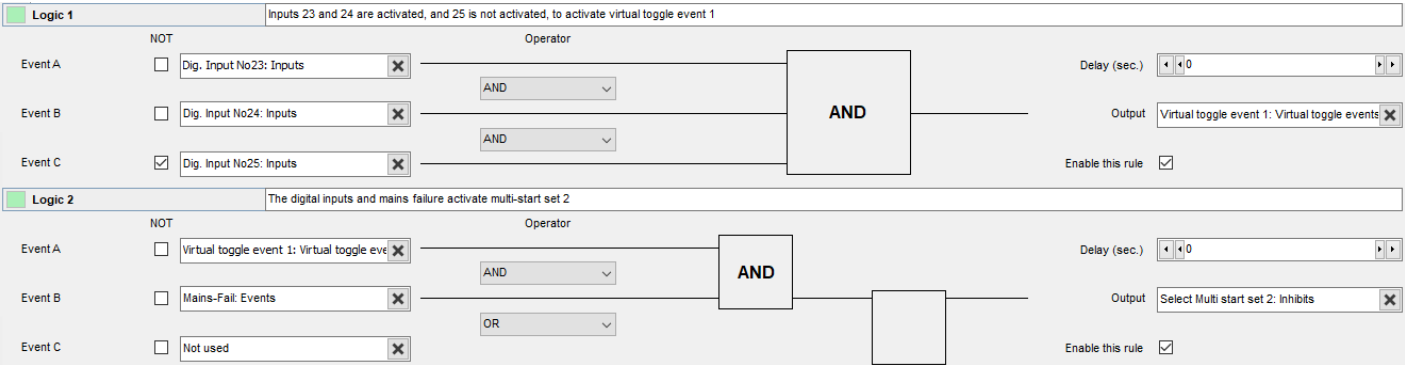
- The *Logic 1* output is set to *Virtual toggle event 1*.
- *Event A* in *Logic 2* is *Virtual toggle event 1*.

Up to five events that can be used in this logic sequence (A + B + C in Logic 1 and B + C in Logic 2).

2.5.2 Set/reset function

If you use a single digital input to select AUTO/MANUAL, you need a SET/RESET function, since two digital inputs are normally required for this.

In the following example, digital input 55 is used to switch between AUTO (input ON) and MANUAL (input OFF).
- First line: If input 55 = ON and AUTO = OFF (NOT Auto operation mode), then set AUTO mode command.
- Second line: If input 55 = OFF and MANUAL = OFF (NOT Manual operation), then set MANUAL mode command.

In M-Logic, it looks like this:

2.5.3 Configure an AOP LED

In this example, button 1 on a connected AOP (Additional Operator Panel) is used to activate Virtual Event 1. In the line AOP 1 (LED 1) is Virtual Event 1 configured to activate red LED 01 on the AOP to red blink.

Select an AOP with the tabs | M-Logic | AOP 1 | AOP 2 - ID1 | AOP 2 - ID2 | AOP 2 - ID3 | AOP 2 - ID4 | AOP 2 - ID5 |.

Configure an AOP button to Virtual Event 1 output as shown:

Configure line 1 in AOP 1 (LED 1) as shown:

Click on the Write [icon] button to save the AOP settings.

In the top menu, click on the AOP 1 [icon] button to open the virtual AOP display.

AOP LED colour priority

If an AOP LED has more than one output for selection of colour, the presented colour will follow this priority:

Priority	Colour		
1	Red flashing		☀
2	Red		●
3	Yellow flashing		☀
4	Yellow		●
5	Green flashing		☀
6	Green		●

📖 **More information**
See the document **Option X Additional display and operator panel 4189340702 UK** for more information about AOPs.

2.5.4 Controlling a relay output with a single AOP button

In this example, the relay can be replaced by any other output, and the AOP button can be replaced by e.g. a binary input.

* The button of the AOP-2 must be set to activate Virtual Event 1 (VE 1) (in this case).
* In Logic 1, the VE 1 will activate the relay output (21). At the same time, the relay output (21) will remain ON, unless Virtual Event 2 (VE 2) is activated (AND NOT VE 2).
* In Logic 2, the VE 1 will activate VE 2 if the relay output (21) is ON (AND Relay output (21)).

The result is that the relay changes position every time the AOP button is activated.
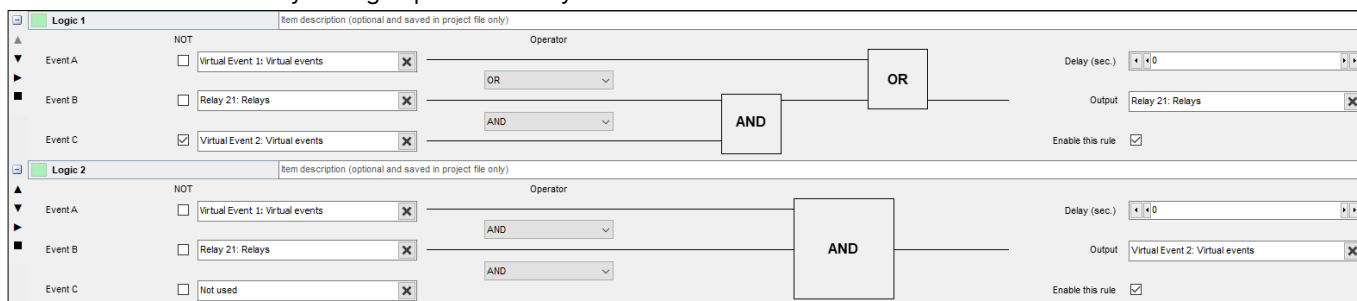
2.5.5 Power up in a specific mode

In this example, the controller will always power up in manual mode. The timer in Logic 1 sets the output for 5 s, and this is used to set manual mode in event 2. When the timer expires, you can freely select any mode since the virtual event 1 turns ON and the Logic 2 says NOT virtual event 1.
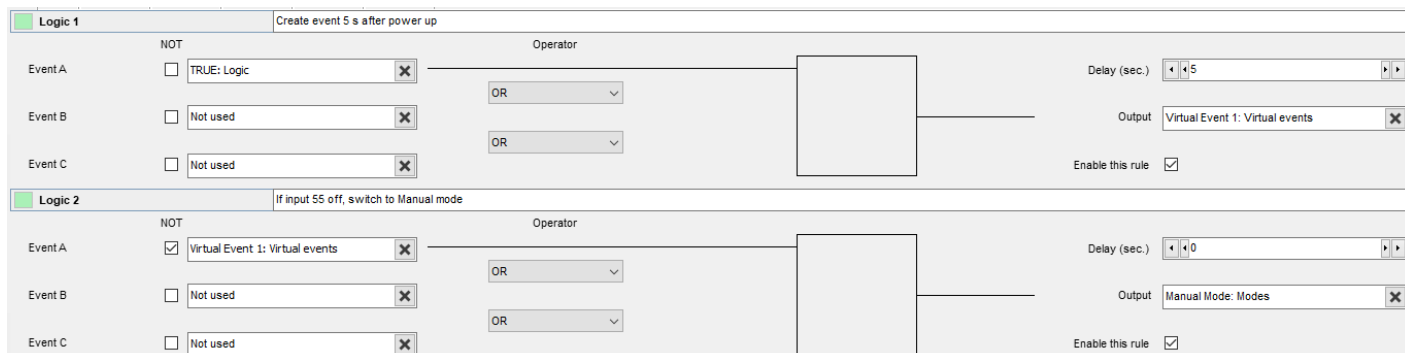
2.5.6 Flip flop function

The flip flop function makes it easy for a pulse input to latch an output, for example a relay.

The Event selects a flip flop output [1-16], and the Output selects the output function:
- Flip flop set [1-16] = Change the flip flop output state to High.
- Flip flop reset [1-16] = Change the flip flop output state to Low.
- Flip flop toggle [1-16] = Shift the flip flop output state from Low to High or from High to Low.

Example

The example shows how flip flop set 1 could be configured to set relay 8:
- Logic 1: Flip flop output 1 is selected to set the relay output.
- Logic 2: Digital input 23 is used to trigger flip flop set 1 and thus sets the relay output active.
- Logic 3: Digital input 24 is used to deactivate the relay output by triggering flip flop reset 1.
- Logic 4: Digital input 25 is used to toggle the flip flop output state.
- Relay 8 must be set to *M-Logic / Limit relay*.

If reset and set are active at the same time, the flip flop will prioritise the reset command. The set or reset function may not be active when the toggle function is used.

The flip flops are also accessible from Modbus.

3. List of events

3.1 Alarms

3.1.1 Alarms

Description	Notes
The alarms are available as events in the alarm category.	The alarm lists have an event for each alarm, including the alarms that are not available in the present configuration of the controller and options.

3.1.2 CIO alarms

Only available if the CIO modules are enabled.

Description	Notes
CIO 116 No. 1 In. 10 to CIO 116 No. 5 In. 26	There is one alarm per input.
CIO 308 No. 1 In. 8.1 to CIO 308 No. 5 In. 29.2	There are two alarms per input.
CIO 308 No. 1 In. 8 wire fail to CIO 308 No. 5 In. 29 wire fail	The M-Logic event is active when the alarm is active. Wire break detection must be activated before this event can become active.
CIO 116 No. 1 module missing to CIO 308 No. 5 module missing	One or more CIO modules are missing.

