DATA SHEET

AGC PM

Automatic Genset Controller, Plant Management

4921240420F

1. Application information

- Management of up to 992 gensets
- Island and parallel operation
- Plant black start capabilities
- Fuel-optimised control
- Integrated genset protection

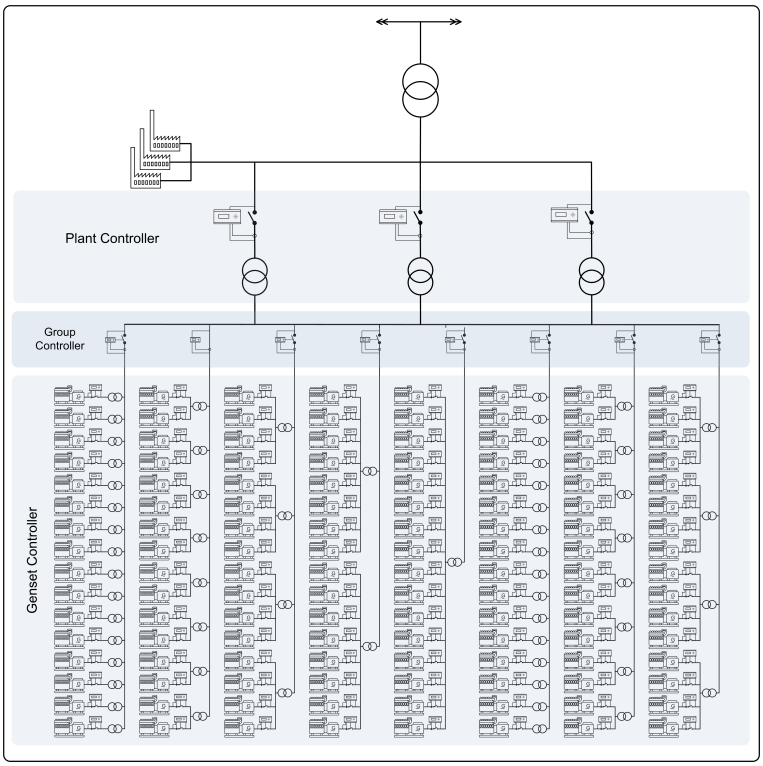
SW version: 4.2x.x or later

1.1 General information

1.1.1 A control system

The AGC Plant Management is a control system that changes the way that we normally look at genset control.

The AGC Plant Management is a plant control system that not only handles genset controls but also has built-in functions that are designated towards utility requirements, plant design, commissioning tools, maintenance and last but not least, a fuel-efficient way of ensuring that the required plant set point always will be fulfilled.



1.1.2 Cost-optimised design

The AGC Plant Management can use the plant's generators directly to black-start large step-up transformers. With a proven ratio of up to 1:39 between the generator and the transformer, the system offers a cost-optimised solution for black start of plants in both island and fixed power mode which reduces the need for high voltage breakers.

1.1.3 Communication

The AGC Plant Management features dedicated plant communication which ensures that SCADA systems and the control system are kept separate. As a result, the system's performance is not compromised, and on-site installation can be reduced to a minimum.

1.1.4 Fast and automated response - even in fixed power mode

When the AGC Plant Management operates in fixed power mode, the generators are assigned their most fuel-efficient power set point. If a generator trips or in other ways fails to deliver the required amount of power, the other generators will automatically deviate from their optimum set points in order to compensate for the production dip until a new generator starts up. When the new generator has synchronised, the deviating generators will return to their original set points.

1.1.5 Utilising the spinning reserve

When the AGC Plant Management operates in island mode, it offers a new way of sharing load: asymmetrical load sharing. Instead of running all generators on the same effort level, which will result in increased fuel consumption, asymmetrical load sharing will load the generators in a cascade. As one generator reaches its fuel-optimised set point, the next generator will start up and begin to take load. If necessary, the load sharing generators can use the system's spinning reserve. By doing so, the system becomes capable of maintaining the majority of generators at their optimum set points without losing the ability to react on significant load fluctuations.

