



-power in control

GC-1F Gen-set Controller DATA SHEET



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 feedback selectable

Generator monitoring

- 3/2/1-phase generator monitoring

Generator protection (ANSI)

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

Engine monitoring

- 3 configurable inputs
 - VDO or
 - 0(4)-20mA from active transducer or
 - Binary with wirebreak
- 6 binary inputs, configurable
- RPM input, selectable
 - Magnetic pick-up
 - NPN or PNP pick-up
 - Charger alternator W terminal

Display panel

- 128 x 64 pixel backlight STN
- Alarm texts editable
- All texts in multilanguage
- 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 Gen-set 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
5. Automatic Mains Failure

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). A PC interface box is needed for this operation (Option J5). Option J5 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).

Language

Master language is English and furthermore, there are three selectable languages. These are listed in the order specification.

Translation

This function makes it possible to change all texts used in the unit.

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 gen-set controller.

Terminals

Terminal	Technical data	Description
1	Power supply +	6...36V DC (UL/cUL Listed: 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/cUL Listed: 1A Resistive)	Start prepare/configurable. Function NO
22	Relay output 22. Contact ratings 2A 30V DC/V AC Resistive (UL/cUL Listed: 1A Resistive)	Starter (crank)/configurable. Function NO
23	Relay output 23. Contact ratings 2A 30V DC/V AC Resistive (UL/cUL Listed: 1A Resistive)	Run coil/configurable. Function NO
24-25	Relay output 24. Contact ratings 8A 30V DC/V AC (UL/cUL Listed: 6A Resistive)	Horn/configurable. Function NO
26-27	Relay output 26. Contact ratings 8A 30V DC/V AC (UL/cUL Listed: 6A Resistive)	Alarm/configurable. Function NO
Multi-functional inputs		
5	Common	Common for term. 6...8
6	VDO1/0(4)...20mA/binary input	Fuel level/configurable
7	VDO2/0(4)...20mA/binary input	Oil pressure/configurable
8	VDO3/0(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	

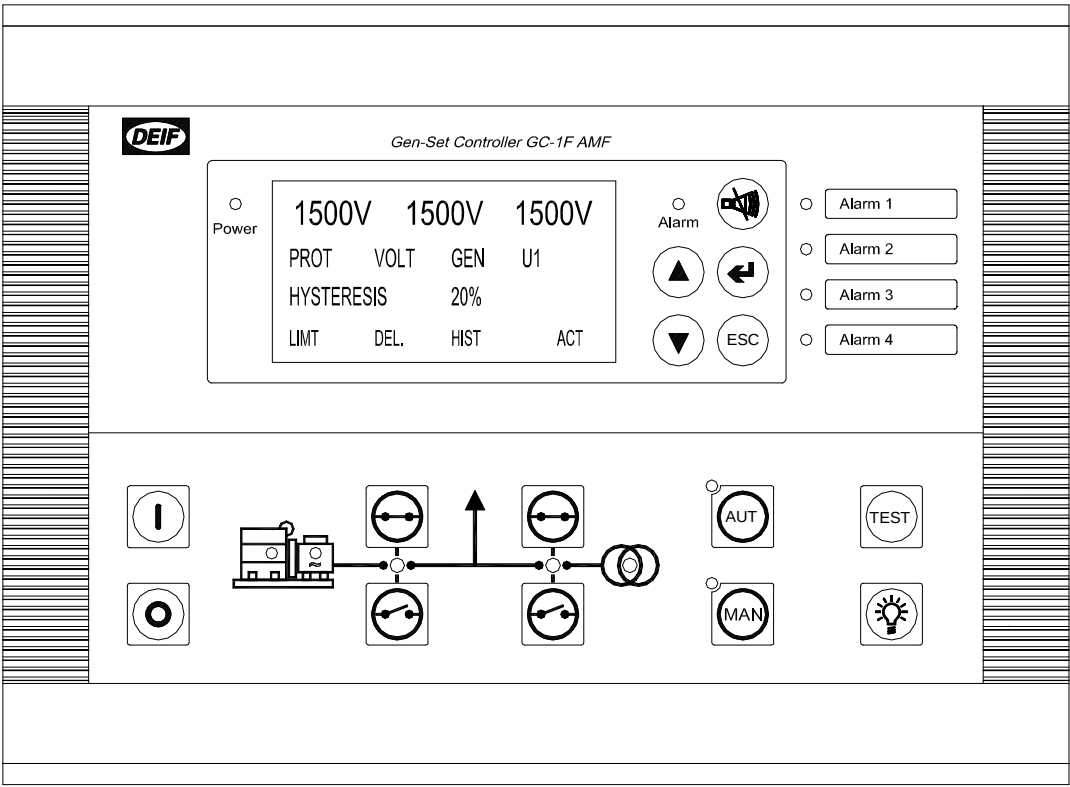
3-phase generator current input		
39	Gen. current L1, s1	Generator current
40	Gen. current L1, s2	
41	Gen. current L2, s1	
42	Gen. current L2, s2	
43	Gen. current L3, s1	
44	Gen. current L3, s2	
Optional 3-phase mains voltage inputs (option B3)		
28	Mains voltage L1	
29	Mains voltage neutral	
30	Mains 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/cUL Listed: 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/cUL Listed: 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	
Optional CANbus #2 Ext. I/O interface (option H8)		
57	CAN-H	CAN communication line to External I/O
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	Front layout with generator breaker.	Hardware option	
H	Communication		
H2	Modbus RS485 RTU or ASCII	Hardware option	
H5	CANbus J1939 CANbus #1 comm - Detroit Diesel - John Deere - Deutz - Volvo Penta EMS - Volvo Penta EMS 2 - Scania EMS - Scania EMS 2 - MTU MDEC 302 - MTU MDEC 303 - MTU ADEC - Cummins - Iveco - Perkins - Caterpillar	Hardware option	

