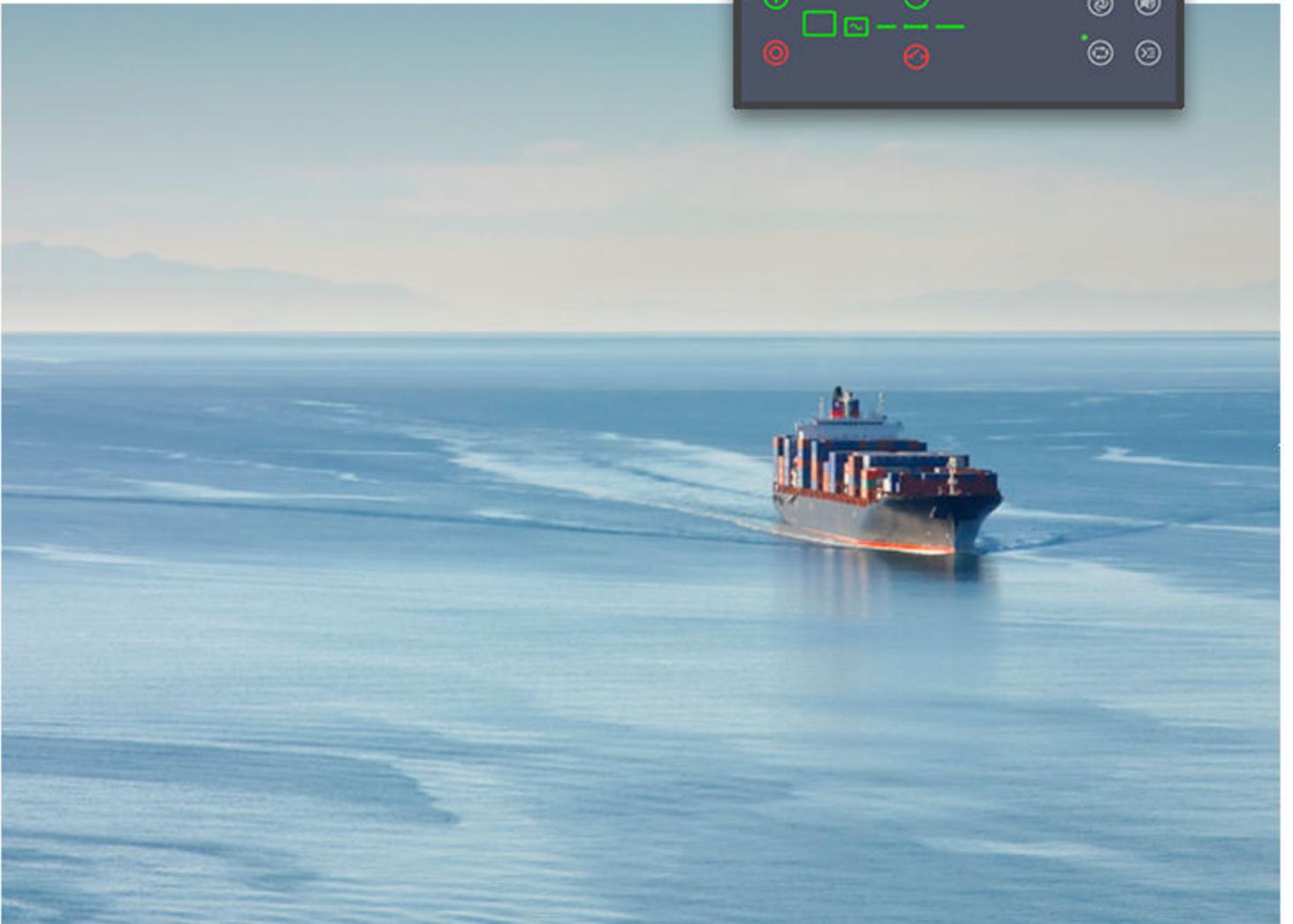


AGC 150

Marine Generator Stand-alone
Data sheet



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1. AGC 150 Marine stand-alone

1.1 About

The AGC 150 Marine Generator Stand-alone controller provides flexible protection and control for one genset in non-synchronising applications. The controller contains all the functions needed to protect and control the genset, the genset breaker, and also a tie/mains breaker.

The controller is a compact, all-in-one controller. Each controller contains all necessary 3-phase measuring circuits.

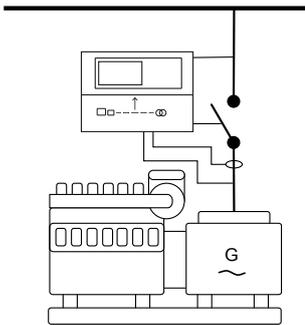
The values and alarms are shown on the LCD display screen, which is sunlight-readable. Operators can easily control the genset and breakers from the display unit. Alternatively, use the communication options to connect to an HMI/SCADA system.

