APPLICATION NOTES

Advanced Genset Controller, AGC-4
M-Logic Internal Logic Controller

- Description of M-Logic
- Functional description
- List of possible selections for logics

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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 Advanced Genset Controller AGC-4, software version 4.74.x.

1.1.2 Intended users

The application notes are mainly aimed at the person responsible for designing AGC-4 systems, typically a panel builder designer, but other users might also find useful information.

1.2 Warnings, safety and legal information

1.2.1 Warnings and notes

This document includes a number of warnings and notes with helpful information. To ensure that these are noticed, they will be highlighted as follows in order to separate them from the general text:

WARNING
Warnings indicate a potentially dangerous situation, which could result in death, personal injury or damaged equipment, if certain guidelines are not followed.

INFO
Info notes provide general information, which will be helpful for the reader to bear in mind.

1.2.2 Safety

WARNING
Installing and operating the AGC-4 controller may imply work with dangerous currents and voltages. Be aware of the hazardous live currents and voltages. Do not touch any AC measurement inputs as this could lead to injuryor death.

1.2.3 Factory settings

The AGC-4 controller is delivered with a number of factory settings. These settings are based on average values and are not necessarily the right settings for matching the engine/generator. Precautions must be taken to check the settings before running the engine/generator set.

1.2.4 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-4, the company responsible for installation or operation of the set must be contacted.

The AGC-4 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. General description

2.1 Introduction

2.1.1 Introduction to M-Logic

The M-Logic is a small logic controller incorporated in the AGC-4 controller. Even though it is a logic controller, it must not be confused with a PLC. The M-Logic can be compared with a PLC limited in functionality and can only be used for uncomplicated tasks.

The M-Logic can carry out binary control functions only; there are no possibilities for analogue reading and/or control functions.

The M-Logic can be programmed from the free PC tool, DEIF Utility Software (USW version 3). The USW can be downloaded from DEIFs web page: www.deif.com/software

M-Logic setting is done in command lines. There are 40 lines, and each line contains three events, two operators and one output with a possibility to make a time delay.

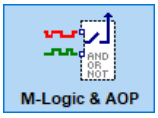
If two operators are not enough, a number of virtual events can be used to pass the control on to another line and carry on there. This makes it possible to build larger event based controls.

3. Configuration

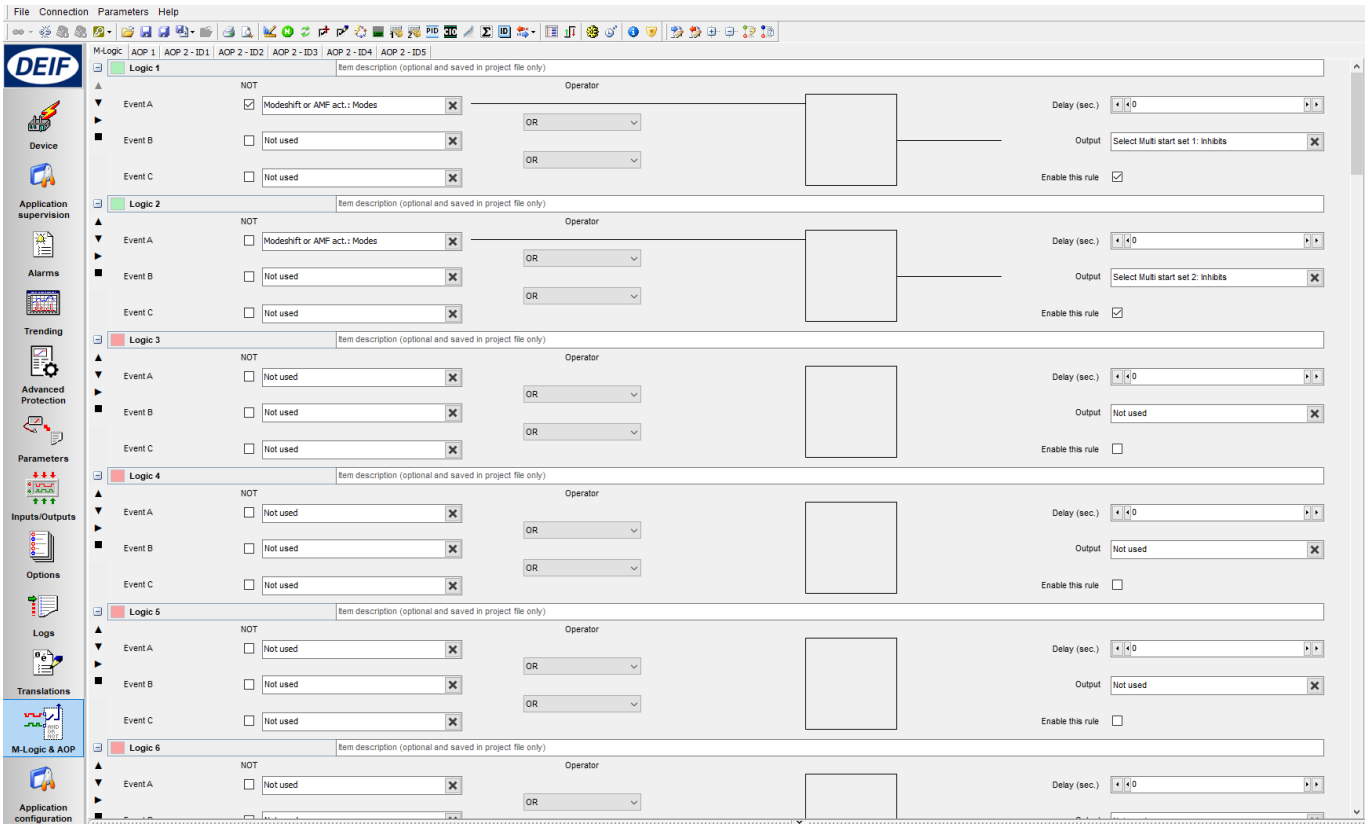
3.1 Starting

3.1.1 Starting the M-Logic

Open the Utility Software and select the M-Logic & AOP button in the left menu.



Click the icon, and the following screen appears:



3.1.2 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 unit:

Press this button to read all M-Logic settings from the unit to the USW.

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

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

3.1.3 Save/open

Press this button to save the M-Logic configuration to a file (part of the general AGC-4 configuration file ".USW").