Data sheet**Gen-set Controller GC-1F**

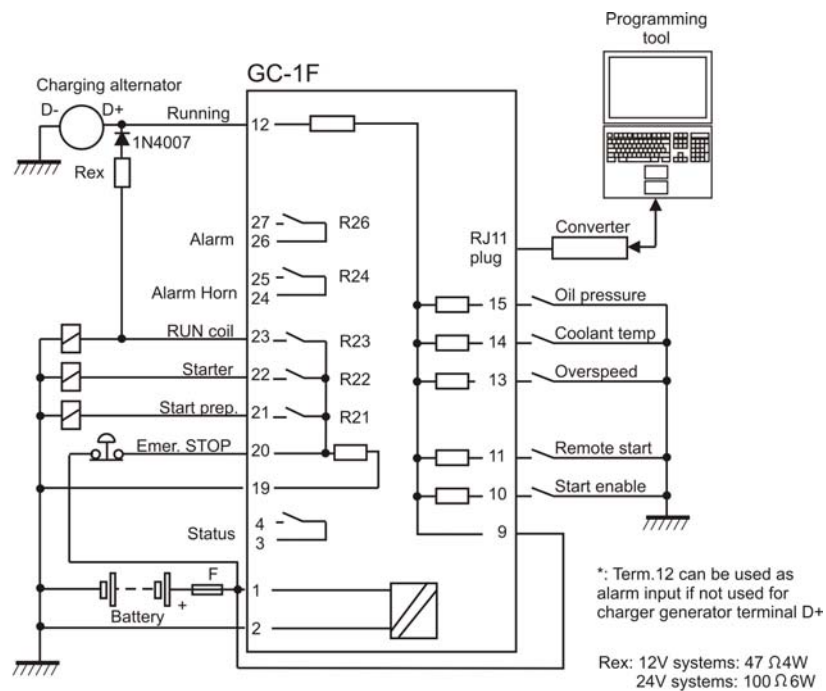
H8	External I/O CANbus #2 comm - support of Beckhoff modules	Hardware option	See supported modules in Option H8 documentation
J	Cables		
J5	PI-1 converter box kit (for PC connection)	Hardware option	
K	Documentation		
K1	Installation Instructions and Reference Handbook (hard copy)	Other	
K2	CD-ROM with 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 #2 comm.	Hardware option	Maximum of 2 AOP2's



