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DATA SHEET

Automatic Genset Controller, AGC-3

- Operation modes
- Engine control
- Generator protection (ANSI)
- Display
- Mains/busbar protection (ANSI)
- M-Logic (Micro PLC)
- General

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Document no.: 4921240396F
SW version: 3.6x.x or later

1. Application information

2. Optional functionality

3. Technical information

4. Ordering information

1. Application information

1.1 General information

1.1.1 Application

The Automatic Genset Controller is a microprocessor-based control unit containing all necessary functions for protection and control of a genset. It contains all necessary 3-phase measuring circuits, and all values and alarms are presented on the LCD display.

The AGC is a compact all-in-one unit designed for the following applications:

- Automatic mains failure
- Island operation
- Fixed power/base load
- Peak shaving
- Load takeover
- Mains power export (fixed power to mains)
- Remote maintenance

Optional applications:

- Multiple gensets, load sharing
- Power management (island operation)
- Power management (island operation, split bus)
- Power management (island operation, ring bus)
- Power management (parallel with mains)
- Power management (parallel with mains, split bus)
- Power management (parallel with mains, ring bus)

The AGC can operate in automatic mains failure mode as a secondary mode regardless of the type of application - except the island applications.

The display is separate and can be installed directly on the main unit or in the front of the switchboard door (requires option J1, J2 or J6 - display cable). Additional displays can be installed within 200 m.

The AGC is supplied with an engine interface I/O card with separate power supply and processor. The card is equipped with the following I/Os:

Inputs/outputs		Available
Multi-inputs:	4 to 20 mA	3 (3)
	Digital inputs	
	Pt100	
	Pt1000	
	RMI	
	0 to 40 V DC	
Digital inputs		7 (6)
RPM (MPU)		1
Relays		4
CAN bus comm.		2

The number in parenthesis indicates the number of user-configurable inputs/outputs.

The two CAN communications are only available, if option G4, G5 or H7 is selected.

1.1.2 Test

The available genset modes except island operation include a test mode. The test can be configured in three different ways.

Simple: Genset starting and running for a preset time. Generator breaker is open during the test.

Load: Genset starting, synchronisation of the generator breaker. The test is carried out for a preset period of time at a fixed power set point parallel to the mains.

Full: Genset starting, synchronisation of the generator breaker, deload and opening of the mains breaker. The test is carried out for a preset period of time after which the load is transferred back to the mains connection.

1.1.3 Setup

Setup is easily done via a menu structure in the display (password-protected) or via the USB PC connection and the Multi-line 2 Windows®-based PC utility software. The PC utility software can be downloaded free of charge from www.deif.com/Download_centre. The utility software offers additional features such as monitoring of all relevant information during commissioning, saving and downloading of settings and downloading of software updates.

1.1.4 Options

In order to perfectly match the product solution to specific applications, the functionality of the AGC can be equipped with a number of available options. The options selected by the customer will be integrated in the standard AGC, hereby securing the same user interface unaffected by whether the application needs a highly complex or a more basic genset controller.

Please refer to the chapter "Available options".

1.1.5 Unit definitions

AGC: The standard control unit designed for a number of applications (one to nine). An extensive list of hardware and software options is available for the AGC.

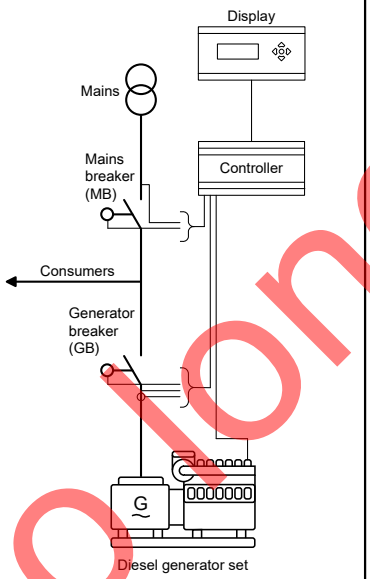
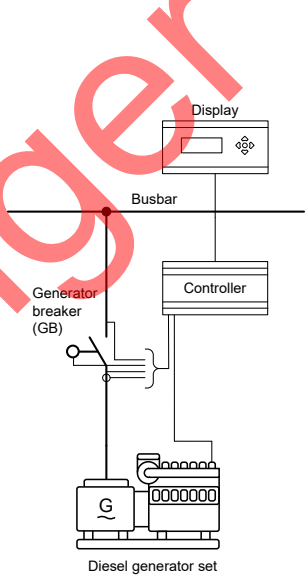
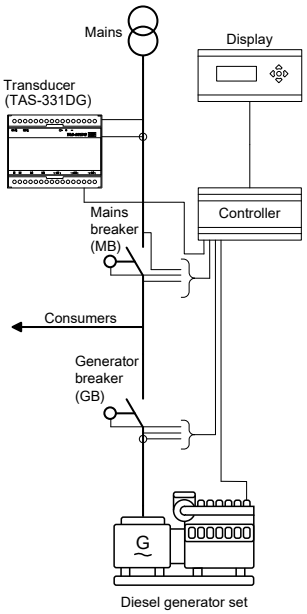
AGC mains: A power management control unit used in the parallel with mains power management application (six to nine). Several options are available for the AGC mains.

AGC BTB: A power management control unit used in the power management application to split the busbar (eight). Several options are available for the AGC BTB.

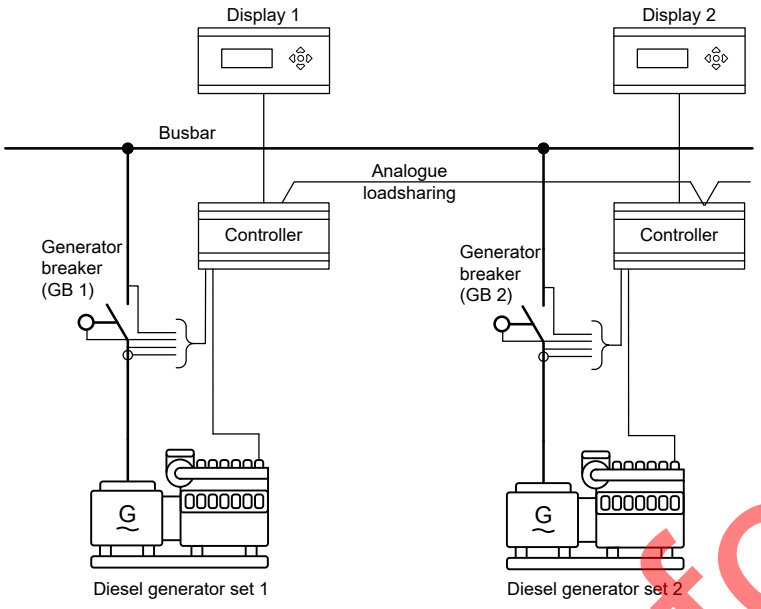
1.1.6 M-Logic (Micro PLC)

This configuration tool is part of the PC utility software which is free of charge. With this tool, it is possible to customise the application to your needs. It is possible to dedicate specific functions or logical conditions to different inputs and outputs.