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

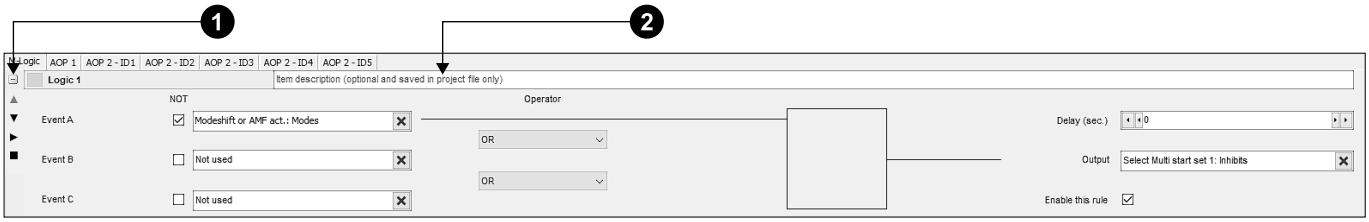
3.2 Basic functions

3.2.1 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

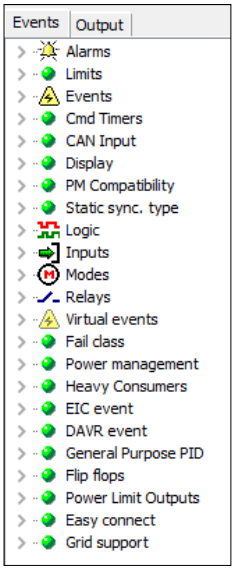
The Logic line can be collapsed or expanded with the button (1). When collapsed, the Item description (2) is still visible. The Item description is stored in the .usw file, but not in the product itself.



3.2.2 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 available event groups in the Events roll-down window are option dependent.
For example:



- Alarms: Use an alarm to activate.
- Limits: Same as alarms, only with no time delay on binary inputs.
- Events: Events that are not alarms, for example *Engine running*.
- Cmd Timers: If the activating (triggering) event is required to be a pulse, this can be used (1 sec. pulse).
- CAN Input: Status of M-Logic functions broadcast on the power management CAN line (requires option G4, G5, G8).
- Display: Set the primary display, when more displays are used.
- PM Compatibility: Set power management digits compatible in all units (requires option G4, G5 and G8).
- Static sync. type: Selected static sync. functionality.
- Logic: Can be TRUE (= always) or FALSE (=never).
- Inputs: Direct activation of a binary input. The availability of binary inputs is option-dependent.
- Modes: Running modes and plant modes, for example *AUTO*.
- Relays: Activation when a relay activates. The availability of relay outputs is option-dependent.
- Virtual events: A number of internal (virtual) events that can be activated from another logic line. By using these virtual events, the number of activating (triggering) events can be

expanded from the three available in each logic line to, in theory, an unlimited number of events.

- Fail class: The event activates upon activation of any alarm with the chosen fail class, for example *Shutdown*.
- Power management: Status related to power management, for example *All GB on* (requires option G4, G5, G8).
- Heavy Consumers: Status related to heavy consumers, for example *HC01 request ID01* (requires option G4, G5, G8).
- EIC event: Events that are related to engine communication (requires option H5, H5.2, H12.2, H12.8).
- DAVR event: Settings for the Digital AVR (requires option T2).
- General purpose PID: Status of the PID 1 to 4.
- Flip flops: Relay outputs periodically ON or OFF.
- Power Limit Outputs: Status for activation of the Power Limit Outputs.
- Easy connect: Connect the controller as stand alone or plant.
- Grid support: Support functions for connection to the grid.

Other possible event groups:

- Redundancy events (requires option T1).
- Maintenance box events (requires option H8.2, H8.8, H12.2, H12.8).
- CIO alarms (if the CIO modules are enabled).
- CIO limits (if the CIO modules are enabled).
- CIO digital inputs (if the CIO modules are enabled).
- CIO digital outputs (if the CIO modules are enabled).

3.2.3 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)

3.2.4 Enable this rule

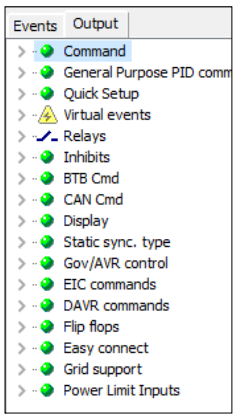
Select this tick box to activate the logic line.

3.2.5 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 available output groups in the Outputs roll-down window are option dependent.
For example:

- Command: Command to the AGC-4, for example select *AUTO* running mode.
- General Purpose PID commands: Commands for PID 1 to 4.
- Quick Setup: Set up the controller as stand alone or plant.
- Virtual events: A number of internal (virtual) events that can be activated and used in another logic line. By using these virtual events, the number of activating (triggering) events can be expanded from the three available in each logic line to, in theory, an unlimited number of events. Virtual events can also be trigged from Modbus.
- Relays: Selection of a relay output (option dependent).
- Inhibits: A selection of inhibit functions for the alarms.
- BTB Cmd: Command to the BTB (requires option G4, G5, G8).



- CAN Cmd: Command to the AGC-4 connected to the power management CAN line (requires option G4, G5, G8).
- Display: Selection of views on the display(s).
- Static sync. type: Selection between static sync. functionalities.
- Gov/AVR control: Possibility to force the speed/voltage control up or down for 5 sec.
- EIC commands: Commands that are related to engine communication (requires option H5, H5.2, H12.2, H12.8).
- DAVR commands: Commands for the Digital AVR (requires option T2).
- Flip flops: Stable state output.
- Easy connect: Add or remove genset.
- Grid support: Support functions for connection to the grid.
- Power Limit Inputs: Selection of active Power Limit Input.

Other possible output groups:

- Redundancy (requires option T1).
- Remote maintenance (requires option H8.2, H8.8, H12.2, H12.8).
- CIO outputs (if the CIO modules are enabled).

INFO
If a relay output is chosen, this relay must be configured as a limit relay output in the parameter list under "OUTPUTS".

3.3 Definitions

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:

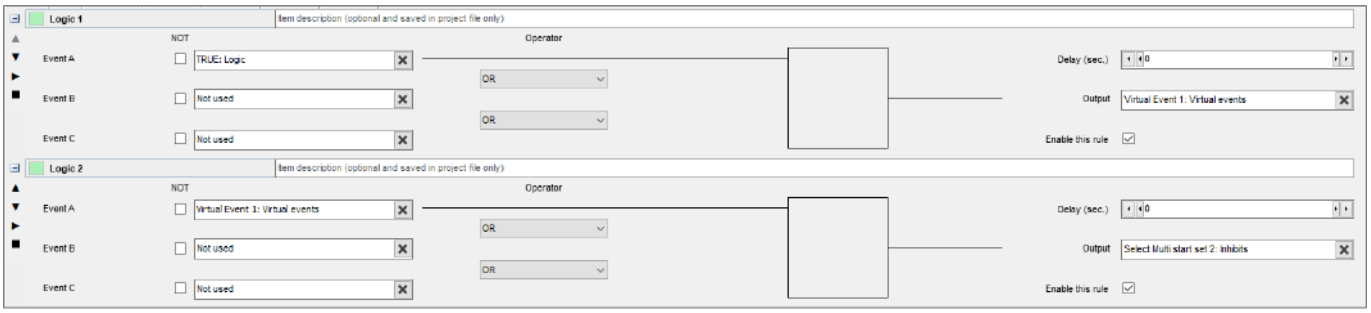
- Digital input is FALSE when deactivated (12/24V DC not applied).
- Alarm condition is FALSE when the alarm is not present.
- Mode condition is FALSE when the mode is not selected.

3.4 Examples

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

3.4.1 Virtual events

Virtual 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 Event 1.
- The Event A in Logic 2 is Virtual Event 1.