Wiring, engine interface



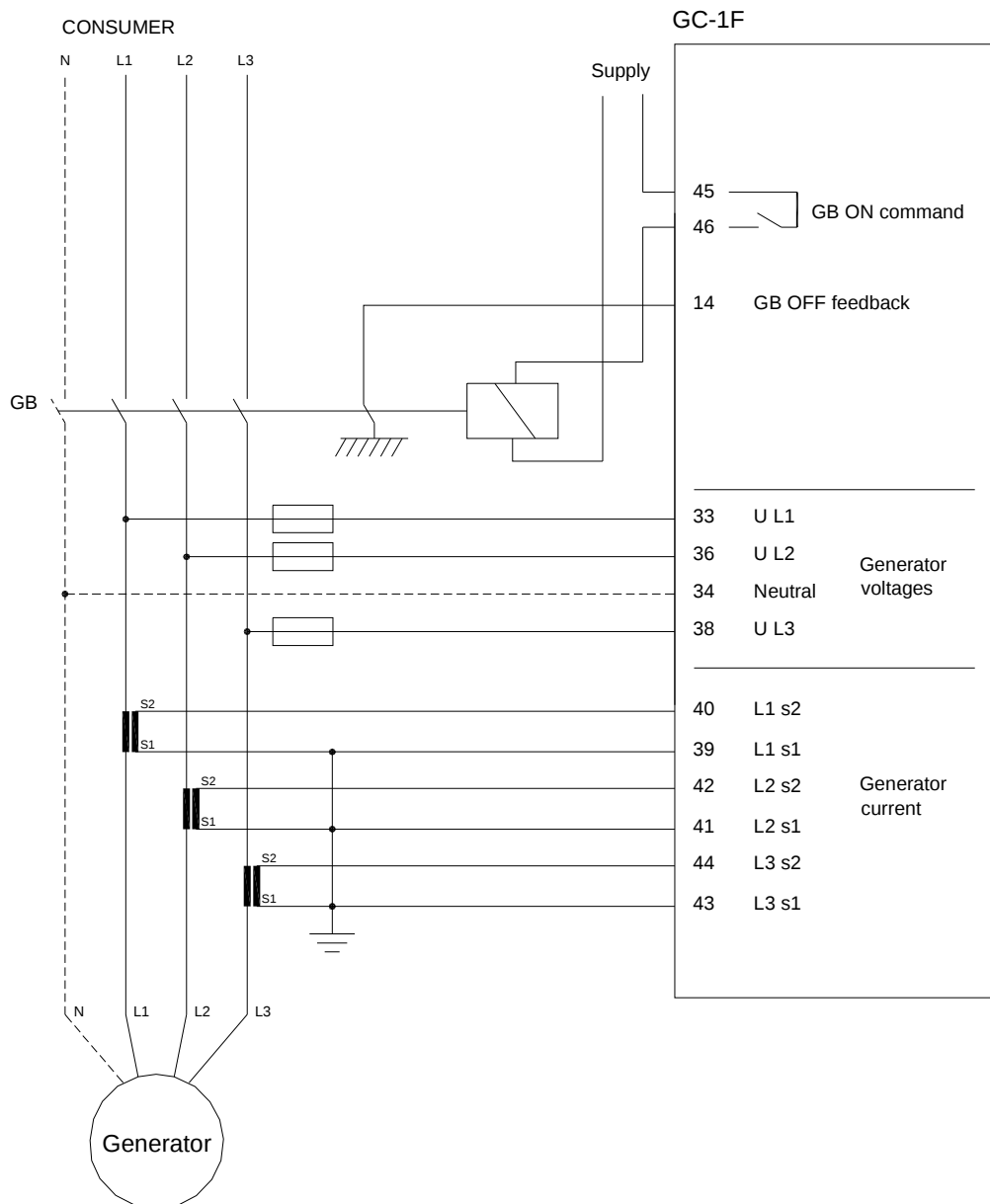
F: Fuse: Min. 2A slow-blow.



Engine communication option H5 	Modbus option H2 	External I/O and AOP2 option H8 / X4
Multi-functional inputs VDO sensors 	Multi-functional inputs Analogue 0(4)-20mA 	Multi-functional inputs Binary input w. wirebreak R= 100 Ohm
Tacho input Magnetic pickup/ Tacho generator 	Tacho input NPN/PNP pickup 	Tacho input W input from charger alternator



It is possible to combine VDO inputs with binary and 0(4)...20mA inputs in a mix.

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.

The diagram illustrates the electrical connections for the GC-1F AMF system, showing the interface between the Mains, Consumers, and the Generator.

