

Standard functions

Engine control

- Start preparation (preheating or prelubrication)
- Start/stop sequences with selectable no. of start attempts
- Fuel solenoid selection (coil type)
- Idle speed control
- Local or remote start/stop
- Stop sequence with cooling down
- Running speed detection selectable
 - Charger alternator input (W terminal)
 - Binary input

Generator monitoring

- 3-phase generator monitoring
 - Voltage/current/frequency/power/reactive power

Generator protection (ANSI)

- Over-/undervoltage (27/59)
- Over-/underfrequency (81)
- Overcurrent (51)
- Reverse power (32)
- Voltage unbalance (60)

Engine monitoring

- 3 configurable inputs
 - VDO or
 - 4-20mA from active transducer or
 - Binary with cable supervision
- 6 binary inputs, configurable
- RPM input, selectable
 - Magnetic pick-up
 - NPN or PNP pick-up
 - Tacho generator
 - Charger alternator W terminal

Clear text display

- 128 x 64 pixel backlight STN
- Graphic symbol messaging
- Clear text alarm messages
- Clear text diagnostics for both hardwired inputs and CANbus messages (J1939)
- Log book holding 150 log entries
- Real time clock for time and date

Application

The Generator Controller GC-1F is a microprocessor-based control unit containing all necessary functions for protection and control of a diesel engine. Furthermore, it contains a three-phase AC voltage measuring circuit. The unit is equipped with an LCD display presenting all values and alarms. GC-1F is a compact all-in-one unit designed for the following applications:

1. Automatic engine start/stop
2. Engine protection
3. Breaker control
4. Generator protection

Optional applications:

5. Automatic Mains Failure
6. CANbus J1939 engine communication

GC-1F automatically carries out a cyclical self test. If any errors are found, then the status relay output will deactivate (normally closed). In order to save battery power, the display can be set to switch off automatically after a given period of time.

The display will turn on again, if events or alarms take place, or if one of the push-buttons is activated.

Setup

Setup is easily done via a PC Windows® based utility software (password protected) using the RJ11/RS232 PC connection. The PC interface box RJ11/RS232 needed for this operation is optional equipment for GC-1F. The PC utility software offers additional features such as monitoring of all relevant information during commissioning, saving and downloading of settings and downloading of software updates. Furthermore, the most frequently used settings can be accessed via the display push-buttons (password protected).

Options

The options selected by the customer will be integrated in the standard GC-1F, hereby securing the same user interface unaffected by whether the application needs a basic or a more complex generator controller.

Terminals

Terminal	Technical data	Description
1	Power supply +	6...36V DC (UL/C-UL: 7.5...32.7V DC)
2	Power supply –	GND
3-4	Status out. Contact ratings 1A 24V DC/V AC Resistive	General status output for marine approvals
9	Common	Common for term. 10...15
10	Digital input	Start enable/configurable
11	Digital input	Remote start/stop/configurable
12	Digital input	Charge alternator D+ (running)/configurable
13	Digital input	Configurable
14	Digital input	Coolant temperature/configurable
15	Digital input	Oil pressure/configurable
19	Common	Common for emergency stop term. 20
20	Emergency stop and common for 21...23	Common for relays 1, 2 and 3 and input for emergency stop*
21	Relay output 21. Contact ratings 2A 30V DC/V AC Resistive (UL/C-UL: 1A Resistive)	Start prepare/configurable. Function NO
22	Relay output 22. Contact ratings 2A 30V DC/V AC Resistive (UL/C-UL: 1A Resistive)	Starter (crank)/configurable. Function NO
23	Relay output 23. Contact ratings 2A 30V DC/V AC Resistive (UL/C-UL: 1A Resistive)	Run coil/configurable. Function NO
24-25	Relay output 24. Contact ratings 8A 30V DC/V AC (UL/C-UL: 6A Resistive)	Horn/configurable. Function NO
26-27	Relay output 26. Contact ratings 8A 30V DC/V AC (UL/C-UL: 6A Resistive)	Alarm/configurable. Function NO
Multi-functional inputs		
5	Common	Common for term. 6...8
6	VDO1/4...20mA/binary input	Fuel level/configurable
7	VDO2/4...20mA/binary input	Oil pressure/configurable
8	VDO3/4...20mA/binary input	Water temp./configurable
Tacho RPM input		
16	RPM input	Magnetic pick-up/tacho generator
17	RPM-GND	Common for RPM input
18	RPM input W	Magnetic pick-up. PNP, NPN or charge alternator W terminal
3-phase generator voltage input		
33	Gen. voltage L1	Generator voltage and frequency
34	Gen. neutral	
35	Not used, must not be connected	
36	Gen. voltage L2	
37	Not used, must not be connected	
38	Gen. voltage L3	

