DATA SHEET

AGC 150

Stand-alone

4921240619C

1. AGC 150 Stand-alone

1.1 About

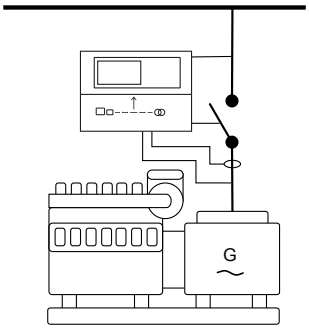
The AGC 150 Stand-alone (Genset) controller provides flexible protection and control for one genset in non-synchronising applications. The controller contains all the functions needed to protect and control the genset, the genset breaker, and also a mains breaker.

The AGC 150 is a compact, all-in-one controller. Each AGC 150 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 Stand-alone controller applications

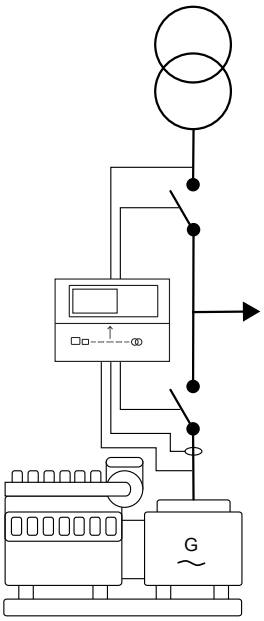
Island mode



Island mode operation is typically used in power plants that are isolated from the national (or local) electricity distribution network. Stand-alone generators not connected to the electricity grid.

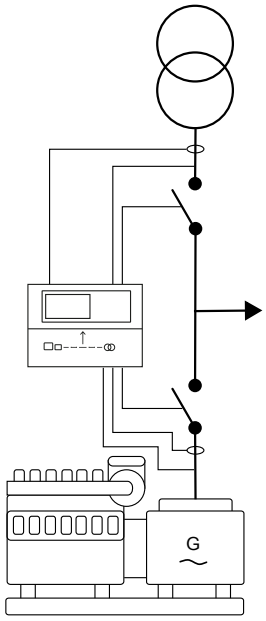
NOTE For the AGC 150 Stand-alone controller, you can disable breaker control.

Automatic mains failure (AMF)



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

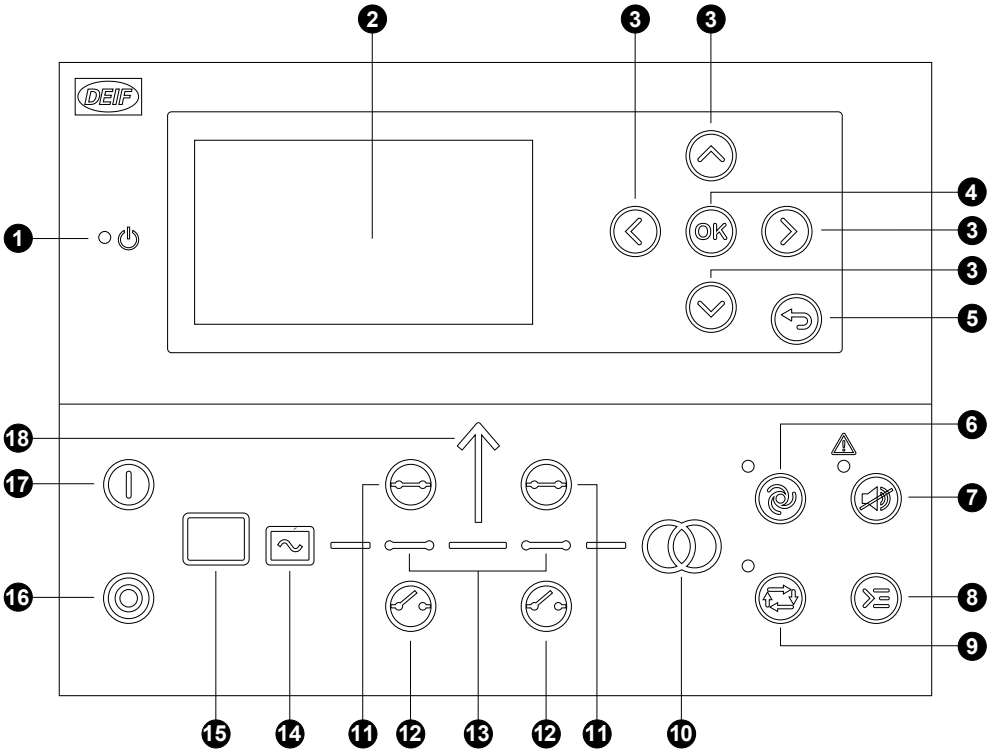
Load take-over



Plant mode where the load is moved from mains to generator, for example, during peak demand periods or periods with a risk of power outages.