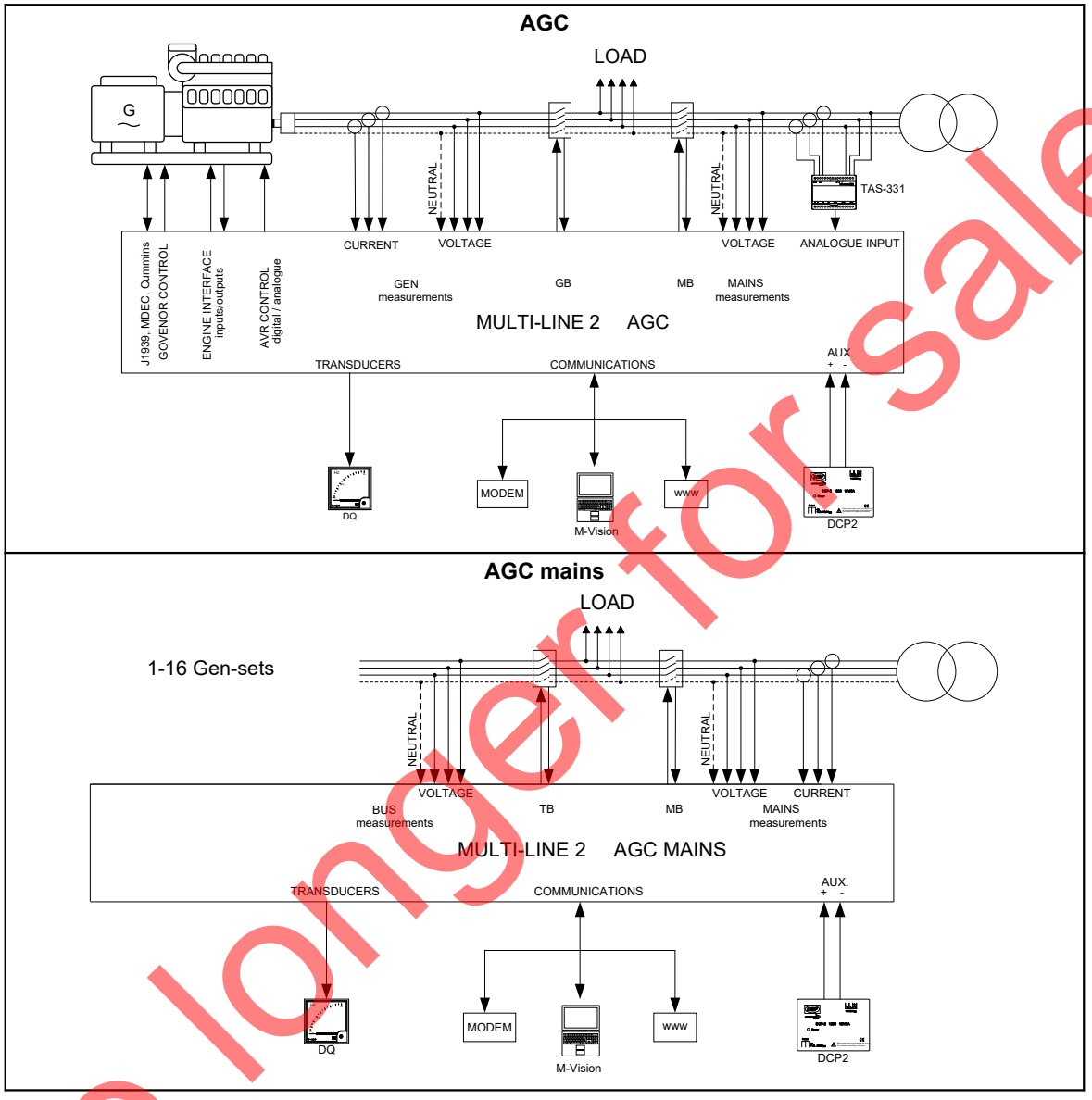
1.1.7 Single line application diagrams

Standard		
1. Automatic mains failure and fixed power/base load	**2. Island**	**3. Peak shaving, load takeover and mains power export**
		

Optional

4. Multiple gensets, load sharing	**5.-9. Power managment**
	See separate page in this data sheet

1.1.8 Principle diagrams



DEIF supplies a complete range of current transformers (DCT range of CTs), power supplies (DCP range), meters (DQ range) and transducers (TAS range) that are suitable for use with our range of generator controls and protection relays - see www.deif.com for full details.

1.2 Power management applications (option G4/G5/G8)

1.2.1 Description

The AGC can be equipped with a power management option (G4, G5 or G8). Using this possibility, the AGC will be able to handle applications with up to

- 16 mains incoming
- 16 mains breakers
- 16 tie breakers
- 8 bus tie breakers
- 16 generators (256 on request)
- 16 generators
- 16 generator breakers

The basic functions are:

- All 56 breakers can be synchronised by choice
- Load-dependent start/stop operation
- Priority selection of gensets
- Priority selection of mains
- Redundant communication between the controllers
- Plant divided into sections for individual functionality
- Selectable mains priority and parallel operation
- The plant mains failure sequence can call for support on local plant sections
- Load management
- Quick setup/broadcast
- Asymmetric load sharing
- CAN flags
- Droop frequency/voltage
- Heavy consumer (HC)
- Non-essential load (NEL)/load shedding
- Secured mode
- Base load
- Multi-master system

In a multi-master system, all vital data is broadcasted from all units to all units, giving all units knowledge of their own position in the application. This philosophy makes the application immune to a failing master controller.