3.2 Limits

3.2.1 Limits

Description	Notes
The limits for alarm outputs are available as events in the limits category.	The limits list includes the limits, including the limits that are not available in the present configuration of the controller and options. If the outputs A and B of an alarm (for example, BB < 1) are set to *Limits* and the alarm conditions are met, then the alarm is not activated, but the alarm still activates the limit in M-Logic.

3.2.2 CIO limits

Only available if the CIO modules are enabled.

Description	Notes
CIO 116 No. 1 In. 10 to CIO 116 No. 5 In. 26	The limit is activated at the same time as the associated alarm. However, the alarm can be hidden by setting output A and output B to *Limits*. In this case the alarm will never be activated, but the limit will be activated when the alarm conditions are met.
CIO 308 No. 1 In. 8.1 to CIO 308 No. 5 In. 29.2	
CIO 308 No. 1 In. 8 wire fail to CIO 308 No. 5 In. 29 wire fail	

3.3   Events

3.3.1   Genset controller events

Events, Events

Description	Notes
Mains fail	Mains failure condition.
Peak shaving active	Peak shaving cuts the peak of the mains consumption by paralleling the generator to the mains.
G volt/freq OK delay expired	Diesel generator V/Hz OK.
Access lock	Binary input access lock activated.
Lamp test	Lamp test in progress.
Battery test active	Battery test in progress.
Mains U OK timer has expired	The timer for mains voltage OK has expired.
Mains F OK timer has expired	The timer for mains frequency OK has expired.
Test type simple selected	Selection of test type: Simple test.
Test type load selected	Selection of test type: Load test.
Test type full selected	Selection of test type: Full test.
BB voltage OK	Busbar voltage is within range.
G volt/freq OK	Generator frequency and voltage are within range.
Ack. all alarms active	Acknowledge all active alarms.
Mode shift activated	Mode shift between a running mode and AMF (Automatic Mains Failure) activated.
Mode shift deactivated	Mode shift between a running mode and AMF (Automatic Mains Failure) deactivated.
GOV up activated	Speed governor increase activated.
GOV down activated	Speed governor decrease activated.
AVR up activated	AVR (voltage control) increase activated.
AVR down activated	AVR (voltage control) decrease activated.
CBE activated	Activate Close Before Excitation function.
CBE deactivated	Deactivate Close Before Excitation function.
Inductive reference selected	Inductive cos phi reference.
Capacitive reference selected	Capacitive cos phi reference.
Dynamic sync selected	Dynamic synchronisation method selected.
Static sync selected	Static synchronisation method selected.
Power offset [1-3] activated	Power reference offset activated.
Cos phi offset [1-3] activated	Cos phi reference offset activated.
Analogue offset set [1-4] active	The analogue offset set follow the activated nominal settings (1, 2, 3 and 4).
Mains sync. inhibit activated	The mains breaker sync. inhibit function is activated (this does not necessarily inhibit the synchronisation of the mains breaker).
Mains sync. inhibited	The mains breaker is in fact inhibited.
Max ventilation activated	True when maximum ventilation is activated.
Max ventilation deactivated	True when maximum ventilation is deactivated.

Description	Notes
Ethernet ready	Ethernet is ready for read/write.
Deload active	The controller is de-loading.
Ana. fan ref. set [1-2] active	The analogue fan reference setting 1 or 2 is active.
Power droop active	The frequency-dependent power droop is active.
Q droop active	The voltage-dependent Q droop is active.
Cos phi droop active	The voltage-dependent PF droop is active.
Idle run activated	Idle run is activated.
Idle run deactivated	Idle run is deactivated.
Load Depend Start/Stop setting 2 activated	Gensets start and stop according to the current load and the settings selected in setting 2.
Load Depend Start/Stop setting 2 deactivated	Load-dependent starts and stops according to settings selected in setting 2 are stopped.

Events, Events AC

Description	Notes
Three phase system	Three phase AC configuration.
Split L1L3 phase system	Split L1L3-phase AC configuration.
Split L1L2 phase system	Split L1L2-phase AC configuration.
Single phase system	Single phase AC configuration.
60 Hz system	True if the nominal frequency is higher than 55 Hz.
L1L2L3 phase rotation active	The phase rotation is L1L2L3.
L1L3L2 phase rotation active	The phase rotation is L1L3L2.

Events, Events Parameter set

Description	Notes
Parameter set [1-4] used	The parameter set can be selected internally or with binary input.
BB Parameter set [1-2] used	Nominal busbar settings 1 or 2.
BB Unom = Gen Unom used	Busbar nominal voltage is equal to the generator nominal voltage.

Events, Events Engine

Description	Notes
Running	Engine is running.
Emergency stop	Emergency stop activated.
DG ready for auto start	All is normal, no alarms.
Cranking	Crank output activated.
Start activated	Start sequence activated.
Cool down active	Cool down sequence in progress.
Eng. heater in manual ctrl.	Force/release block of engine heater (toggle function).
Alternative start activated	Alternative start is a full AMF sequence test of the plant.

Events, Events Breakers

Description	Notes
MB closed	Mains breaker closed.
MB opened	Mains breaker opened.
GB closed	Generator breaker closed.
GB opened	Generator breaker opened.
GB synchronising	Generator breaker synchronising.
MB synchronising	Mains breaker synchronising.
GB direct in	Generator breaker is being closed on a dead busbar.
GB black close request	Generator breaker direct close on request to dead busbar.
MB synchronisation to DG activated	Mains breaker synchronisation activated.
MB synchronisation to DG deactivated	Mains breaker synchronisation deactivated.
GB synchronisation to mains activated	Generator breaker synchronisation activated.
GB synchronisation to mains deactivated	Generator breaker synchronisation deactivated.
Mains sync. inhibit activated	Mains synchronisation inhibit activated.
Mains sync. inhibited	Mains synchronisation is inhibited.
CBE activated	Close before excitation activated.
CBE deactivated	Close before excitation deactivated.
CBE excitation start level (rpm) reached	In close before excitation, the configured start level is reached.

Events, Events Plant

Description	Notes
Application [1-4] activated	Activate the application from the controller.
Single DG selected	Single DG application selection.
Multi mains selected	Multi-mains application selection.
Genset group selected	Genset group application selection.
Genset group plant selected	Genset group plant application selection.
Test application selected with output cmd enabled	Emulation with engine and breaker relay reaction.
Test application selected with output cmd disabled	Emulation without engine and breaker relay reactions.

Events, Events Power management (option G5)

Description	Notes
DG in quarantine	The diesel generator cannot be used.
Any mains protection alarm active	At least one mains protection alarm is active.
Multi-start set [1-2] selected	Selection of generator sets to be started upon blackout.
Dynamic section equal static section	Power management feature.
Update mode local selected	Update of setting on local controller.
Update mode on all selected	Update of setting on all controllers.
Absolute prio. used	Fixed start priority.
Relative prio. used	Start priority relative to running hour counters.

Description	Notes
Fast start sequence from Auto start/stop via Digital input 117 READY	See **Fast start of engine** in **Option G5 Power management**.
Fast start sequence from Mains via Power management READY	See **Fast start of engine** in **Option G5 Power management**.

3.3.2 Mains controller events

Events, Events

Description	Notes
Ack. all alarms active	Acknowledge all active alarms.
Access lock	Binary input access lock activated.
Emergency stop	Emergency stop activated.
Lamp test	Lamp test in progress.
Alternative start activated	Alternative start is a full AMF sequence test of the plant.
Mains ATS active	Indicates if the mains ATS function is active (only in mains controllers).
Mains U OK timer has expired	The timer for mains voltage OK has expired.
Mains F OK timer has expired	The timer for mains frequency OK has expired.
Test type simple selected	Selection of test type: Simple test.
Test type load selected	Selection of test type: Load test.
Test type full selected	Selection of test type: Full test.
BB voltage OK	Busbar voltage OK.
Power offset [1-3] activated	Power reference offset activated.
Cos phi offset [1-3] activated	Cos phi reference offset activated.
Mains sync. inhibit activated	The mains breaker sync. inhibit function is activated (this does not necessarily inhibit the synchronisation of the mains breaker).
Mains sync. inhibited	The mains breaker is in fact inhibited.
Ethernet ready	Ethernet is ready for read/write.
Power droop active	The frequency-dependent power droop is active.
Cos phi droop active	The voltage-dependent PF droop is active.

Events, Events AC

Description	Notes
Three phase system	Three phase AC configuration.
Split L1L3 phase system	Split L1L3-phase AC configuration.
Split L1L2 phase system	Split L1L2-phase AC configuration.
Single phase system	Single phase AC configuration.
L1L2L3 phase rotation active	The phase rotation is L1L2L3.
L1L3L2 phase rotation active	The phase rotation is L1L3L2.

Events, Events Parameter set

Description	Notes
Parameter set [1-4] used	The parameter set can be selected internally or with binary input.
BB Parameter set [1-2] used	Nominal busbar settings 1 or 2.
BB Unom = Mains Unom used	Busbar nominal voltage is equal to the generator nominal voltage.

Events, Events Breakers

Description	Notes
Mains fail	Mains failure condition.
MB closed	Mains breaker closed.
MB opened	Mains breaker opened.
TB closed	Tie breaker closed.
TB opened	Tie breaker opened.
TB synchronising	Tie breaker synchronising in progress.
MB synchronising	Mains breaker synchronising in progress.
MB synchronisation to DG activated	Mains breaker synchronisation activated.
MB synchronisation to DG deactivated	Mains breaker synchronisation deactivated.
GB synchronisation to mains activated	Generator breaker synchronisation activated.
GB synchronisation to mains deactivated	Generator breaker synchronisation deactivated.