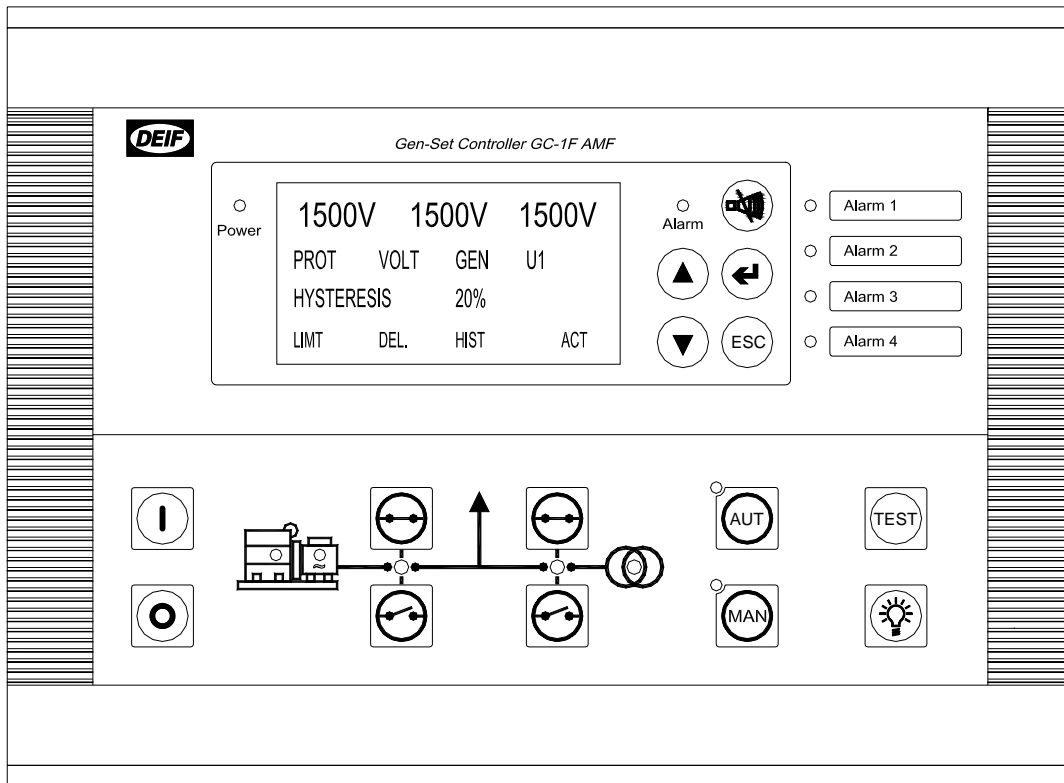
3-phase generator current input		
39	Gen. current L1, s1	Generator current
40	Gen. current L1, s2	
41	Gen. current L2, s1	
42	Gen. current L2, s2	
43	Gen. current L3, s1	
44	Gen. current L3, s2	
Optional 3-phase mains voltage inputs		
28	Mains voltage L1	
29	Mains voltage neutral	
30	Mains voltage L2	
31	Not used, must not be connected	
32	Mains voltage L3	
Breaker relays		
45	Relay R45. Contact ratings 2A 30V DC/250V AC (UL/C-UL: Contact ratings 2A 30V DC/30V AC)	Generator circuit breaker/configurable, function NO (normally open).
46	Relay R45	
Optional relay for closing mains breaker (option B3)		
47	Relay R47. Contact ratings 2A 30V DC/250V AC (UL/C-UL: Contact ratings 2A 30V DC/30V AC)	Mains circuit breaker/configurable, function NC (normally closed). Option B3.
48	Relay R47	
Optional Modbus RS485 interface (option H2)		
49	B (-)	Modbus RS485 RTU or ASCII
50	GND	
51	A (+)	
Optional CANbus #1 engine interface		
53	CAN-H	CAN J1939 engine communication
54	CAN-GND	
55	CAN-L	
Optional CANbus AOP-2 interface (option X4)		
57	CAN-H	CAN communication line to AOP-2
58	CAN-GND	
59	CAN-L	