1.2.2 Application

The plant modes supported by the power management options are:

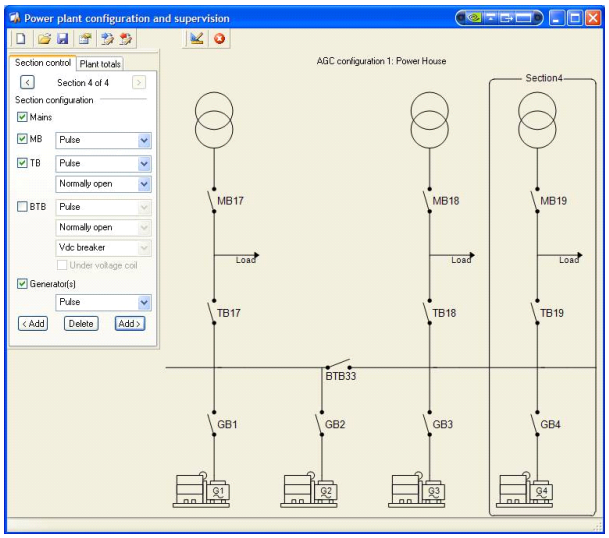
- Automatic mains failure/ATS
- Island operation
- Fixed power/base load
- Peak shaving
- Load takeover
- Mains power export (fixed power to mains)

The plant modes are configurable, and it is possible to change the plant mode on the fly, both in single genset and in power management applications.

The plant can be divided into sections by several bus tie breakers, making it possible to run different plant modes in each section.

1.2.3 Configuration

The setup of the application is easily configured using a computer and the DEIF PC utility software.



Your PC tool visualises it - the AGC realises it.

1.2.4 Load management

The load management is primarily handled by the tie breakers. Functions are available to ensure sufficient power capacity to handle the load either in terms of number of gensets or by soft-starting the load.

If a certain level of available power on the busbar is required to connect a load group, functions are available both for starting additional generators, and relays can be configured to activate when a specific level of available power is reached.

1.2.5 Load-dependent operation

The load-dependent starting and stopping of the gensets is based on a power-available calculation. The next generator will start when the available power decreases below the adjustable set point. It will stop when too much power is available.

1.2.6 Priority selection

Priority routines are individually made for the mains in the plant sections and for the gensets.

The mains priority routines in the AGC mains are:

- Selected primary mains
- Parallel mains

The genset priority routines in the AGC are:

- Manual selection based on ID
- Running hours
- Fuel optimising calculating the best combination of generator kW size and the plant load. Works with up to 16 gensets

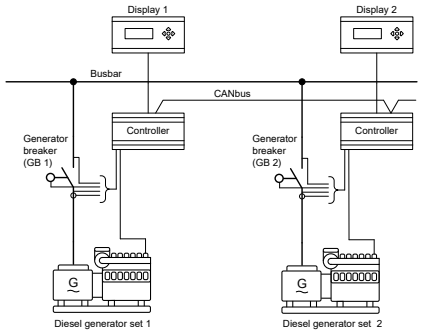
1.2.7 Redundant AGC mains and CAN bus

In emergency systems requiring extra operation reliability, redundant AGC mains units and redundant CAN bus communication lines can be used to provide backup.

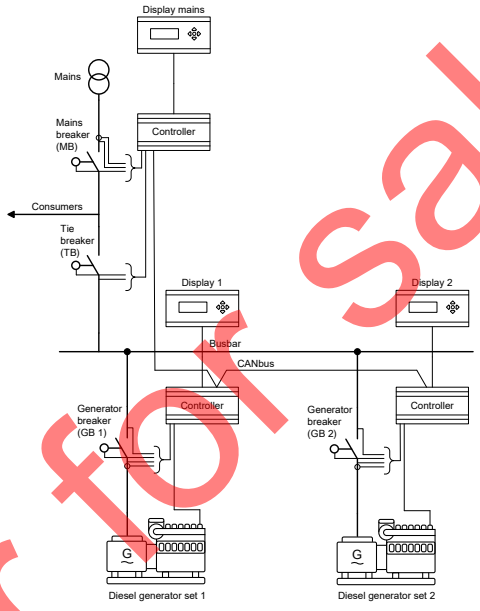
Redundant AGC mains units are only supported in the application: Dual mains (7).

1.2.8 Optional power management applications

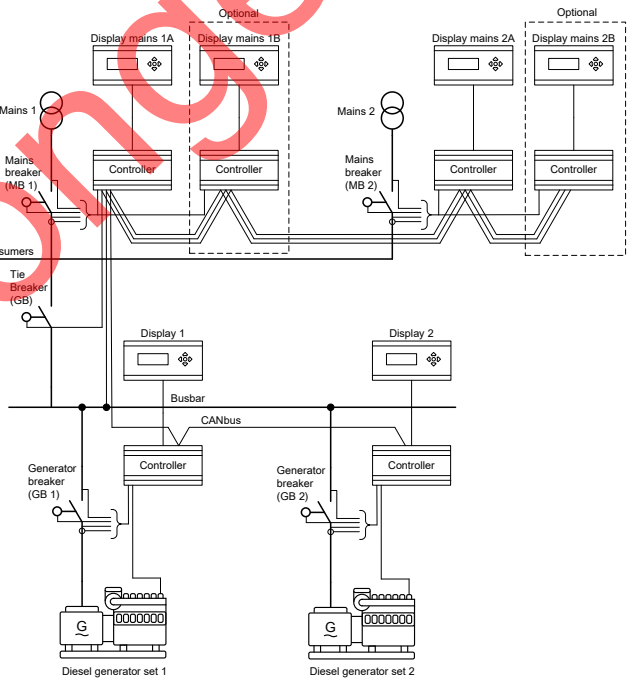
5. Island operation.



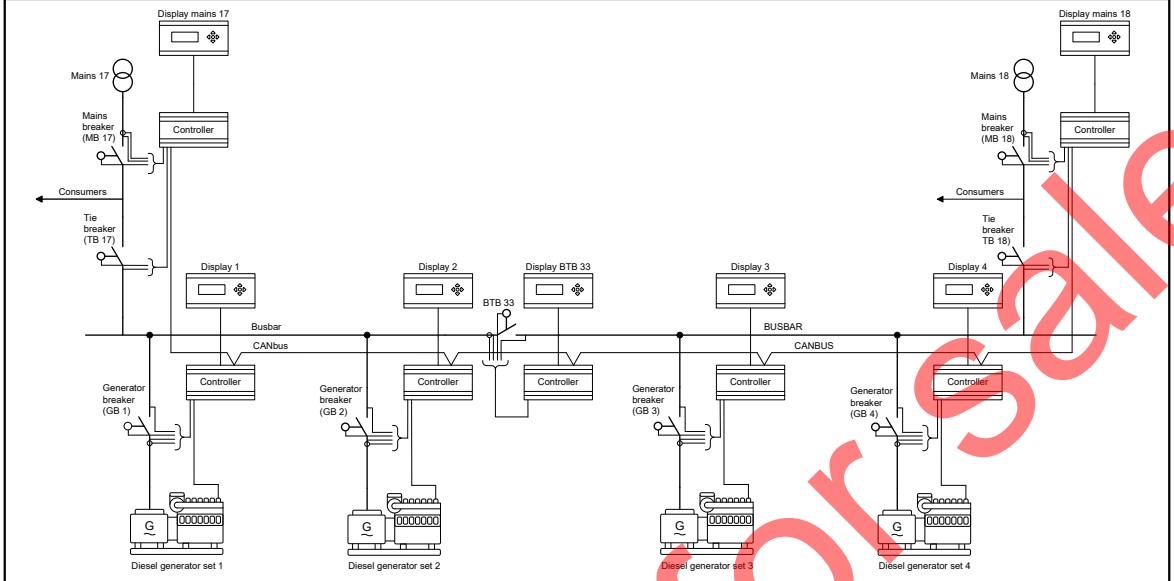
6. Parallel with mains.
The tie breaker is selectable depending on applicational needs.