1.1.6 Think about it: 992 gensets in one application

One generator can be separated into multiple different sub-systems: power measurement, synchronisation, communication, fuel pump logic, DC supply, breaker handling, binary input, and so on. To develop a grounding system counting up to 992 generators and thousands of sub-systems is almost impossible. Most attempts are likely to result in burnt components, erratic system behaviour and unwanted generator trips due to earth leaks and simple distortion. The AGC Plant Management, however, is different. For example, all sub-systems are galvanically separated. Faults in one sub-system will be isolated to the individual sub-system and never cause problems outside of it. The system's ability to deal with faults locally improves the stability and performance of the entire plant.

1.1.7 Automatic response to abnormal grid variations

As the size of a plant may have considerable effects on the grid, the AGC Plant Management can be programmed to respond automatically to abnormalities in the grid. Programmable automatic ramps will be activated if the grid frequency/voltage moves outside a normal deadband.

Frequency support:

The AGC Plant Management carries out automatic frequency support of the grid. If the grid is overloaded with kW, causing the grid frequency to drop, the system will detect it and increase the power production. Result is a stabilised grid frequency.

The AGC Plant Management is also able to keep a fixed power production at the connection point, automatically compensating for internal loads in the plant.

Voltage support:

The AGC Plant Management also carries out automatic voltage support to the grid. If the grid is overloaded with kvar, the system will detect it, change the power factor of the plant and start to export kvar. This is to remove kvar from the transmission lines and the next upstream transformer, improving the load profiles of both. Result is a stabilised grid voltage.

The AGC Plant Management is also able to keep a fixed power factor at the connection point, automatically compensating for internal loads in the plant.

1.2 Standard functions

1.2.1 Standard functions, AGC Plant Management

Table 1.1 Measuring

Measuring	Genset	Group	Plant
Generator/busbar voltage (3-phase/4-wire) galvanically separated	X	X	X
Generator current (3 × true rms)	X	X	X

Measuring	Genset	Group	Plant
CT selectable 1/5	X	X	X
100 to 690 V AC selectable	X	X	X
Mains/busbar voltage (3-phase/4-wire)	X	X	X
Phase angle compensation gen/busbar/mains for synchronising over a D/Y transformer	X	X	X

Table 1.2 Single genset

Genset modes	Genset	Group	Plant
Island operation	X		
Fixed power/base load	X		
Peak shaving	X		
Load takeover	X		
Mains power export	X		

Table 1.3 Power management

0 to 32 incomings and 0 to 32 gensets (32 being the maximum number of incomings and gensets in total)	Genset	Group	Plant
Island operation	X	X	
Fixed power/base load	X	X	
Peak shaving	X	X	
Load takeover	X	X	
Mains power export	X	X	

Table 1.4 Plant management

0 to 32 incomings and 0 to 32 groups (32 being the maximum number of incomings and groups in total). Each group holds a maximum of 31 gensets	Genset	Group	Plant
Island operation	X	X	X
Fixed power/base load	X	X	X
Peak shaving	X	X	X
Load takeover	X	X	X
Mains power export	X	X	X

Table 1.5 Control

Control	Genset	Group	Plant
Start/stop sequences	X	X	X
Synchronisation	X	X	X
Nos. of breakers/contactors to be controlled/synchronised	2	32	1024
J1939 regulation governor/AVR	X		
Relay outputs for governor control/AVR	X		

Control	Genset	Group	Plant
Analogue outputs for governor control/AVR	X		
PWM output for CAT and Cummins	X		
Analogue load sharing for power and var	X		
Internal configurable load sharing lines for: • Cummins PCC • Woodward SPM-D11 • Selco T4800	X		
Logs: • Event LOG with real-time clock • Alarm LOG with real-time clock • Engine diagnostic active alarm LOG • Engine diagnostic historical alarm LOG	X	X	X
DM1 J1939 log	X		
DM2 J1939 log	X		
Active diagnostic, to read the engine diagnostic codes without starting the engine	X		