Available options

Option	Description	Type	Note
B	Generator protection		
B3	Automatic Mains Failure - Generator and mains breaker control - Change-over (no synchronisation)	Hardware option	
G	Breaker		
G6	Generator breaker. Front layout with generator breaker	Hardware option	
H	Communication		
H2	Modbus RS485 RTU or ASCII	Hardware option	
H5	CANbus J1939 - Detroit Diesel DDEC - John Deere JDEC - Deutz EMR - Volvo Penta D12 AUX - Scania DEC - MDEC MTU	Hardware option	
J	Cables		
J5	PI-1 converter box kit (for PC connection)	Hardware option	
K	Documentation		
K1	Installation Instructions and Reference Handbook (hard copy)	Other	
K2	CD-ROM with complete documentation	Other	
L	Gasket for IP65	Hardware option	
X	Display		
X4	Additional operator panel (AOP-2): 16 configurable LEDs, 8 configurable buttons and 1 status relay. CANbus comm.	Hardware option	

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

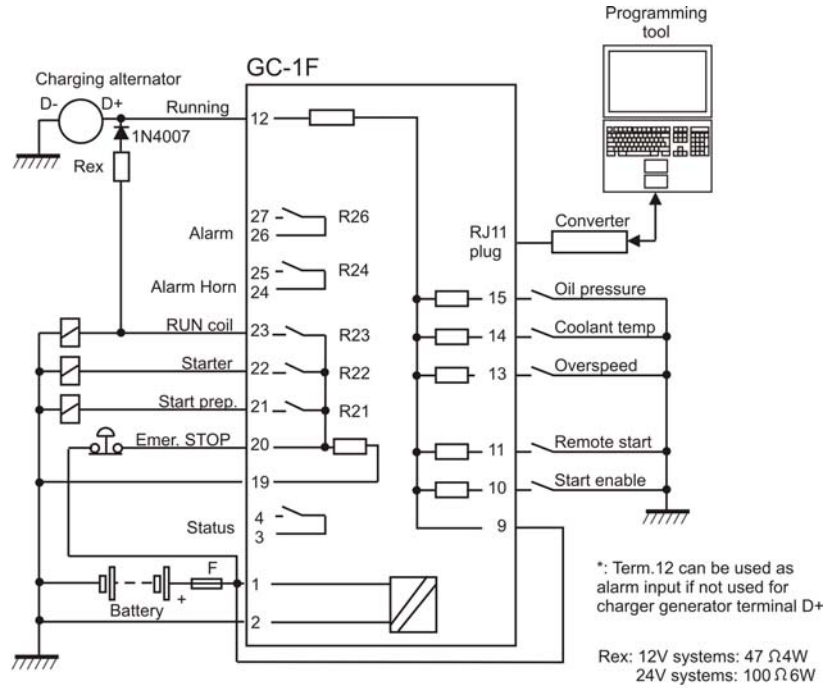
Option B3 display layout



Wiring, engine interface



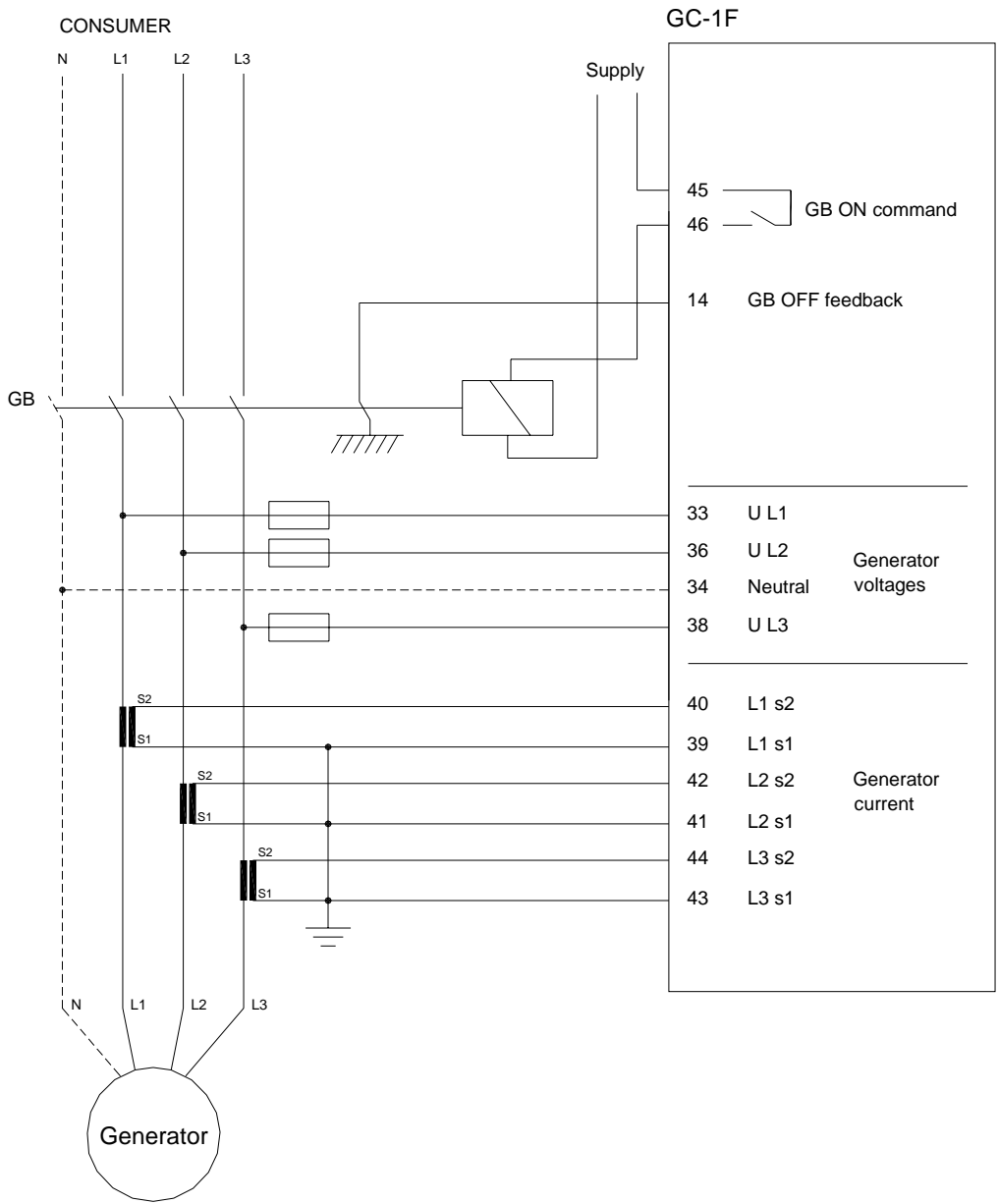
F: Fuse: Min. 2A slow-blow.



<p>Engine communication option H5</p>	<p>Modbus RTU option H2</p>	<p>CAN bus for AOP2 option X4</p>
<p>Multi-functional inputs VDO sensors</p>	<p>Multi-functional inputs 4-20 mA transmitters</p>	<p>Multi-functional inputs Binary input w. cable superv.</p> <p>R= 100 Ohm</p>
<p>Tacho input Magnetic pickup/ Tacho generator</p>	<p>Tacho input NPN/PNP pickup</p>	<p>Tacho input W input from charger alternator</p>