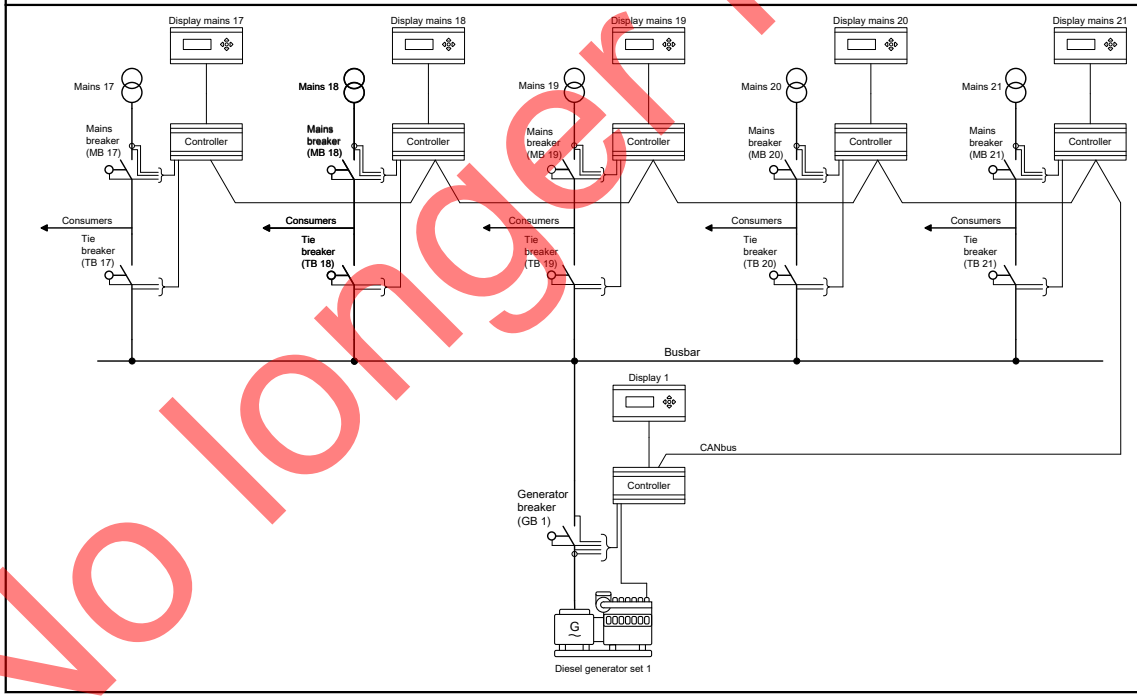
7. Parallel with 2 mains/dual mains application.
The tie breaker is selectable depending on applicational needs



8. H-coupling.
The tie breaker controlled by the AGC mains is selectable depending on applicational needs.



9. X mains and 1 DG.
The tie breaker controlled by the AGC mains is selectable depending on applicational needs.

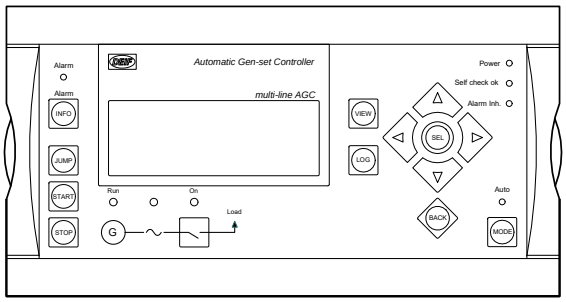


2. Optional functionality

2.1 Display layouts

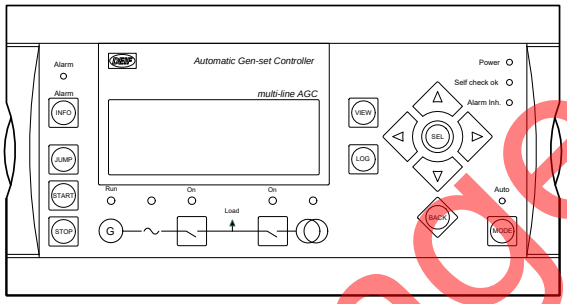
2.1.1 Option Y1

Engine and generator breaker control (island)