NOTE Alternatively, these applications can have an externally controlled mains breaker.

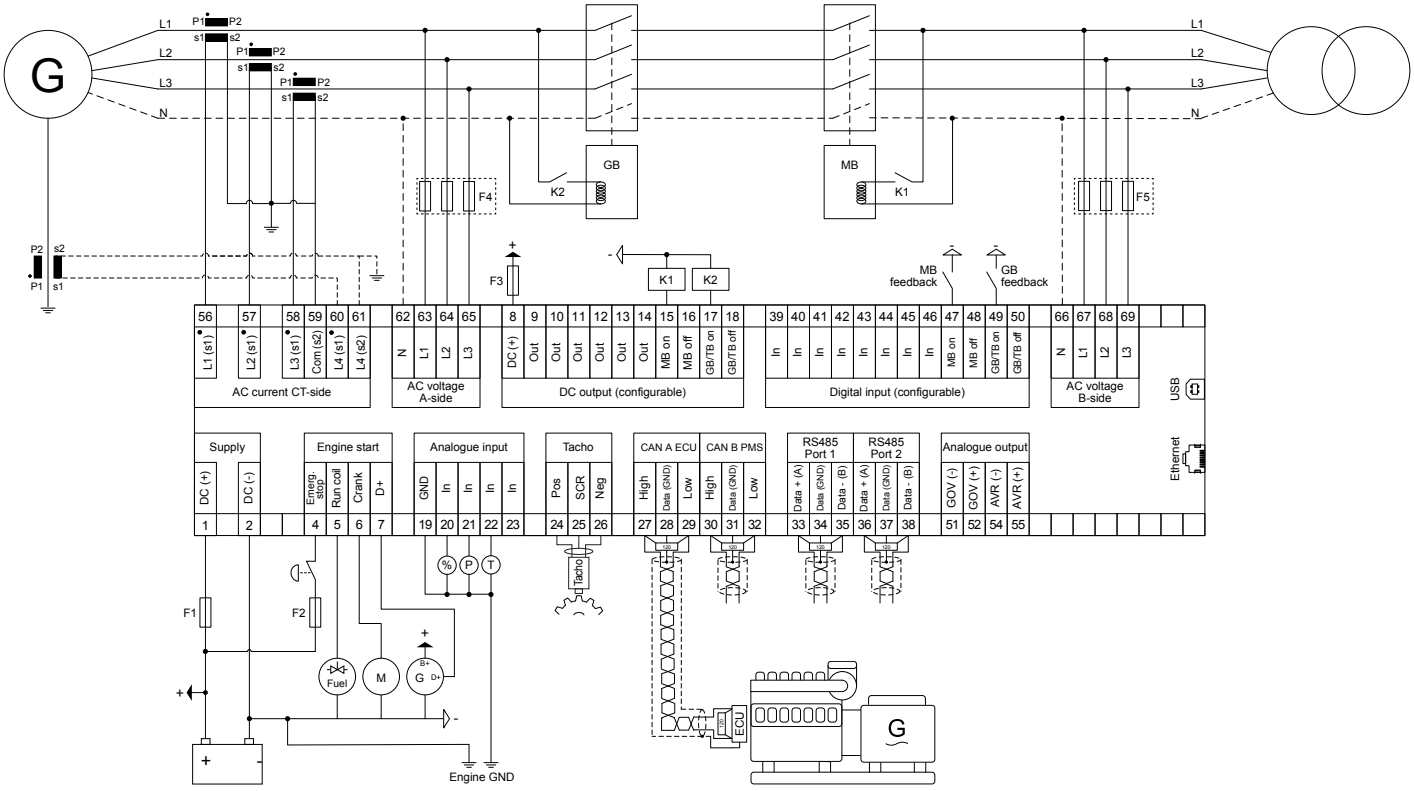
1.3 Display, buttons and LEDs



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.