Events, Events Plant

Description	Notes
Application [1-4] activated	Activate the application from the controller.
Single DG selected	Single DG application selection.
Multi mains selected	Multi-mains application selection.
Genset group selected	Genset group application selection.
Genset group plant selected	Genset group plant application selection.
Test application selected with output cmd enabled	Emulation with engine and breaker relay reaction.
Test application selected with output cmd disabled	Emulation without engine and breaker relay reactions.
Mode shift activated	Mode shift between a running mode and AMF (Automatic Mains Failure) activated.
Mode shift deactivated	Mode shift between a running mode and AMF (Automatic Mains Failure) deactivated.
Autoswitch off selected	Autoswitch is not enabled.
Autoswitch static selected	Autoswitch enabled for static section.
Autoswitch dynamic selected	Autoswitch enabled for dynamic section.
Autoswitch all selected	Autoswitch enabled for all sections.
MB parallel activated	Multiple mains are allowed to supply the same busbar.
No break transfer activated	No break transfer is active.
MB close failure start activated	MB close failure start is active.

Description	Notes
Inductive reference selected	Inductive cos phi reference.
Capacitive reference selected	Capacitive cos phi reference.

Events, Events Power management

Description	Notes
Capacity overrule active	Power capacity overrule is active.
Capacitive overrule inactive	Power capacity overrule is inactive.
Dynamic section equal static section	Power management feature.
My ID to run selected	Determines which mains feeder is allowed to operate parallel to the mains.
M volt/freq OK	Mains frequency and voltage are within range.
Run one mains selected	Only one mains breaker is allowed to be closed at the time.
Run all mains selected	All mains breakers are allowed to be closed at the time.
Update mode local selected	Update of setting on local controller.
Update mode on all selected	Update of setting on all controllers.
Exclude from Run All activated	Exclude one or more breakers when Run ALL is activated.

3.3.3   Bus tie breaker controller events

Events for BTB

Description	Notes
BTB closed	The bus tie breaker is closed.
BTB opened	The bus tie breaker is open.
BTB synchronising	Bus tie breaker synchronising in progress.
Access lock	Binary input access lock activated.
Emergency stop	Emergency stop activated.
Lamp test	Lamp test in progress.
Event log selected for printing	Printer option: The Event log printout can be selected.
Alarm log selected for printing	Printer option: The Alarm log printout can be selected.
Battery log selected for printing	Printer option: The Battery log printout can be selected.
Parameter set [1-4] used	The parameter set can be selected internally or with binary input.
BB voltage OK	Busbar B voltage.
Application [1-4] activated	Activate the application from the controller.
Single DG selected	Single DG application selection.
Multi mains selected	Multi-mains application selection.
Dynamic section equal static section	Power management feature.
BA volt/freq OK	Busbar A frequency and voltage are within range.
Ack. all alarms active	Acknowledge all active alarms.
Genset group selected	Genset group application selection.
Genset group plant selected	Genset group plant application selection.
Test application selected with output cmd enabled	Emulation with engine and breaker relay reaction.

Description	Notes
Test application selected with output cmd disabled	Emulation without engine and breaker relay reactions.
BB Parameter set 1 used	Nominal busbar settings 1.
BB Parameter set 2 used	Nominal busbar settings 2.
BB Unom = BA Unom used	Busbar nominal voltage is equal to the generator nominal voltage.
Ethernet ready	Ethernet is ready for read/write.
Direct close on dead BA and dead BB Active	The BTB can close if the busbar is black on both sides.
Direct close on dead BA or dead BB Active	The BTB can close if the busbar is black on either sides.
L1L2L3 phase rotation active	The phase rotation is L1L2L3.
L1L3L2 phase rotation active	The phase rotation is L1L3L2.

3.3.4   Group tie breaker controller events

Events for group tie breakers

Description	Notes
TB closed	Tie breaker closed.
TB opened	Tie breaker opened.
TB synchronising	Tie breaker synchronising in progress.
Access lock	Binary input access lock activated.
Emergency stop	Emergency stop activated.
Lamp test	Lamp test in progress.
Parameter set [1-4] used	The parameter set can be selected internally or with binary input.
Multi start set [1-2] selected	Gensets in set 1 or 2 selected to start at the same time.
BB voltage OK	Busbar voltage OK.
Capacity overrule active	Power capacity overrule is active.
Capacitive overrule inactive	Power capacity overrule is inactive.
Application [1-4] activated	Activate the application from the controller.
Single DG selected	Single DG application selection.
Multi mains selected	Multi-mains application selection.
Dynamic section equal static section	Power management feature.
BA volt/freq OK	Busbar A frequency and voltage are within range.
Update mode local selected	Update of setting on local controller.
Update mode on all selected	Update of setting on all controllers.
Ack. all alarms active	Acknowledge all active alarms.
Three phase system	Three phase AC configuration.
Split L1L3 phase system	Split L1L3-phase AC configuration.
Split L1L2 phase system	Split L1L2-phase AC configuration.
Single phase system	Single phase AC configuration.
Genset group selected	Genset group application selection.
Genset group plant selected	Genset group plant application selection.

Description	Notes
Inductive reference selected	Inductive cos phi reference.
Capacitive reference selected	Capacitive cos phi reference.
Exclude from Run All activated	Exclude one or more breakers when Run ALL is activated.
Power offset [1-3] activated	Power reference offset activated.
Cos phi offset [1-3] activated	Cos phi reference offset activated.
Test application selected with output cmd enabled	Emulation with engine and breaker relay reaction.
Test application selected with output cmd disabled	Emulation without engine and breaker relay reactions.
BB Parameter set [1-2] used	Nominal busbar settings 1 or 2.
Ethernet ready	Ethernet is ready for read/write.
L1L2L3 phase rotation active	The phase rotation is L1L2L3.
L1L3L2 phase rotation active	The phase rotation is L1L3L2.

3.3.5   Plant controller events

Events for plant

Description	Notes
Mains fail	Mains failure condition.
MB closed	Mains breaker closed.
MB opened	Mains breaker opened.
MB synchronising	Mains breaker synchronising in progress.
Access lock	Binary input access lock activated.
Emergency stop	Emergency stop activated.
Lamp test	Lamp test in progress.
Alternative start activated	Alternative start is a full AMF sequence test of the plant.
Event log selected for printing	Printer option: The Event log printout can be selected.
Alarm log selected for printing	Printer option: The Alarm log printout can be selected.
Battery log selected for printing	Printer option: The Battery log printout can be selected.
Parameter set [1-4] used	The parameter set can be selected internally or with binary input.
Test type simple selected	Selection of test type: Simple test.
Test type load selected	Selection of test type: Load test.
Test type full selected	Selection of test type: Full test.
BB voltage OK	Busbar voltage OK.
Capacity overrule active	Power capacity overrule is active.
Capacitive overrule inactive	Power capacity overrule is inactive.
Application [1-4] activated	Activate the application from the controller.
Single DG selected	Single DG application selection.
Multi mains selected	Multi-mains application selection.
Dynamic section equal static section	Power management feature.
My ID to run selected	Determines which mains feeder is allowed to operate parallel to the mains.

Description	Notes
M volt/freq OK	Mains frequency and voltage are within range.
Run one mains selected	Only one mains breaker is allowed to be closed at the time.
Run all mains selected	All mains breakers are allowed to be closed at the time.
Update mode local selected	Update of setting on local controller.
Update mode on all selected	Update of setting on all controllers.
Ack. all alarms active	Acknowledge all active alarms.
MB synchronisation to DG activated	Mains breaker synchronisation activated.
MB synchronisation to DG deactivated	Mains breaker synchronisation deactivated.
GB synchronisation to mains activated	Generator breaker synchronisation activated.
GB synchronisation to mains deactivated	Generator breaker synchronisation deactivated.
Mode shift activated	Mode shift between a running mode and AMF (Automatic Mains Failure) activated.
Mode shift deactivated	Mode shift between a running mode and AMF (Automatic Mains Failure) deactivated.
Autoswitch off selected	Auto-switch is not enabled.
Autoswitch static selected	Auto-switch enabled for static section.
Autoswitch dynamic selected	Auto-switch enabled for dynamic section.
Autoswitch all selected	Auto-switch enabled for all sections.
MB parallel activated	Multiple mains are allowed to supply the same busbar.
No break transfer activated	No break transfer is active.
MB close failure start activated	MB close failure start is active.
Three phase system	Three phase AC configuration.
Split L1L3 phase system	Split L1L3-phase AC configuration.
Split L1L2 phase system	Split L1L2-phase AC configuration.
Single phase system	Single phase AC configuration.
Genset group selected	Genset group application selection.
Genset group plant selected	Genset group plant application selection.
Inductive reference selected	Inductive cos phi reference.
Capacitive reference selected	Capacitive cos phi reference.
Exclude from Run All activated	Exclude one or more breakers when Run ALL is activated.
Power offset [1-3] activated	Power reference offset activated.
Cos phi offset [1-3] activated	Cos phi reference offset activated.
Test application selected with output cmd enabled	Emulation with engine and breaker relay reaction.
Test application selected with output cmd disabled	Emulation without engine and breaker relay reactions.
BB Parameter set [1-2] used	Nominal busbar settings 1 or 2.
BB Unom = Mains Unom used	Busbar nominal voltage is equal to the generator nominal voltage.
Mains sync. inhibit activated	The mains breaker sync. inhibit function is activated (this does not necessarily inhibit the synchronisation of the mains breaker).
Mains sync. inhibited	The mains breaker is in fact inhibited.