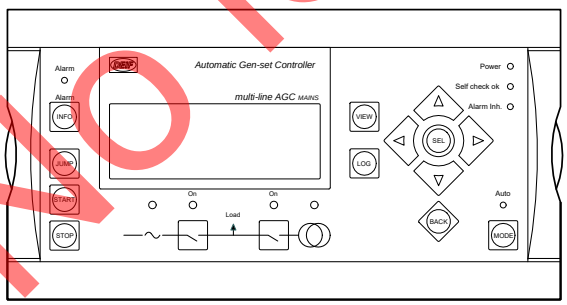
2.1.2 Option Y3

Generator breaker and mains breaker control



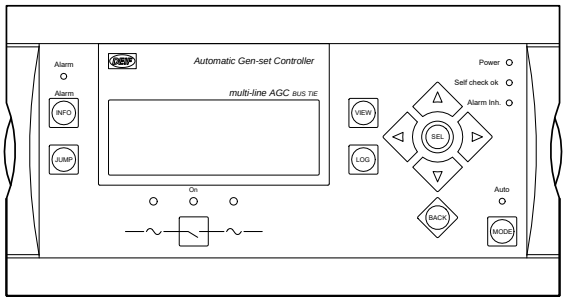
2.1.3 Option Y4

Tie breaker and mains breaker control



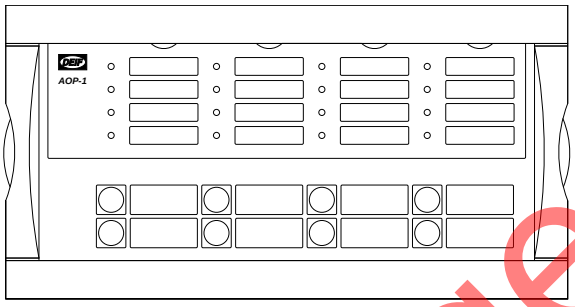
2.1.4 Option Y5

Bus tie breaker control



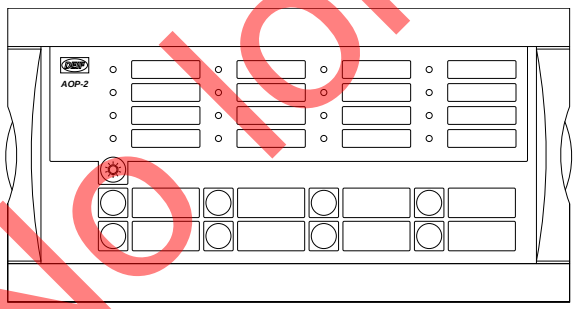
2.1.5 Option X3

Additional operator's panel - AOP-1



2.1.6 Option X4

Additional operator's panel - AOP-2



2.2 Available options

2.2.1 Available variants

Type	Var-iant	Description	Item no.	Note
AGC-3	16	AGC-3 without display	2912410030-12	
AGC-3	17	AGC-3 w. display + J1	2912410030-13	One 3 m display cable is included as standard
AGC-3	07	AGC-3 BTB without display + G4	2912410030-07	
AGC-3	06	AGC-3 BTB w. display + G4 + J1	2912410030-06	One 3 m display cable is included as standard
AGC-3	09	AGC-3 Mains without display + A1 + G5	2912410030-09	
AGC-3	08	AGC-3 Mains with display + A1 + G5 + J1	2912410030-08	One 3 m display cable is included as standard
AGC-3	18	AGC-3 Flex with display + A1 + D1 + EF6 + G3 + G8 + H5 + M12 + N + J1	2912410030-18	One 3 m display cable is included as standard
AGC-3	19	AGC-3 Flex without display + A1 + D1 + EF6 + G3 + G8 + H5 + M12 + N + J1	2912410030-19	
AGC-3	20	AGC-3 Flex with display + A1 + D1 + EF6 + G8	2912410030-20	One 3 m display cable is included as standard
AGC-3	21	AGC-3 Flex without display + A1 + D1 + EF6 + G8	2912410030-21	

2.2.2 Available software options

Option	Description	Slot no.	Option type	Note
A	**Mains protection package**			
A1	Time-dependent under-voltage (27t) Under-voltage and reactive power lov (27Q) Vector jump (78) df/dt (ROCOF) (81)		SW	
A4	Positive sequence (mains voltage low) (27)		SW	
A5	Directional over-current (67)		SW	
C2	Negative sequence voltage high (47) Negative sequence current high (46) Zero sequence voltage high (59) Zero sequence current high (50)		SW	
D	**Voltage/var/PF control**			Not available for AGC mains and AGC bus tie
D1	Constant voltage control (stand-alone) Constant reactive power control (parallel with mains) Constant power factor control (parallel with mains) Reactive load sharing (island paralleling with other generators)		SW	
E, F	**Analogue controller and transducer outputs**			
E1	2 × +/-25 mA (GOV/AVR or transducer)	4	HW	Not with E2, EF2, EF4, EF5 or EF6 AVR output requires D1
E2	2 × 0(4) to 20 mA (GOV/AVR or transducer)	4	HW	Not with E1, EF2, EF4, EF5 or EF6 AVR output requires D1
EF2	1 × +/-25 mA (GOV/AVR or transducer) 1 × 0(4) to 20 mA (GOV/AVR or transducer)	4	HW	Not with E1, E2, EF4, EF5 or EF6 AVR output requires D1
EF4	1 × +/-25 mA (GOV/AVR or transducer) 2 × relay outputs (GOV/AVR or configurable)	4	HW	Not with E1, E2, EF2, EF5 or EF6 AVR output requires D1
EF5	1 × PWM (Pulse Width Modulated) output for CAT GOV +/-20 mA for AVR. 2 × relay outputs for AVR	4	HW	Not with E1, E2, EF2, EF4 or EF6 AVR output requires D1

Option	Description	Slot no.	Option type	Note
EF6	1 × PWM (Pulse Width Modulated) output for CAT GOV 2 × +/-25 mA (GOV/AVR or transducer)	4	HW	Not with E1, E2, EF2, EF4 or EF5 AVR output requires D1
F1	2 × 0(4) to 20 mA (transducer)	6	HW	Not with H8.2, M13.6, M14.6 or M15
G	**Load sharing/power management**			
G3	Load sharing with analogue lines	3	HW/SW	If M12 is present, G3 is a software option Not available for AGC mains and AGC bus tie
G4	Power management, 16 gensets, 8 bus tie breakers	7	SW	Not with H7, G5 or G8
G5	Power management, 16 mains, 16 gensets, 8 bus tie breakers	7	SW	Not with H7, G4 or G8
G8	Power management, 16 gensets	7	SW	Not with H7, G4 or G5
H	**Serial communication**			
H2	Modbus RTU (RS-485)	2	HW	Not with H3, H8.2 or M14.2
H3	Profibus DP	2	HW	Not with H2, H8.2 or M14.2
H5	CAN bus: MTU (ADEC and MDEC) and all J1939 engine comm.	8	HW	Not with H6, H7, M13.8, M14.8, M15.8 or H8.8 Not available for AGC mains and AGC bus tie
H6	Cummins GCS	8	HW	Not with H5, H7, M13.8, M14.8, M15.8 or H8.8 Not available for AGC mains and AGC bus tie
H7	CAN bus (J1939):	7	SW	Not with H5, H6 or G5 Not available for AGC mains and AGC bus tie

Option	Description		Slot no.	Op-tion type	Note
	Caterpillar Cummins CM850/570 Detroit Diesel (DDEC) Deutz (EMR) Iveco (NEF/CURSOR) John Deere (JDEC)	Perkins Scania (EMS) Scania (EMS S6) Volvo Penta (EMS) Volvo (EMS2)			
H8.X	External I/O modules		2, 8	HW	H8.2: Not with H2, H3 or M14.2 H8.8: Not with H5, H6, M13.8, M14.8 or M15.8
H11	LED I/F card w/RS-232 service port			HW	Not with N Class 1.0 measure-ments
M	**Binary and analogue I/Os**				
M12	13 binary inputs, 4 relay outputs, configurable		3	HW/SW	If G3 is present, M12 is a software option
M13.X	7 binary inputs, configurable		6, 8	HW	M13.6: Not with F1, M14.6 or M15 M13.8: Not with H5, H6, M14.8, M15.8 or H8.8
M14.X	4 relay outputs, configurable		2, 6, 8	HW	M14.2: Not with H2, H3 or H8.2 M14.6: Not with F1, M13.6 or M15 M14.8: Not with H5, H6, M13.8, M15.8 or H8.8
M15.X	4 analogue inputs, configurable, 4 to 20 mA		6, 8	HW	M15.6: Not with F1, M13.6, M14.6 or M15.8 M15.8: Not with H5, H6, M13.8, M14.8, H8.8 or M15.6
N	**Option N (N3)**				
N	- Modbus TCP/IP - EtherNet/IP - SMS/e-mail alarms			HW	
P	**Printer**				
P1	Event and alarm printer software			SW	Only with H11

(ANSI# as per IEEE Std C37.2-1996 (R2001) in parenthesis).

