

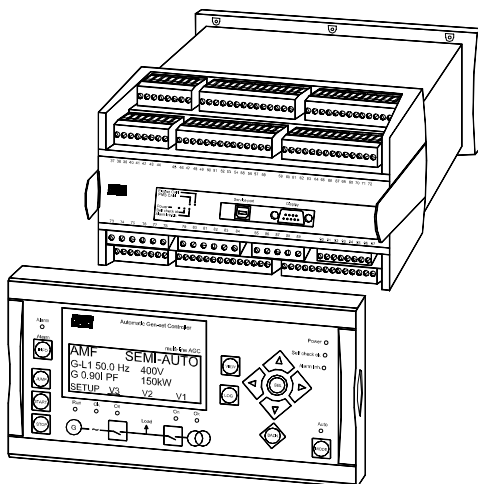
Installation Instructions



Automatic Gen-set Controller

4189340432A (UK)

SW 3.0X.X



- *Mounting*
- *Board slot positions*
- *Terminal strip overview*
- *I/O lists*
- *Wiring*



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1. About this document

General purpose

This document is the Installation Instructions for DEIF's Automatic Gen-set Controller, the AGC. The document mainly includes general product information, mounting instructions, terminal strip overviews, I/O lists and wiring descriptions.

The general purpose of these installation instructions is to give the user important information to be used in the installation of the unit.



Please make sure that you read this manual before starting to work with the multi-line 2 controller and the gen-set to be controlled. Failure to do this could result in damaging the equipment or even worse injury of personnel.

Intended users

These installation instructions are mainly intended for the panel builder designer in charge. On the basis of this document, the panel builder designer will give the electrician the information he needs in order to install the AGC, e.g. detailed electrical drawings. In some cases the electrician may use these installation instructions himself.

Contents/overall structure

This document is divided into chapters, and in order to make the structure simple and easy to use, each chapter will begin from the top of a new page.

2. Warnings and legal information

Legal information and responsibility

DEIF takes no responsibility for installation or operation of the generator set. If there is any doubt about how to install or operate the generator controlled by the unit, the company responsible for the installation or the operation of the set must be contacted.

The units are not to be opened by unauthorised personnel. If opened anyway, the warranty will be lost.

Electrostatic discharge awareness

Sufficient care must be taken to protect the terminals against static discharges during the installation. Once the unit is installed and connected, these precautions are no longer necessary.

Safety issues

Installing the unit implies work with dangerous currents and voltages. Therefore, the installation of the AGC should only be carried out by authorised personnel who understands the risks involved in the working with live electrical equipment.



Be aware of the hazardous live currents and voltages. Do not touch any AC measurement inputs as this could lead to injury or death.

Notes

Throughout this document a number of notes with helpful user information will be presented. To ensure that these are noticed, they will be highlighted in order to separate them from the general text.

Note symbol



The notes provide general information which will be helpful for the reader to bear in mind.

Warning symbol

The warnings indicate a potentially dangerous situation which could result in death, personal injury or damaged equipment, if certain guidelines are not followed.

3. General product information

Introduction

The AGC is part of the DEIF multi-line 2 product family. Multi-line 2 is a complete range of multi-function generator protection and control products integrating all the functions you need into one compact and attractive solution.

The concept of the AGC is to offer a cost-effective solution to gen-set builders, who need a flexible generator protection and control unit for medium to large gen-set applications. Being part of the multi-line product family, the standard functions can be supplemented with a variety of optional functions.

Type of product

The Automatic Gen-set Controller is a micro-processor based control unit containing all necessary functions for protection and control of a gen-set.

It contains all necessary 3-phase measuring circuits, and all values and alarms are presented on the LCD display

Options

The multi-line 2 product range consists of different basic versions, which can be supplemented with the flexible options needed to provide the optimum solution. The options cover e.g. various protections for generator, busbar and mains, voltage/var/PF control, various outputs, power management, serial communication, additional operator display etc.

Standard functions

Operation modes

- Automatic Mains Failure
- Island operation
- Fixed power/base load
- Peak shaving
- Load take over
- Mains power export

Engine control

- Start/stop sequences
- Run and stop coil
- Relay outputs for governor control

Protection (ANSI)

- Overcurrent, 4 levels (51)
- Reverse power, 2 levels (32)
- Multi inputs, 3 configurable

Display

- Push-buttons for start and stop
- Push-buttons for breaker operations
- Status texts
- Alarm indication
- Prepared for remote mounting

M-logic

- Simple logic configuration tool
- Selectable input events
- Selectable output commands

General

- USB interface to PC
- Free PC utility software for commissioning
- Additional functions available

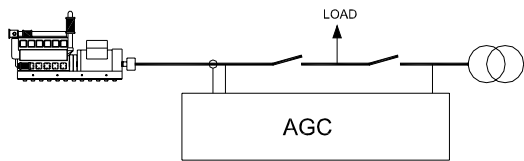
Standard and optional applications

In the following sections, the standard and optional applications of the AGC will be presented. In addition, the correct application configuration for the different applications is listed. It is only possible to use the unit for one of the purposes, e.g. AMF (Automatic Mains Failure). The selection must be made on site.



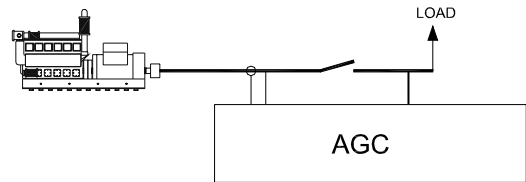
All units are supplied with AMF as factory setting.

Automatic Mains Failure, AMF



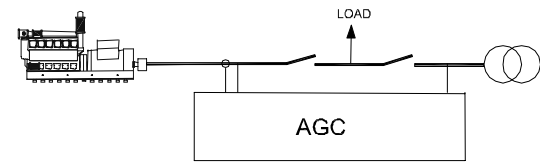
No.	Setting		Setting
6071	Gen-set mode	AMF	AMF

Island operation



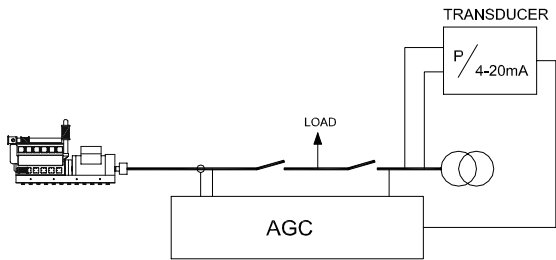
No.	Setting		Setting
6071	Gen-set mode	Island operation	Island operation

Fixed power/base load



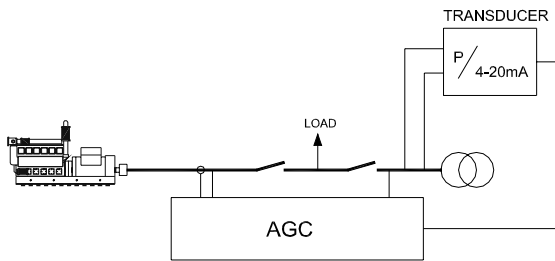
No.	Setting		Setting
6071	Gen-set mode	Fixed power	Fixed power

Peak shaving



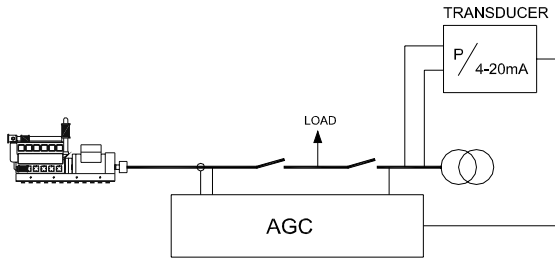
No.	Setting		Setting
6071	Gen-set mode	Peak shaving	Peak shaving

Load take over



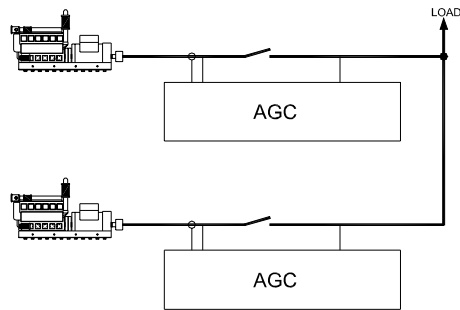
No.	Setting		Setting
6071	Gen-set mode	Load take over	Load take over

Mains power export (fixed power to mains)



No.	Setting		Setting
6071	Gen-set mode	Mains power export	Mains power export

Multiple gen-sets, load sharing



No.	Setting		Setting
6071	Gen-set mode	Island operation	Island operation

Multiple gen-sets, power management



For information about the power management application, refer to ‘Description of options’ (G5).