Description	Notes
Ethernet ready	Ethernet is ready for read/write.
L1L2L3 phase rotation active	The phase rotation is L1L2L3.
L1L3L2 phase rotation active	The phase rotation is L1L3L2.

3.4   Close before excitation (CBE)

These events are available for group tie breaker controllers only.

Description	Notes
CBE activated	The tie breaker is allowed to close before the genset is excited. This is typically used for asynchronous gensets.
CBE deactivated	The tie breaker is not allowed to close before the genset is excited.
CBE test relay(s) activated	

3.5   Redundancy

📖 **More information**
See the document **Description of options: Option T1 Critical power** for information about redundancy events.

3.6   Maintenance box

These events are for the remote maintenance box (RMB). They are only available for genset controllers.

📖 **More information**
See **Option T4 Remote maintenance box with multiple gensets** for more information.

3.7   Command timers

Description	Notes
Cmd timer [01-04] active	The command timers (1 to 4) will operate in pairs to activate and deactivate a flop flop function.
Any Cmd timers active	Any command timers will operate in pairs to activate and deactivate a flop flop function.

3.8   CAN inputs

📖 **More information**
See **Option G5 Power management** for information about CAN Inputs.

3.9   CANshare flags

These events are for CANshare applications.

📖 **More information**
See **Applications without power management, CANshare** in the **Designer's handbook**.

3.10   PMS lite event

These events are for PMS lite applications.

> 📖 **More information**
> See **PMS lite** in the **Designer's handbook**.

3.11   Display

Description	Notes
Display [1-3] primary	When more displays are used, set the display [1-3] as the primary.

3.12   PM compatibility

> 📖 **More information**
> See **Option G5 Power management** for information.

3.13   Static synchronisation type

These events are only available in genset controllers.

Description	Notes
GB: Breaker	Static sync. of the GB is set to Breaker Sync.
GB: Infinite	Static sync. of the GB is set to Infinite Sync.
MB: Breaker	Static sync. of the MB is set to Breaker Sync.
MB: Infinite	Static sync. of the MB is set to Infinite Sync.

3.14   Logic

These events are not available in bus tie breaker controllers.

Description	Notes
TRUE	= Always
FALSE	= Never

3.15   Digital inputs

3.15.1   Digital inputs

Description	Required option	Notes
Dig. input No [23-27]	-	The number indicates the terminal number for the input in question.
Dig. input No [29-35]	M13.2	
Dig. input No [43-55]	M12	
Dig. input No [65-71]	M13.4	
Dig. input No [91-97]	M13.6	
Dig. input No 102	-	
Dig. input No 105	-	
Dig. input No 108	-	
Dig. input No [112-117]	-	
Dig. input No [127-133]	M13.8	
Ext. I/O Dig. In [1-16]	H12.2, H12.8	

NOTE   For pulse input counters, M-Logic can register up to 5 digital input pulses per second.

3.15.2   CIO digital inputs

Only available if the CIO modules are enabled.

Description	Notes
CIO 116 no. 1. In. 10 to CIO 116 no. 5. In. 26	The event is active when the terminal is energised.

3.16   Modes

Mode events available for each controller type

Description	Genset	Mains	Bus tie breaker	Group	Plant	Notes
Island	●	●		●	●	One or more generators running in island mode are **not** connected to the mains grid.
AMF	●	●		●	●	AMF (Automatic Mains Failure) function mode.
Peak shaving	●	●		●	●	Peak shaving cuts the peak of the mains consumption by paralleling the generator to the mains.
Fixed power	●	●		●	●	Mains grid parallel fixed generator power.
Mains power export	●	●		●	●	Export of power to the mains grid.
Load take over	●	●		●	●	Load is transferred from mains to generator, and mains is disconnected.
Power management	●					Power management function mode.
Remote maintenance	●					Remote transformer maintenance.
Dry alternator	●					Dry alternator function mode.

Description	Genset	Mains	Bus tie breaker	Group	Plant	Notes
Ventilation	●					Ventilation function mode.
Genset group mode				●		
Semi-auto mode	●	●	●	●	●	Indication of generator running in Semi-auto mode.
Test mode	●	●		●	●	Indication of generator running in Test mode.
Auto mode	●	●	●	●	●	Indication of generator running in Auto mode.
Manual mode	●					Indication of generator running in Manual mode.
Block mode	●	●	●	●	●	Indication of generator running in Block mode.
DI Semi-auto mode used	●	●	●	●	●	DI = Digital Input.
DI Test mode used	●	●		●	●	DI = Digital Input.
DI Auto mode used	●	●	●	●	●	DI = Digital Input.
DI Manual mode used	●					DI = Digital Input.
DI Block mode used	●	●	●	●	●	DI = Digital Input.
Mode shift or AMF activated	●	●	●	●	●	Mode shift active or AMF sequence active.

3.17 Digital outputs

3.17.1 Relays

Description	Required option	Notes
Not used	-	
Relay 5	-	
Relay 8	-	
Relay 11	-	
Relay 14	-	
Relay 17	-	
Relay 20	-	
Relay 21	-	
Relay 29	M14.2	
Relay 31	M14.2	
Relay 33	M14.2	
Relay 35	M14.2	
Relay 57	M12	
Relay 59	M12	
Relay 61	M12	
Relay 63	M12	
Relay 65	M14.4	The list shows all possible relays, including the optional relays. Make sure that a selected relay is actually present.
Relay 67	M14.4	
Relay 69	M14.4	
Relay 71	M14.4	
Relay 90	M14.6	
Relay 92	M14.6	
Relay 94	M14.6	
Relay 96	M14.6	
Relay 119	-	
Relay 120	-	
Relay 121	-	
Relay 123	-	
Relay 126	M14.8	
Relay 128	M14.8	
Relay 130	M14.8	
Relay 132	M14.8	
Ext. I/O Dig. Out [1-16]	H12.2, H12.8	

3.17.2 CIO digital outputs

Only available if the CIO modules are enabled.

Description	Notes
CIO 208 no. [1-5] Out. [9; 11; 13; 15; 18; 21; 24; 27]	Activates the relay if the Relay function is set to Limit relay. Only visible if the CIO modules are enabled.
CIO [116; 208; 308] no. [1-5] conf. status output	Activates the relay if the relay function is set to Limit relay and the relay type is Configurable. Only visible if the CIO modules are enabled.

3.18   Virtual events

3.18.1   Virtual toggle events

Description	Notes
Virtual toggle event [1-96]*	Virtual toggle events 1 to 96 can be activated by Modbus. They can also be used in multiple lines of logic to increase the number of events possible in one sequence.

NOTE   * Previously *Virtual event [1-96]*.

3.18.2   Virtual switch events

Description	Notes
Virtual switch event [1-32]	Virtual switch events 1 to 32 can be activated by Modbus. They can also be used in multiple lines of logic to increase the number of events possible in one sequence.

3.19   AOP buttons

Description	Notes
Button [01-08]	The selected AOP button is activated.

More information
See **Configuration Tools, Parameters, M-Logic & AOP** in the **USW Help** for more information about configuring the AOP.

3.20   Fail class

Available fail classes for each controller type

Description	Genset	Mains	Bus tie breaker	Group	Plant	Notes
Block	●	●	●	●	●	Start blocking.
Warning	●	●	●	●	●	Warning.
Trip GB	●					Trip genset breaker.
Trip+stop	●					Trip breaker, cool down and stop.
Shutdown	●					Trip genset breaker and stop engine.
Trip MB	●	●			●	Trip mains breaker.
Trip BTB			●			Trip bus tie breaker.
Trip TB		●		●		Trip tie breaker.
Safety stop	●				●	A failure condition is expected, and the generator will be taken out for safety reasons. This feature is only useful in power management.

Description	Genset	Mains	Bus tie breaker	Group	Plant	Notes
Trip MB/GB	●					MB will be primary breaker to trip. If no MB is available in the application, the GB will trip instead.
Controlled stop	●					De-load genset, trip breaker, cool down and stop.
Trip MB/TB		●				First try to open the MB. If no MB exists, open the TB. If an MB exists but is already open, do not open the TB.

3.21   Power management

More information
See **Option G5 Power management** for information.

3.22   Heavy consumers

These events are only available in genset controllers.

More information
See the document **ALC-4 Designer's reference handbook** for information about Heavy consumer events.

3.23   EIC events

These events are only available in genset controllers.

More information
See **Options H12 and H13 Engine communication** for information.

3.24   DAVR events

These events are only available in genset controllers.

DVC 310 event

More information
See **Option T2 Digital AVR 4189340771** on the DVC 310 documentation page for more information.

DVC 550 events

More information
See **Configure the DVC 550 with the AGC-4, M-Logic related to DVC 550** in the **DVC 550 Designer's handbook** for more information about DAVR events.

DVC 350 events

More information
See the **DVC 350 Designer's handbook**.

3.24.1 DAVR PSS events

Description	Notes
PSS Off	The DAVR power system stabiliser function is off.
PSS enabled AND inactive	The DAVR power system stabiliser function is enabled, but it is not active because the load is below the threshold.