Options E1, E2, EF2, EF4, EF5 and EF6 are used for GOV/AVR control. Four relays are used as standard in the AGC for GOV/AVR control. If selected, these options will replace the four relays.

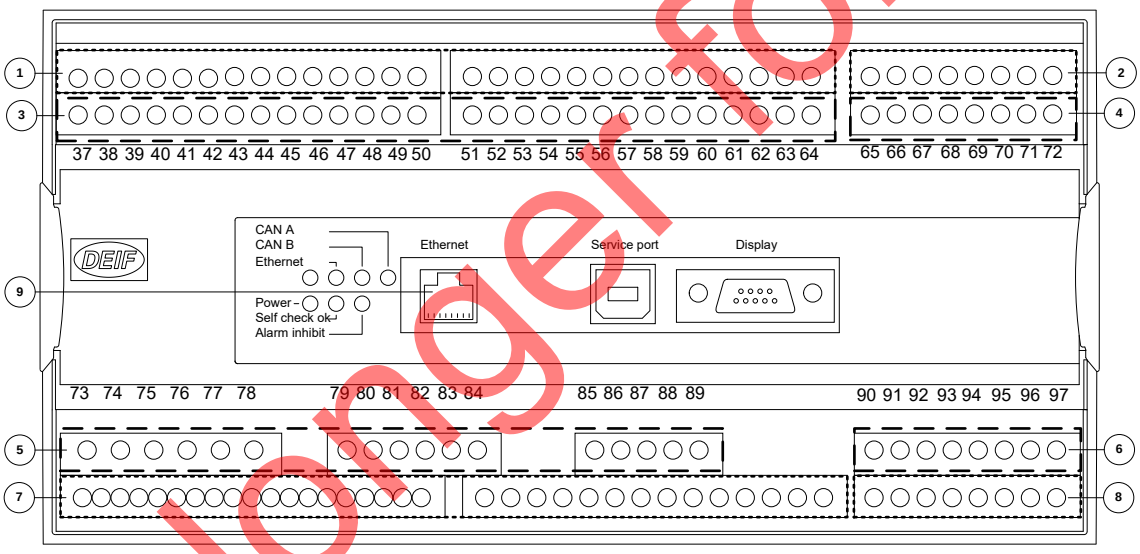
Notice that not all options can be selected for the same unit. Refer to the chapter "Hardware overview" in this data sheet for further information about the location of the options in the unit.

2.2.3 Available accessories

Option	Description	Slot no.	Option type	Note
J	**Cables**			
J1	Display cable with plugs, 3 m. UL94 (V1) approved		Other	
J2	Display cable with plugs, 6 m. UL94 (V1) approved		Other	
J3	PC cable for utility software (RS-232), 3 m. UL94 (V1) approved		Other	Only with H11
J4	PC cable for option N-programming (Ethernet cable crossed), 3 m. UL94 (V1) approved		Other	
J6	Display cable with plugs, 1 m. UL94 (V1) approved		Other	
J7	PC cable for utility software (USB), 3 m. UL94 (V1) approved		Other	Not with H11
J8	Display CAN cable for DU-2 connection and 2 × plugs for cables for the Remote Maintenance Box		Other	RMB connector kit
K	**Documentation**			
K1	Designer's Reference Handbook (hard copy)		Other	
K2	CD-ROM with complete documentation		Other	
L	**Display gasket for IP54**		Other	Standard is IP40
Q	**Measurement accuracy**		Hardware	
Q1	Verified class 0.5		Other	Not with H11
X	**Additional displays**			
X2	Additional standard display (DU-2). CAN bus comm.		Other	Two options X2 can be ordered for each AGC unit Only available if the AGC unit is ordered with a display
X3	Additional operator panel (AOP-1): 16 configurable LEDs and 8 configurable push-buttons		Other	
X4	Additional operator panel (AOP-2): 16 configurable LEDs, 8 configurable buttons and 1 status relay. CAN bus comm.		Other	Five options X4 can be ordered for each AGC unit Only available if the AGC unit is ordered with a display
Y	**Display layout**		Hardware	

Option	Description	Slot no.	Option type	Note
Y1	Engine and generator breaker control (island)		Other	Available for AGC genset controller
Y3	Generator breaker and mains breaker control		Other	Available for AGC genset controller
Y4	Tie breaker and mains breaker control		Other	Available for AGC mains controller
Y5	Bus tie breaker control		Other	Available for AGC BTB controller

2.2.4 Hardware options



(1) : The numbers in the drawing above refer to the slot numbers indicated in the table below.

Slot #	Option/stand-ard	Description
1		**Terminal 1-28, power supply**
	Standard	8 to 36 V DC supply, 11 W; 1 × status output relay; 5 × relay outputs; 2 × pulse outputs (kWh, kvarh); 5 × digital inputs
2		**Terminal 29-36, communication**
	H2	Modbus RTU (RS-485)
	H3	Profibus DP
	H8.2	External I/O modules
	M14.2	4 × relay outputs
3		**Terminal 37-64, in-/outputs/load sharing**
	M12	13 × digital inputs; 4 × relay outputs
	G3	Active power load sharing; reactive power load sharing (requires D1)
4		**Terminal 65-72, governor, AVR, in-/outputs**
	Standard	4 × relay
	E1	2 × +/-25 mA out
	E2	2 × 0(4) to 20 mA out
	EF2	1 × +/-25 mA out; 1 × 0(4) to 20 mA out
	EF4	1 × +/-25 mA out; 2 × relay
	EF5	1 × +/-25 mA out; 1 × PWM out; 2 × relay
	EF6	2 × +/-25 mA out; 1 × PWM out
5		**Terminal 73-89, AC measuring**
	Standard	3 × generator voltage; 3 × generator current; 3 × busbar/mains voltage
6		**Terminal 90-97, in-/outputs**
	F1	2 × 0(4) to 20 mA out, transducer
	M13.6	7 × digital inputs
	M14.6	4 × relay outputs
	M15.6	4 × 4 to 20 mA inputs
7		**Terminal 98-125, engine I/F**
	Standard	8 to 36 V DC supply, 5 W; 1 × magnetic pickup (MPU); 3 × multi-inputs; 7 × digital inputs; 4 × relay outputs
	G4/G5/G8	Power management

Slot #	Option/stand-ard	Description
	H7	J1939
8		**Terminal 126-133, engine communication, in-/outputs**
	H5	MTU (MDEC) + J1939 (option H7)
	H6	Cummins GCS
	H8.8	External I/O modules
	M13.8	7 × digital inputs
	M14.8	4 × relay outputs
	M15.8	4 × 4 to 20 mA inputs
9		**LED I/F**
	H11	RS-232 service port
	N	Modbus TCP/IP; EtherNet/IP; SMS/e-mail alarms

There can only be one hardware option in each slot. For example, it is not possible to select option H2 and option H3 at the same time, because both options require a PCB in slot #2.