No.	Name	Function
4	OK	Go to the Menu system. Confirm the selection on the screen.
5	Back	Go to the previous page.
6	AUTO mode	The controller automatically starts and stops (and connects and disconnects) the genset. No operator actions are needed. The controller also automatically opens and closes the mains breaker (open transitions, since there is no synchronisation).
7	Silence horn	Turns off an alarm horn (if configured) and enters the Alarm menu.
8	Shortcut menu	Access the Jump menu, Mode selection, Test, Lamp test
9	SEMI-AUTO mode	The controller cannot automatically start, stop, connect or disconnect the genset, or open and close the mains breaker. The operator or an external signal can start, stop, connect or disconnect the genset, or open or close the mains breaker.
10	Mains symbol	Green: Mains voltage and frequency are OK. The controller can close the breaker. Red: Mains failure.
11	Close breaker	Push to close the breaker.
12	Open breaker	Push to open the breaker.
13	Breaker symbols	Green: Breaker is closed. Red: Breaker failure.
14	Generator	Green: Generator voltage and frequency are OK. The controller can 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 is too low to measure.
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	Stops the genset if SEMI-AUTO or Manual is selected.
17	Start	Starts the genset if SEMI-AUTO or Manual is selected.
18	Load symbol	Green: The supply voltage and frequency are OK. Red: Supply voltage/frequency failure.

1.4 Typical wiring for stand-alone controller



Fuses

- F1: 2 A DC max. time-delay fuse/MCB, c-curve
- F2: 6 A AC 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

1.5 Functions and features

1.5.1 Stand-alone 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
Fuel pump logics
Maintenance alarms
Configurable crank and run coil

Other engine functions
Fuel usage monitoring
Fuel pump logic and refill
Diesel exhaust fluid monitoring
Diesel exhaust fluid logic and refill
Generic fluid monitoring
Generic fluid logic and refill

Protection packages
Engine protection
Communication with KWG ISO5 isolation monitor (CAN bus)

Operation modes
Island mode
AMF mode
Load take-over

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) • Mains current (and power) • Neutral current (1 × true RMS) • Ground current (with 3rd harmonic filter)
Ground relay

4th current transformer measurement	Alarms
High current alarms	2
High reverse alarms	2
High power alarms	2

General functions
Built-in test sequences (Simple test, Load test, Full test, and Battery test)
20 lines of PLC logic (M-Logic)
Counters, including: • Breaker operations • kWh meter (day, week, month, total)

General functions
• kvarh meter (day, week, month, total)

Setting and parameter functions
Quick setup
User-defined permission level
Password-protected setup
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

1.5.2 Supported controllers and engines

The AGC can communicate with the following ECUs and engines.

Manufacturer	ECU	Engines	Tier 4/Stage V	AGC parameter 7561
Generic J1939	Any ECU that uses J1939	Any engine that uses J1939	●	Generic J1939
Baudouin	WOODWARD PG+	-	-	Baudouin Gas
Baudouin	Wise 10B	-	-	Baudouin Wise10B
Baudouin	Wise 15	-	●	Baudouin Wise15
Bosch	EDC17			Bosch EDC17CV54TMTL
Caterpillar	ADEM3	C4.4, C6.6, C9, C15, C18, C32, 3500, 3600	-	Caterpillar ADEM3
Caterpillar	ADEM4		-	Caterpillar ADEM4
Caterpillar	ADEM3, ADEM4	C4.4, C6.6, C9, C15, C18, C32, 3500, 3600	-	Caterpillar Generic*
Cummins	CM 500	QSL, QSB5, QSX15 and 7, QSM11, QSK 19/23/50/60	-	Cummins CM500