1.2 Software version

This document is based on AGC 150 software version 1.35.

1.3 Single genset

Single genset

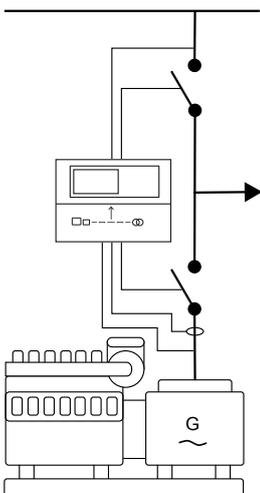


Single genset application is typically used in power plants that are isolated from other power generation systems.

NOTE You can disable breaker control.

1.4 Emergency genset

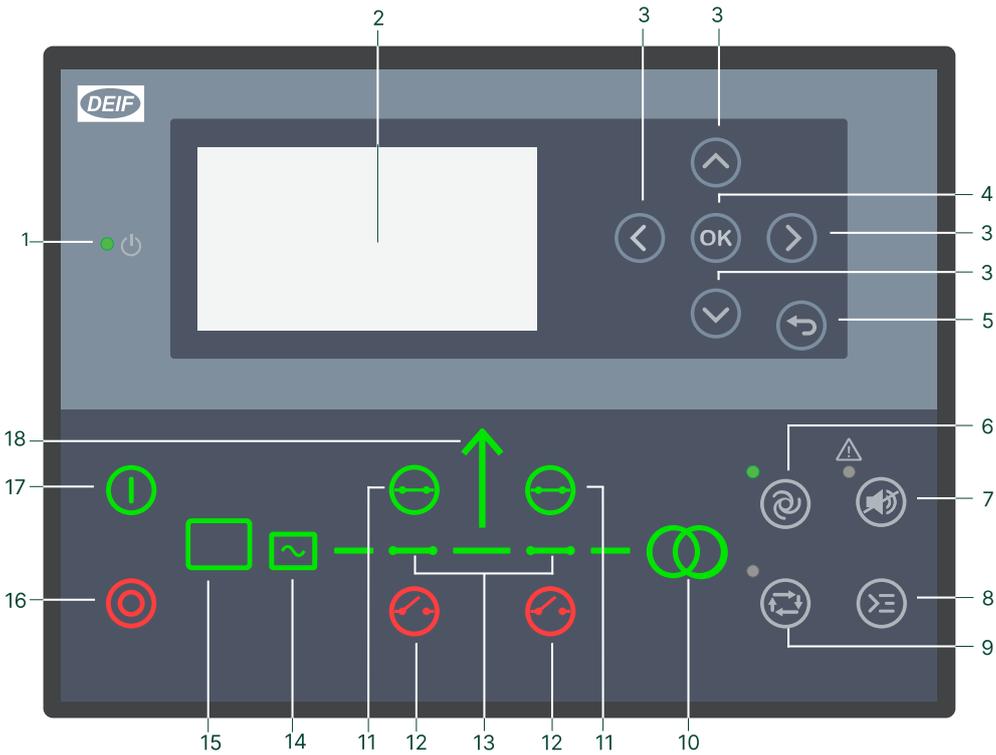
Emergency genset



If there is a significant loss of power or a total blackout in the main power generation system, the controller automatically changes the supply to the emergency generator. This makes sure that there is power during a failure and prevents damage to electrical equipment.

NOTE Alternatively, the breaker to the busbar can be externally controlled.