4. Mounting

Mounting of the unit

The unit is designed for mounting inside the switchboard. The display can be installed on the switchboard door and connected to the main unit with a display cable. The technical specifications in chapter 7 include detailed information about:

- Unit dimensions
- Panel cutout
- Screw hole positions and dimensions

Panel cutout

In order to ensure optimum mounting, the switchboard door must be cut out according to the *panel cutout* illustration presented in chapter 7.

Mounting instructions

The unit can be mounted in two different ways:

1. Directly mounted on a DIN rail.
2. Fastened with screws to the rear side of the cabinet. Six screw holes are available for this mounting method.



DEIF recommends using the screw hole fastening.

5. Hardware

Board slot positions

The unit housing is divided into board slot positions. This means that the unit consists of a number of printed circuit boards (PCB) mounted in numbered slots. The green terminal blocks are then mounted in the PCBs. Some of these board slots are standard and some are intended for options. The board slot positions are arranged as illustrated below.

Slot type	Option	Slot #1	Slot #3	Slot #5	Slot #7
Terminals		1-28	37-64	73-89	98-125
Power supply	Standard	X			
AC measure-ments	Standard			X	
Engine interface	Standard				X
Load sharing	G3		X		
Power manage-ment	G5				X
Engine communi-cation	H7				X
In-/output exten-sion	M12		X		

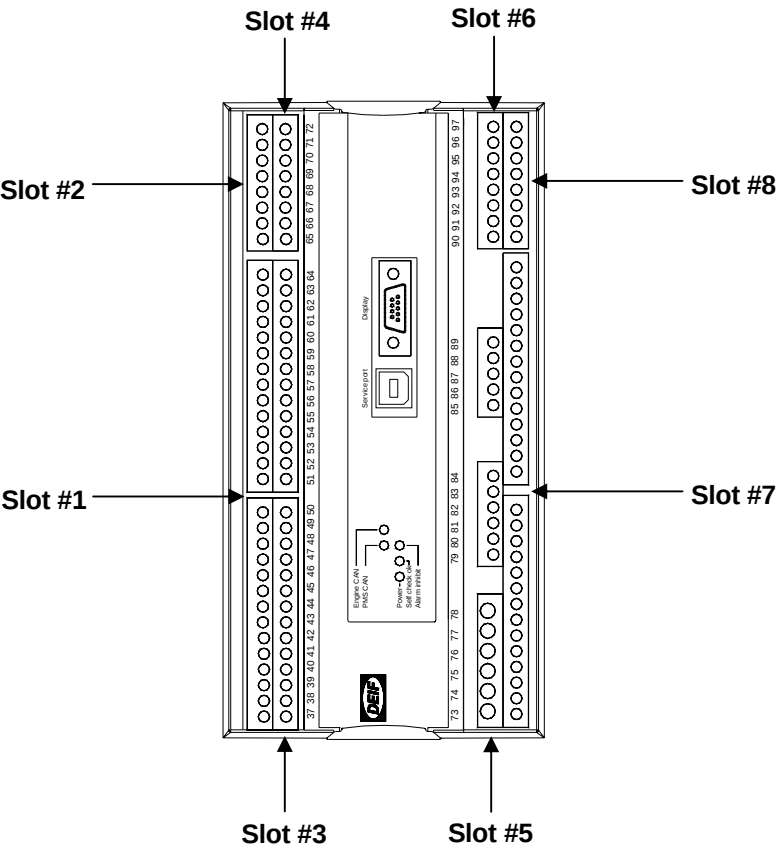
Slot type	Option	Slot #2	Slot #4	Slot #6	Slot #8
Terminals		29-34	65-72	90-97	126-133
Analogue controller outputs	E1/E2		X		
Analogue transducer outputs	F1			X	
Combination outputs	EF2/EF4		X		
Serial communication	H2/H3	X			
Engine communication	H5/H6				X
I/O extension cards	M13.6/M14.6/M15			X	
I/O extension cards	M13.8/M14.8				X



Only hardware options, which will affect the hardware of the unit, are represented in the table. The software options will be seen through the PC utility software. The absent software options can be located in the data sheet.

Unit top side overview

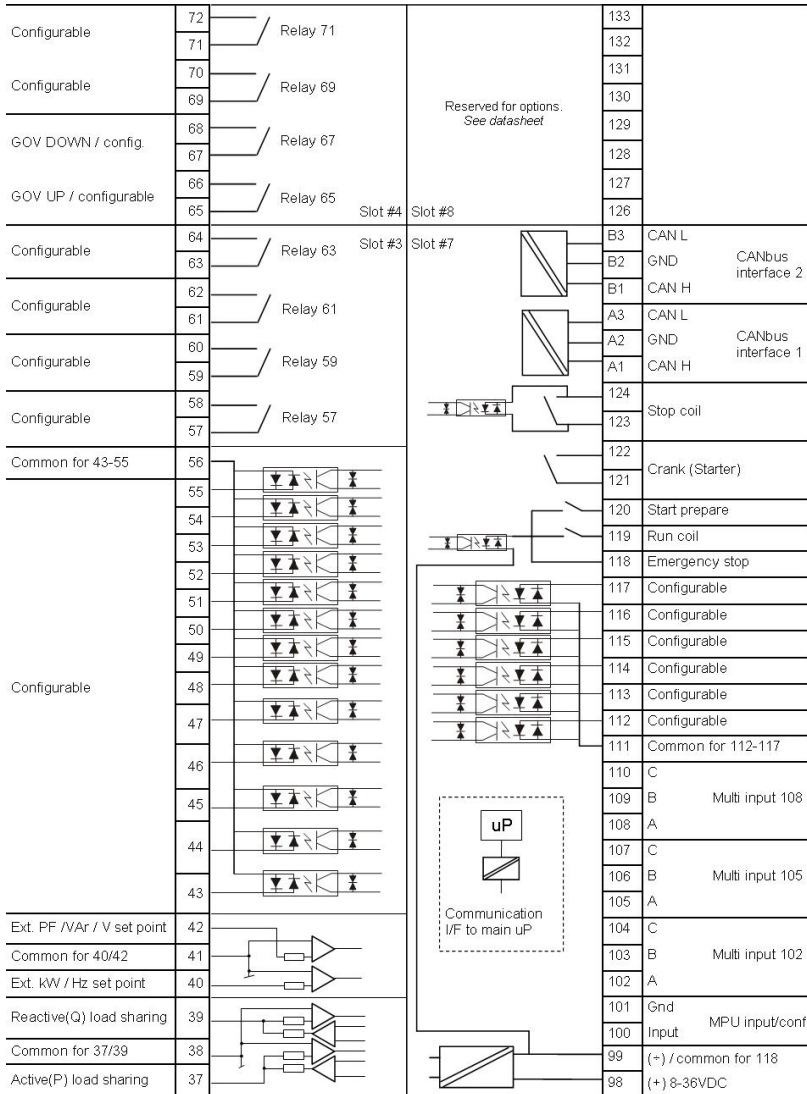
An overview of the terminals is presented below. The slot positions are as follows:



Terminal strip overview

Standard unit

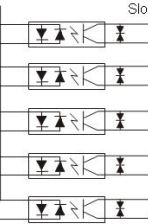
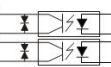
	36	Reserved for options. See datasheet	Reserved for options. See datasheet	97	
	35			96	
	34			95	
	33			94	
	32			93	
	31			92	
	30			91	
	29			90	
		Slot #2	Slot #6		
Common for 23-27	28	Slot #1	Slot #5		
GB Closed	27				
GB Open	26				
MB Closed / configurable	25				
MB Open / configurable	24				
Configurable	23				
Common for 20/21	22				
kVAh pulse / Relay 21	21				
kWh pulse / Relay 20	20				
	19	Relay 11			
Close Generator Breaker (sync.)	18				
	17				
	16				
Open Generator Breaker	15				
	14				
	13				
Close Mains Breaker / configurable	12				
	11				
Open Mains Breaker / configurable	10				
	9	Relay 08			
	8				
	7				
Alarm horn / configurable	6	Relay 05			
	5				
	4	Status relay			
Status relay	3				
	2				
DC power supply (+)	1				
8-36VDC (+)					
				89	L3
				88	Neutral
				87	L2
				86	
				85	L1
				84	Neutral
				83	L3
				82	
				81	L2
				80	
				79	L1
				78	S2 (I) L3 AC current
				77	S1 (k) L3 AC current
				76	S2 (I) L2 AC current
				75	S1 (k) L2 AC current
				74	S2 (I) L1 AC current
				73	S1 (k) L1 AC current

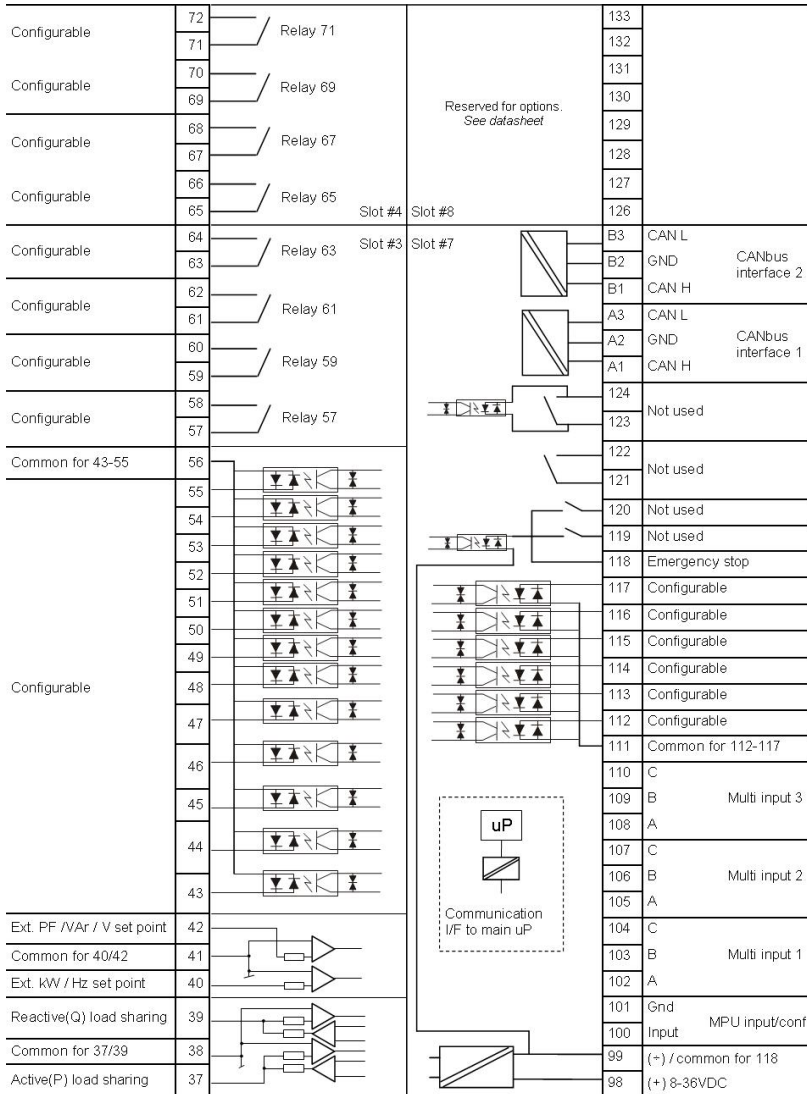


The hardware shown in slot #3 is option M12 and G3.
For a detailed description of these options, please refer to the option manuals.

Terminal strip overview

Mains unit

	36	Reserved for options. See datasheet	Reserved for options. See datasheet	97			
	35			96			
	34			95			
	33			94			
	32			93			
	31			92			
	30			91			
	29			90			
		Slot #2	Slot #6				
Common for 23-27	28		Slot #5				
TB Closed / configurable	27						
TB Open / configurable	26						
MB Closed / configurable	25						
MB Open / configurable	24						
Configurable	23						
Common for 20/21	22						
kVAh pulse / Relay 21	21						
kWh pulse / Relay 20	20						
Close Tie Breaker / configurable	19			89	L3	BUSBAR VOLTAGE	
	18				88		Neutral
	17				87		L2
Open Tie Breaker / configurable	16	Relay 14		86		MAINS VOLTAGE	
	15			85	L1		
Close Mains Breaker / configurable	13	Relay 11		84	Neutral		
	12			83	L3		
Open Mains Breaker / configurable	10	Relay 08		82	L2		
	9			81			
	8	Relay 05		80			
	7			79	L1		
Alarm horn / configurable	6	Relay 05		78	S2 (I) L3 AC current		
	5			77	S1 (k) L3 AC current		
Status relay	4	Status relay		76	S2 (I) L2 AC current		
	3			75	S1 (k) L2 AC current		
DC power supply (+)	2			74	S2 (I) L1 AC current		
8-36VDC (+)	1			73	S1 (k) L1 AC current		



The hardware shown in slot#3 is option M12 and G3. For a detailed description of these options please refer to the option manuals.

Input/output lists

In the I/O lists below the following terms will be used in connection with the relay outputs:

NO means Normally Open

NC means Normally Closed

Com. means common terminal

Slot #1, power supply PCB

Term.	Function	Technical data	Description
1	+12/24V DC	12/24V DC +/-30%	Power supply
2	0V DC		
3	NC	Status relay 24V DC/1A	Normally closed relay, processor/power supply status supervision
4	Com.		
5	NO	Relay 05 250V AC/8A	Central alarm HORN / configurable
6	Com.		
7	NC		
8	NO	Relay 08 250V AC/8A	Open mains breaker / configurable
9	Com.		
10	NC		
11	NO	Relay 11 250V AC/8A	Close mains breaker (synchronising) / configurable
12	Com.		
13	NC		
14	NO	Relay 250V AC/8A	Open generator breaker
15	Com.		
16	NC		
17	NO	Relay 250V AC/8A	Close generator breaker (synchronising)
18	Com.		
19	NC		
20	Open collector 1	Transistor output / Relay 20	Pulse output 1, kWh counter / configurable

Term.	Function	Technical data	Description
21	Open collector 2	Transistor output / Relay 21	Pulse output 2, kVArh counter / configurable
22	Com.	Common	Common terminal for terminals 20 and 21
23	Digital input 23	Optocoupler	Configurable
24	Digital input 24	Optocoupler	Mains breaker open / configurable
25	Digital input 25	Optocoupler	Mains breaker closed / configurable
26	Digital input 26	Optocoupler	Generator breaker open
27	Digital input 27	Optocoupler	Generator breaker closed
28	Com.	Common	Common for terminals 23 to 27

Slot #1, power supply PCB - AGC mains unit

The I/O list below is for the AGC mains unit.