MAINS

28 U L1
29 Neutral
30 U L2
32 U L3

15 MB OFF feedback
47 MB ON command
48 MB ON command
45 GB ON command
46 GB ON command

14 GB OFF feedback

33 U L1
36 U L2
34 Neutral
38 U L3

40 L1 s2
39 L1 s1
42 L2 s2
41 L2 s1
44 L3 s2
43 L3 s1

Generator

Consumers

MB

GB

Supply

GC-1F AMF

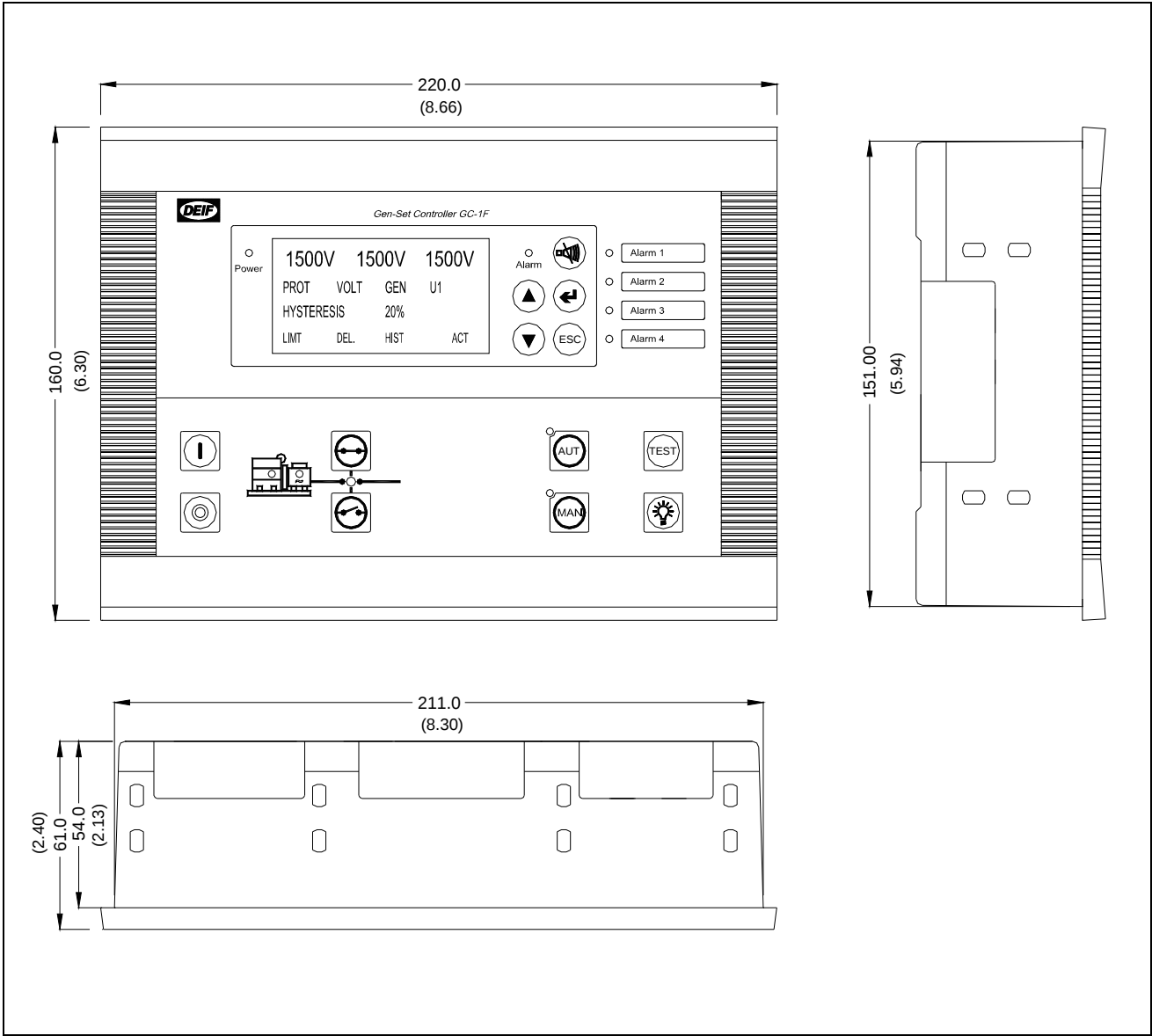


Fuse for AC voltage: Max. 2A slow-blow.