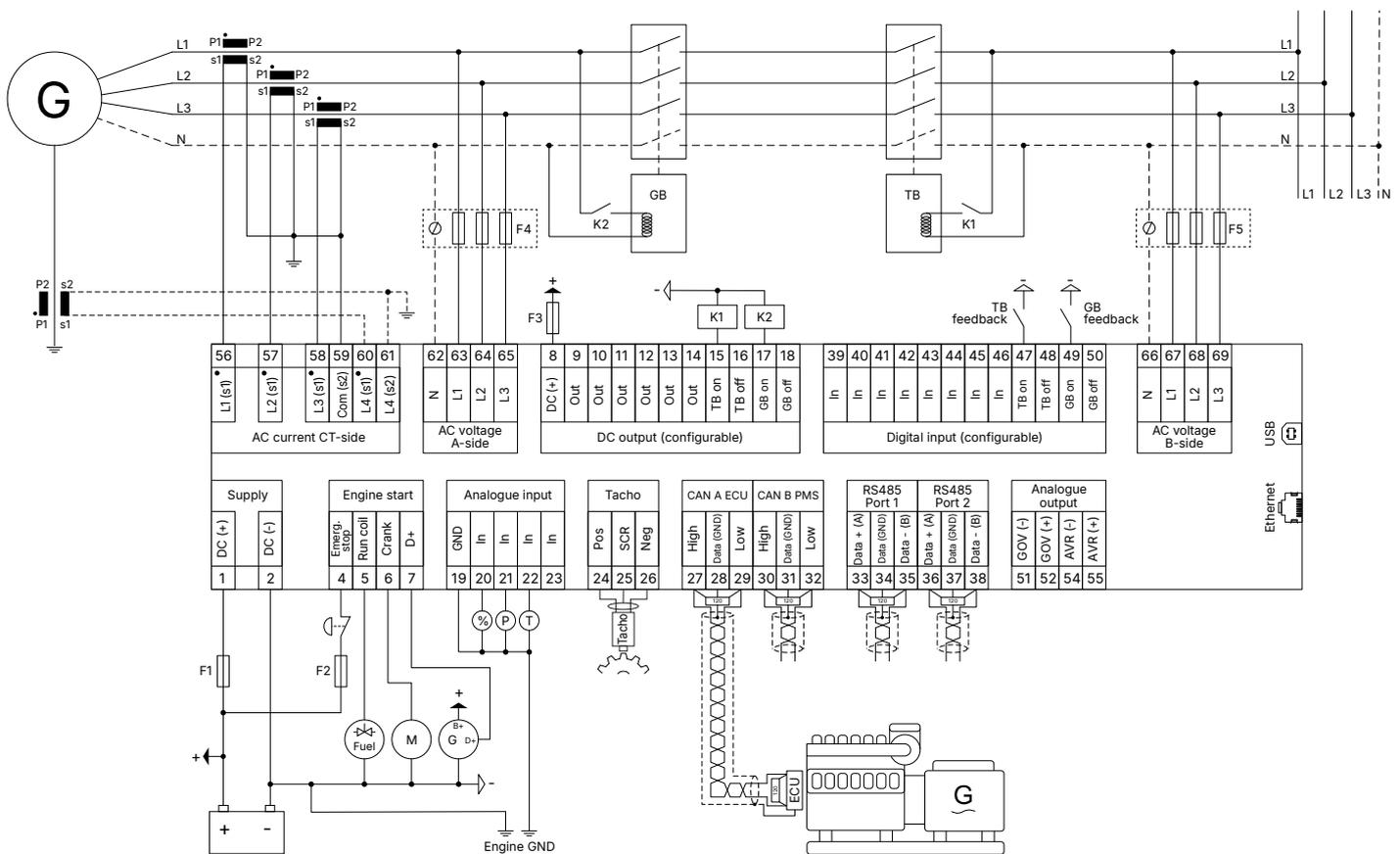
1.5 Display layout



No.	Name	Function
1	Power	Green: The controller power is ON. OFF: The controller power is OFF.
2	Display screen	Resolution: 240 x 128 px. Viewing area: 88.50 x 51.40 mm. Six lines, each with 25 characters.
3	Navigation	Move the selector up, down, left, and right on the screen.
4	OK	Go to the Menu system. Confirm the selection on the screen.
5	Back	Go to the previous page.
6	AUTO mode	Single genset (GEN): Use to switch to REMOTE mode. Remote equipment (digital inputs, Modbus commands, AOP-2 commands) controls the controller. The operator cannot control the controller from the display. Emergency genset (EDG): Use to switch to AUTO mode. If there is a blackout, the controller automatically starts and connects the genset. No operator actions are needed. The controller also automatically opens and closes the tie breaker (open transitions, since there is no synchronisation).
7	Silence horn	Stops an alarm horn (if configured) and enters the Alarm menu.
8	Shortcut menu	Access the Jump menu, Mode selection, Test, and Lamp test.
9	MANUAL mode	Single genset (GEN): Use to switch to LOCAL mode. The operator can use the display buttons to start and stop the engine as well as open and close the breaker. Remote equipment cannot start and stop the engine. Emergency genset (EDG): Use to switch to MANUAL mode. The operator or an external signal can start, stop, connect or disconnect the genset. The generator controller cannot automatically perform these actions.
10	Mains symbol	This controller does not use this. It is only lit during a lamp test.
11	Close breaker	Push to close the breaker.

No.	Name	Function
12	Open breaker	Push to open the breaker.
13	Breaker symbols	Green: Breaker is closed. Red: Breaker failure. OFF: The breaker is open.
14	Generator	Green: Generator voltage and frequency are OK. The controller can synchronise and close the breaker. Green flashing: The generator voltage and frequency are OK, but the V&Hz OK timer is still running. The controller cannot close the breaker. Red: The generator voltage or frequency is outside the V/Hz OK window.
15	Engine	Green: There is running feedback. Green flashing: The engine is getting ready. Red: The engine is not running, or there is no running feedback.
16	Stop	Single genset (GEN): Stops the genset if LOCAL mode is selected. Emergency genset (EDG): Stops the genset if MANUAL mode is selected.
17	Start	Single genset (GEN): Starts the genset if LOCAL mode is selected. Emergency genset (EDG): Starts the genset if MANUAL mode is selected.
18	Load symbol	Green: The supply voltage and frequency are OK. Red: Supply voltage/frequency failure.