Wiring, AC interface

Connection of the 3-phase voltage and current



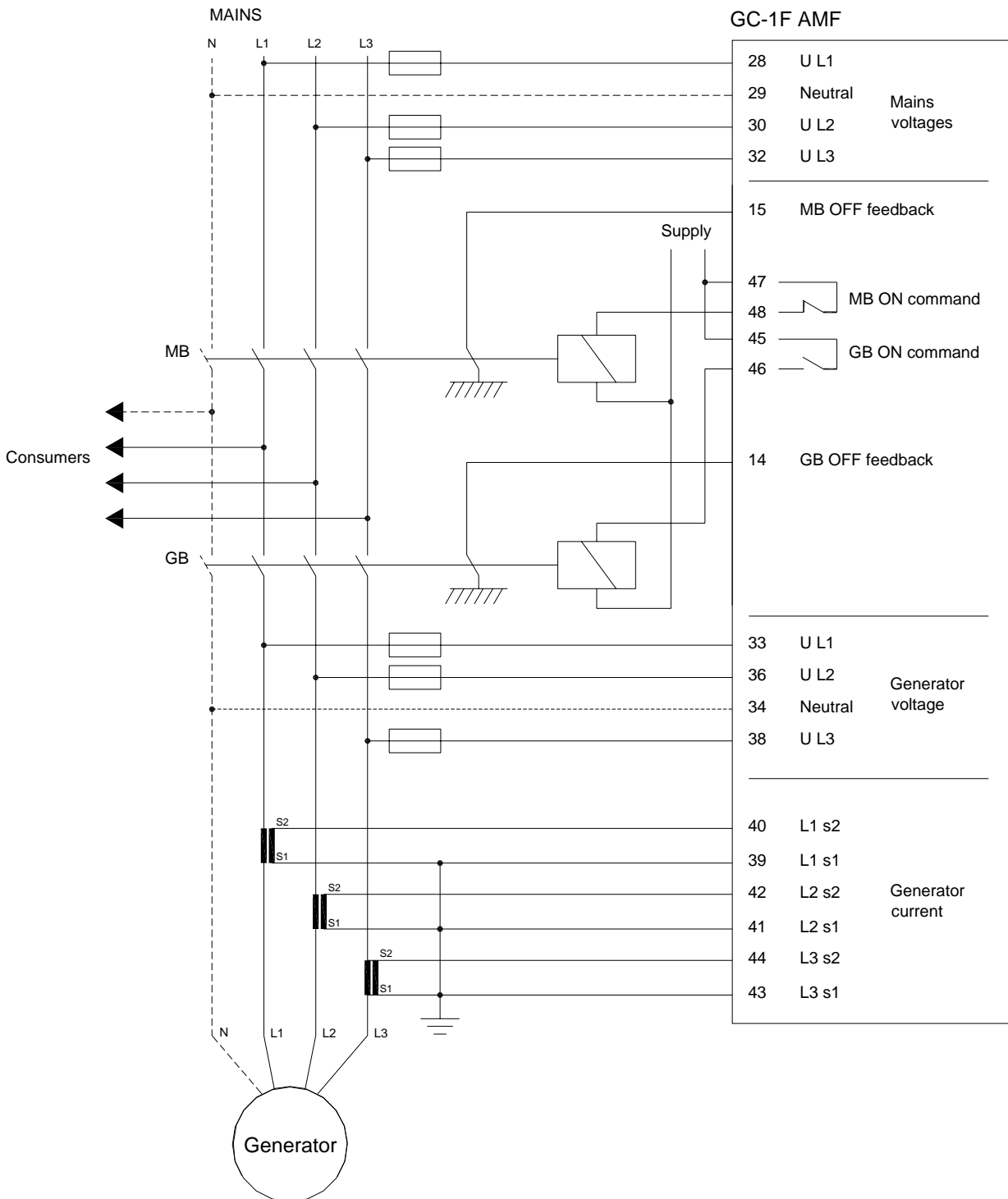
The AC current grounding can be made as required to s1 or s2.



GB: Use a contactor. The ON output from the GC-1F is a constant signal. Remember to use free-wheel diodes across the contactor coils, if DC voltage is used as supply for these.

Fuse for AC voltage: Max. 2A slow-blow.

Wiring, AMF (option B3)



The AC current grounding can be made as required to s1 or s2.



GB: Use a contactor. The ON output from the GC-1F is a constant signal. Remember to use free-wheel diodes across the contactor coils, if DC voltage is used as supply for these.

Fuse for AC voltage: Max. 2A slow-blow.