Manufacturer	ECU	Engines	Tier 4/Stage V	AGC parameter 7561
Cummins	CM 558	QSL, QSB5, QSX15 and 7, QSM11, QSK 19/23/50/60	-	Cummins CM558
Cummins	CM 570	QSL, QSB5, QSX15 and 7, QSM11, QSK 19/23/50/60	-	Cummins CM570
Cummins	CM 850	QSL, QSB5, QSX15 and 7, QSM11, QSK 19/23/50/60	-	Cummins CM850
Cummins	CM 2150	QSL, QSB5, QSX15 and 7, QSM11, QSK 19/23/50/60	●	Cummins CM2150
Cummins	CM 2250	QSL, QSB5, QSX15 and 7, QSM11, QSK 19/23/50/60	●	Cummins CM2250
Cummins	CM 500, CM 558, CM 570, CM 850, CM 2150 and CM 2250	-	ECU-dependent	Cummins Generic*
Cummins	CM 2350		●	Cummins CM2350
Cummins	CM 2850		●	Cummins CM2850
Cummins	CM 2880		●	Cummins CM2880
Cummins	-	KTA19	-	Cummins KTA19
Detroit Diesel	DDEC III	Series 50, 60 and 2000	-	DDEC III
Detroit Diesel	DDEC IV	Series 50, 60 and 2000	-	DDEC IV
Detroit Diesel	DDEC III, DDEC IV	Series 50, 60 and 2000	-	DDEC Generic*
Deutz	EMR2	-	-	Deutz EMR 2
Deutz	EMR3	-	-	Deutz EMR 3
Deutz	EMR 2, EMR 3	-	-	Deutz EMR Generic*
Deutz	EMR4	-	-	Deutz EMR 4
Deutz	EMR5	-	-	Deutz EMR 5
Deutz	EMR4/EMR5 Stage V	-	●	Deutz EMR 5 Stage V
Doosan	EDC17	-	-	Doosan G2 EDC17
Doosan	MD1	-	●	Doosan MD1
Doosan			●	Doosan stage V
FPT industrial	EDC17	-	-	FPT EDC17CV41
FPT industrial	Bosch MD1	-	●	FPT stage V
Hatz Diesel	-	3/4H50 TICD	●	Hatz
Hatz Diesel	EDC17	-	-	Hatz EDC17
Isuzu	ECM	4JJ1X, 4JJ1T, 6WG1X FT-4	-	Isuzu
Iveco	CURSOR	-	-	Iveco CURSOR
Iveco	EDC7 (Bosch MS6.2),	-	-	Iveco EDC7
Iveco	NEF	-	-	Iveco NEF
Iveco	VECTOR 8	-	-	Iveco Vector8
Iveco	CURSOR, NEF, EDC7, VECTOR 8		●**	Iveco Generic*
Iveco	Bosch MD1	-	●	Iveco Stage V
JCB	-	ECOMAX DCM3.3+	●	JCB

Manufacturer	ECU	Engines	Tier 4/Stage V	AGC parameter 7561
Jichai	JC15D-ECU22	-	-	JC15D Weifu***
Jichai	JC15D WYS		-	JC15D WYS
Jichai	JC190		-	JC190
Jichai	JC15T JG		-	Jichai JC15T JG
John Deere	JDEC	PowerTech M, E and Plus	●	John Deere
John Deere	FOCUS controls (version 2.1)	-	●	John Deere Stage V
Kohler	ECU2-HD	KD62V12	●	Kohler KD62V12
Kubota	KORD3		●	Kubota Stage V
MAN	EDC17	-		MAN EDC17
MAN	EMC 2.0	-	-	MAN EMC Step 2.0
MAN	EMC 2.5	-	-	MAN EMC Step 2.5
MAN	EMC 2.0 and 2.5	-	-	MAN Generic*
MTU	MDEC, module M.201	-		MDEC 2000/4000 M.201
MTU	MDEC module M.302	Series 2000 and 4000	-	MDEC 2000/4000 M.302
MTU	MDEC module M.303	Series 2000 and 4000	-	MDEC 2000/4000 M.303
MTU	MDEC, module M.304	-		MDEC 2000/4000 M.304
MTU	ADEC	Series 2000 and 4000 (ECU7), MTU PX	-	MTU ADEC
MTU	ADEC, ECU7 without SAM module (software module 501)	Series 2000 and 4000	-	MTU ADEC module 501
MTU	ECU7 with SAM module	-	-	MTU ECU7 with SAM
MTU	ECU8	-	-	MTU ECU8
MTU	ECU9	-	●	MTU ECU9
MTU	J1939 Smart Connect, ECU8, ECU9	Series 1600	● (ECU9 or later)	MTU J1939 Smart Connect
Perkins	ADEM3	-	-	Perkins ADEM3
Perkins	ADEM4	-	-	Perkins ADEM4
Perkins	ADEM3 and ADEM4	Series 850, 1100, 1200, 1300, 2300, 2500 and 2800	-	Perkins Generic*
Perkins	EDC17	-	-	Perkins EDC17C49
Perkins	-	Series 400 and 1200	●	Perkins Stage V
Perkins	-	Series 400 Model IQ IR IW IY IF	●	Perkins StV 400
Perkins	-	Series 1200F Model MT, MU, MV, MW, BM and BN	●	Perkins StV 1200
Perkins	-	Series 1200J Model SU, VM	●	Perkins StV 120xJ (SU/VM)
PSI/Power Solutions	-	PSI/Power Solutions	●	PSI/Power Solutions
QiYao			-	QiYao Gas
Scania	EMS	-	-	Scania EMS
Scania	EMS S6 (KWP2000)	Dx9x, Dx12x, Dx16x	-	Scania EMS 2 S6