1.6 Typical wiring for marine generator stand-alone controller

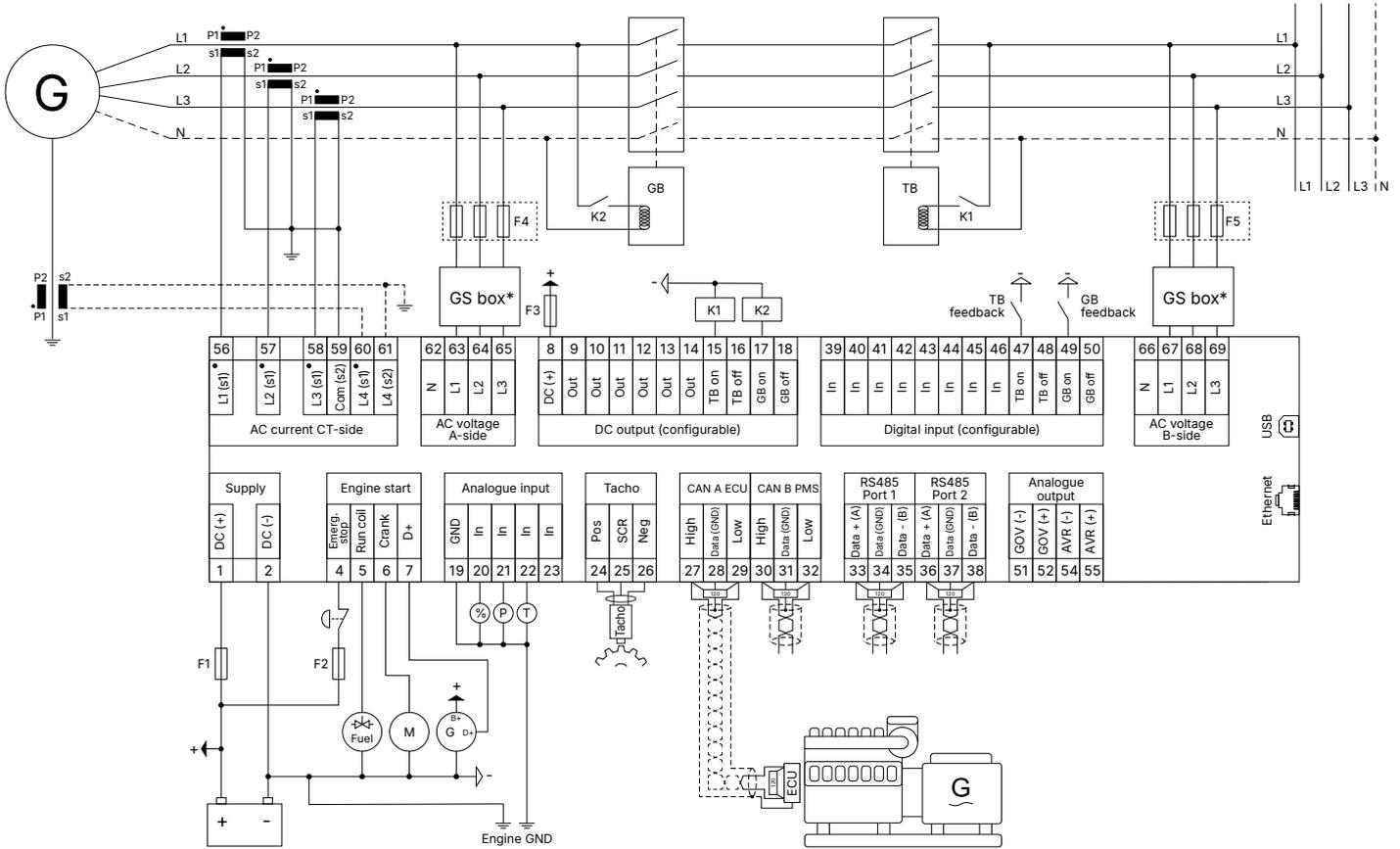


Fuses

- F1: 2 A DC max. time-delay fuse/MCB, c-curve

- F2: 6 A DC max. time-delay fuse/MCB, c-curve
- F3: 4 A DC max. time-delay fuse/MCB, b-curve
- F4, F5: 2 A AC max. time-delay fuse/MCB, c-curve

Typical wiring for marine generator stand-alone controller with GS-box for galvanic separation



NOTE * One GS-box provides galvanic separation for both sets of voltage measurements.

See previous diagram for fuse information.