This gives a total of five events that can be used in this logic sequence (A + B + C in Logic 1 and B + C in Logic 2).

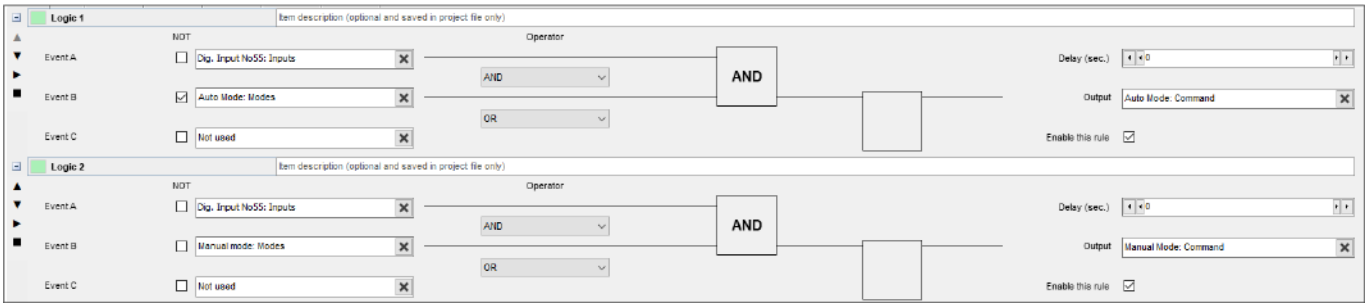
3.4.2 Set/reset function

If you use a single binary input for e.g. selection of AUTO/MANUAL, you need a SET/RESET function, since two binary inputs are normally required for this.

In the following example, binary input no. 10 is used to switch between AUTO (input ON) and MANUAL (input OFF).

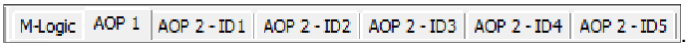
- First line: If input 10 = ON and AUTO = OFF (NOT Auto operation mode), then set AUTO mode command.
- Second line: If input 10 = OFF and MANUAL = OFF (NOT Manual operation), then set MANUAL mode command.

In M-Logic, it looks like this:

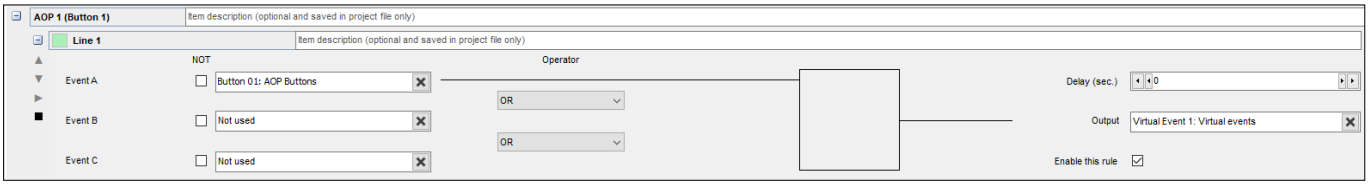


3.4.3 Configure an AOP LED

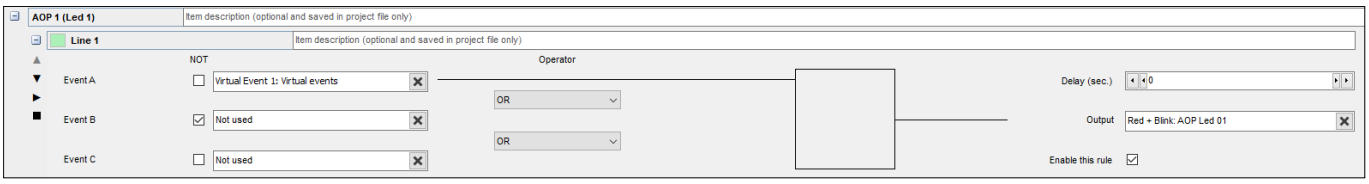
In this example, button 1 on a connected AOP (Additional Operator Panel) is used to activate Virtual Event 1. In the line AOP 1 (LED 1) is Virtual Event 1 configured to activate red LED 01 on the AOP to red blink.

Select an AOP with the tabs 

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

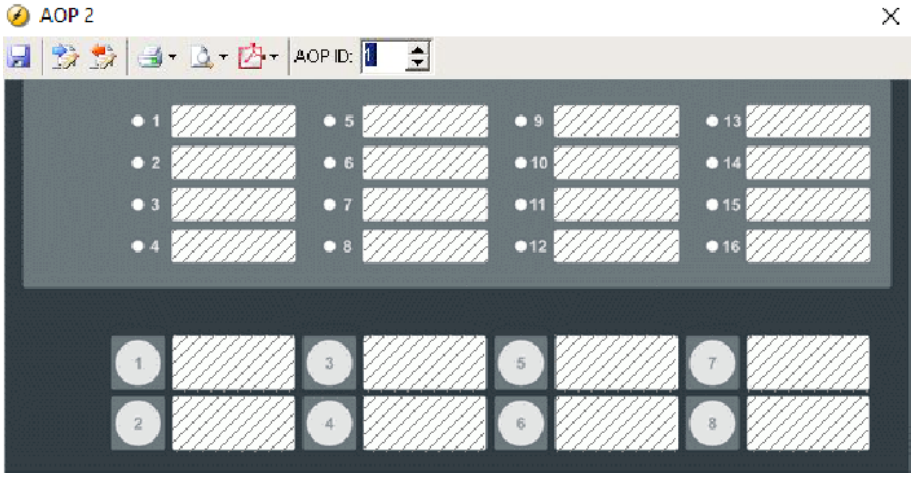


Configure line 1 in AOP 1 (LED 1) as shown:



Click on the Write button to save the AOP settings.

In the top menu, click on the AOP 1 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

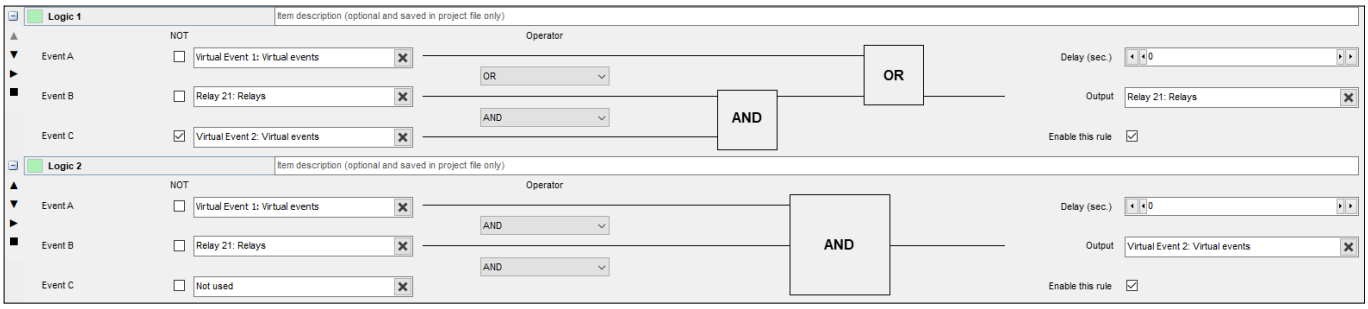
More information
See the document **Option X Additional display and operator panel 4189340702 UK** for more information about AOPs.