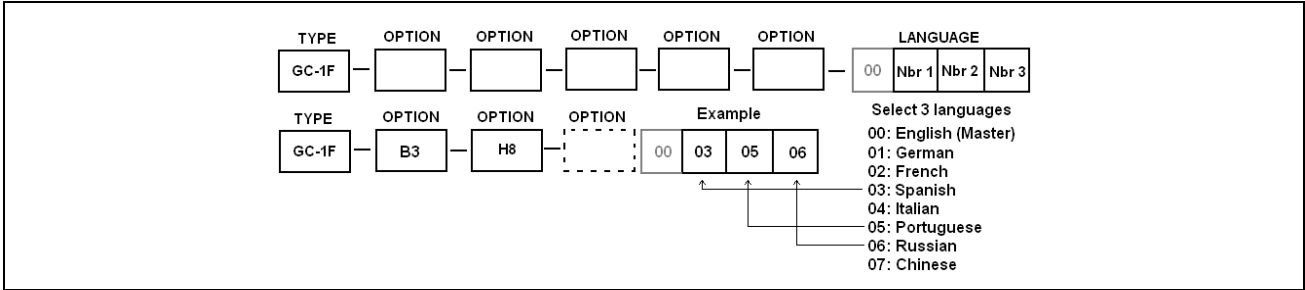
Technical specifications

Accuracy:	Class 2.0 To EN 60688/IEC 688	Mounting:	Panel mounted
Operating temp.:	-20...70°C (-4...158°F) (UL/cUL Listed: Max. 50°C ambient)	Size:	160 x 220 mm (6.30" x 8.66")
Storage temp.:	-40...70°C (-40...158°F)	Climate:	Class HSE, to DIN 40040
Measuring input voltage:	50...480V AC (+20%) Phase to phase	Display:	128 x 64 pixel backlight STN
Load:	1.5MΩ/phase	Safety:	To EN 61010-1, UL508 and CSA22.2 No. 14-05 Installation category (over-voltage category) III, 300V, pollution degree 2
Frequency:	30...70Hz	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
Measuring input current:	1A or 5A AC from current transformer	EMC/CE:	To EN 61000-6-1/2/3/4 SS4631503 (PL4) and IEC 255-3
Consumpt. max.:	0.3 VA/phase	Material:	All plastic materials are self- extinguishing acc. to UL94 (V1)
Pick-up input voltage:	2...70V peak	Plug connections:	AC voltage/current inputs: 3.5 mm ² (13 AWG) multi stranded Other: 1.5 mm ² (16 AWG) multi stranded
Frequency:	10-10000Hz	Tightening torque, min.:	AC voltage input: 0.5Nm (5-7lb-in) Other: 0.5Nm (5-7lb-in)
Aux. supply:	6-36V DC continuously (UL/cUL Listed: 7.5...32.7V DC) Max. 8W consumption	PC connection:	RS232 converter box (option J5)
Passive binary input voltage:	Bi-directional optocoupler 6...36V DC	Approval:	CE & UL/cUL Listed
Impedance:	4.7kΩ	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)
Dropout cranking:	Able to survive 0 V for 50 mS at 12 VDC Aux. supply before dropout.	DC/DC converter for AOP-2:	Tightening torque: 0.5Nm (4.4lb-in) Wire size: AWG 22-14
VDO inputs:	Resistor inputs, internal 3V supply	Weight:	Approx. 0.9 kg (1.9 lbs)
Analogue input:	From active transducer		
Current:	(0)4...20mA		
Impedance:	50Ω		
Active binary input voltage:	Dry contact inputs (see note) 3V DC supply, with cable supervision		
Relay outputs:			
Impedance:	240Ω ~ 16mA		
3 relays:	30V DC/AC 2A (UL/cUL Listed: 1A Resistive)		
2 relays:	250V AC/30V DC 2A (UL/cUL Listed: 30V DC/AC 2A Resistive)		
2 relays:	30V DC/AC 8A (UL/cUL Listed: 6A Resistive)		
1 status relay:	24V DC 1A Resistive		

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