Term.	Function	Technical data	Description
1	+12/24V DC	12/24V DC +/-30%	Power supply
2	0V DC		
3	NC	Status relay 24V DC/1A	Normally closed relay, processor/power supply status supervision
4	Com.		
5	NO	Relay 05	Central alarm HORN / configurable
6	Com.	250V AC/8A	
7	NC		
8	NO	Relay 08	Open mains breaker / configurable
9	Com.	250V AC/8A	
10	NC		
11	NO	Relay 11 250V AC/8A	Close mains breaker (synchronising) / configurable
12	Com.		
13	NC		
14	NO	Relay 14	Open tie breaker / configurable
15	Com.	250V AC/8A	
16	NC		
17	NO	Relay 17	Close tie breaker / configurable
18	Com.	250V AC/8A	
19	NC		
20	Open col- lector 1	Transistor output / Relay 20	Pulse output 1, kWh counter / configurable

Term.	Function	Technical data	Description
21	Open collector 2	Transistor output / Relay 21	Pulse output 2, kVArh counter / configurable
22	Com.	Common	Common terminal for terminals 20 and 21
23	Digital input 23	Optocoupler	Configurable
24	Digital input 24	Optocoupler	Mains breaker open / configurable
25	Digital input 25	Optocoupler	Mains breaker closed / configurable
26	Digital input 26	Optocoupler	Tie breaker open / configurable
27	Digital input 27	Optocoupler	Tie breaker closed / configurable
28	Com.	Common	Common for terminals 23 to 27

Slot #2, serial communication (option H)

Modbus (option H2)

Term.	Function	Description
29	DATA + (A)	Modbus RTU, RS485
30	GND	
31	DATA - (B)	
32	Not used	
33	DATA + (A)	
34	Not used	
35	DATA - (B)	
36	Not used	

The serial communication line should be terminated between DATA + and DATA - with a resistor equal to the cable impedance. The terminals 29/33 and 31/35 are internally connected.

Profibus (option H3)

Term.	Function	Description
29	DATA + (B)	Pin 3 on 9 pole sub-D connector Pin 5 on 9 pole sub-D connector Pin 8 on 9 pole sub-D connector
30	GND	
31	DATA - (A)	
32	DATA + (B)	
33	GND	
34	DATA - (A)	
35	Not used	
36	Not used	

The serial communication line should be terminated between DATA + and DATA - with a resistor equal to the cable impedance. The terminals 29/32, 30/33 and 31/34 are internally connected.

Use shielded twisted pair cable.

Slot #3, load sharing control (option G3)

Term.	Function	Technical data	Description
37	-5...0...5V DC	Analogue I/O	Active load sharing line
38	Com.	Common	Common for load sharing lines
39	-5...0...5V DC	Analogue I/O	Reactive load sharing
40	-10...0...10V DC	Analogue I/O	f/P set point (passive)
41		Common	Common for 40/42
42	-10...0...10V DC	Analogue I/O	U/Q set point (passive)
43	Not used		
44			
45			
46			
47			
48			
49			
50			
51			
52			
53			
54			
55			
56			
57			
58			
59			
60			
61			
62			
63			
64			

Slot #3, 13 binary inputs and 4 relay outputs (option M12)

Term.	Function	Technical data	Description
37	Not used		
38			
39			
40			
41			
42			
43	Binary input	Optocoupler	Configurable
44	Binary input	Optocoupler	Configurable
45	Binary input	Optocoupler	Configurable
46	Binary input	Optocoupler	Configurable
47	Binary input	Optocoupler	Configurable
48	Binary input	Optocoupler	Configurable
49	Binary input	Optocoupler	Configurable
50	Binary input	Optocoupler	Configurable
51	Binary input	Optocoupler	Configurable
52	Binary input	Optocoupler	Configurable
53	Binary input	Optocoupler	Configurable
54	Binary input	Optocoupler	Configurable
55	Binary input	Optocoupler	Configurable
56	Com.	Common	Common for terminals 43 to 55
57	NO	Relay 57 250V AC/5A	Configurable
58	Com.		
59	NO	Relay 59 250V AC/5A	Configurable
60	Com.		
61	NO	Relay 61 250V AC/5A	Configurable
62	Com.		
63	NO	Relay 63 250V AC/5A	Configurable
64	Com.		

Slot #4, relay outputs (option M14.4, standard)

Term.	Function	Technical data	Description
65	NO	Relay 65 250V AC/5A	Generator GOV: Increase frequency / configurable
66	Com.		
67	NO	Relay 67 250V AC/5A	Generator GOV: Decrease frequency / configurable
68	Com.		
69	Not used	Relay 69 250V AC/5A	Configurable
70	Com.		
71	Not used	Relay 71 250V AC/5A	Configurable
72	Com.		

Slot #4, analogue outputs for GOV/AVR or transducer (option E1)

Term.	Function	Description
65	Not used	Configurable
66	+/-25mA out	
67	0	
68	Not used	Configurable
69	Not used	
70	+/-25mA out	
71	0	
72	Not used	

Slot #4, analogue outputs for GOV/AVR or transducer (option EF2)

Term.	Function	Description
65	Not used	Configurable
66	+/-25mA out	
67	0	
68	Not used	Configurable
69	Not used	
70	0(4)-20mA out	
71	0	
72	Not used	

Slot #4, combination outputs for GOV/AVR or transducer (option EF4)

Term.	Function	Description
65	+/-25mA out	Configurable
66	0	
67	Not used	
68	Not used	
69	Relay	Relay 69
70	Relay	
71	Relay	Relay 71
72	Relay	

Slot #4, analogue outputs for GOV/AVR or transducer (option E2)

Term.	Function	Description
65	Not used	
66	0(4)-25mA out	Configurable
67	0	
68	Not used	
69	Not used	
70	0(4)-25mA out	Configurable
71	0	
72	Not used	

Slot #5, AC measuring

Term.	Function	Technical data	Description
73	I L1, s1	Generator current L1	x/1A or x/5A input
74	I L1, s2		
75	I L2, s1	Generator current L2	x/1A or x/5A input
76	I L2, s2		
77	I L3, s1	Generator current L3	x/1A or x/5A input
78	I L3, s2		
79	U L1	Generator voltage L1	Max. 690V AC phase-phase value
80		Not used	
81	U L2	Generator voltage L2	Max. 690V AC phase-phase value
82		Not used	
83	U L3	Generator voltage L3	Max. 690V AC phase-phase value
84	U _{NEUTRAL}	Generator voltage neutral	
85	U L1	Mains/bus voltage L1	Max. 690V AC phase-phase value
86		Not used	
87	U L2	Mains/bus voltage L2	Max. 690V AC phase-phase value
88	U _{NEUTRAL}	Mains/bus voltage neutral	
89	U L3	Mains/bus voltage L3	Max. 690V AC phase - phase value

Slot #5, AC measuring - AGC mains unit

The I/O list below is for the AGC mains unit.