1.7 Functions and features

1.7.1 Controller functions

Engine features
Start and stop sequences
Engine communication
Speed sensing using CAN, MPU or frequency
Tier 4 final support
Temperature-dependent cooling down
Time-based cooling down
Fuel usage monitoring
Maintenance alarms
Configurable crank and run coil

Other engine functions

Fuel pump monitoring, logic, and refill

Diesel exhaust fluid monitoring, logic, and refill

Generic fluid monitoring, logic, and refill

Protection packages

Engine protection

Communication with KWG ISO5 isolation monitor (CAN bus)

Operation modes

Single genset

Emergency genset

AC functions

4 sets of nominal settings

Select the AC configuration:

- 3-phase/3-wire
- 3-phase/4-wire
- 2-phase/3wire (L1/L2/N or L1/L3/N)
- 1-phase/2-wire L1

100 to 690 V AC (selectable)

CT -/1 or -/5 (selectable)

4th current measurement (select one)

- Busbar current (and power)
- Neutral current (1 × true RMS)
- Filtered neutral fault current (with 3rd harmonic filter)
- Reverse power
- Overload

Ground relay

General functions

Built-in test sequences
(Simple test and Full test)

20 lines of PLC logic (M-Logic)

Counters, including:

- Breaker operations
- kWh meter (day, week, month, total)
- kvarh meter (day, week, month, total)

Setting and parameter functions

Quick setup

User-defined permission level

Password-protected setup

Setting and parameter functions

Trending on USW

Event logs with password, up to 500 entries

Display and language functions

Supports multiple languages
(including Chinese, Russian, and other languages with special characters)

20 configurable graphical screens

Graphical display with six lines

Parameters can be changed on the display unit

3 engine function shortcuts

20 configurable shortcut buttons

5 configurable display screen "LED lamps" (on/off/blink)

Modbus functions

Modbus RS-485

Modbus TCP/IP

Configurable Modbus area

1.7.2 Supported ECUs and engines

The controller supports J1939 and can communicate with any engine that uses generic J1939. In addition, the controller can communicate with a wide range of ECUs and engines.



More information

See **iE 150 AGC 150 Engine communication** for a full list of supported ECUs and engines, along with detailed information for each protocol.

1.7.3 Exhaust after-treatment (Tier 4/Stage V)

The controller supports Tier 4 (Final)/Stage V requirements. It provides monitoring and control of the exhaust after-treatment system, as required by the standard.



More information

See the **Operator's manual** for more information.

1.7.4 Easy configuration with the utility software

Set up an application easily with a PC and the utility software.

You can also use the utility software to quickly configure the inputs, outputs, parameters, and settings.

1.8 Protections overview

AC protections	Alarms	ANSI	Operate time
Reverse power	2	32R	<200 ms
Fast over-current	2	50P	<40 ms
Over-current	4	50TD	<200 ms

AC protections	Alarms	ANSI	Operate time
Voltage dependent over-current	1	50V	
Over-voltage	2	59	<200 ms
Under-voltage	3	27P	<200 ms
Over-frequency	3	81O	<300 ms
Under-frequency	3	81U	<300 ms
Unbalance voltage	1	47	<200 ms
Unbalance current	1	46	<200 ms
Under-excitation or reactive power import	1	32RV	<200 ms
Over-excitation or reactive power export	1	32FV	<200 ms
Overload	5	32F	<200 ms
Filtered neutral fault inverse time over-current	1	50G	<100 ms
Neutral inverse time over-current	1	50N	<100 ms
Busbar over-voltage	3	59P	<50 ms
Busbar under-voltage	4	27P	<50 ms
Busbar over-frequency	3	81O	<50 ms
Busbar under-frequency	3	81U	<50 ms
Emergency stop	1		<200 ms
Low auxiliary supply	1	27DC	
High auxiliary supply	1	59DC	
Generator breaker external trip	1		
Tie breaker external trip	1		
Breaker open failure	1/breaker	52BF	
Breaker close failure	1/breaker	52BF	
Breaker position failure	1/breaker	52BF	
Phase sequence error	1	47	
Hz/V failure	1		
Not in remote	1		

Engine protections	Alarms	ANSI	Operate time
Overspeed	2	12	<400 ms
Crank failure	1	48	
Running feedback error	1	34	
MPU wire break	1	-	
Start failure	1	48	
Stop failure	1	-	
Stop coil, wire break alarm	1	-	
Engine heater	1	26	
Max. ventilation/radiator fan	1	-	
Fuel fill check	1	-	

2. Compatible products

2.1 Additional inputs and outputs

The controller uses CAN bus communication with these:

- **CIO 116** is a remote input expansion module. See www.deif.com/products/cio-116
- **CIO 208** is a remote output expansion module. See www.deif.com/products/cio-208
- **CIO 308** is a remote I/O module. See www.deif.com/products/cio-308
- **IOM 220** and **IOM 230** each have two analogue outputs. These can be used for general PID control. See www.deif.com/products/iom-200230

2.2 Additional operator panel, AOP-2

The controller uses CAN bus communication to the additional operator panel (AOP-2). Configure the controller using M-Logic. On the AOP-2, the operator can then:

- Use the buttons to send commands to the controller.
- See LEDs light up to show statuses and/or alarms.