Table 1.6 Minimum I/Os

Minimum I/Os	Genset	Group	Plant
Inputs (configurable)	24(21)	24(21)	24(21)
Relay outputs (configurable)	14(9)	14(9)	14(9)
Multi-inputs configurable • RMI • Pt100 • Pt1000 • 4 to 20 mA • 0 to 40 V (start battery monitoring) • Binary input with cable supervision	3	3	3
Emergency input	1	1	1
Pickup MPU/W/PNP/NPN/tacho	1	1	1
CAN bus communication interfaces	2	3	2
TCP/IP Modbus communication	1	1	1

Table 1.7 M-Logic

Logic configuration tool	Genset	Group	Plant
Inputs: • Alarms • Limits • Events • Command timers • DEIF CAN commands • Displays • Synchronisation types	X	X	X

Logic configuration tool	Genset	Group	Plant
• Logic • Binary inputs • Modes • Relay status • Virtual events • Fail classes • Power/plant management status • EIC events			
Outputs: • Commands • Virtual events • Relays • Inhibits • DEIF CAN commands • Displays • Synchronisation types • GOV/AVR control • EIC commands	X	X	X

Table 1.8 Plant management functions

Plant management functions	Genset	Group	Plant
Common power/var/PF set points for up to 961 generators	X	X	X
Plant power control selectable in utility connection point or generator export	X	X	X
Automatic power response to grid Hz abnormality	X	X	X
Automatic PF/var response to grid voltage abnormality	X	X	X
Transformer temperature plant derate	X	X	X
Plant PF compensation for large not controlled generators	X	X	X
Generator automatic load profile priority	X		
Plant compensation for auto/local control mode		X	X
Black plant start procedure, soft magnetising plant transformers (1 to 31 gensets can be started at the same time)		X	X
Independent plant operation in case of multiple incoming connection points			X
Bus tie breaker handling		X	X
Plant load-dependent start/stop	X	X	X
Plant (group) priority selection: • Manual • Running hours • Fuel optimisation • Load profile	X	X	X
Safety stop (fail class = trip and stop)	X		
Asymmetric load sharing (LS)	X	X	X
Independent group power control		X	
Independent group PF control		X	

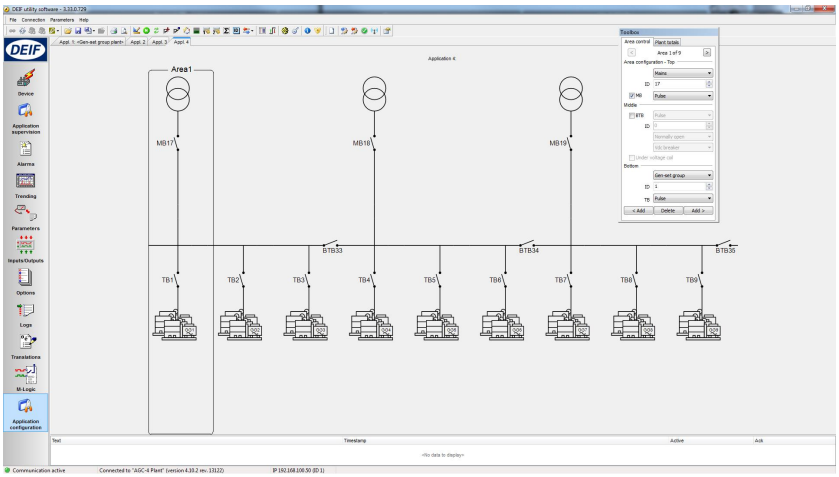
Plant management functions	Genset	Group	Plant
Independent group var control		X	
Global plant CAN flags		X	X
Integrated software comparability check	X	X	X