Description	Notes
PSS enabled AND active	The DAVR power system stabiliser function is active.
PSS feature present in DAVR	The DAVR power system stabiliser function is present.

3.25 General purpose PID

These events are only available in genset controllers.

Description	Notes
PID [1-6] active	Indicates that the PID is active.
PID [1-6] at min. output	Indicates when the PID is at minimum output.
PID [1-6] at max. output	Indicates when the PID is at maximum output.
PID [1-6] output frozen	Indicates that the PID is frozen.
PID [1-6] using input [1-3]	Indicates which PID input is active.
PID [1-6] Modbus control	Indicates if the PID is controlled by Modbus.

3.26 Flip flops

Description	Notes
Flip flop output [1-16]	The event is active when the flip flop is set or toggled.

3.27 Oneshots

Description	Notes
Oneshot output [1-16]	The event is active when the oneshot output is activated.

3.28 Power limit outputs

These events are only available in genset controllers.

Description	Notes
Power Limit Output [1-4]	Indicates which Power Limit Output is active.

3.29 Easy connect

These events are only available in genset controllers.

Description	Notes
Plant active	The event is active when the controller is in a power management system.
Stand-alone	The event is active when the controller is not in a power management system.

3.30 Grid support

These events are only available in genset controllers.

Description	Notes
Power Ramp [1-4] active	The actual power ramp [1-4] is active.
Default Var Reg variant active	Default Var Regulation variant is active.
Var Reg variant [A-F] active	The actual Var Regulation variant [A-F] is active.
Q(u) variant A ext. control set to OFF	Q(u) variant A external control set to OFF is active.
Q(u) variant A ext. control set to MODBUS	Q(u) variant A external control set to MODBUS is active.
Q(u) variant A ext. control set to ANALOGUE	Q(u) variant A external control set to ANALOGUE is active.
Q(u) variant C ext. control set to OFF	Q(u) variant C external control set to OFF is active.
Q(u) variant C ext. control set to MODBUS	Q(u) variant C external control set to MODBUS is active.
Q(u) variant C ext. control set to ANALOGUE	Q(u) variant C external control set to ANALOGUE is active.

3.31   Frequency adjustment

Events > Frequency adjustment

Description	Notes
Control inactive	The dynamic frequency response function does not control the frequency.
Control active - Nominal frequency	The dynamic frequency response function controls the frequency at the *Frequency reference* setting.
Control active - High frequency	The dynamic frequency response function controls the frequency at the *High frequency* setting.
Control active	The dynamic frequency response function controls the frequency.
Control active - High Freq. by step	The genset power was low. The dynamic frequency response function therefore increased the frequency set point in steps, so that the frequency set point is now at the maximum.
Control active - High Freq. by control	The genset power was very low (P f max). The dynamic frequency response function therefore increased (in one big step) the frequency set point to the maximum.
Mode - Off	The dynamic frequency response function is not activated.
Mode - Nominal frequency	The dynamic frequency response function is activated. The controller controls the frequency at the nominal frequency.
Mode - High frequency	The dynamic frequency response function is activated. The controller controls the frequency at the *High frequency* setting.
Mode - Automatic	The dynamic frequency response function is activated. The controller automatically selects the mode and activates suitable control.

3.32   M-Logic event counters

Description	Notes
M-logic event counter limit [1-8]	The event counter has reached the limit selected in the *Counters > M-logic event counter* window.
M-logic event reset counter [1-8]	The event counter has been reset. The reset conditions are in the *Counters > M-logic event counter* window.

4. List of outputs

4.1 Commands

4.1.1 Genset controller commands

`Output > Command`

Description	Notes
Lamp test	Activate lamp test (LEDs on display).
Ack. all alarms	Acknowledge all alarms.
Set clock to 4 am	Set the controller clock to 04h00.
Derate Pnom [1-3]	Activate nominal power derate.
Select test type to simple	Test sequence selection.
Select test type to load	Test sequence selection.
Select test type to full	Test sequence selection.
Freeze ramp	Locks the power ramp up function until the command is disabled again.
Idle run low speed	Idle speed constant low speed.
Idle run temp control	Idle speed temperature-dependent.
Cool down threshold	Interrupt cool down sequence.
Inductive reference	Inductive cos phi reference.
Capacitive reference	Capacitive cos phi reference.
Act. dynamic sync.	Activate dynamic sync.
Act. static sync.	Activate static sync.
Fan A running	Running feedback for cooling fan A.
Fan B running	Running feedback for cooling fan B.
Fan C running	Running feedback for cooling fan C.
Fan D running	Running feedback for cooling fan D.
Act. power offset [1-3]	Activate the power reference offset.
Deact. power offset [1-3]	Deactivate the power reference offset.
Act. cos phi offset [1-3]	Activate cos phi reference offset.
Deact. cos phi offset [1-3]	Deactivate cos phi reference offset.
Activate Fuel Pump	Override fuel pump hysteresis to fill the tank to threshold level.
Reset horn	Reset the horn relay.
Reset I max. demand	Reset the peak current detected in the controller.
Reset I thermal demand	Reset the thermal current detected in the controller.
Pulse counter [1-2]	Increase the selected pulse counter.
Reset pulse counter [1-2]	Reset the selected pulse counter.
Force use of analogue offset [1-4]	This command forces the selected analogue offset to be active.
Mains sync. inhibit activate	Activates the close inhibit functionality on the mains breaker.
Mains sync. inhibit deactivate	Deactivates the close inhibit functionality on the mains breaker.
Ack. mains protection alarms	Acknowledges all mains alarms including: 1270-1430, 1660, 1700, 1960, 1970, 7480-7490.

Description	Notes
Act. max. ventilation	Activates max. ventilation.
Deact. max. ventilation	Deactivates max. ventilation.
Act. Frequency droop regulation	Activates frequency droop regulation.
Act. Voltage droop regulation	Activates voltage droop regulation.
Shutdown override	Activates shutdown override.
Mains Okay	This function can be used if an input has been configured to *Mains Okay*. When it is set, the command Mains Okay is given. This command is sometimes called *External Mains Okay*.
Access lock	Activates access lock.
Alternative start	Activates alternative start.
Activate ana. fan ref. set [1-2]	Activates analogue fan reference parameters.
Activate Idle run	Activates idle run.
Deactivate Idle run	Deactivates idle run.
Mains P measurement for droop reference	Activates the P measurement directly from a transducer.
Mains Q measurement for droop reference	Activates the Q measurement directly from a transducer.
Mains U measurement for droop reference	Activates the U measurement directly from a transducer.
Frequency offset measurement for droop	Activates the frequency offset directly from a transducer.
Activate load depend start/stop setting 2	Activates setting 2 for load-dependent start/stop.
Deactivate load depend start/stop setting 2	Deactivates setting 2 for load-dependent start/stop.
Activate load depend start setting 2	Activates setting 2 for load-dependent start.
Deactivate load depend start setting 2	Deactivates setting 2 for load-dependent start.
Activate load depend stop setting 2	Activates setting 2 for load-dependent stop.
Deactivate load depend stop setting 2	Deactivates setting 2 for load-dependent stop.

Output > Command AC

Description	Notes
Select three phase system	Sets the controller to work in a three-phase system.
Select split L1L3 phase system	Sets the controller to work in a two-phase system (L1-L3).
Select split L1L2 phase system	Sets the controller to work in a two-phase system (L1-L3).
Select single phase system	Sets the controller to work in a single-phase system (L1).
Select L1L2L3 phase rotation	Activates L1L2L3 as phase rotation direction.
Select L1L3L2 phase rotation	Activates L1L3L2 as phase rotation direction.

Output > Command Parameter set

Description	Notes
Set parameter [1-4]	Choose the parameter set for nominal settings.
Set BB parameter [1-2]	Select the parameter set for busbar nominal settings.
Set BB Unom = Gen Unom	Busbar nominal voltage is equal to the generator nominal voltage.

`Output > Command Engine`

Description	Notes
Activate Warm Up Ramp	Activate warm up ramp
Battery test	Activate battery test
Eng. heater manual ctrl.	Enable/disable the engine heater function.
Auto start/stop	ON = Start, OFF = Stop.
Remote start	Pulse signal.
Remote stop	Pulse signal.
DG start + GB on	Start engine and close generator breaker.
DG stop + GB off	Open generator breaker and stop engine.

`Output > Command Breakers`

Description	Notes
GB close inhibit	Prevents the generator breaker from closing.
Open GB	Open the generator breaker.
Close GB	Close the generator breaker.
Open MB	Open the mains breaker.
Close MB	Close the mains breaker.
MB close inhibit	Prevents mains breaker from closing.
Ignore any GB pos fail - allow GB close	Allow the generator breaker to close even though another generator has a GB position failure.

`Output > Command Plant`

Description	Notes
Select application [1-4]	Power management: Select the power management application from the controller.

`Output > Command Power management`

> 📖 **More information**
> See **M-Logic** in **Option G5** for these commands.

4.1.2   Mains controller commands

`Output > Command`

Description	Notes
Lamp test	Activate lamp test (LEDs on display).
Ack. all alarms	Acknowledge all alarms.
Set clock to 4 am	Set the controller clock to 04h00.
Select test type to simple	Test sequence selection.
Select test type to load	Test sequence selection.
Select test type to full	Test sequence selection.
Activate capacity overrule	Activates power capacity overrule.
Deactivate capacity overrule	Deactivates power capacity overrule.
Activate MB parallel	Mains breaker in parallel is activated (parameter 8182).