Term.	Function	Technical data	Description
73	I L1, s1	Mains current L1	x/1A or x/5A input
74	I L1, s2		
75	I L2, s1	Mains current L2	x/1A or x/5A input
76	I L2, s2		
77	I L3, s1	Mains current L3	x/1A or x/5A input
78	I L3, s2		
79	U L1	Mains voltage L1	Max. 690V AC phase-phase value
80		Not used	
81	U L2	Mains voltage L2	Max. 690V AC phase-phase value
82		Not used	
83	U L3	Mains voltage L3	Max. 690V AC phase-phase value
84	U _{NEUTRAL}	Mains voltage neutral	
85	U L1	Bus voltage L1	Max. 690V AC phase-phase value
86		Not used	
87	U L2	Bus voltage L2	Max. 690V AC phase-phase value
88	U _{NEUTRAL}	Bus voltage neutral	
89	U L3	Bus voltage L3	Max. 690V AC phase-phase value

Slot #6, 7 digital inputs (option M13.6)

Term.	Function	Technical data	Description
90	Com.	Common	Common for terminals 90-97
91	Binary input 91	Optocoupler	Configurable
92	Binary input 92	Optocoupler	Configurable
93	Binary input 93	Optocoupler	Configurable
94	Binary input 94	Optocoupler	Configurable
95	Binary input 95	Optocoupler	Configurable
96	Binary input 96	Optocoupler	Configurable
97	Binary input 97	Optocoupler	Configurable

Slot #6, 4 relay outputs (option M14.6)

Term.	Function	Technical data	Description
90	NO	Relay 90 250V AC 5A	Configurable
91	Com.		
92	NO	Relay 92 250V AC 5A	Configurable
93	Com.		
94	NO	Relay 94 250V AC 5A	Configurable
95	Com.		
96	NO	Relay 96 250V AC 5A	Configurable
97	Com.		

Slot #6, 4 analogue inputs (option M15)

Term.	Function	Technical data	Description
90	Analogue input 91 -	Common	Configurable
91	Analogue input 91 +	4-20mA in	
92	Analogue input 93 -	Common	Configurable
93	Analogue input 93 +	4-20mA in	
94	Analogue input 95 -	Common	Configurable
95	Analogue input 95 +	4-20mA in	
96	Analogue input 97 -	Common	Configurable
97	Analogue input 97 +	4-20mA in	

Slot #6, analogue outputs for GOV/AVR or transducer (option F1)

Term.	Function	Description
90	Not used	
91	0	Transducer output
92	0(4)-20mA out	
93	Not used	
94	Not used	
95	0	Transducer output
96	0(4)-20mA out	
97	Not used	

Slot #7, engine interface card (standard)

Term.	Function	Technical data	Description
98	+12/24V DC	12/24V DC +/-30%	DC power supply
99	0V DC		
100	MPU input	0.5-70V AC/ 10-10,000Hz	Magnetic pick-up
101	MPU GND		
102	A	0(4)-20mA Digital PT100 PT1000 VDO 0-40V DC	Multi input 1
103	B		
104	C		
105	A		Multi input 2
106	B		
107	C		
108	A		Multi input 3
109	B		
110	C		
111	Com.	Common	Common for terminals 112-117
112	Digital input 112	Optocoupler	Configurable
113	Digital input 113	Optocoupler	Configurable
114	Digital input 114	Optocoupler	Configurable
115	Digital input 115	Optocoupler	configurable
116	Digital input 116	Optocoupler	configurable

Term.	Function	Technical data	Description
117	Digital input 117	Optocoupler	Configurable
118	Digital input 118	Optocoupler	Emergency stop and common for 119 and 120
119	NO	Relay 24V DC/5A	Run coil
120	NO	Relay 24V DC/5A	Start prepare
121	Com.	Relay 250V AC/5A	Crank (starter)
122	NO		
123	Com.	Relay 24V DC/5A	Stop coil w/wire failure detection
124	NO		
A1	CAN-H		CANbus interface 1 (option G5 or H7)
A2	GND		
A3	CAN-L		
B1	CAN-H		CANbus interface 2 (option G5)
B2	GND		
B3	CAN-L		

Slot #7, engine interface card (standard) AGC mains

Term.	Function	Technical data	Description
98	+12/24V DC	12/24V DC	DC power supply
99	0V DC	+/-30%	
100	MPU input	0.5-70V AC/	Magnetic pick-up
101	MPU GND	10-10,000Hz	
102	A	0(4)-20mA Digital PT100 PT1000 VDO 0-40V DC	Multi input 1
103	B		Multi input 2
104	C		
105	A		
106	B	0-40V DC	Multi input 3
107	C		
108	A		
109	B		
110	C		
111	Com.	Common	Common for terminals 112-117
112	Digital input 112	Optocoupler	Configurable
113	Digital input 113	Optocoupler	Configurable
114	Digital input 114	Optocoupler	Configurable
115	Digital input 115	Optocoupler	Configurable
116	Digital input 116	Optocoupler	Configurable
117	Digital input 117	Optocoupler	Configurable
118	Digital input 118	Optocoupler	Emergency stop and common for 119 and 120
119	NO	Relay 24V DC/5A	Not used
120	NO	Relay 24V DC/5A	Not used
121	Com.	Relay 250V AC/5A	Not used
122	NO		
123	Com.	Relay	Not used
124	NO	24V DC/5A	

Term.	Function	Technical data	Description
A1	CAN-H		CANbus interface 1
A2	GND		
A3	CAN-L		
B1	CAN-H		CANbus interface 2
B2	GND		
B3	CAN-L		

Slot #8, engine interface communication (option H5)

Term.	Function	Description
126	Not used	CANbus based engine interface communication
127	Not used	
128	Can-L	
129	GND	
130	Can-H	
131	Can-L	
132	GND	
133	Can-H	

Slot #8, Cummins engine interface communication (option H6)

Term.	Function	Description
126	Not used	Modbus RTU(RS485)
127	DATA - (B)	
128	Not used	
129	DATA + (A)	
130	Not used	
131	DATA - (B)	
132	GND	
133	DATA + (A)	

Slot #8, 7 digital inputs (option M13.8)

Term.	Function	Technical data	Description
126	Com.	Common	Common for terminals 127-133
127	Digital input 127	Optocoupler	Configurable
128	Digital input 128	Optocoupler	Configurable
129	Digital input 129	Optocoupler	Configurable
130	Digital input 130	Optocoupler	Configurable
131	Digital input 131	Optocoupler	Configurable
132	Digital input 132	Optocoupler	Configurable
133	Digital input 133	Optocoupler	Configurable

Slot #8, 4 relay outputs (option M14.8)

Term.	Function	Technical data	Description
126	NO	Relay 126 250V AC/5A	Configurable
127	Com.		
128	NO	Relay 128 250V AC/5A	Configurable
129	Com.		
130	NO	Relay 130 250V AC/5A	Configurable
131	Com.		
132	NO	Relay 132 250V AC/5A	Configurable
133	Com.		

6. Wirings

AC connections

The multi-line 2 can be wired up in three-phase, single phase or split phase configuration.



Contact the switchboard manufacturer for accurate information about required wiring for the specific application.

Neutral line (N)

When three-phase distribution systems are used, the neutral line (N) is only necessary if it is a three-phase + neutral system. If the distribution system is a three-phase system without neutral, then leave the terminals 84 and 88 empty.

Current transformer ground

The current transformer ground connection can be made on s1 or s2 connection, whichever is preferred.