Manufacturer	ECU	Engines	Tier 4/Stage V	AGC parameter 7561
Scania	EMS 2 S8	DC9, DC13, DC16	•	Scania EMS 2 S8
Steyr	EDC17	-	-	Steyr EDC17
Volvo Penta	EDC3	-	-	Volvo Penta EDC3
Volvo Penta	EDC4	-	-	Volvo Penta EDC4
Volvo Penta	EDC III, EDC IV	TAD4x, TAD5x, TAD6x, TAD7x	-	Volvo Penta Generic*
Volvo Penta	EMS, EMS 2.0 to EMS2.3	D6, D7, D9, D12, D16 (GE and AUX variants only)	•	Volvo Penta EMS2
Volvo Penta	EMS2.3		•	Volvo Penta EMS2.3
Volvo Penta	EMS2.4	-	•	Volvo Penta EMS 2.4
Weichai	WOODWARD PG+	Diesel	•	Weichai Diesel
Weichai	WOODWARD PG+	Gas	•	Weichai Gas
Weichai	Wise 10B	-	•	Weichai Wise10B
Weichai	Wise 15	-	•	Weichai Wise15
Weichai			-	Weichai Baudouin E6 Gas
Xichai				Xichai Gas
YANMAR	EDC17	-	-	YANMAR EDC17
Yuchai United	YCGCU (Version 4.2)	Diesel	•	Yuchai United Diesel
Yuchai United	YCGCU (Version 4.2)	Gas	•	Yuchai United Gas
Yuchai United	YC-BCR	-	-	Yuchai YC-BCR
Yuchai United	YC-ECU	-	-	Yuchai YC-ECU

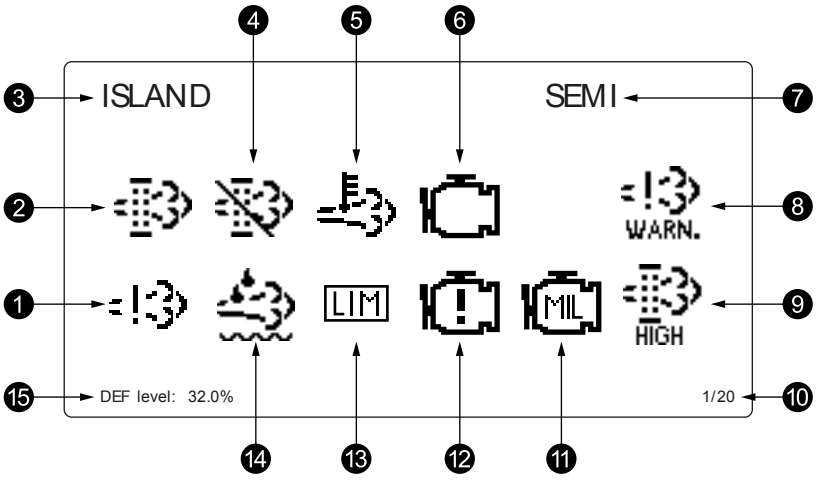
NOTE * Generic protocols are included for backward compatibility.
NOTE ** If supported by the ECU and engine.
NOTE *** Previously *Jichai*

Other EIC protocols: Contact DEIF.

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

AGC 150 supports Tier 4 (Final)/Stage V requirements. It provides monitoring and control of the exhaust after-treatment system, as required by the standard.