Description	Notes
Deactivate MB parallel	Mains breaker in parallel is deactivated (parameter 8182).
Activate no break transfer	No break transfer is activated.
Deactivate no break transfer	No break transfer is deactivated.
Activate MB close failure start	MB close failure start is activated.
Deactivate MB close failure start	MB close failure start is deactivated.
Inductive reference	Inductive cos phi reference.
Capacitive reference	Capacitive cos phi reference.
Act. power offset [1-3]	Activate the selected power reference offset.
Deact. power offset [1-3]	Deactivate the selected power reference offset.
Act. cos phi offset [1-3]	Activate the cos phi reference offset.
Deact. cos phi offset [1-3]	Deactivate the cos phi reference offset.
Reset horn	Reset the horn relay.
Reset I max. demand	Reset the peak current detected in the controller.
Reset I thermal demand	Reset the thermal current detected in the controller.
Pulse counter [1-2]	Increase the selected pulse counter.
Reset pulse counter [1-2]	Reset the selected pulse counter.
Mains sync. inhibit activate	Activates the close inhibit functionality on the mains breaker.
Mains sync. inhibit deactivate	Deactivates the close inhibit functionality on the mains breaker.
Ack. mains protection alarms	Acknowledges all mains alarms including: 1270-1430, 1660, 1700, 1960, 1970, 7480-7490.
Mains Okay	This function can be used if an input has been configured to Mains Okay. When it is set, the command Mains Okay is given. This command is sometimes called *External Mains Okay*.
Access lock	Activates access lock.

Output > Command - Mains ATS

📖 **More information**
See **M-Logic** in **Option G5** for these commands.

Output > Command - AC

Description	Notes
Select three phase system	Sets the controller to work in a three-phase system.
Select split L1L3 phase system	Sets the controller to work in a two-phase system (L1-L3).
Select split L1L2 phase system	Sets the controller to work in a two-phase system (L1-L3).
Select single phase system	Sets the controller to work in a single-phase system (L1).
Select L1L2L3 phase rotation	Activates L1L2L3 as phase rotation direction
Select L1L3L2 phase rotation	Activates L1L3L2 as phase rotation direction

`Output > Command - Parameter set`

Description	Notes
Set parameter [1-4]	Choose the parameter set for nominal settings.
Set BB parameter [1-2]	Select the parameter set for busbar nominal settings.
Set BB Unom = Mains Unom	Busbar nominal voltage is considered equal to the mains nominal voltage.

`Output > Command - Breakers`

Description	Notes
MB open inhibit	Prevents mains breaker from opening.
TB open inhibit	Prevents tie breaker from opening.
MB close inhibit	Prevents the mains breaker from closing.
TB close inhibit	Prevents the tie breaker from closing.
Open TB	Open the tie breaker.
Close TB	Close the tie breaker.
Open MB	Open the mains breaker.
Close MB	Close the mains breaker.

`Output > Command - Plant`

Description	Notes
Select application [1-4]	Power management: Select the application from the controller.

`Output > Command - Power management`

📖 **More information**
See **M-Logic** in **Option G5** for these commands.

4.1.3   Bus tie breaker controller commands

`Output > Command`

Description	Notes
Semi-Auto mode	Semi-auto running mode.
Auto mode	Auto running mode.
Block mode	Block running mode.
Lamp test	Activate lamp test (LEDs on display).
Ack. all alarms	Acknowledge all alarms.
Set clock to 4 am	Set the controller clock to 04h00.
Set parameter [1-4]	Choose the parameter set for nominal settings.
BTB close inhibit	Prevents the BTB from closing.
Select application [1-4]	Power management: Select the application from the controller.
Open BTB	Open the bus tie breaker.
Close BTB	Close the bus tie breaker.
Select three phase system	Sets the controller to work in a three-phase system.
Select split L1L3 phase system	Sets the controller to work in a two-phase system (L1-L3).
Select split L1L2 phase system	Sets the controller to work in a two-phase system (L1-L3).

Description	Notes
Select single phase system	Sets the controller to work in a single-phase system (L1).
Reset horn	Reset the horn relay.
Reset I max. demand	Reset the peak current detected in the controller.
Reset I thermal demand	Reset the thermal current detected in the controller.
Pulse counter [1-2]	Increase the selected pulse counter.
Reset pulse counter [1-2]	Reset the selected pulse counter.
Set parameter [1-2]	Select the parameter set for nominal settings.
Ack. BB protection alarms	Acknowledges all busbar alarms including: 1270-1430, 1660, 1700, 1960, 1970, 7480-7490.
Access lock	Activates access lock.

More information
See **Option G5 Power management** for the BTB direct close and breaker configuration commands.

4.1.4   Group tie breaker controller commands

Commands for group tie breaker

Description	Notes
Island	Island function mode.
AMF	AMF (Automatic Mains Failure) function mode.
Peak shaving	Peak shaving function mode.
Fixed power	Fixed power function mode.
Mains power export	Mains power export function mode.
Load take over	Load take over function mode.
Genset group	
Semi-Auto mode	Semi-auto running mode.
Test mode	Test running mode.
Auto mode	Auto running mode.
Block mode	Block running mode.
Lamp test	Activate lamp test (LEDs on display).
Ack. all alarms	Acknowledge all alarms.
Set to local start	Select local start in a power management application.
Set to remote start	Select remote start in a power management application.
Set clock to 4 am	Set the controller clock to 04h00.
Set BA parameter [1-4]	Choose the parameter set for nominal settings for busbar A.
Activate capacity overrule	See **Option G7 Extended power management**.
Deactivate capacity overrule	See **Option G7 Extended power management**.
TB close inhibit	Prevents the tie breaker from closing.
Select application [1-4]	Power management: Select the power management application from the controller.
Update mode local	The running mode for the local controller in the power management system is updated to the selected mode.

Description	Notes
Update mode on all	The running mode for all controllers in the power management system is updated to the selected mode.
Store common settings	See **Handling settings for sections** in **Option G5 Power management**.
Open TB	Open the tie breaker.
Close TB	Close the tie breaker.
Auto start/stop	ON = Start, OFF = Stop.
First priority	Forces this controller to have the first priority in a power management system.
Activate Asymmetric LS	Activate asymmetric load share.
Deactivate Asymmetric LS	Deactivate asymmetric load share.
Select three phase system	Sets the controller to work in a three-phase system.
Select split L1L3 phase system	Sets the controller to work in a two-phase system (L1-L3).
Select split L1L2 phase system	Sets the controller to work in a two-phase system (L1-L3).
Select single phase system	Sets the controller to work in a single-phase system (L1).
Inductive reference	Inductive cos phi reference.
Capacitive reference	Capacitive cos phi reference.
Act. power offset [1-3]	Activate the power reference offset.
Deact. power offset [1-3]	Deactivate the power reference offset.
Act. cos phi offset [1-3]	Activate cos phi reference offset.
Deact. cos phi offset [1-3]	Deactivate cos phi reference offset.
Reset horn	Reset the horn relay.
Reset I max. demand	Reset the peak current detected in the controller.
Reset I thermal demand	Reset the thermal current detected in the controller.
Pulse counter [1-2]	Increase the selected pulse counter.
Reset pulse counter [1-2]	Reset the selected pulse counter.
Set BB parameter [1-2]	Select the parameter set for busbar nominal settings.
Ack. mains protection alarms	Acknowledges all mains alarms including: 1270-1430, 1660, 1700, 1960, 1970, 7480-7490.
Access lock	Activates access lock.
Select L1L2L3 phase rotation	Activates L1L2L3 as phase rotation direction.
Select L1L3L2 phase rotation	Activates L1L3L2 as phase rotation direction.
TB configuration: Normal close	Change the tie breaker in the application configuration to *Normally closed*.
TB configuration: Normal open	Change the tie breaker in the application configuration to *Normally open*.

4.1.5   Plant controller commands

Commands for plant

Description	Notes
Island	Island function mode.
AMF	AMF (Automatic Mains Failure) function mode.
Peak shaving	Peak shaving function mode.

Description	Notes
Fixed power	Fixed power function mode.
Mains power export	Mains power export function mode.
Load take over	Load take over function mode.
Semi-Auto mode	Semi-auto running mode.
Test mode	Test running mode.
Auto mode	Auto running mode.
Block mode	Block running mode.
Lamp test	Activate lamp test (LEDs on display).
Ack. all alarms	Acknowledge all alarms.
Set to local start	Select local start in a power management application.
Set to remote start	Select remote start in a power management application.
Set clock to 4 am	Set the controller clock to 04h00.
Switch log to print	Switch between event, alarm and battery log to print.
Print log	Print output.
Print status	Print output.
Set parameter [1-4]	Choose the parameter set for nominal settings.
Select test type to simple	Test sequence selection.
Select test type to load	Test sequence selection.
Select test type to full	Test sequence selection.
Activate capacity overrule	Activates power capacity overrule.
Deactivate capacity overrule	Deactivates power capacity overrule.
Select application [1-4]	Power management: Select the application from the controller.
Run my ID constant	Runs the connected mains (constant)
Run my ID activate	Runs the connected mains (one shot)
Run one mains	Only one mains breaker is closed at the time.
Run all mains	All mains breakers are closed at the time.
Update mode local	Running mode update for the local controller.
Update mode on all	The running mode for all controllers in the power management system is updated to the selected mode.
Store common settings	See **Handling settings for sections** in **Option G5 Power management**.
Open MB	Open the mains breaker.
Close MB	Close the mains breaker.
Auto start/stop	ON = Start, OFF = Stop.
Autoswitch off	Auto-switch is not enabled.
Autoswitch static	Auto-switch enabled for static section.
Autoswitch dynamic	Auto-switch enabled for dynamic section.
Autoswitch all	Auto-switch enabled for all sections.
Activate MB parallel	Mains breaker in parallel is activated (parameter 8182).
Deactivate MB parallel	Mains breaker in parallel is deactivated (parameter 8182).
Activate no break transfer	No break transfer is activated.