Technical specifications

Accuracy: Class 2.0
To EN 60688/IEC 688

Operating temp.: -20...70°C (-4...158°F)
(UL/C-UL: Max. 50°C ambient)

Storage temp.: -40...70°C (-40...158°F)

Measuring input voltage:
50...480V AC (+20%)
Phase to phase

Load: 1.5MΩ

Frequency: 30...70Hz

Measuring input current:
1A or 5A AC from current transformer

Consumpt. max.: 0.3 VA/phase

Pick-up input voltage:
2...70V peak

Frequency: 10-10000Hz

Aux. supply: 6-36V DC continuously
(UL/C-UL: 7.5...32.7V DC)
Max. 8W consumption

Passive binary in voltage:
Bi-directional optocoupler
6...36V DC

Impedance: 4.7kΩ

VDO inputs: Resistor inputs, internal 3V supply

Analogue input: From active transducer

Current: (0)4...20mA

Impedance: 50Ω

Active binary in internal voltage:
Dry contact inputs (see note)
3V DC supply, with cable supervision

Relay outputs:

Impedance: 240Ω ~ 16mA

3 relays: 30V DC/AC 2A
(UL/C-UL: 1A Resistive)

2 relays: 250V AC/30V DC 2A
(UL/C-UL: 30V DC/AC 2A Resistive)

2 relays: 30V DC/AC 8A
(UL/C-UL: 6A Resistive)

1 status relay: 24V DC 1A Resistive

Mounting: Panel mounted

Size: 160 x 220 mm (6.30" x 8.66")

Climate: Class HSE, to DIN 40040

Display: 128 x 64 pixel backlight STN

Safety: To EN 61010-1, UL508 and CSA22.2 No. 14-05
Installation category (over-voltage category) III, 300V, pollution degree 2

Protection: Front: IP52/NEMA type 1
(IP65/NEMA type 1 with gasket, option L)
Terminals: IP20/NEMA type 1
To IEC 529 and EN 60529

EMC/CE: To EN 61000-6-1/2/3/4
SS4631503 (PL4) and IEC 255-3

Material: All plastic materials are self-extinguishing acc. to UL94 (V1)

Plug connections: AC voltage/current inputs:
3.5 mm² (13 AWG) multi stranded
Other:
1.5 mm² (16 AWG) multi stranded

Tightening torque, min.:
AC voltage input: 0.5Nm (5-7lb-in)
Other: 0.5Nm (5-7lb-in)

PC connection: RS232 converter box (option J5)

Approval: CE & C-UL

UL approval:
AOP-2: Maximum ambient temperature: 60°C
Wiring: Use 60/75°C copper conductors only
Mounting: For use on a flat surface of type 1 (IP54) enclosure
Main disconnect must be provided by installer
Installation: To be installed in acc. with the NEC (US) or the CEC (Canada)