AGC 150 Tier 4/Stage V screen



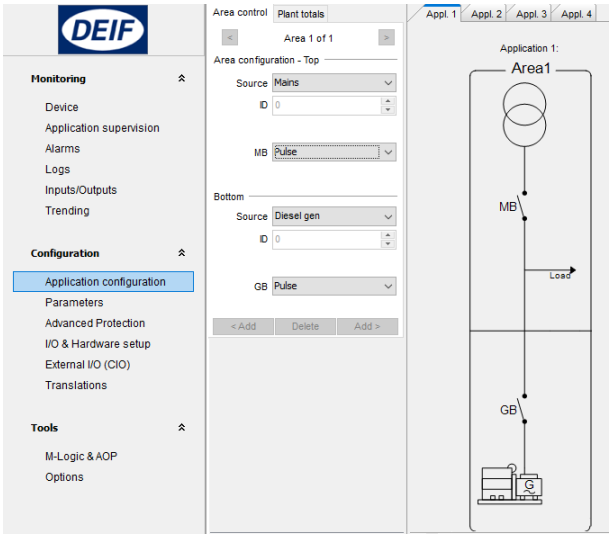
No.	Referent	Symbol	Description
1.	Engine emission system failure		Shows an emission failure or malfunction.
2.	Diesel Particle Filter (DPF)		Shows that a regeneration is needed.
3.	Application mode	-	-
4.	Diesel Particle Filter (DPF) Inhibit		Shows that regeneration is inhibited.
5.	High temperature - Regeneration		Shows a high temperature and regeneration is in process.
6.	Engine interface status		Shows an engine warning.
7.	Operation mode	-	-
8.	Engine emission system failure level		Shows the severity of an emission failure or malfunction.
9.	Diesel Particle Filter (DPF) level		Shows the severity of a needed regeneration.
10.	Page number	-	Shows the number of the View menu screen.
11.	Engine interface status		Shows a malfunction.
12.	Engine interface status		Shows an engine shutdown.
13.	LIMIT lamp		Only for MTU engines.
14.	Diesel Exhaust Fluid (DEF)		Shows the fluid tank level is low.
15.	Diesel Exhaust Fluid (DEF) % level	-	Shows the level (%) of the Diesel Exhaust Fluid.

NOTE Grey symbols show that communication is available for the referent. An engine type might not support all of the referents.

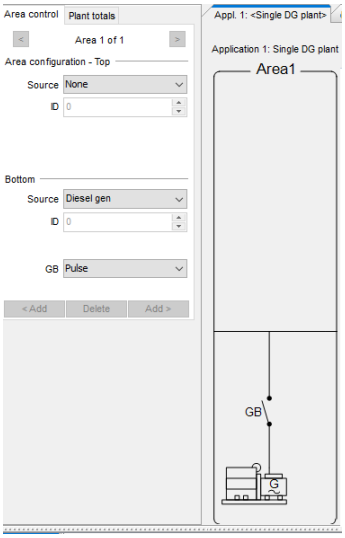
1.5.4 Easy configuration with the utility software

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

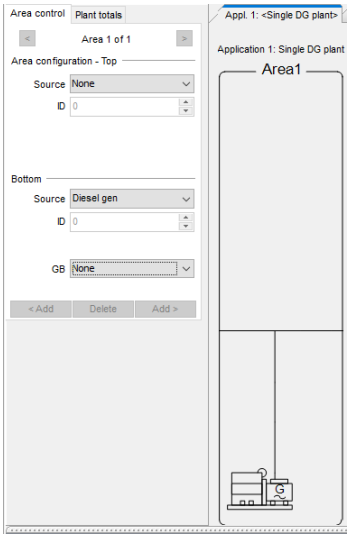
You can also use the utility software to quickly configure the inputs, outputs, and parameters.



Application with two breakers



Application with one breaker



Application with no breakers

1.6 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
Voltage-dependent over-current	1	51V	
Over-voltage	2	59	<200 ms
Under-voltage	3	27P	<200 ms
Over-frequency	3	81O	<300 ms
Under-frequency	3	81U	<300 ms
Unbalanced voltage	1	47	<200 ms
Unbalanced 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
Earth current	1	51G	<100 ms
Neutral current	1	51N	<100 ms
Mains over-voltage	3	59P	<50 ms
Mains under-voltage	4	27P	<50 ms
Mains over-frequency	3	81O	<50 ms
Mains under-frequency	3	81U	<50 ms
Emergency stop	1	1	<200 ms
Low auxiliary supply	1	27DC	
High auxiliary supply	1	59DC	
Generator breaker external trip	1	5	
Mains breaker external trip	1	5	
Breaker open failure	1/breaker	52BF	