Description	Notes
Deactivate no break transfer	No break transfer is deactivated.
Activate MB close failure start	MB close failure start is activated.
Deactivate MB close failure start	MB close failure start is deactivated.
Select three phase system	Sets the controller to work in a three-phase system.
Select split L1L3 phase system	Sets the controller to work in a two-phase system (L1-L3).
Select split L1L2 phase system	Sets the controller to work in a two-phase system (L1-L3).
Select single phase system	Sets the controller to work in a single-phase system (L1).
Inductive reference	Inductive cos phi reference.
Capacitive reference	Capacitive cos phi reference.
Act. power offset [1-3]	Activate the selected power reference offset.
Deact. power offset [1-3]	Deactivate the selected power reference offset.
Act. cos phi offset [1-3]	Activate the cos phi reference offset.
Deact. cos phi offset [1-3]	Deactivate the cos phi reference offset.
MB close inhibit	Prevents the mains breaker from closing.
Reset horn	Reset the horn relay.
Reset I max. demand	Reset the peak current detected in the controller.
Reset I thermal demand	Reset the thermal current detected in the controller.
Pulse counter [1-2]	Increase the selected pulse counter.
Reset pulse counter [1-2]	Reset the selected pulse counter.
Set parameter [1-2]	Select the parameter set for busbar nominal settings.
Set BB U_{NOM} = Mains U_{NOM}	Busbar nominal voltage is considered equal to the mains nominal voltage.
Mains sync. inhibit activate	Activates the close inhibit functionality on the mains breaker.
Mains sync. inhibit deactivate	Deactivates the close inhibit functionality on the mains breaker.
Ack. mains protection alarms	Acknowledges all mains alarms including: 1270-1430, 1660, 1700, 1960, 1970, 7480-7490.
Mains Okay	This function can be used if an input has been configured to *Mains Okay*. When it is set, the command Mains Okay is given. This command is sometimes called *External Mains Okay*.
Access lock	Activates access lock.
Alternative start	Activates alternative start.
Select L1L2L3 phase rotation	Activates L1L2L3 as phase rotation direction
Select L1L3L2 phase rotation	Activates L1L3L2 as phase rotation direction

4.1.6   M-Logic and AOP alarms

Command M-Logic and AOP

Description	Notes
M-Logic alarm [1-5]	Activates the M-Logic alarm. Configure these alarms in menus 3570 to 3610.
M-Logic ext alarm [1-4] : Start extended timer	Starts the timer configured in parameters 3621 to 3652. Use the parameters to select the units for the timer and configure the alarm. When the timer runs out, the alarm is activated.

Description	Notes
	Auto reset: The timer is automatically reset when the alarm event is no longer present. **Manual reset**: The timer is paused (but not reset) if the alarm event is no longer present. The timer thus corresponds to the total time that the alarm event is present. The timer is only reset when the M-Logic reset command is used.
M-Logic ext alarm [1-4] : Reset extended timer	Resets the timer.

4.1.7   General purpose PID commands

These commands are only available for genset controllers.

Description	Notes
PID [1-6] activate	Activates the PIDs.
PID [1-6] force min. outp.	Forces the PID output to minimum.
PID [1-6] force max. outp.	Forces the PID output to maximum.
PID [1-6] reset	Resets the PID outputs.
PID [1-6] freeze output	Freezes the PID outputs

4.2   Modes

Modes for genset (Output, Modes)

Description	Notes
Island	Island function mode.
AMF	AMF (Automatic Mains Failure) function mode.
Peak shaving	Peak shaving function mode.
Fixed power	Fixed power function mode.
Mains power export	Mains power export function mode.
Load take over	Load take over function mode.
Power management	Power management function mode.
Remote maintenance	Remote transformer maintenance.
Dry alternator	Dry alternator function mode (DVC 550 required).
Ventilation	Ventilation function mode (DVC 550 required).
Semi-Auto mode	Semi-auto running mode.
Test mode	Test running mode.
Auto mode	Auto running mode.
Manual mode	Manual running mode.
Block mode	Block running mode.

Modes for mains (Output, Modes)

Description	Notes
Island	Island function mode.
AMF	AMF (Automatic Mains Failure) function mode.

Description	Notes
Peak shaving	Peak shaving function mode.
Fixed power	Fixed power function mode.
Mains power export	Mains power export function mode.
Load take over	Load take over function mode.
Semi-Auto mode	Semi-auto running mode.
Test mode	Test running mode.
Auto mode	Auto running mode.
Block mode	Block running mode.

4.3   Redundancy

More information
See **Option T1 Critical power** for information about redundancy commands.

4.4   Remote maintenance

These commands are for the remote maintenance box (RMB). They are only available for genset controllers.

More information
See **Remote maintenance box DRH** and **Option T4 Remote maintenance box with multiple gensets** for more information.

4.5   Quick setup

Description	Notes
Off	Quick setup is off.
Setup stand alone	Stand alone quick setup.
Setup plant	Plant quick setup.

4.6   Virtual events

4.6.1   Virtual toggle events

Description	Notes
Virtual toggle event [1-96]	Virtual toggle events 1 to 96 can be activated by M-Logic or Modbus. The event is activated for about 100 ms.

4.6.2   Virtual switch events

Description	Notes
Virtual switch event [1-32]	Virtual switch events 1 to 32 can be activated by M-Logic or Modbus. The event remains activated while the corresponding Modbus function is activated.

4.7 Digital outputs

4.7.1 Relays

Description	Required option	Notes
Not used	-	
Relay 5	-	
Relay 8	-	
Relay 11	-	
Relay 14	-	
Relay 17	-	
Relay 20	-	
Relay 21	-	
Relay 29	M14.2	
Relay 31	M14.2	
Relay 33	M14.2	
Relay 35	M14.2	
Relay 57	M12	
Relay 59	M12	
Relay 61	M12	The list shows all possible relays, including the optional relays. Make sure that a selected relay is actually present.
Relay 63	M12	
Relay 65	M14.4	
Relay 67	M14.4	
Relay 69	M14.4	
Relay 71	M14.4	
Relay 90	M14.6	
Relay 92	M14.6	
Relay 94	M14.6	
Relay 96	M14.6	
Relay 126	M14.8	
Relay 128	M14.8	
Relay 130	M14.8	
Relay 132	M14.8	
Ext. I/O Dig. Out [1-16]	H12.2, H12.8	

4.7.2 CIO digital outputs

Only available if the CIO modules are enabled.

Description	Notes
CIO 208 no. [1-5] Out. [9; 11; 13; 15; 18; 21; 24; 27]	Activates the relay if the Relay function is set to Limit relay.

Description	Notes
	Only visible if the CIO modules are enabled.
CIO [116; 208; 308] no. [1-5] conf. status output	Activates the relay if the relay function is set to Limit relay and the relay type is Configurable. Only visible if the CIO modules are enabled.

4.8   Inhibits

Inhibits for each controller type

Description	Genset	Mains	Bus tie breaker	Group tie breaker	Plant	Notes
Activate LD stop used	●					Load-dependent stop. See **Option G5**.
Activate LD stop	●					
Deactivate mode button	●	●	●	●	●	Mode button on display front.
Activate MB synchronisation to DG	●	●			●	Mains breaker synchronisation to the genset(s) is activated.
Activate GB synchronisation to mains	●	●			●	Generator breaker synchronisation to the mains is activated.
Deactivate MB synchronisation to DG	●	●			●	Mains breaker synchronisation to the genset(s) is deactivated.
Deactivate GB synchronisation to mains	●	●			●	Generator breaker synchronisation to the mains is deactivated.
Inh. analogue load share	●					Deactivate analogue load sharing.
Inh. acknowledge in AUTO	●	●	●	●	●	If in AUTO mode, the alarm acknowledge is not possible.
Inh. Modbus commands	●	●	●	●	●	Modbus commands are ignored.
Activate short time parallel	●	●			●	Activate 1 s max. parallel time.
Deactivate short time parallel	●	●			●	Deactivate 1 s max. parallel time.
Inhibit [1-3]	●	●	●	●	●	Alarm inhibits.
Activate power management		●			●	
Deactivate power management		●			●	
Select multi-start set [1-2]	●			●	●	Selection of number of generators to start on blackout.
Block priority swapping	●			●		Present start priority list is maintained.
Activate mode shift	●	●			●	Activate shift from a running mode to AMF in case of mains failure.
Deactivate mode shift	●	●			●	Deactivate shift from a running mode to AMF in case of mains failure.
Inh. BTB close request	●	●		●	●	Bus tie breaker closing not allowed.
Inh. request for section	●	●		●	●	Prevent the section from helping other sections.
Inh. BTB deload			●			
Inh. AOP1 buttons	●	●	●	●	●	All command buttons on AOP1 are ignored.