Table 1.9 Emulation

Emulation	Genset	Group	Plant
Available emulators: • Power/var/PF emulator • Motor emulator • Generator emulator • EIC data emulator • Digital input emulator • Analogue input emulator • Plant emulator • Mains voltage/frequency emulator • Load emulator	X	X	X

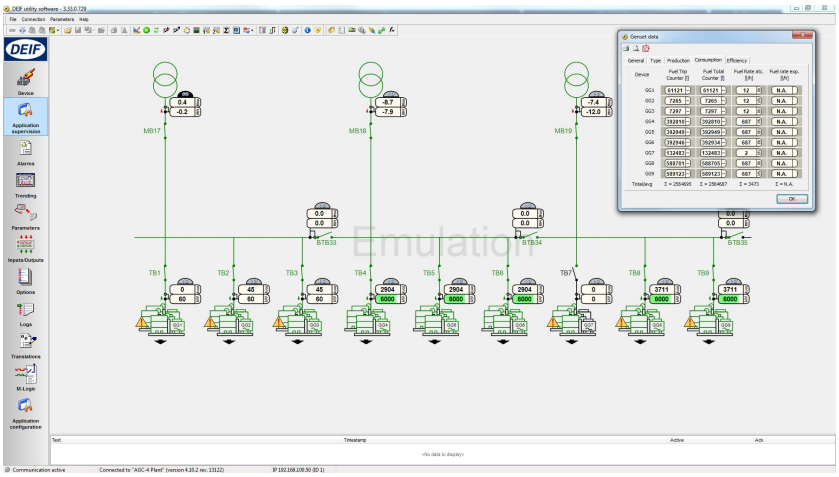
1.2.2 Easy configuration of single line diagrams

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



The application drawing is programmed to the controller, and the plant layout is then programmed.

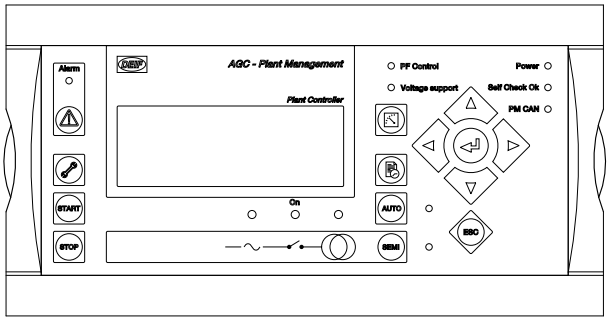
The configuration tool will automatically turn into a supervision module afterwards with the possibility to see summarised values from the plant.


DEIF utility software - 3.33.0.729
File Connection Parameters Help
DEIF
Device
Application supervision
Alarms
Trending
Parameters
Inputs/Outputs
Options
Logs
Translations
M-Logic
Application configuration
Emulation
MB17
MB18
MB19
BTB33
BTB34
BTB35
TB1
TB2
TB3
TB4
TB5
TB6
TB7
TB8
TB9
Text
Timestamp
Active
Ack
<No data to display>
Communication active
Connected to "ASC-4 Plant" (version 4.30.2 rev. 13122)
IP 192.168.100.50 (ID 1)