3.4.4 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.

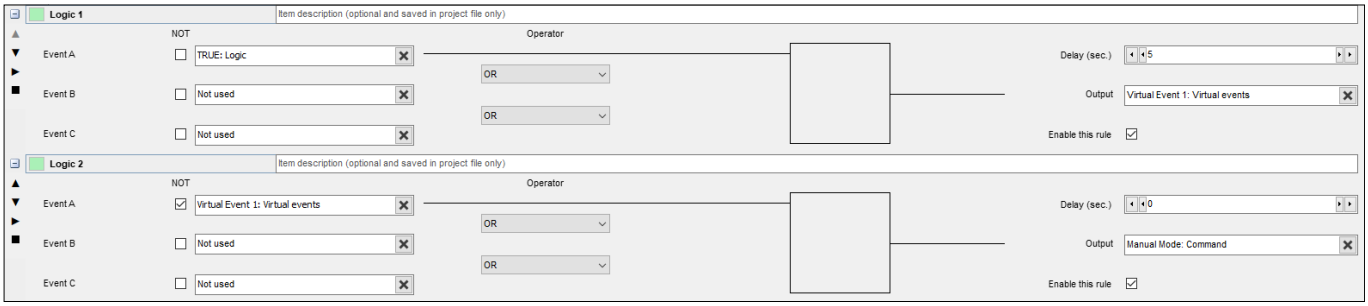
- The button of the AOP-2 must be set to activate Virtual Event 1 (VE 1) (in this case).
- In Logic 1, the VE 1 will activate the relay output (21). At the same time, the relay output (21) will remain ON, unless Virtual Event 2 (VE 2) is activated (AND NOT VE 2).
- In Logic 2, the VE 1 will activate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



3.4.5 Power up in a specific mode

In this example, the unit 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.



3.4.6 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 to 16), and the Output selects the output function:

- Flip flop set (1 to 16) = Change the flip flop output state to High.
- Flip flop reset (1 to 16) = Change the flip flop output state to Low.
- Flip flop toggle (1 to 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.
- The relay 8 (parameter) must be set to "Limit".

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.

4. List of events and commands

4.1 References

4.1.1 References to DRH and Description of options

The terms used in the lists are also used in the **Designer's Reference Handbook** and the **Description of options**. Please refer to these documents for detailed explanations.

4.2 Events and outputs

4.2.1 Events

Alarms

Description	Notes
All alarms are available as events in the alarm category.	The Alarm list shows **all** alarms, including those that are not available in the present configuration of the controller and options.

CIO alarms (only if the CIO modules are enabled)

Description	Notes
CIO 116 No. 1 In. 10 to CIO 116 No. 3 In. 26	There is one alarm per input.
CIO 308 No. 1 In. 8.1 to CIO 308 No. 3 In. 29.2	There are two alarms per input.
CIO 308 No. 1 In. 8 wire fail to CIO 308 No. 3 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. 3 module missing	One or more CIO modules are missing.

Limits

Description	Notes
Like the alarm list it represents the alarms.	If the outputs A and B of an alarm (for example, BB < 1) are set to *Limits*, the alarm message will not appear, but the function will still trigger in the M-Logic limits section.

CIO limits (only if the CIO modules are enabled)

Description	Notes
CIO 116 No. 1 In. 10 to CIO 116 No. 3 In. 26	Is active at the same time as the associated alarm, except that the alarm can be hidden by setting output A and output B to *Limits*. In this case the alarm event will always be deactivated, but the limit event will be active when the alarm is active.
CIO 308 No. 1 In. 8.1 to CIO 308 No. 3 In. 29.2	
CIO 308 No. 1 In. 8 wire fail to CIO 308 No. 3 In. 29 wire fail	

Events

Table 4.1 Events for genset

Description	Required option	Notes
Mains fail	-	Mains failure condition.
MB closed	-	Mains breaker closed.
MB opened	-	Mains breaker opened.
MB synchronising	-	Mains breaker synchronising.
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.
GB direct in	-	Generator breaker is being closed on a dead busbar.
Running	-	Engine is running.
Access lock	-	Binary input access lock activated.
Emergency stop	-	Emergency stop activated.
DG ready for auto start	-	All is normal, no alarms.
Cranking	-	Crank output activated.
Start activated	-	Start sequence activated.
Lamp test	-	Lamp test in progress.
Battery test active	-	Battery test in progress.
GB black close request	-	Generator breaker direct close on request to dead busbar.
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.
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.
Parameter set 1 used	-	The parameter set 1 can be selected internally or with binary input.
Parameter set 2 used	-	The parameter set 2 can be selected internally or with binary input.
Parameter set 3 used	-	The parameter set 3 can be selected internally or with binary input.
Parameter set 4 used	-	The parameter set 4 can be selected internally or with binary input.
DG in quarantine	G4, G5, G8	The diesel generator cannot be used.
Any mains protection alarm active	-	At least one mains protection alarm is active.
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.
Multi-start set 1 selected	G4, G5, G8	Selection of generator sets to be started upon blackout.
Multi-start set 2 selected	G4, G5, G8	Selection of generator sets to be started upon blackout.
BB voltage OK	-	Busbar voltage.
Application 1 activated	-	Activate application 1 from the controller.
Application 2 activated	-	Activate application 2 from the controller.
Application 3 activated	-	Activate application 3 from the controller.
Application 4 activated	-	Activate application 4 from the controller.

Description	Required option	Notes
Single DG selected	G4, G5, G8	Single DG application selection.
Multi mains selected	G4, G5, G8	Multi-mains application selection.
Dynamic section equal static section	G4, G5, G8	Power management feature.
G volt/freq OK	-	Generator frequency and voltage are within range.
Update mode local selected	G4, G5, G8	Update of setting on local controller.
Update mode on all selected	G4, G5, G8	Update of setting on all controllers.
Absolute prio. used	G4, G5, G8	Fixed start priority.
Relative prio. used	G4, G5, G8	Start priority relative to running hour counters.
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.
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.
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	G7	Genset group application selection.
Genset group plant selected	G7	Genset group plant application selection.
Inductive reference selected	D1	Inductive cos phi reference.
Capacitive reference selected	D1	Capacitive cos phi reference.
Dynamic sync selected	-	Dynamic synchronisation method selected.
Static sync selected	-	Static synchronisation method selected.
Power offset 1 activated	-	Power reference offset 1 activated.
Power offset 2 activated	-	Power reference offset 2 activated.
Power offset 3 activated	-	Power reference offset 3 activated.
Cos phi offset 1 activated	D1	Cos phi reference offset 1 activated.
Cos phi offset 2 activated	D1	Cos phi reference offset 2 activated.