Description	Genset	Mains	Bus tie breaker	Group tie breaker	Plant	Notes
Inh. AOP2_[1-5] buttons	●	●	●	●	●	All command buttons on AOP2/[1-5] are ignored.
Activate CBE	●				●	Activates the Close Before Excitation function.
Deactivate CBE	●				●	Deactivates the Close Before Excitation function.
Inh. regulation	●				●	Ignore regulation.
Exclude from Run all sequences		●				
Include in Run all sequences		●				
Inh. start button	●	●		●	●	Ignore the start button.
Inh. stop button	●	●		●	●	Ignore the stop button.
Inh. GB button	●					Ignore the generator breaker button.
Inh. MB button	●	●			●	Ignore the mains breaker button.
Inh. BTB button			●			
Inh. TB button				●		
Inh. GG BTB close request				●		
Inh. request for GG section				●		
Inh. engine start	●					Engine start is not allowed.
Inh. GB black close	●					Genset is not allowed to close to a black busbar.

4.9 BTB Cmd

Output, BTB Cmd

Description	Notes
BTB [33-40] open feedback	The power management system must regard the BTB as open.
BTB [33-40] closed feedback	The power management system must regard the BTB as closed.
BTB [33-40] open cmd	The power management system must command the BTB to open.
BTB [33-40] close cmd	The power management system must command the BTB to close.

4.10 Fast TB action and CBE

These commands are only available for group tie breaker controllers.

Description	Notes
TB Direct close - fast	
TB Direct close on dead BA and dead BB	
TB Direct close - skip power capacity	
Activate CBE	Activates close before excitation for the tie breaker. This command is usually used with asynchronous gensets.

Description	Notes
Deactivate CBE	Deactivate close before excitation for the tie breaker.
GG Test CBE relay(s)	

4.11   CAN commands

More information
See **Option G5 Power management** for information.

4.12   CANshare flags

These commands are for CANshare applications.

More information
See **Applications without power management, CANshare** in the **Designer's handbook**.

4.13   PMS lite commands

These commands are for PMS lite applications.

More information
See **PMS lite** in the **Designer's handbook**.

4.14   Display

Description	Notes
Set display [1-3] to primary	When more displays are used, set display [1-3] as the primary.
Act. view [1-20] on display [1-3]	Activate a specific view on display [1-3].
Act. power reference menu on display [1-3]	Makes the menu 7050 "Fixed Power set" appear on display [1-3].
Act. test power reference menu on display [1-3]	Makes the menu 7040 "Test" appear on display [1-3].
Act. cos phi reference menu on display [1-3]	Makes the menu 7050 "Fixed Power set" appear on display [1-3].

4.15   Static synchronisation type

These commands are only available for genset controllers.

Description	Notes
GB: breaker	Set GB to Breaker Sync in static sync.
GB: infinite	Set GB to Infinite Sync in static sync.
MB: breaker	Set MB to Breaker Sync in static sync.
MB: infinite	Set MB to Infinite Sync in static sync.

4.16   GOV/AVR control

These commands are only available for genset controllers.

Description	Notes
GOV increase	Speed governor control output.
GOV decrease	Speed governor control output.
Freeze Gov. regulation	Speed governor control output.
AVR increase	AVR voltage control output.
AVR decrease	AVR voltage control output.
Freeze AVR regulation	AVR voltage control output.
Freeze reactive power ramp	Reactive power ramp control output.
Reset Analogue output (Gov & AVR)	Resets the analogue governor or AVR output if it has been manually changed.
External power control CIO 308_1_8	Changes the analogue signal for power control to input 8 on CIO308.
External frequency control CIO 308_1_8	Changes the analogue signal for frequency control to input 8 on CIO308.
External voltage control CIO 308_1_11	Changes the analogue signal for voltage control to input 11 on CIO308.
External cos phi control CIO 308_1_11	Changes the analogue signal for cos phi control to input 11 on CIO308.
External reactive power control CIO 308_1_11	Changes the analogue signal for reactive power control to input 11 on CIO308.

4.17   EIC commands

These commands are only available for genset controllers.

> **More information**
> See **Options H12 and H13 Engine communication** for information.

4.18   DAVR commands

These commands are only available for genset controllers.

> **More information**
> See **Configure the DVC 550 with the AGC-4, M-Logic related to DVC 550** in the **DVC 550 Designer's handbook** for more information about DAVR commands.

> **More information**
> See the **DVC 350 Designer's handbook**.

4.18.1   DAVR PSS commands

Description	Notes
Disable PSS	Turn off the DAVR power system stabiliser function.
Enable PSS at GB pos ON	The DAVR power system stabiliser function is enabled when the genset breaker is closed.
Enable PSS at mains parallel	The DAVR power system stabiliser function is enabled when the genset is parallel to the mains/grid.

4.19 Flip flops

Description	Notes
Flip flop set [1-16]	The output is used to activate the flip flop. Once activated, the flip flop remains activated.
Flip flop reset [1-16]	The output is used to deactivate the flip flop.
Flip flop toggle [1-16]	The output is used to toggle the state of the flip flop. That is, if the flip flop was deactivated, it is activated. If it was activated, it is deactivated.

4.20 Oneshots

Description	Notes
Oneshot set [1-16]	The oneshot is activated for a short time (about 100 ms) when the logic is true. If the logic remains true, the oneshot is not activated again. When the logic is false, the function is reset.
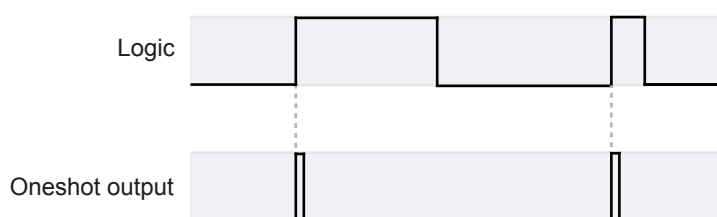
4.21 Easy connect

These commands are only available for genset controllers.

Description	Notes
Add DG	Adds DG to the power management system.
Remove DG	Removes DG from the power management system.
Select yes on the display	Selects yes on the display in easy connect mode.
Select no on the display	Selects no on the display in easy connect mode.
Enable Easy connect	Enables Easy connect for the power management system.
Disable Easy connect	Disables Easy connect for the power management system.

4.22 Grid support

These commands are only available for genset and mains controllers.

Description	Notes
Activate Power Ramp [1-4*]	Activate power ramp [1-4*].
Var Reg Type Normal	Activate normal var regulation.
Var Reg Type Q/U U_SHIFT	See **Option A10**.
Var Reg Type Q/P REG CURVE	See **Option A10**.
Var Reg Type Q/U Q_SHIFT	See **Option A10**.
Var Reg Type FIXED COSPHI	See **Option A10**.
Var Reg Type FIXED Q	See **Option A10**.

Description	Notes
Var Reg Type SUPERIOR	See **Option A10** (only in genset controllers).
Set Q(u) variant A ext. control to OFF	Set Q(u) variant A external control to OFF.
Set Q(u) variant A ext. control to MODBUS	Set Q(u) variant A external control to MODBUS.
Set Q(u) variant A ext. control to ANALOGUE	Set Q(u) variant A external control to ANALOGUE.
Set Q(u) variant C ext. control to OFF	Set Q(u) variant C external control to OFF.
Set Q(u) variant C ext. control to MODBUS	Set Q(u) variant C external control to MODBUS.
Set Q(u) variant C ext. control to ANALOGUE	Set Q(u) variant C external control to ANALOGUE.
Enable droop curve [1-2]	See **Option A10**.
Disable droop curve [1-2]	See **Option A10**.
Droop curve 2: Activate cosphi reference	See **Option A10**.
Droop curve 2: Activate Q reference	See **Option A10**.
Use Pset Min(Modbus/AI)	See **Option A10**.

NOTE   * For option A20, there are only two power ramps.

4.23 Power limit inputs

These commands are only available for genset controllers.

Description	Notes
Power Limit Input [1-4]	Configure binary input 1 to 4 for RRCR (Radio Ripple Control Receiver) signals.

4.24 Frequency adjustment

`Output > Frequency adjustment`

Description	Notes
Off	Deactivate the dynamic frequency response function (the controller does not adjust the frequency set point).
Nominal frequency	Dynamic frequency response controls the frequency at the nominal frequency.
High frequency	Controls the frequency at the dynamic frequency response *High frequency* setting.
Automatic	Automatically select the dynamic frequency response mode. Activate the suitable dynamic frequency response control.

4.25 M-Logic event counters

Description	Notes
M-logic event counter [1-8]	M-Logic increases the event counter.
M-logic event reset counter [1-8]	M-Logic resets the event counter.

Counters > M-logic event counter window

For each counter, you can use the M-Logic command to increase the counter when the M-Logic condition is met.

To open the *Counters* window, use the Σ icon in the utility software.

> **Examples**
>
> In the screenshot shown above, counter 1 has a limit of 100. When the counter reaches the limit, the controller activates the event *M-logic event counter limit 1*. The counter is reset to zero every 24 hours.
>
> Counter 2 has a limit of 10. When the counter reaches the limit, the controller activates the event *M-logic event counter limit 2*. There is a 1-hour rolling timer reset. The counter uses the event time stamps to only count the events that occurred in the last hour.