AC protections	Alarms	ANSI	Operate time
Breaker close failure	1/breaker	52BF	
Breaker position failure	1/breaker	52BF	
Phase sequence error	1	47	
Hz/V failure	1	53	
Not in Auto	1	34	

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	48	
Stop coil, wire break alarm	1	5	
Engine heater	1	26	
Max. ventilation/radiator fan	1	-	
Fuel fill check	1	-	

2. Compatible products

2.1 Remote monitoring service: Insight

Insight is a responsive remote monitoring service. It includes real-time genset data, a customisable dashboard, GPS tracking, equipment and user management, email and/or SMS alerts, and cloud data management. See www.deif.com/products/insight

2.2 Additional inputs and outputs

AGC 150 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

2.3 Additional operator panel, AOP-2

The AGC 150 uses CAN bus communication to the additional operator panel (AOP-2). Configure the AGC 150 using M-Logic. On the AOP-2, the operator can then:

- Use the buttons to send commands to the AGC 150.
- See LEDs light up to show statuses and/or alarms.

You can configure and connect two AOP-2s if the AGC 150 has the premium software package.

2.4 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

2.5 Other equipment

DEIF has a wide variety of other equipment that is compatible with AGC 150. This includes synchroscopes, meters, transducers, current transformers, power supplies, and battery chargers. See www.deif.com

2.6 Controller types

If the controller has an extended or premium software package, you can change it to any AGC 150 or ASC 150 controller type. Select the controller type under `Basic settings > Controller settings > Type`.

Parameter	Setting	Controller	Controls
9101	DG unit	AGC 150 Generator AGC 150 Stand-alone	Genset
	Mains unit	AGC 150 Mains	Mains
	BTB unit	AGC 150 BTB	Bus tie breaker
	DG HYBRID unit	AGC 150 Hybrid	Genset-Solar hybrid
	ENGINE DRIVE unit	AGC 150 Engine drive	Engine drive
	Remote unit	-	Remote display
	ENGINE DRIVE MARINE unit	AGC 150 Engine drive Marine	Engine drive for marine use
	DG MARINE unit	AGC 150 Generator Marine	Stand-alone genset for marine use
	ASC 150 Storage	ASC 150 Storage	Energy storage system
	ATS unit	AGC 150 ATS	Automatic transfer switch

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

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: • ±1 % of nominal from 2 to 100% current • ±1 % of measured current from 100 to 300 % current From 3.5 to 10 Hz:

Current measurement	
	• +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	+/- 1 V_{peak} to 70 V_{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: • Negative switching digital input • 0 V to 10 V sensor • 4 mA to 20 mA sensor • 0 Ω to 2.5 kΩ sensor
Accuracy	Current:

Analogue inputs	
	• Accuracy: ±20 uA ±1.00 % rdg Voltage: • Range: 0 to 10 V DC • Accuracy: ±20 mV ±1.00 % rdg RMI 2-wire LOW: • Range: 0 to 800 Ω • Accuracy: ±2 Ω ±1.00 % rdg RMI 2-wire HIGH: • Range: 0 to 2500 Ω • Accuracy: ±5 Ω ±1.00 % rdg

Voltage regulator output	
Output types	Isolated DC voltage output
Voltage range	-10 to +10 V DC
Resolution in voltage mode	Better than 1 mV
Max Common Mode Voltage	±3 kV
Minimum load in voltage mode	500 Ω
Accuracy	±1 % of setting value

Speed governor output	
Output types	Isolated DC voltage output Isolated PWM output
Voltage range	-10 to +10 V DC
Resolution in voltage mode	Less than 1 mV
Max Common Mode Voltage	±550 V
Minimum load in voltage mode	500 Ω
PWM frequency range	1 to 2500 Hz ±25 Hz
PWM duty cycle resolution (0-100%)	12 bits (4096 steps)
PWM voltage range	1 to 10.5 V
Voltage accuracy	±1% of setting value