You can configure and connect two AOP-2s if the controller has the premium software package.

2.3 Remote display: AGC 150

The remote display is an AGC 150 that only has a power supply and an Ethernet connection to an AGC 150 controller. The remote display allows the operator to see the controller's operating data, as well as operate the controller remotely.

See www.deif.com/products/agc-150-remote-display

2.4 Shutdown unit, SDU 104

The SDU 104 is a safety device for the protection of engines. The unit keeps the engine running if the main controller fails. The unit can also safely shut down the engine.

See www.deif.com/products/sdu-104

2.5 GS-box

The GS-box is a galvanic-separation unit that isolates AC-voltage measurement inputs in marine IT installations. It transfers the measured voltages through internal transformers to provide functional isolation between the electrical system and the controller inputs. This ensures stable and reliable voltage measurements in installations affected by earth-leakage currents or internal ground displacement.

For the controller, the GS-box is a compatible accessory for all controllers that use AC measurements. Use the GS-box when galvanic isolation is required between the controller and the generator or grid. It is especially relevant in IT-grounded marine systems or in installations where earth-leakage issues can affect measurement accuracy.



More information

For AGC 150 Marine controllers see [AGC 150 Stand-alone marine](#).

2.6 Other equipment

DEIF has a wide variety of other equipment that is compatible. Here are some examples:

- **Synchrosopes**
 - **CSQ-3** (www.deif.com/products/csq-3)
- **Battery chargers/power supplies**
 - **DBC-1** (www.deif.com/products/dbc-1)
- **Current transformers**
 - **ASK** (www.deif.com/products/ask-asr)
 - **KBU** (www.deif.com/products/kbu)
- **Transducers**
 - **MTR-4** (www.deif.com/products/mtr-4)

3. Technical specifications

3.1 Electrical specifications

Power supply	
Power supply range	Nominal voltage: 12 V DC or 24 V DC Operating range: 6.5 to 36 V DC
Voltage withstand	Reverse polarity
Power supply drop-out immunity	0 V DC for 50 ms (coming from min. 6 V DC)
Power supply load dump protection	Load dump protected according to ISO16750-2 test A
Power consumption	5 W typical 12 W max.
RTC clock	Time and date backup

Supply voltage monitoring	
Measuring range	0 V to 36 V DC Max. continuous operating voltage: 36 V DC
Resolution	0.1 V
Accuracy	±0.35 V

Voltage measurement	
Voltage range	Nominal range: 100 to 690 V phase-to-phase (above 2000 m derate to max. 480 V)
Voltage withstand	$U_n + 35\%$ continuously, $U_n + 45\%$ for 10 seconds Measuring range of nominal: 10 to 135 % Low range, nominal 100 to 260 V: 10 to 351 V AC phase-to-phase High range, nominal 261 to 690 V: 26 to 932 V AC phase-to-phase
Voltage accuracy*	±1 % of nominal within 10 to 75 Hz +1/-4 % of nominal within 3.5 to 10 Hz
Frequency range	3.5 to 75 Hz
Frequency accuracy*	±0.01 Hz within 60 to 135 % of nominal voltage ±0.05 Hz within 10 to 60 % of nominal voltage
Input impedance	4 MΩ/phase-to-ground, and 600 kΩ phase/neutral

NOTE * If a GS-box is used, then these measurements have a lower accuracy.

Current measurement	
Current range	Nominal: -/1 A and -/5 A Range: 2 to 300 %
Number of CT input	4
Max. measured current	3 A (-/1 A) 15 A (-/5 A)
Current withstand	7 A continuous 20 A for 10 seconds 40 A for 1 second
Current accuracy	From 10 to 75 Hz:

Current measurement

	<ul style="list-style-type: none">• ± 1 % of nominal from 2 to 100% current• ± 1 % of measured current from 100 to 300 % current From 3.5 to 10 Hz: <ul style="list-style-type: none">• $+1/-4$ % of nominal from 2 to 100 % current• $+1/-4$ % of measured current from 100 to 300 % current
Burden	Max. 0.5 VA

Power measurement

Accuracy power	± 1 % of nominal within 35 to 75 Hz
Accuracy power factor	± 1 % of nominal within 35 to 75 Hz

D+

Excitation current	210 mA, 12 V 105 mA, 24 V
Charging fail threshold	6 V

Tacho input

Voltage input range	$\pm 1 V_{\text{peak}}$ to $70 V_{\text{peak}}$
W	8 to 36 V
Frequency input range	10 to 10 kHz (max.)
Frequency measurement tolerance	1 % of reading

Digital inputs

Number of inputs	12 x digital inputs Negative switching
Maximum input voltage	+36 V DC with respect to plant supply negative
Minimum input voltage	-24 V DC with respect to plant supply negative
Current source (contact cleaning)	Initial 10 mA, continuous 2 mA