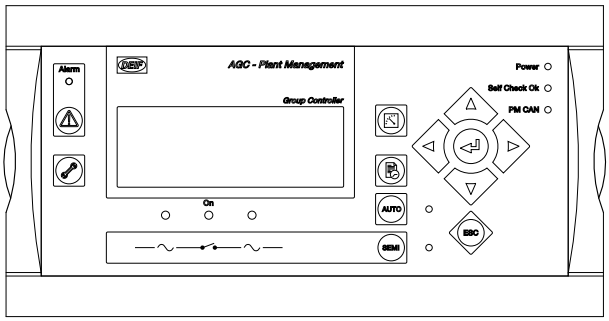
2. Display layout

2.1 Displays

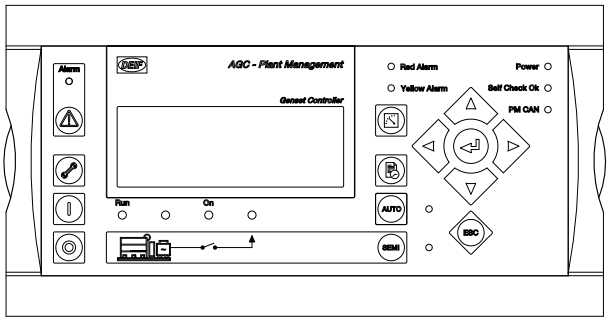
2.1.1 Display plant controller



2.1.2 Display group controller

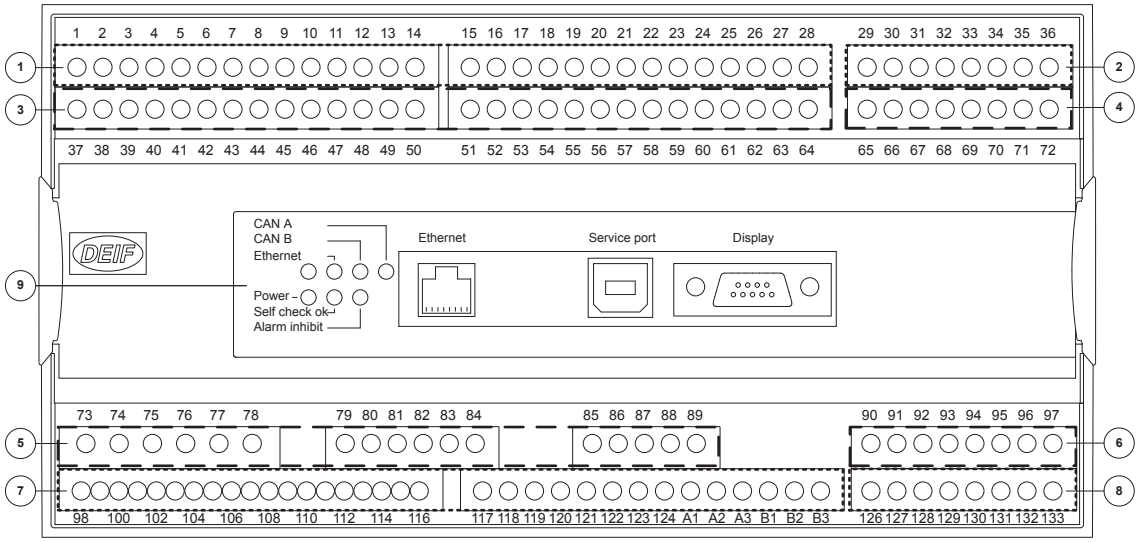


2.1.3 Display genset controller



3. Hardware and software options

3.1 Hardware options and slot number location



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

3.1.1 Plant controller

Slot #	Option/standard	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 or configurable open collector outputs); 5 × digital inputs
2		**Terminal 29-36, communication, inputs/outputs**
	H2	Modbus RTU (RS-485)
	H5.2	Plant Management communication, CAN port C
	H12.2	Plant Management communication, CAN port C and D
	M13.2	7 × binary inputs
	M14.2	4 × relay outputs
3		**Terminal 37-64, inputs/outputs/load sharing**
	Standard	13 × digital inputs; 4 × relay outputs
4		**Terminal 65-72, inputs/outputs**
	E1	2 × +/-25 mA outputs
	E2	2 × 0(4) to 20 mA outputs
	EF2	1 × +/-25 mA output; 1 × 0(4) to 20 mA output
	EF6	2 × +/-25 mA outputs; 1 × PWM output
	M13.4	7 × binary inputs