Description	Required option	Notes
Cos phi offset 3 activated	D1	Cos phi reference offset 2 activated.
Test application selected with output cmd enabled	I1	Emulation with engine and breaker relay reaction.
Test application selected with output cmd disabled	I1	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 U_{NOM} = Gen U_{NOM} used	-	Busbar nominal voltage is equal to the generator nominal voltage.
60 Hz system	-	True if the nominal frequency is higher than 55 Hz.
Analogue offset set 1 active	-	The analogue offset set 1 follow the activated nominal settings (1, 2, 3 and 4).
Analogue offset set 2 active	-	The analogue offset set 2 follow the activated nominal settings (1, 2, 3 and 4).
Analogue offset set 3 active	-	The analogue offset set 3 follow the activated nominal settings (1, 2, 3 and 4).
Analogue offset set 4 active	-	The analogue offset set 4 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.
Ethernet ready	-	Ethernet (option N) is ready for read/write.
De-load active	-	The unit is de-loading.
Ana. fan ref. set 1 active	G7	The analogue fan reference setting 1 is active.
Ana. fan ref. set 2 active	G7	The analogue fan reference setting 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.
L1L2L3 phase rotation active	-	The phase rotation is L1L2L3.
L1L3L2 phase rotation active	-	The phase rotation is L1L3L2.
Fast start sequence from Auto start/ stop via Digital input 117 READY	G4, G5, G8	See **Fast start of engine** in the document ***Options G4, G5 and G8 Power management***.
Fast start sequence from Mains via Power management READY	G4, G5, G8	See **Fast start of engine** in the document ***Options G4, G5 and G8 Power management***.

Table 4.2 Events for mains

Description	Required option	Notes
Mains fail	-	Mains failure condition.
MB closed	-	Mains breaker closed.

Description	Required option	Notes
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.
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 units).
Parameter set 1 used	-	The parameter set 1 can be selected internally or with binary input.
Parameter set 2 used	-	The parameter set 2 can be selected internally or with binary input.
Parameter set 3 used	-	The parameter set 3 can be selected internally or with binary input.
Parameter set 4 used	-	The parameter set 4 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 activated	-	Activate application 1 from the controller.
Application 2 activated	-	Activate application 2 from the controller.
Application 3 activated	-	Activate application 3 from the controller.
Application 4 activated	-	Activate application 4 from the controller.
Single DG selected	G4, G5, G8	Single DG application selection.
Multi mains selected	G4, G5, G8	Multi-mains application selection.
Dynamic section equal static section	G4, G5, G8	Power management feature.
My ID to run selected	G4, G5, G8	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	G4, G5, G8	Only one mains breaker is allowed to be closed at the time.
Run all mains selected	G4, G5, G8	All mains breakers are allowed to be closed at the time.
Update mode local selected	G4, G5, G8	Update of setting on local controller.
Update mode on all selected	G4, G5, G8	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.

Description	Required option	Notes
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	-	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.
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	G7	Genset group application selection.
Genset group plant selected	G7	Genset group plant application selection.
Inductive reference selected	D1	Inductive cos phi reference.
Capacitive reference selected	D1	Capacitive cos phi reference.
Exclude from Run All activated	-	Exclude one or more breakers when Run ALL is activated.
Power offset 1 activated	-	Power reference offset 1 activated.
Power offset 2 activated	-	Power reference offset 2 activated.
Power offset 3 activated	-	Power reference offset 3 activated.
Cos phi offset 1 activated	D1	Cos phi reference offset 1 activated.
Cos phi offset 2 activated	D1	Cos phi reference offset 2 activated.
Cos phi offset 3 activated	D1	Cos phi reference offset 2 activated.
Test application selected with output cmd enabled	I1	Emulation with engine and breaker relay reaction.
Test application selected with output cmd disabled	I1	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 U_{NOM} = Mains U_{NOM} 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.
Ethernet ready	-	Ethernet (option N) 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.
L1L2L3 phase rotation active	-	The phase rotation is L1L2L3.

Description	Required option	Notes
L1L3L2 phase rotation active	-	The phase rotation is L1L3L2.
Fast start sequence from Auto start/ stop via Digital input 117 READY	G4, G5, G8	See **Fast start of engine** in the document ***Options G4, G5 and G8 Power management***.
Fast start sequence from Mains via Power management READY	G4, G5, G8	See **Fast start of engine** in the document ***Options G4, G5 and G8 Power management***.

Table 4.3 Events for BTB

Description	Required option	Notes
BTB closed	-	Bus tie breaker unit closed.
BTB opened	-	Bus tie breaker unit opened.
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 used	-	The parameter set 1 can be selected internally or with binary input.
Parameter set 2 used	-	The parameter set 2 can be selected internally or with binary input.
Parameter set 3 used	-	The parameter set 3 can be selected internally or with binary input.
Parameter set 4 used	-	The parameter set 4 can be selected internally or with binary input.
BB voltage OK	-	Busbar B voltage.
Application 1 activated	-	Activate application 1 from the controller.
Application 2 activated	-	Activate application 2 from the controller.
Application 3 activated	-	Activate application 3 from the controller.
Application 4 activated	-	Activate application 4 from the controller.
Single DG selected	G4, G5, G8	Single DG application selection.
Multi mains selected	G4, G5, G8	Multi-mains application selection.
Dynamic section equal static section	G4, G5, G8	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	G7	Genset group application selection.
Genset group plant selected	G7	Genset group plant application selection.
Test application selected with output cmd enabled	I1	Emulation with engine and breaker relay reaction.
Test application selected with output cmd disabled	I1	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.
Ethernet ready	-	Ethernet (option N) is ready for read/write.

Description	Required option	Notes
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.

Redundancy events

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

Maintenance box

More information
See the document **Description of options: Option H8.x and H12.x External I/O modules** for information about Maintenance box.

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.

CAN Inputs

More information
See the document **Automatic genset controller, AGC: Options G4, G5 and G8 Power management** for information about CAN Inputs.

Display

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

PM Compatibility

More information
See the document **Automatic genset controller, AGC: Options G4, G5 and G8 Power management** for information about PM Compatibility.

Static sync. type

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.

Logic

Description	Notes
Not used	-
TRUE	= Always
FALSE	= Never

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	M4	
Dig. input No 105	M4	
Dig. input No 108	M4	
Dig. input No [112-117]	M4	
Dig. input No [127-133]	M13.8	
Ext. I/O Dig. In [1-16]	H8.2, H8.7, H8.8, H12.2, H12.8	

CIO digital inputs (only if the CIO modules are enabled)

Description	Notes
CIO 116 no. 1. In. 10 to CIO 116 no. 3. In. 26	The event is active when the terminal is energised.

Modes

Description	Required option	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	G4, G5, G8	Power management function mode.
Remote maintenance	H8.2, H8.8, H12.2, H12.8	Remote transformer maintenance.
Dry alternator	T2	Dry alternator function mode.
Ventilation	T2	Ventilation function mode.
Genset group mode	-	Active for AGC mains units.
Semi-auto mode	-	Indication of generator running in Semi-auto mode.