Besides the hardware options shown on this page, it is possible to select the software options mentioned in the chapter "Available options".

3. Technical information

3.1 Specifications and dimensions

3.1.1 Technical specifications

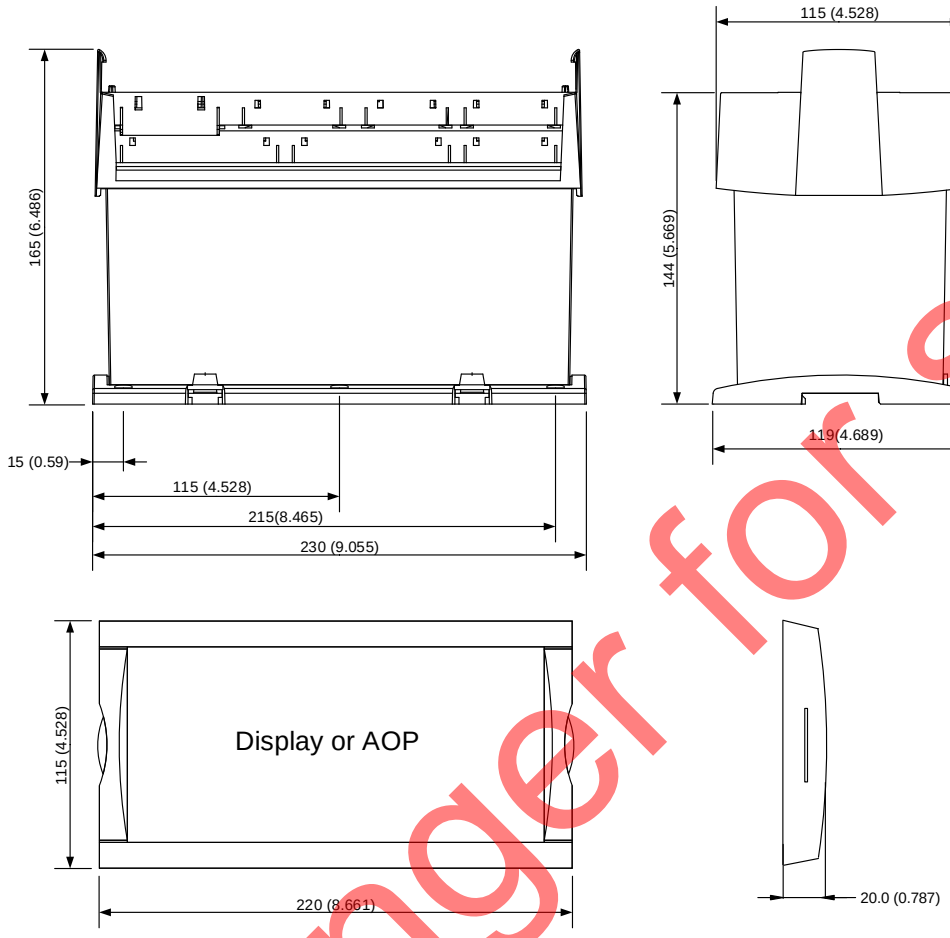
Accuracy	Class 1.0 -25 to 15 to 30 to 70 °C Temperature coefficient: +/-0.2 % of full scale per 10 °C Class 0.5 with option Q1 Positive, negative and zero sequence alarms: Class 1 within 5 % voltage unbalance Class 1.0 for negative sequence current Fast over-current: 3 % of 350 %*In Analogue outputs: Class 1.0 according to total range Option EF4/EF5: Class 4.0 according to total range To IEC/EN60688
Operating temperature	-25 to 70 °C (-13 to 158 °F) -25 to 60 °C (-13 to 140 °F) if Modbus TCP/IP (option N) is available in the controller. (UL/cUL Listed: Max. surrounding air temperature: 55 °C/131 °F)
Storage temperature	-40 to 70 °C (-40 to 158 °F)
Climate	97 % RH to IEC 60068-2-30
Operating altitude	0 to 4000 m above sea level Derating 2001 to 4000 m above sea level: Max. 480 V AC phase-phase 3W4 measuring voltage Max. 690 V AC phase-phase 3W3 measuring voltage
Measuring voltage	100 to 690 V AC +/-20 % (UL/cUL Listed: 600 V AC phase-phase) Consumption: Max. 0.25 VA/phase
Measuring current	-/1 or -/5 A AC (UL/cUL Listed: From CTs 1-5 A) Consumption: Max. 0.3 VA/phase
Current overload	4 × I_n continuously 20 × I_n, 10 sec. (max. 75 A) 80 × I_n, 1 sec. (max. 300 A)
Measuring frequency	30 to 70 Hz
Aux. supply	Terminals 1 and 2: 12/24 V DC nominal (8 to 36 V DC operational). Max. 11 W consumption Battery voltage measurement accuracy: ±0.8 V within 8 to 32 V DC, ±0.5 V within 8 to 32 V DC @ 20 °C Terminals 98 and 99: 12/24 V DC nominal (8 to 36 V DC operational). Max. 5 W consumption 0 V DC for 10 ms when coming from at least 24 V DC (cranking dropout) The aux. supply inputs are to be protected by a 2 A slow blow fuse. (UL/cUL Listed: AWG 24)