Slot #	Option/standard	Description
	M14.4	4 × relay outputs
5		**Terminal 73-89, AC measuring**
	Standard	3 × busbar voltage; 3 × busbar current; 3 × mains voltage
6		**Terminal 90-97, inputs/outputs**
	F1	2 × 0(4) to 20 mA outputs, transducer
	M13.6	7 × digital inputs
	M14.6	4 × relay outputs
	M15.6	4 × 4 to 20 mA inputs
	M16.6	4 × multi-inputs (4 to 20 mA or 0 to 5 V or Pt100)
7		**Terminal 98-125, engine I/F**
	Standard	8 to 36 V DC supply; 3 × multi-inputs; 7 × digital inputs; 4 × relay outputs Power management communication, CAN port A and B
8		**Terminal 126-133, inputs/outputs**
	M13.8	7 × digital inputs
	M14.8	4 × relay outputs
	M15.8	4 × 4 to 20 mA inputs
	M16.8	4 × multi-inputs (4 to 20 mA or 0 to 5 V or Pt100)
	H5.8	Plant Management communication, CAN port C
9		**LED I/F**
	Standard	- Modbus TCP/IP
Standard accessories		
		AOP-1
		DU-2

INFO
There can only be one hardware option in each slot. For example, it is not possible to select option H2 and option M13.2 at the same time, because both options require a PCB in slot #2.

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

3.1.2 Group controller

Slot #	Option/standard	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 or configurable open collector outputs); 5 × digital inputs
2		**Terminal 29-36, communication, inputs/outputs**
	H5.2	Plant Management communication, CAN port C
	H12.2	Plant Management communication, CAN port C and D
3		**Terminal 37-64, inputs/outputs/load sharing**
	Standard	13 × digital inputs; 4 × relay outputs
4		**Terminal 65-72, inputs/outputs**
	E1	2 × +/-25 mA outputs
	E2	2 × 0(4) to 20 mA outputs
	EF2	1 × +/-25 mA output; 1 × 0(4) to 20 mA output
	EF6	2 × +/-25 mA outputs; 1 × PWM output
	M13.4	7 × binary inputs
	M14.4	4 × relay outputs
5		**Terminal 73-89, AC measuring**
	Standard	3 × busbar (A) voltage; 3 × busbar (A) current; 3 × busbar (B) voltage
6		**Terminal 90-97, inputs/outputs**
	F1	2 × 0(4) to 20 mA outputs, transducer
	M13.6	7 × digital inputs
	M14.6	4 × relay outputs
	M15.6	4 × 4 to 20 mA inputs
	M16.6	4 × multi-inputs (4 to 20 mA or 0 to 5 V or Pt100)
7		**Terminal 98-125, engine I/F**
	Standard	8 to 36 V DC supply; 3 × multi-inputs; 7 × digital inputs; 4 × relay outputs Power management communication, CAN port A and B
8		**Terminal 126-133, inputs/outputs**
	M13.8	7 × digital inputs
	M14.8	4 × relay outputs
	M15.8	4 × 4 to 20 mA inputs
	M16.8	4 × multi-inputs (4 to 20 mA or 0 to 5 V or Pt100)
	H5.8	Plant Management communication, CAN port C

Slot #	Option/standard	Description
9		**LED I/F**
	Standard	- Modbus TCP/IP
Standard accessories		
		AOP-1
		DU-2

INFO
There can only be one hardware option in each slot. For example, it is not possible to select option H2 and option M13.2 at the same time, because both options require a PCB in slot #2.

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

3.1.3 Genset controller

Slot #	Option/standard	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 or configurable open collector outputs); 5 × digital inputs
2		**Terminal 29-36, communication, inputs/outputs**
	H2	Modbus RTU (RS-485)
	H5.2	J1939 engine communication and MTU (ADEC/MDEC), CAN port C
	H12.2	J1939 engine communication and MTU (ADEC/MDEC), CAN port C and D
	M13.2	7 × binary inputs
	M14.2	4 × relay outputs
3		**Terminal 37-64, inputs/outputs/load sharing**
	Standard	13 × digital inputs; 4 × relay outputs Active power load sharing; reactive power load sharing
4		**Terminal 65-72, governor, AVR, inputs/outputs**
	E1	2 × +/-25 mA outputs
	E2	2 × 0(4) to 20 mA outputs
	EF2	1 × +/-25 mA output; 1 × 0(4) to 20 mA output
	EF6	2 × +/-25 mA outputs; 1 × PWM output
	M13.4	7 × binary inputs
	M14.4	4 × relay outputs
5		**Terminal 73-89, AC measuring**