Description	Required option	Notes
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.

Relays

Description	Required option	Notes
Not used	-	The relay number relates to the lowest terminal number of the output.
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	
Relay 67	M14.4	
Relay 69	M14.4, EF4	
Relay 71	M14.4, EF4	
Relay 90	M14.6	
Relay 92	M14.6	
Relay 94	M14.6	
Relay 96	M14.6	
Relay 119	M4	
Relay 120	M4	
Relay 121	M4	
Relay 123	M4	
Relay 126	M14.8	
Relay 128	M14.8	
Relay 130	M14.8	
Relay 132	M14.8	
Ext. I/O Dig. Out [1-16]	H8.2, H8.7, H8.8, H12.2, H12.8	

CIO digital outputs (only if the CIO modules are enabled)

Description	Notes
CIO 208 no. 1 Out. 9 to CIO 208 no. 3 Out. 27	The event is active when the relay is energised.
CIO 116 no. 1 conf. status output	The event is active when the relay is energised.

Description	Notes
to CIO 308 no. 3 conf. status output	If the status relay is not set as configurable, the event will be deactivated at all times.

Virtual events

Description	Notes
Virtual event [1-96]	Virtual events 1 to 96 are used as connection between multiple logics to enhance the possible number of events in one sequence.

Fail class

Description	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.
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.

Power management

More information
See the document **Automatic genset controller, AGC: Options G4, G5 and G8 Power management** for information about Power management events.

Heavy consumers

More information
See the document **Automatic genset controller, AGC: Options G4, G5 and G8 Power management** for information about Heavy consumer events.

EIC events

More information
See the document **AGC-4 Options H5, H12 and H13 Engine communication** for information about EIC events.

DAVR 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.

General purpose PID

Description	Notes
PID [1-4] active	Indicates that the PID is active.
PID [1-4] at min. output	Indicates when the PID is at minimum output.

Description	Notes
PID [1-4] at max. output	Indicates when the PID is at maximum output.
PID [1-4] output frozen	Indicates that the PID is frozen.
PID [1-4] using input [1-3]	Indicates which PID input is active.
PID [1-4] Modbus control	Indicates if the PID is controlled by Modbus.

Flip flops

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

Power Limit Outputs

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

Easy connect

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.

Grid support

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-D] active	The actual Var Regulation variant [A-D] 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.

4.2.2 Outputs

Commands

Table 4.4 Commands for genset

Description	Required option	Notes
Island	-	Island function mode.
AMF	-	AMF (Automatic Mains Failure) function mode.
Peak shaving	-	Peak shaving function mode.
Fixed power	-	Fixed power function mode.

Description	Required option	Notes
Mains power export	-	Mains power export function mode.
Load take over	-	Load take over function mode.
Power management	G4, G5, G8	Power management function mode.
Remote maintenance	H8.2, H8.8, H12.2, H12.8	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.
Lamp test	-	Activate lamp test (LEDs on display).
Ack. all alarms	-	Acknowledge all alarms.
Activate Warm Up Ramp	-	Activate warm up ramp
Battery test	-	Activate battery test
Eng. heater manual ctrl.	-	Enable/disable the engine heater function.
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 device clock to 4 am/04.00.
Switch log to print	-	Switch between event, alarm and battery log to print.
Print log	-	Print output.
Print status	-	Print output.
Set parameter 1	-	Choose parameter set 1 (nominal settings).
Set parameter 2	-	Choose parameter set 2 (nominal settings).
Set parameter 3	-	Choose parameter set 3 (nominal settings).
Set parameter 4	-	Choose parameter set 4 (nominal settings).
Derate P_{NOM} 1	-	Activate derate 1.
Derate P_{NOM} 2	-	Activate derate 2.
Derate P_{NOM} 3	-	Activate derate 3.
GB off and block	-	Opens and blocks genset breaker.
Select test type to simple	-	Test sequence selection.
Select test type to load	-	Test sequence selection.
Select test type to full	-	Test sequence selection.
GB close inhibit	-	Prevents the generator breaker from closing.
Select application 1	-	Power management: Select application 1 of 4 from the controller.
Select application 2	-	Power management: Select application 2 of 4 from the controller.
Select application 3	-	Power management: Select application 3 of 4 from the controller.
Select application 4	-	Power management: Select application 4 of 4 from the controller.
Update mode local	G4, G5, G8	Running mode update for the local controller.

Description	Required option	Notes
Update mode on all	G4, G5, G8	Running mode update for all controllers.
Store common settings	G4, G5, G8	Broadcast the common settings to all units.
Abs. prio. handling	G4, G5, G8	Absolute (fixed) start priority.
Rel. prio. handling	G4, G5, G8	Relative (running timer based) start priority.
Open GB	-	Open the generator breaker.
Close GB	-	Close the generator breaker.
Open MB	-	Open the mains breaker.
Close MB	-	Close the mains breaker.
Auto start/stop	-	ON = Start, OFF = Stop.
Remote start	-	Pulse signal.
Remote stop	-	Pulse signal.
Activate base load	G4, G5, G8	Activates the base load function.
Deactivate base load	G4, G5, G8	Disables the base load function.
Activate secured mode	G4, G5, G8	Secured mode is activated.
Deactivate secured mode	G4, G5, G8	Secured mode is deactivated.
Start and close GB	-	Start engine and close generator breaker.
GB open and stop	-	Open generator breaker and stop engine.
First priority	G4, G5, G8	Forces this unit to have the first priority in a power management system.
Freeze ramp	-	Locks the power ramp up function until the command is disabled again.
Use Ana LS instead of CAN	G3, G4, G5, G8	Forces the power management system to use the analogue load share line.
Activate Asymmetric LS	G4, G5, G8	Activate asymmetric load share.
Deactivate Asymmetric LS	G4, G5, G8	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).
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	D1	Inductive cos phi reference.
Capacitive reference	D1	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.