Fuses

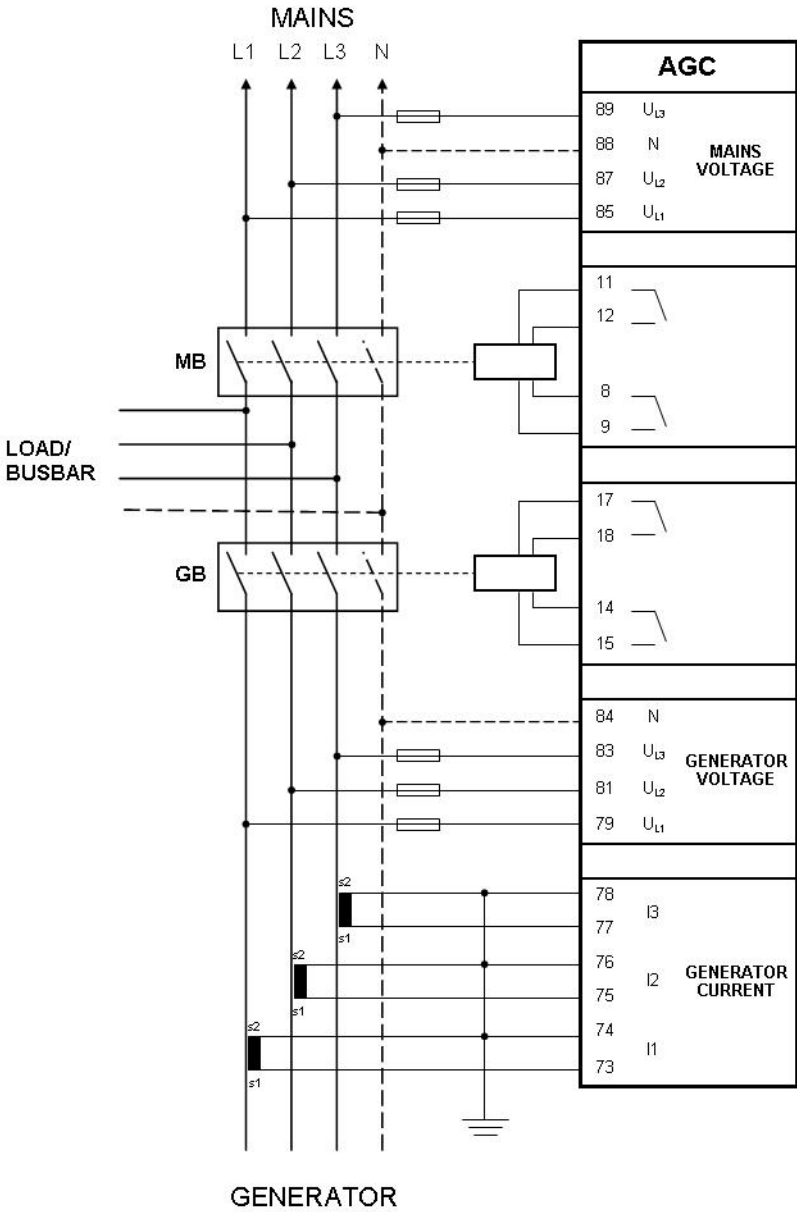
If the cables are protected with fuses, then use 2 A, slow blow.

Breaker wiring

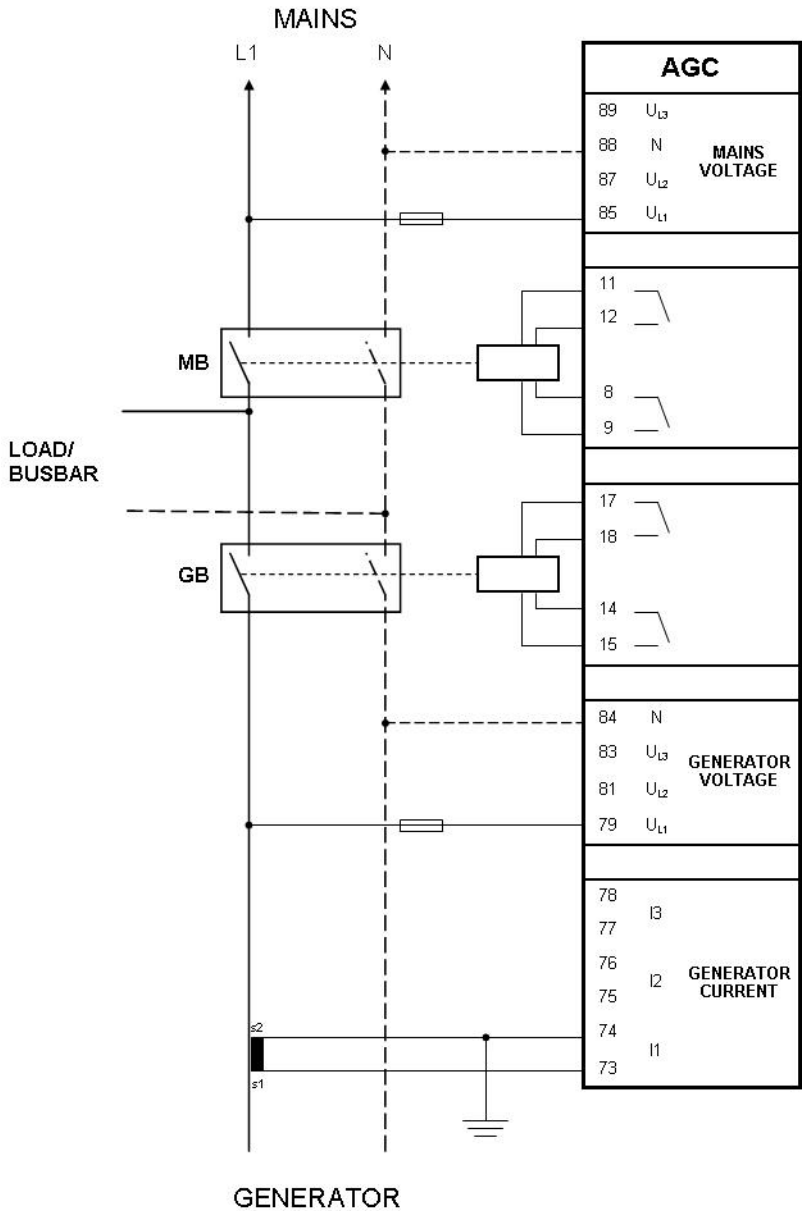
The breaker off wiring is an example only.