Binary inputs	Optocoupler, bi-directional ON: 8 to 36 V DC Impedance: 4.7 kΩ OFF: <2 V DC
Analogue inputs	-10 to +10 V DC: Not galvanically separated. Impedance: 100 kΩ 0(4) to 20 mA: Impedance 50 Ω. Not galvanically separated RPM (MPU): 2 to 70 V AC, 10 to 10000 Hz, max. 50 kΩ
Multi-inputs	0(4) to 20 mA: 0 to 20 mA, +/-1 %. Not galvanically separated Binary: Max. resistance for ON detection: 100 Ω. Not galvanically separated Pt100/1000: -40 to 250 °C, +/-1 %. Not galvanically separated. To IEC/EN60751 RMI: 0 to 1700 Ω, +/-2 %. Not galvanically separated V DC: 0 to 40 V DC, +/-1 %. Not galvanically separated
Relay outputs	Electrical rating: 250 V AC/30 V DC, 5 A. (UL/cUL Listed: 250 V AC/24 V DC, 2 A resistive load) Thermal rating @ 50 °C: 2 A: Continuously. 4 A: t_{on} = 5 sec., t_{off} = 15 sec. (Unit status output: 1 A)
Open collector outputs	Supply: 8 to 36 V DC, max. 10 mA
Analogue outputs	0(4) to 20 mA and +/-25 mA. Galvanically separated. Active output (internal supply). Load max. 500 Ω. (UL/cUL Listed: Max. 20 mA output) Update rate: Transducer output: 250 ms. Regulator output: 100 ms
Load sharing lines	-5 to 0 to +5 V DC. Impedance: 23.5 kΩ
Galvanic separation	Between AC voltage and other I/Os: 3250 V, 50 Hz, 1 min. Between AC current and other I/Os: 2200 V, 50 Hz, 1 min. Between analogue outputs and other I/Os: 550 V, 50 Hz, 1 min. Between binary input groups and other I/Os: 550 V, 50 Hz, 1 min.

Response times (delay set to min.)	**Busbar:** Over-/under-voltage: <50 ms Over-/under-frequency: <50 ms Voltage unbalance: <250 ms **Generator:** Reverse power: <250 ms Over-current: <250 ms Fast over-current: <40 ms Directional over-current: <150 ms Over-/under-voltage: <250 ms Over-/under-frequency: <350 ms Overload: <250 ms Current unbalance: <250 ms Voltage unbalance: <250 ms Reactive power import: <250 ms Reactive power export: <250 ms Voltage-dependent I>: <250 ms Negative sequence I: <500 ms Negative sequence U: <500 ms Zero sequence I: <500 ms Zero sequence U: <500 ms Overspeed: <500 ms Digital inputs: <250 ms Emergency stop: <200 ms Multi-inputs: 800 ms Wire failure: <600 ms **Mains:** df/dt (ROCOF): <130 ms (4 periods) Vector jump: <40 ms Positive sequence: <60 ms Time-dependent under-voltage, U_t<: <50 ms Under-voltage and reactive power low, U_Q<: <250 ms
Mounting	DIN-rail mount or base mount with six screws
Safety	To EN 61010-1, installation category (over-voltage category) III, 600 V, pollution degree 2 To UL 508 and CSA 22.2 no. 14-05, over-voltage category III, 600 V, pollution degree 2
EMC/CE	To EN 61000-6-2, EN 61000-6-4, IEC 60255-26
Vibration	3 to 13.2 Hz: 2 mm_{pp}. 13.2 to 100 Hz: 0.7 g. To IEC 60068-2-6 & IACS UR E10 10 to 60 Hz: 0.15mm_{pp}. 60 to 150 Hz: 1 g. To IEC 60255-21-1 Response (class 2) 10 to 150 Hz: 2 g. To IEC 60255-21-1 Endurance (class 2)
Shock (base mount)	10 g, 11 ms, half sine. To IEC 60255-21-2 Response (class 2) 30 g, 11 ms, half sine. To IEC 60255-21-2 Endurance (class 2) 50 g, 11 ms, half sine. To IEC 60068-2-27
Bump	20 g, 16 ms, half sine. To IEC 60255-21-2 (class 2)
Material	All plastic materials are self-extinguishing according to UL94 (V1)

Plug connections Tightening torque	AC current: 0.2 to 4.0 mm^2 stranded wire. (UL/cUL Listed: AWG 18) AC voltage: 0.2 to 2.5 mm^2 stranded wire. (UL/cUL Listed: AWG 20) Relays: (UL/cUL Listed: AWG 22) Terminals 98-116: 0.2 to 1.5 mm^2 stranded wire. (UL/cUL Listed: AWG 24) Other: 0.2 to 2.5 mm^2 stranded wire. (UL/cUL Listed: AWG 24) Display: 9-pole Sub-D female Service port: USB A-B For further information, refer to the "Installation Instructions"
Protection	Unit: IP20. Display: IP40 (IP54 with gasket: Option L). (UL/cUL Listed: Type Complete Device, Open Type). To IEC/EN 60529
Governors	Multi-line 2 interfaces to all governors, including GAC, Barber-Colman, Woodward and Cummins See interfacing guide at www.deif.com
Approvals	UL/cUL Listed to UL508. UL/cUL Recognized to UL2200
UL markings Tightening torque	Wiring: Use 60/75 °C copper conductors only Mounting: For use on a flat surface of type 1 enclosure Installation: To be installed in accordance with the NEC (US) or the CEC (Canada) **AOP-2:** Maximum ambient temperature: 60 °C Wiring: Use 60/75 °C copper conductors only Mounting: For use on a flat surface of type 3 (IP54) enclosure. Main disconnect must be provided by installer Installation: To be installed in accordance with the NEC (US) or the CEC (Canada) **DC/DC converter for AOP-2:** Tightening torque: 0.5 Nm (4.4 lb-in) Wire size: AWG 22-14 For further information, refer to the "Installation Instructions"
Weight	Base unit: 1.6 kg (3.5 lbs.) Option J1/J3/J4/J6/J7: 0.2 kg (0.4 lbs.) Option J2: 0.4 kg (0.9 lbs.) Display: 0.4 kg (0.9 lbs.)

3.1.2 Unit dimensions in mm (inches)



4. Ordering information

4.1 Order specifications and disclaimer

4.1.1 Order specifications

Variants

Mandatory information			Additional options to the standard variant				
Item no.	Type	Variant no.	Option	Option	Option	Option	Option

Example:

Mandatory information			Additional options to the standard variant				
Item no.	Type	Variant no.	Option	Option	Option	Option	Option
2912410030-20	AGC-3 Flex with display + A1 + D1 + EF6 + G8	20	C2	M12			

The AGC mains unit is only usable with option G5; this option is already included when ordered. The AGC bus tie unit is only usable with option G4 or G5.

Specify the AGC type: DG/mains/BTB/group tie/plant unit.

Accessories

Mandatory information		
Item no.	Type	Accessory

Example:

Mandatory information		
Item no.	Type	Accessory
1022040065	Accessories for AGC-3	USB cable, 3 m (J7)

4.1.2 Disclaimer

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