Description	Required option	Notes
Act. power offset 1	-	Activate power reference offset 1.
Act. power offset 2	-	Activate power reference offset 2.
Act. power offset 3	-	Activate power reference offset 3.
Deact. power offset 1	-	Deactivate power reference offset 1.
Deact. power offset 2	-	Deactivate power reference offset 2.
Deact. power offset 3	-	Deactivate power reference offset 3.
Act. cos phi offset 1	D1	Activate cos phi reference offset 1.
Act. cos phi offset 2	D1	Activate cos phi reference offset 2.
Act. cos phi offset 3	D1	Activate cos phi reference offset 3.
Deact. cos phi offset 1	D1	Deactivate cos phi reference offset 1.
Deact. cos phi offset 2	D1	Deactivate cos phi reference offset 2.
Deact. cos phi offset 3	D1	Deactivate cos phi reference offset 3.
MB close inhibit	-	Prevents mains breaker from closing.
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 unit.
Reset I thermal demand	-	Reset the thermal current detected in the unit.
Pulse counter 1	-	Increase pulse counter 1.
Pulse counter 2	-	Increase pulse counter 2.
Reset pulse counter 1	-	Reset pulse counter 1.
Reset pulse counter 2	-	Reset pulse counter 2.
Set BB parameter 1	-	Select parameter set 1 for Busbar nominal settings.
Set BB parameter 2	-	Select parameter set 2 for Busbar nominal settings.
Set BB U_{NOM} = Gen U_{NOM}	-	Busbar nominal voltage is equal to the generator nominal voltage.
Force use of analogue offset 1	-	This will force the analogue offset 1 to be active.
Force use of analogue offset 2	-	This will force the analogue offset 2 to be active.
Force use of analogue offset 3	-	This will force the analogue offset 3 to be active.
Force use of analogue offset 4	-	This will force the analogue offset 4 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.
M-Logic alarm 1	-	Virtual alarm that can be used to trigger M-Logic events. The alarm can also be set in the digital inputs.
M-Logic alarm 2	-	Virtual alarm that can be used to trigger M-Logic events. The alarm can also be set in the digital inputs.
M-Logic alarm 3	-	Virtual alarm that can be used to trigger M-Logic events. The alarm can also be set in the digital inputs.
M-Logic alarm 4	-	Virtual alarm that can be used to trigger M-Logic events. The alarm can also be set in the digital inputs.

Description	Required option	Notes
M-Logic alarm 5	-	Virtual alarm that can be used to trigger M-Logic events. The alarm can also be set in the digital inputs.
Act. max. ventilation	-	Activates max. ventilation.
Deact. max. ventilation	-	Deactivates max. ventilation.
Act. Frequency droop regulation	-	Activates frequency droop regulation.
Act. Voltage droop regulation	D1	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	G7	Activates analogue fan reference set 1.
Activate ana. fan ref. set 2	G7	Activates analogue fan reference set 2.
Activate Idle run	-	Activates Idle run.
Deactivate Idle run	-	Deactivates Idle run.
Multi start all sections - this section	G4, G5, G8	See **Multi start all sections** in the document **Options G4, G5 and G8 Power management**.
Fast start sequence from Auto start/ stop via Digital input 117	G4, G5, G8	See **Fast start of engine** in the document **Options G4, G5 and G8 Power management**.
Fast start sequence from Mains via Power management	G4, G5, G8	See **Fast start of engine** in the document **Options G4, G5 and G8 Power management**.
Select L1L2L3 phase rotation	-	Activates L1L2 L3 as phase rotation direction.
Select L1L3L2 phase rotation	-	Activates L1L3L2 as phase rotation direction.
Assume all BTB POS fdb OFF in case of pos fail or ID missing	-	Faulty handling procedure.
Mains P measurement for droob reference	-	Activates the P measurement directly from a transducer.
Mains Q measurement for droob reference	-	Activates the Q measurement directly from a transducer.
Mains U measurement for droob reference	-	Activates the U measurement directly from a transducer.
Run all available island DG's	-	Start all available DG’s in an Island power management application.
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.

Table 4.5 Commands for mains

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

Description	Required option	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 device clock to 4 am/04.00.
Switch log to print	-	Switch between event, alarm and battery log to print.
Set parameter 1	-	Choose parameter set 1 (nominal settings).
Set parameter 2	-	Choose parameter set 2 (nominal settings).
Set parameter 3	-	Choose parameter set 3 (nominal settings).
Set parameter 4	-	Choose parameter set 4 (nominal settings).
MB open inhibit	-	Prevents mains breaker from opening.
TB open inhibit	-	Prevents tie breaker from opening.
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.
TB close inhibit	-	Prevents the tie breaker from closing.
Select application 1	-	Power management: Select application 1 of 4 from the controller.
Select application 2	-	Power management: Select application 2 of 4 from the controller.
Select application 3	-	Power management: Select application 3 of 4 from the controller.
Select application 4	-	Power management: Select application 4 of 4 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	G4, G5, G8	Running mode update for the local controller.
Update mode on all	G4, G5, G8	Running mode update for all controllers.
Store common settings	G4, G5, G8	Broadcast the common settings to all units.
Open TB	-	Open the tie breaker.
Close TB	-	Close the tie breaker.
Open MB	-	Open the mains breaker.

Description	Required option	Notes
Close MB	-	Close the mains breaker.
Auto start/stop	-	ON = Start, OFF = Stop.
Autoswitch off	-	Autoswitch is not enabled.
Autoswitch static	-	Autoswitch enabled for static section.
Autoswitch dynamic	-	Autoswitch enabled for dynamic section.
Autoswitch all	-	Autoswitch 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.
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	D1	Inductive cos phi reference.
Capacitive reference	D1	Capacitive cos phi reference.
Act. power offset 1	-	Activate power reference offset 1.
Act. power offset 2	-	Activate power reference offset 2.
Act. power offset 3	-	Activate power reference offset 3.
Deact. power offset 1	-	Deactivate power reference offset 1.
Deact. power offset 2	-	Deactivate power reference offset 2.
Deact. power offset 3	-	Deactivate power reference offset 3.
Act. cos phi offset 1	D1	Activate cos phi reference offset 1.
Act. cos phi offset 2	D1	Activate cos phi reference offset 2.
Act. cos phi offset 3	D1	Activate cos phi reference offset 3.
Deact. cos phi offset 1	D1	Deactivate cos phi reference offset 1.
Deact. cos phi offset 2	D1	Deactivate cos phi reference offset 2.
Deact. cos phi offset 3	D1	Deactivate cos phi reference offset 3.
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 unit.
Reset I thermal demand	-	Reset the thermal current detected in the unit.
Pulse counter 1	-	Increase pulse counter 1.
Pulse counter 2	-	Increase pulse counter 2.
Reset pulse counter 1	-	Reset pulse counter 1.
Reset pulse counter 2	-	Reset pulse counter 2.
Set BB parameter 1	-	Select parameter set 1 for Busbar nominal settings.

Description	Required option	Notes
Set BB parameter 2	-	Select parameter set 2 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.
M-Logic alarm 1	-	Virtual alarm that can be used to trigger M-Logic events. The alarm can also be set in the digital inputs.
M-Logic alarm 2	-	Virtual alarm that can be used to trigger M-Logic events. The alarm can also be set in the digital inputs.
M-Logic alarm 3	-	Virtual alarm that can be used to trigger M-Logic events. The alarm can also be set in the digital inputs.
M-Logic alarm 4	-	Virtual alarm that can be used to trigger M-Logic events. The alarm can also be set in the digital inputs.
M-Logic alarm 5	-	Virtual alarm that can be used to trigger M-Logic events. The alarm can also be set in the digital inputs.
Act. TB deload	-	Activate tie breaker de-load (only in semi-auto mode).
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.
TB power capacity - direct close	G4, G5, G8	See **Tie breaker configuration** in the document **Options G4, G5 and G8 Power management**.
Select L1L2L3 phase rotation	-	Activates L1L2 L3 as phase rotation direction
Select L1L3L2 phase rotation	-	Activates L1L3L2 as phase rotation direction
TB ignore LED/button	-	Disables the TB LED on the controller when mains is without tie breaker.
Assume all BTB POS fdb OFF in case of pos fail or ID missing	-	Faulty handling procedure.