DC outputs

Number of 3 A outputs	2 x outputs (for fuel and crank) 15 A DC inrush and 3 A continuous, supply voltage 0 to 36 V DC Endurance tested according to UL/ULC6200:2019 1.ed: 24 V, 3 A, 100000 cycles (with an external freewheeling diode)
Number of 0.5 A outputs	10 x outputs 2 A DC inrush and 0.5 A continuous, supply voltage 4.5 to 36 V DC
Common	12/24 V DC

Analogue inputs

Number of inputs	4 x analogue inputs
Electrical range	Configurable as: <ul style="list-style-type: none">• Negative switching digital input• 0 V to 10 V sensor• 4 mA to 20 mA sensor

Analogue inputs

	<ul style="list-style-type: none">• 0 Ω to 2.5 kΩ sensor
Accuracy	Current: <ul style="list-style-type: none">• Accuracy: ± 20 μA ± 1.00 % rdg Voltage: <ul style="list-style-type: none">• Range: 0 to 10 V DC• Accuracy: ± 20 mV ± 1.00 % rdg RMI 2-wire LOW: <ul style="list-style-type: none">• Range: 0 to 800 Ω• Accuracy: ± 2 Ω ± 1.00 % rdg RMI 2-wire HIGH: <ul style="list-style-type: none">• Range: 0 to 2500 Ω• Accuracy: ± 5 Ω ± 1.00 % rdg

Display unit

Type	Graphical display screen (monochrome)
Resolution	240 x 128 pixels
Navigation	Five-key menu navigation
Log book	Data log and trending function
Language	Multi-language display

3.2 Environmental specifications

Operation conditions

Operating temperature (incl. display screen)	-40 to +70 $^{\circ}$ C (-40 to +158 $^{\circ}$ F)
Storage temperature (incl. display screen)	-40 to +85 $^{\circ}$ C (-40 to +185 $^{\circ}$ F)
Accuracy and temperature	Temperature coefficient: 0.2 % of full scale per 10 $^{\circ}$ C
Operating altitude	0 to 4000 m with derating
Operating humidity	Damp Heat Cyclic, 20/55 $^{\circ}$ C at 97 % relative humidity, 144 hours. To IEC 60255-1 Damp Heat Steady State, 40 $^{\circ}$ C at 93 % relative humidity, 240 hours. To IEC 60255-1
Change of temperature	70 to -40 $^{\circ}$ C, 1 $^{\circ}$ C / minute, 5 cycles. To IEC 60255-1
Protection degree	IEC/EN 60529 <ul style="list-style-type: none">• IP65 (front of module when installed into the control panel with the supplied sealing gasket)• IP20 on terminal side
Vibration	Response: <ul style="list-style-type: none">• 10 to 58.1 Hz, 0.15 mmpp• 58.1 to 150 Hz, 1 g. To IEC 60255-21-1 (Class 2) Endurance: <ul style="list-style-type: none">• 10 to 150 Hz, 2 g. To IEC 60255-21-1 (Class 2) Seismic vibration: <ul style="list-style-type: none">• 3 to 8.15 Hz, 15 mmpp• 8.15 to 35 Hz, 2 g. To IEC 60255-21-3 (Class 2)

Operation conditions	
Shock	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 Withstand (Class 2) 50 g, 11 ms, half sine. To IEC 60068-2-27, test Ea Tested with three impacts in each direction in three axes (total of 18 impacts per test)
Bump	20 g, 16 ms, half sine IEC 60255-21-2 (Class 2) Tested with 1000 impacts in each direction on three axes (total of 6000 impacts per test)
Galvanic separation	CAN port 2 (CAN B): 550 V, 50 Hz, 1 minute RS-485 port 1: 550 V, 50 Hz, 1 minute Ethernet: 550 V, 50 Hz, 1 minute Analogue output 51-52 (GOV): 550 V, 50 Hz, 1 minute Analogue output 54-55 (AVR): 3000 V, 50 Hz, 1 minute Note: No galvanic separation on CAN port 1 (CAN A) and RS-485 port 2
Safety	Installation CAT. III 600 V Pollution degree 2 IEC/EN 60255-27
Flammability	All plastic parts are self-extinguishing to UL94-V0
EMC	IEC/EN 60255-26

3.3 UL/cUL Listed

Requirements	
Installation	To be installed in accordance with the NEC (US) or the CEC (Canada)
Enclosure	A suitable type 1 (flat surface) enclosure is required Unventilated/ventilated with filters for controlled/pollution degree 2 environment
Mounting	Flat surface mounting
Connections	Use 90 °C copper conductors only
Wire size	AWG 30-12
Terminals	Tightening torque: 5-7 lb-in.
Current transformers	Use Listed or Recognized isolating current transformers
Communication circuits	Only connect to communication circuits of a listed system/equipment