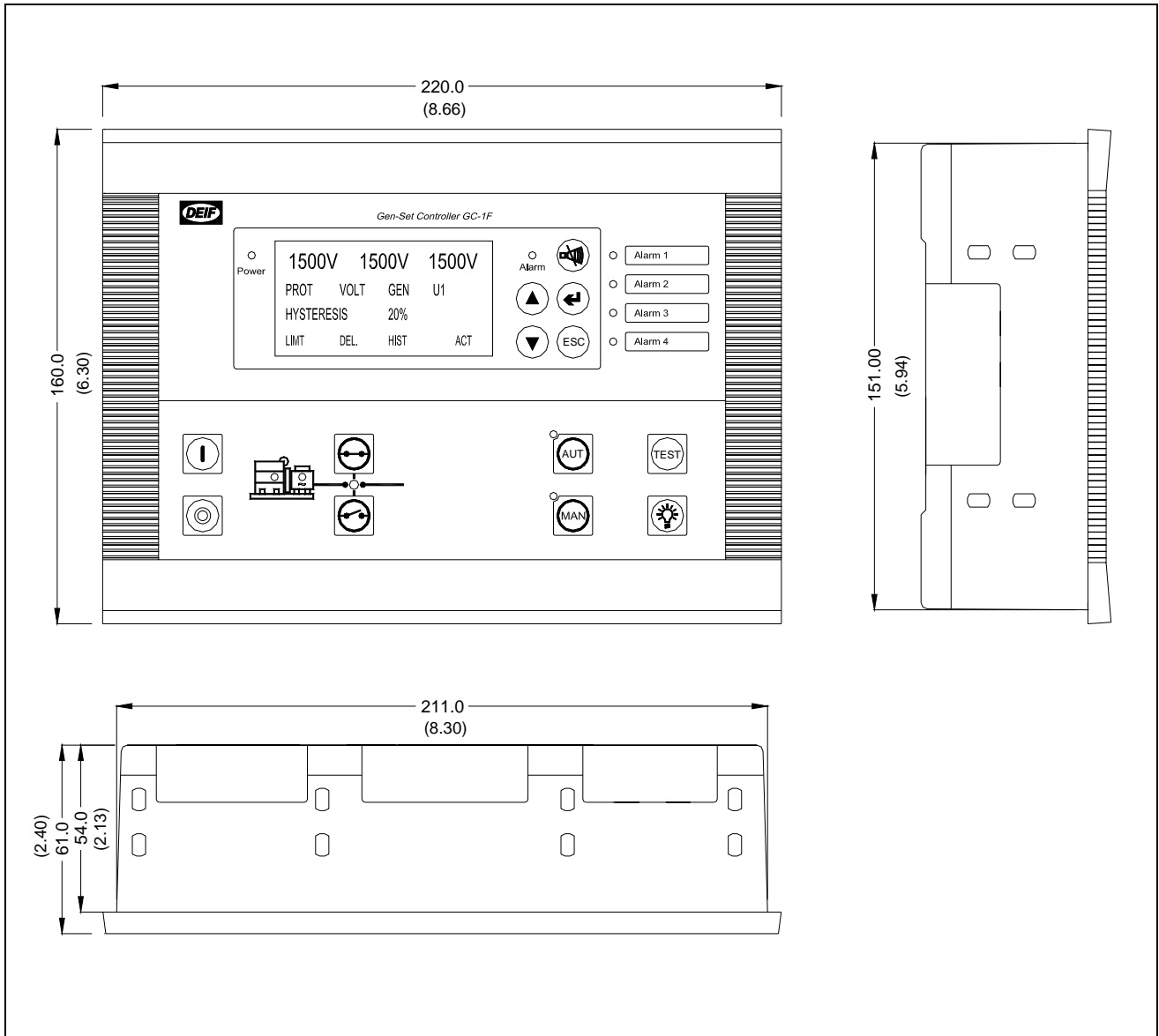
DC/DC converter for AOP-2:
Tightening torque: 0.5Nm (4.4lb-in)
Wire size: AWG 22-14

Weight: Approx. 0.9 kg (1.9 lbs)

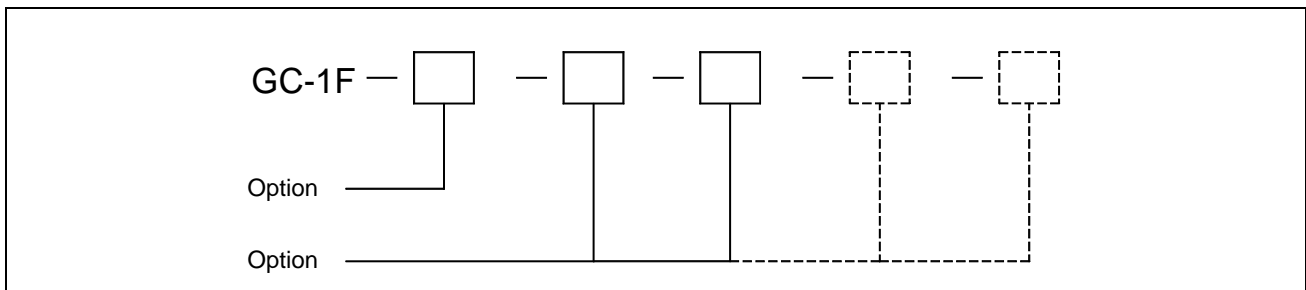


It is possible to combine VDO inputs with binary and 4...20mA inputs in a mix.

Unit dimensions in mm (inches)



Order specifications



Due to our continuous development we reserve the right to supply equipment which may vary from the described.



DEIF A/S, Frisenborgvej 33
DK-7800 Skive, Denmark

Tel.: +45 9614 9614, Fax: +45 9614 9615
E-mail: deif@deif.com, URL: www.deif.com