3-phase

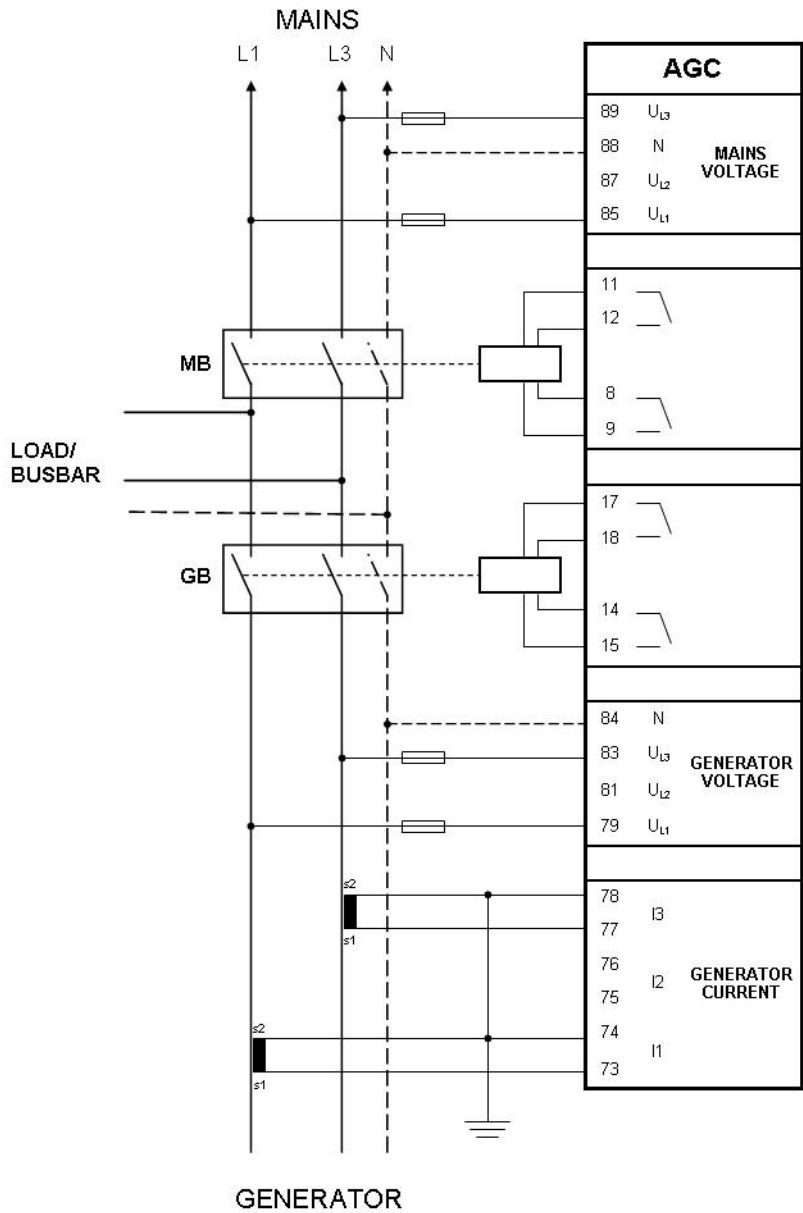
AMF, fixed power, peak shaving, load take over, mains power export.



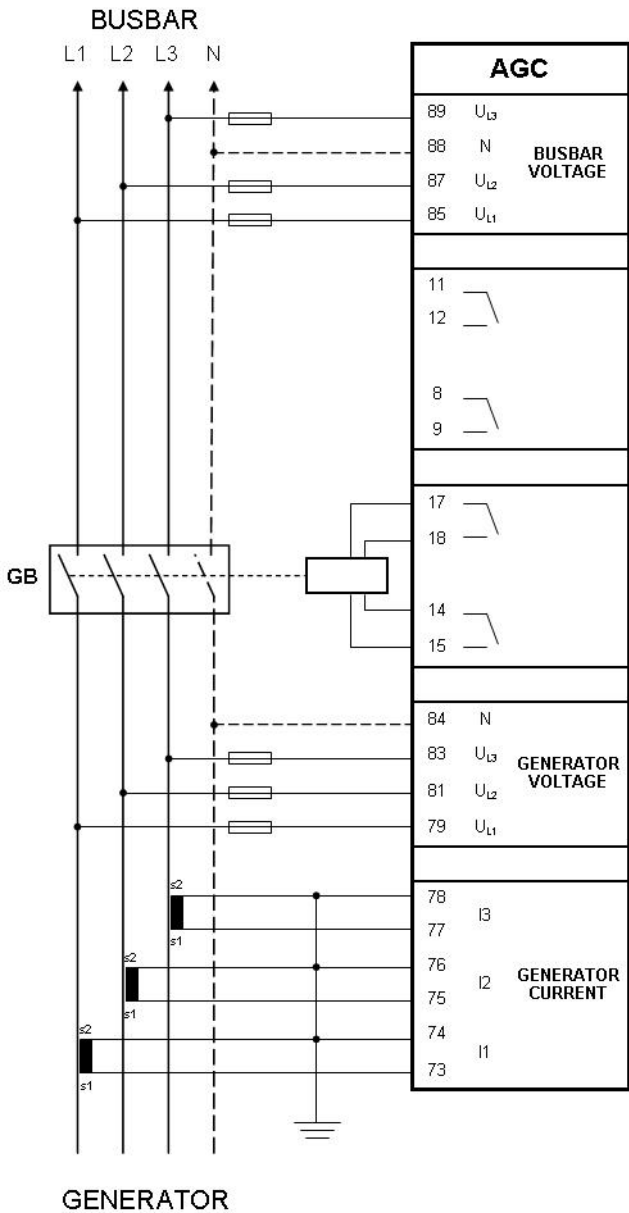
Single phase



2-phase (split phase)

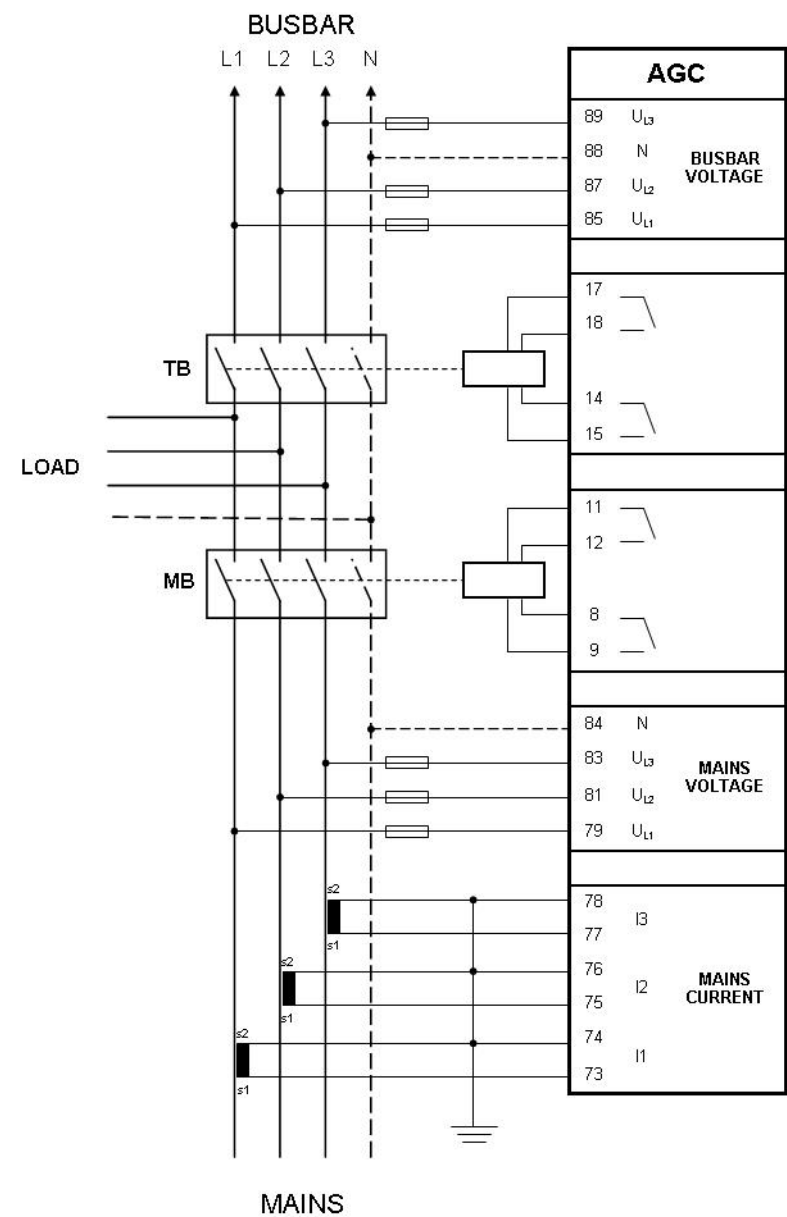


Island mode and power management (option G5)