Slot #	Option/standard	Description
	Standard	3 × generator voltage; 3 × generator current; 3 × busbar/mains voltage
6		**Terminal 90-97, inputs/outputs**
	F1	2 × 0(4) to 20 mA outputs, transducer
	M13.6	7 × digital inputs
	M14.6	4 × relay outputs
	M15.6	4 × 4 to 20 mA inputs
	M16.6	4 × multi-inputs (4 to 20 mA or 0 to 5 V or Pt100)
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 Power management communication, CAN ports A and B
8		**Terminal 126-133, inputs/outputs**
	M13.8	7 × digital inputs
	M14.8	4 × relay outputs
	M15.8	4 × 4 to 20 mA inputs
	M16.8	4 × multi-inputs (4 to 20 mA or 0 to 5 V or Pt100)
	H5.8	J1939 engine communication and MTU (ADEC/MDEC), CAN port C
9		**LED I/F**
	Standard	- Modbus TCP/IP
Standard accessories		
		AOP-1
		DU-2

INFO
There can only be one hardware option in each slot. For example, it is not possible to select option H2 and option M13.2 at the same time, because both options require a PCB in slot #2.

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

3.2 Available software options

Option	Description	Slot no.	Option type	Note
A	**Loss of mains protection package**			
A1	Time-dependent under-voltage (27t) Under-voltage and reactive power low (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) Power-dependent reactive power (40) Inverse time over-current (51) (according to IEC 60255-151)		SW	
H	**Serial communication**			
H13	MTU ADEC M.501 + same engine types as H5.2 and H12.2	8	HW/SW	