3.4 Communication

Communication	
CAN A	You can connect these in a daisy chain (and operate them at the same time): <ul style="list-style-type: none"> • Engine CAN Port • CIO 116, CIO 208, and CIO 308 • IOM 220 and IOM 230 Data connection 2-wire + common, or 3-wire Not isolated External termination required (120 Ω + matching cable) DEIF engine specification (J1939 + CANopen)
CAN B	Used for: AOP-2 Data connection 2-wire + common, or 3-wire Isolated External termination required (120 Ω + matching cable)

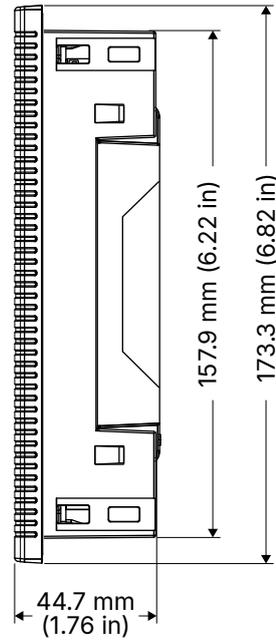
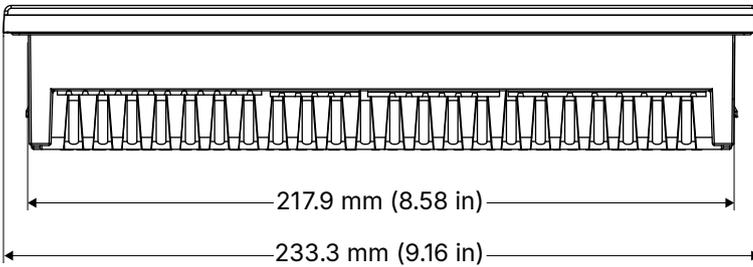
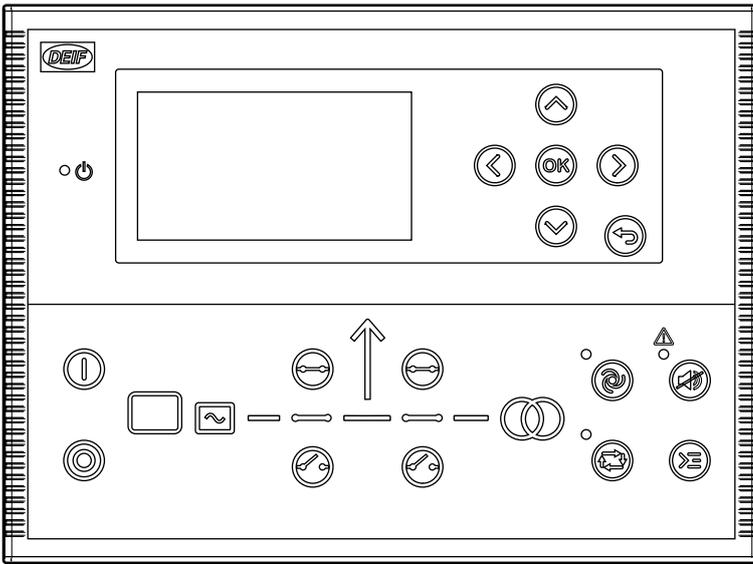
Communication	
	PMS 125 kbit and 250 kbit
RS-485 Port 1	Used for: Modbus RTU, PLC, SCADA, Remote monitoring (Insight) Data connection 2-wire + common, or 3-wire Isolated External termination required (120 Ω + matching cable) 9600 to 115200
RS-485 Port 2	Used for: Modbus RTU, PLC, SCADA, Remote monitoring (Insight) Data connection 2-wire + common, or 3-wire Not isolated External termination required (120 Ω + matching cable) 9600 to 115200
RJ45 Ethernet	Used for: <ul style="list-style-type: none"> • Modbus to PLC, SCADA, and so on • NTP time synchronisation with NTP servers • PC utility software Isolated Auto detecting 10/100 Mbit Ethernet port
USB	Service port (USB-B)

3.5 Approvals

Standards
CE
UL/ULC Listed to UL6200:2019 1 st edition controllers for use in Power Production

NOTE Refer to www.deif.com for the most recent approvals.

3.6 Dimensions and weight



Dimensions and weight

Dimensions	Length: 233.3 mm (9.16 in) Height: 173.3 mm (6.82 in) Depth: 44.7 mm (1.76 in)
Panel cutout	Length: 218.5 mm (8.60 in) Height: 158.5 mm (6.24 in) Tolerance: ± 0.3 mm (0.01 in)
Max. panel thickness	4.5 mm (0.18 in)
Mounting	UL/cUL Listed: Type complete device, open type 1 UL/cUL Listed: For use on a flat surface of a type 1 enclosure
Weight	0.79 kg

4. Legal information

4.1 Disclaimer

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