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 °C (-40 to +158 °F)
Storage temperature (incl. display screen)	-40 to +85 °C (-40 to +185 °F)
Accuracy and temperature	Temperature coefficient: 0.2 % of full scale per 10 °C
Operating altitude	0 to 4000 m with derating
Operating humidity	Damp Heat Cyclic, 20/55 °C at 97 % relative humidity, 144 hours. To IEC 60255-1 Damp Heat Steady State, 40 °C at 93 % relative humidity, 240 hours. To IEC 60255-1
Change of temperature	70 to -40 °C, 1 °C / minute, 5 cycles. To IEC 60255-1
Protection degree	IEC/EN 60529 • IP65 (front of module when installed into the control panel with the supplied sealing gasket) • IP20 on terminal side
Vibration	Response: • 10 to 58.1 Hz, 0.15 mmpp • 58.1 to 150 Hz, 1 *g*. To IEC 60255-21-1 (Class 2) Endurance: • 10 to 150 Hz, 2 *g*. To IEC 60255-21-1 (Class 2) Seismic vibration: • 3 to 8.15 Hz, 15 mmpp • 8.15 to 35 Hz, 2 *g*. To IEC 60255-21-3 (Class 2)
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: 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 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

Requirements	
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

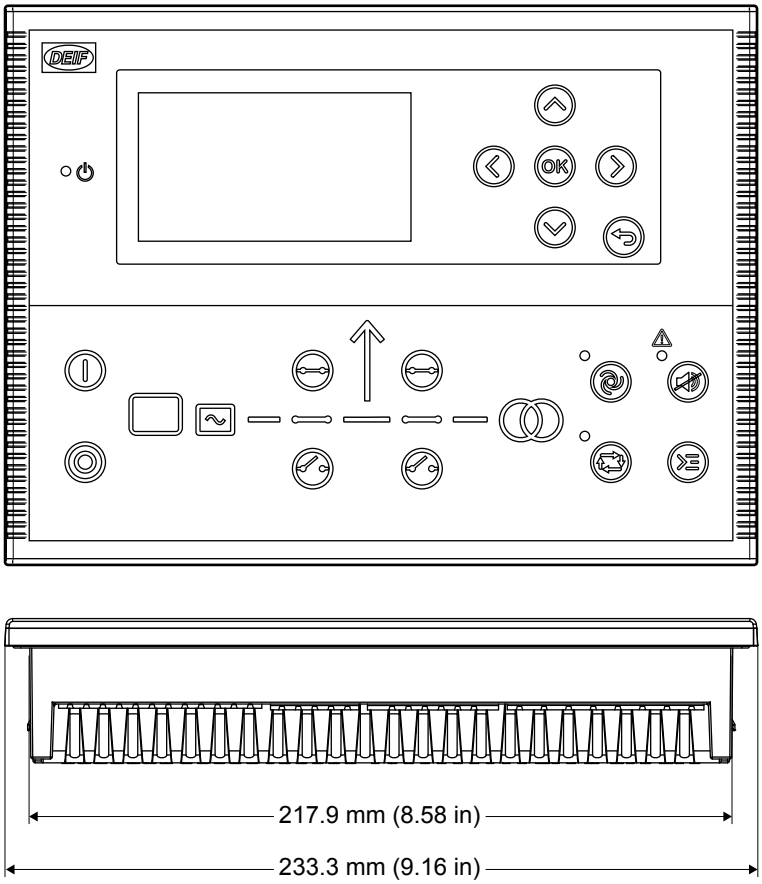
Communication	
CAN A	You can connect these in a daisy chain (and operate them at the same time): • Engine CAN Port • CIO 116, CIO 208, and CIO 308 Data connection 2 wire + common Not isolated External termination required (120 Ω + matching cable) DEIF engine specification (J1939 + CANopen)
CAN B	Used for: AOP-2 Data connection 2 wire + common Isolated External termination required (120 Ω + matching cable) PMS 125 kbit and 250 kbit
RS-485 Port 1	Used for: Modbus RTU, PLC, SCADA, Remote monitoring (Insight) Data connection 2-wire + common 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 Not isolated External termination required (120 Ω + matching cable) 9600 to 115200
RJ45 Ethernet	Used for: • Modbus to PLC, SCADA, and so on • NTP time synchronisation with NTP servers Isolated Auto detecting 10/100 Mbit Ethernet port
USB	Service port (USB-B)

3.5 Approvals

Standards
CE
UL/cUL Listed to UL/ULC6200:2019, 1. ed. controls for stationary engine gensets

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

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.

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4.1 Software version

This document is based on AGC 150 software version 1.14.