Table 4.6 Commands for BTB

Description	Required option	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 device clock to 4 am/04.00.
Switch log to print	-	Switch between event, alarm and battery log to print.
Print log	-	Print output.
Print status	-	Print output.

Description	Required option	Notes
Set parameter 1	-	Choose parameter set 1 (nominal settings).
Set parameter 2	-	Choose parameter set 2 (nominal settings).
Set parameter 3	-	Choose parameter set 3 (nominal settings).
Set parameter 4	-	Choose parameter set 4 (nominal settings).
BTB close inhibit	-	Prevents the BTB from closing.
Select application 1	-	Power management: Select application 1 of 4 from the controller.
Select application 2	-	Power management: Select application 2 of 4 from the controller.
Select application 3	-	Power management: Select application 3 of 4 from the controller.
Select application 4	-	Power management: Select application 4 of 4 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).
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 unit.
Reset I thermal demand	-	Reset the thermal current detected in the unit.
Pulse counter 1	-	Increase pulse counter 1.
Pulse counter 2	-	Increase pulse counter 2.
Reset pulse counter 1	-	Reset pulse counter 1.
Reset pulse counter 2	-	Reset pulse counter 2.
Set parameter 1	-	Select parameter set 1 for nominal settings.
Set parameter 2	-	Select parameter set 2 for nominal settings.
Ack. BB protection alarms	-	Acknowledges all busbar alarms including: 1270-1430, 1660, 1700, 1960, 1970, 7480-7490.
M-Logic alarm 1	-	Virtual alarm that can be used to trigger M-Logic events. The alarm can also be set in the digital inputs.
M-Logic alarm 2	-	Virtual alarm that can be used to trigger M-Logic events. The alarm can also be set in the digital inputs.
M-Logic alarm 3	-	Virtual alarm that can be used to trigger M-Logic events. The alarm can also be set in the digital inputs.
M-Logic alarm 4	-	Virtual alarm that can be used to trigger M-Logic events. The alarm can also be set in the digital inputs.
M-Logic alarm 5	-	Virtual alarm that can be used to trigger M-Logic events. The alarm can also be set in the digital inputs.
Access lock	-	Activates access lock.
Direct close on dead BA and dead BB	G4, G5, G8	See **Special M-Logic function - BTB direct close** in the document **Options G4, G5 and G8 Power management**.
Direct close breaker on dead BA or dead BB	G4, G5, G8	See **Special M-Logic function - BTB direct close** in the document **Options G4, G5 and G8 Power management**.

Description	Required option	Notes
Breaker configuration: Normal Close	G4, G5, G8	See **Tie breaker configuration** in the document **Options G4, G5 and G8 Power management**.
Breaker configuration: Normal Open	G4, G5, G8	See **Tie breaker configuration** in the document **Options G4, G5 and G8 Power management**.

General purpose PID commands

Description	Notes
PID [1-4] activate	Activates the PIDs.
PID [1-4] force min. outp.	Forces the PID output to minimum.
PID [1-4] force max. outp.	Forces the PID output to maximum.
PID [1-4] reset	Resets the PID outputs.
PID [1-4] freeze output	Freezes the PID outputs

Redundancy

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

Remote maintenance

More information
See the document **Description of options: Option H8.x and H12.x External I/O modules** for information about Maintenance box.

Quick setup

Description		Notes
Off	-	Quick setup is off.
Setup stand alone	-	Stand alone quick setup.
Setup plant	G4, G5, G8	Plant quick setup.

Virtual events

Description	Notes
Virtual event [1-96]	These are used as interconnection between multiple logics to enhance the possible number of events in one sequence.

Relays

Description	Required option	Notes
Not used	-	The list will show all relays possible, including the optional ones. Make sure that a selected relay is actually present.
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	
Relay 67	M14.4	
Relay 69	M14.4, EF4	
Relay 71	M14.4, EF4	
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]	H8.2, H8.7, H8.8, H12.2, H12.8	

CIO outputs

Description	Notes
CIO 208 no. 1 Out. 9 to CIO 208 no. 3 Out. 27	Activates the relay if the Relay function is set to Limit relay. Only visible if the CIO modules are enabled.
CIO 116 no. 1 conf. status output to CIO 308 no. 3 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.

Inhibits

Description	Required option	Notes
Not used	-	-
Activate LD stop used	G4, G5, G8	Load-dependent stop.
Activate LD stop	G4, G5, G8	Load-dependent stop.
Deactivate mode button	-	Mode button on display front.
Activate MB synchronisation	-	Mains breaker synchronisation is activated.
Activate GB synchronisation	-	Generator breaker synchronisation is activated.
Deactivate MB synchronisation	-	Mains breaker synchronisation is deactivated.
Deactivate GB synchronisation	-	Generator breaker synchronisation 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.
Force DG in quarantine	G4, G5, G8	Diesel generator will not participate in power management.
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.
Select multi-start set [1-2]	G4, G5, G8	Selection of number of generators to start on blackout.
Block priority swapping	G4, G5, G8	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	G4, G5, G8	Bus tie breaker closing not allowed.
Inh. request for section	G4, G5, G8	Prevent the section from helping other sections.
Inh. AOP1 buttons	-	All command buttons on AOP1 are ignored.
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.
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. engine start	-	Engine start is not allowed.
Inh. GB black close	-	Genset is not allowed to close to a black busbar.

BTB commands

More information
See the document **Automatic genset controller, AGC: Options G4, G5 and G8 Power management** for information about BTB commands.

CAN commands

More information
See the document **Automatic genset controller, AGC: Options G4, G5 and G8 Power management** for information about CAN commands.

Display outputs

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].

Static sync. type

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.

GOV/AVR control

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.

EIC commands

More information
See the document **AGC-4 Options H5, H12 and H13 Engine communication** for information about EIC events.

DAVR commands

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.

Flip flops

Description	Notes
Flip flop set [1-16]	The output is used to set the flip flop state.
Flip flop reset [1-16]	The output is used to reset the flip flop state.
Flip flop toggle [1-16]	The output is used to toggle the flip flop state.

Easy connect

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.

Grid support

Description	Required option	Notes
Activate Power Ramp [1-2]	-	Activate power ramp [1-2].
Activate Power Ramp [3-4]	A10	Activate power ramp [3-4].
Var Reg Type Normal	-	Var Regulation Type Normal is active.
Var Reg Type Q/U U_SHIFT	-	Var Regulation Type Q/U U_SHIFT is active.
Var Reg Type Q/P REG CURVE	-	Var Regulation Type Q/P REG CURVE is active.
Var Reg Type Q/U Q_SHIFT	-	Var Regulation Type Q/U Q_SHIFT is active.
Var Reg Type FIXED COSPHI	-	Var Regulation Type FIXED COSPHI is active.
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]	-	Enable droop curve [1-2].
Disable droop curve [1-2]	-	Disable droop curve [1-2].

Power Limit Inputs

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