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

4. Technical information

4.1 Specifications and dimensions

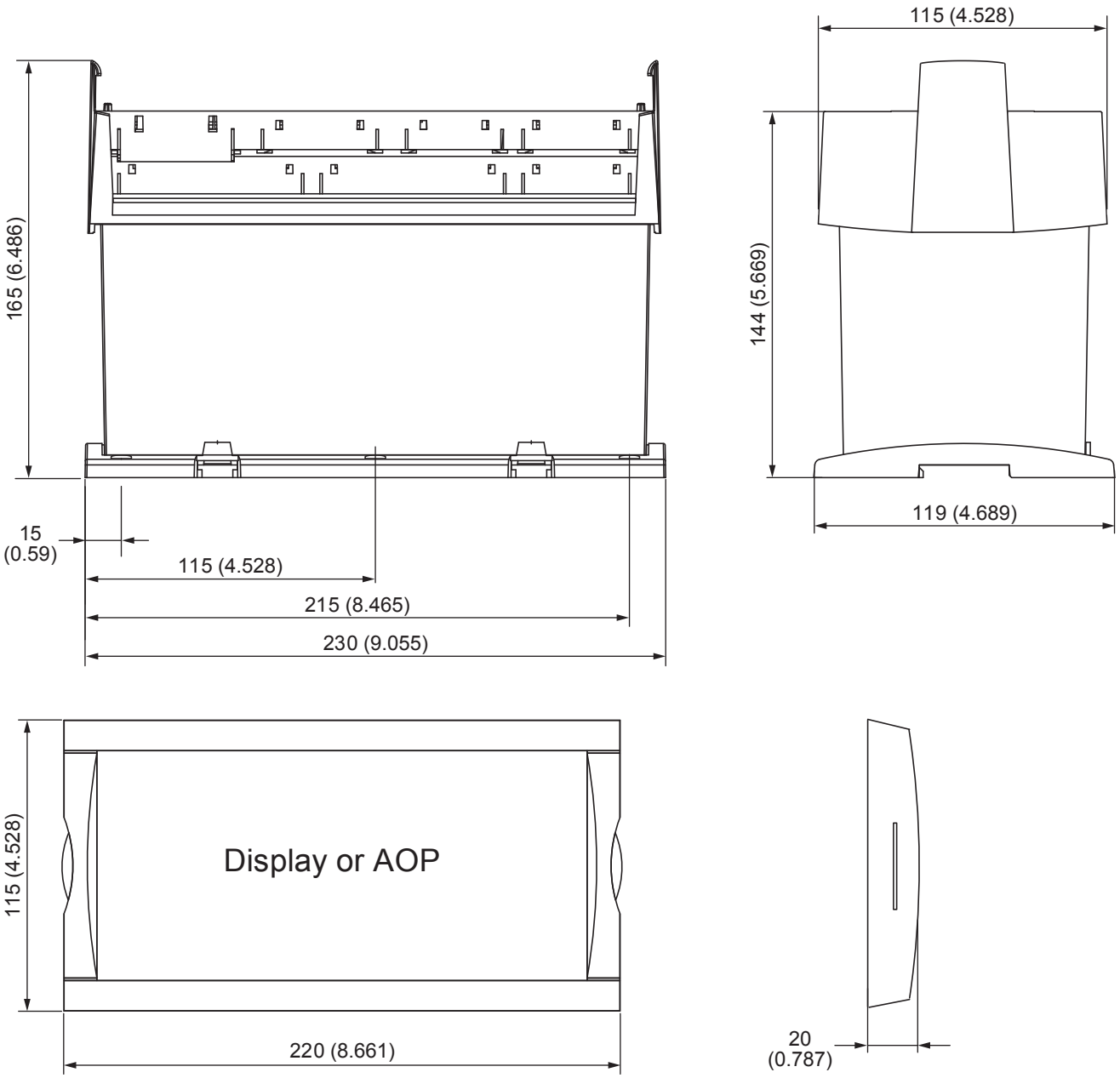
4.1.1 Technical specifications

Accuracy	Class 0.5 -25 to 15 to 30 to 60 °C Temperature coefficient: +/-0.2 % of full scale per 10 °C 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/EN 60688
Operating temperature	-25 to 60 °C (-13 to 140 °F) (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 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 OFF: <2 V DC, ON: 8 to 36 V DC Impedance: 4.7 kΩ
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 (terminal 20, 21, 22 (com))
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 58.1 Hz: 0.15 mm_{pp}. 58.1 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) 3 to 8.15 Hz: 15 mm_{pp}. 8.15 to 35 Hz: 2 g. To IEC 60255-21-3 Seismic (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	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
Protection	Unit: IP20. Display: IP40. (UL/cUL Listed: Type Complete Device, Open Type). To IEC/EN 60529
Governors and AVRs	Multi-line 2 interfaces to all governors and AVRs using analogue, relay control or CAN-based J1939 communication See interfacing guide at www.deif.com
Approvals	UL/cUL Listed to UL508
UL markings	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
Weight	Base unit: 1.6 kg (3.5 lbs.) Option J1/J4/J6/J7: 0.2 kg (0.4 lbs.) Option J2: 0.4 kg (0.9 lbs.) Option J8: 0.3 kg (0.58 lbs.) Display: 0.4 kg (0.9 lbs.)

4.1.2 Dimensions



5. Ordering information

5.1 Order specifications and disclaimer

5.1.1 Order specifications

Table 5.1 Variants

Type	Option	Option	Option	Option	Option

Table 5.2 Example: Plant controller

Type	Option	Option	Option	Option	Option
Plant controller	A1	C2	M15.6	M14.8	

Table 5.3 Example: Group controller

Type	Option	Option	Option	Option	Option
Group controller	C2	M15.6	M14.8		

Table 5.4 Example: Genset controller

Type	Option	Option	Option	Option	Option
Genset controller	M15.6	C2	M14.8		

5.1.2 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.