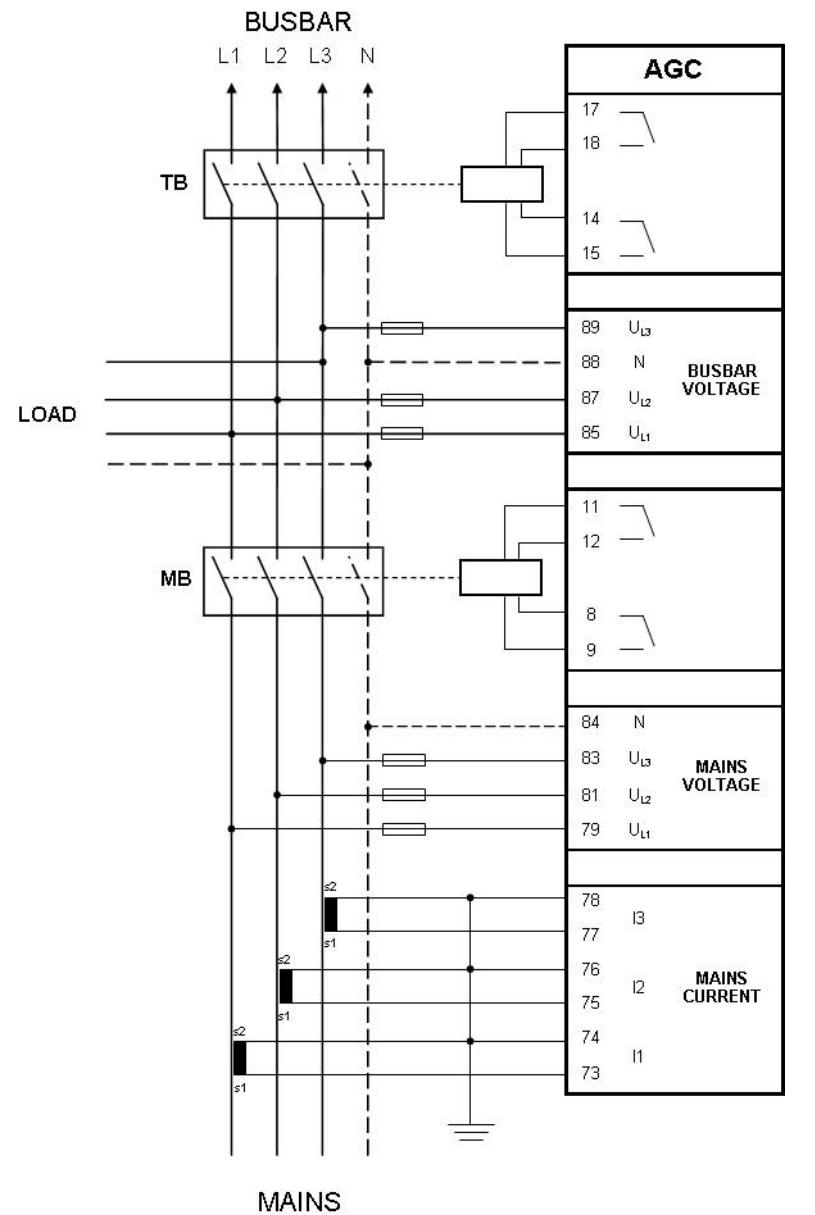
2-phase and 1-phase systems also supported.

Power management (option G5), single mains - AGC mains

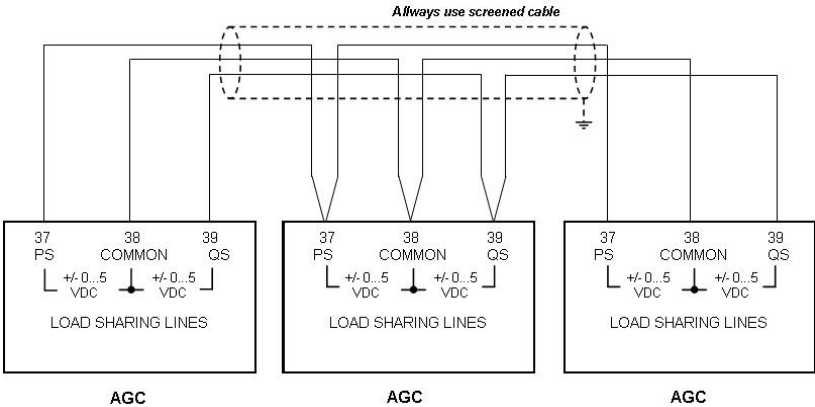


1- and 2-phase systems also supported.

Power management (option G5), multiple mains - AGC mains

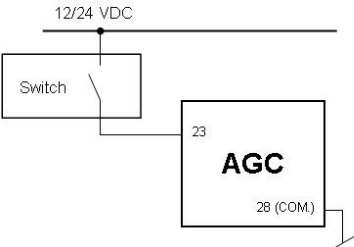


Load sharing lines (option G3)

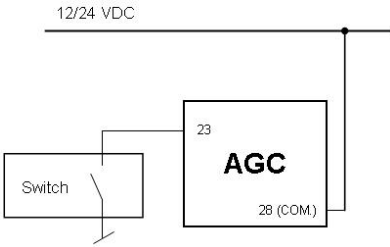


Digital inputs

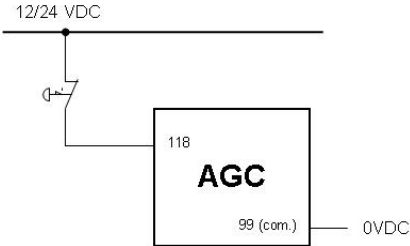
Battery positive to input:



Battery negative to input:



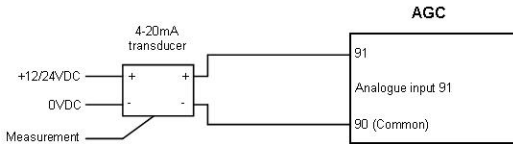
Emergency stop:



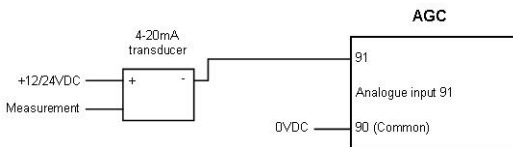
Analogue inputs

4-20mA (option M15)

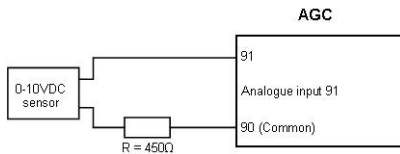
Active transducer



Passive transducer



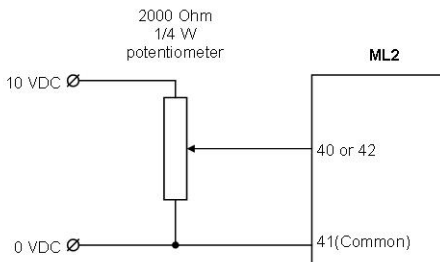
V DC sensor



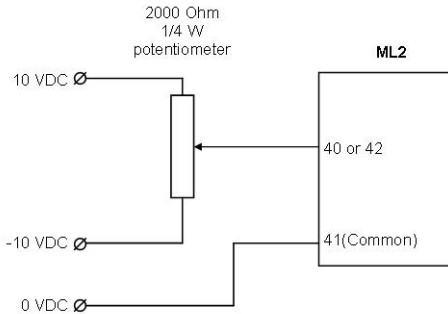
External set points (option G3)

The set point inputs are passive, i.e. an external power source is needed. This can be an active output from e.g. a PLC, or a potentiometer can be used.

0-10V DC input using potentiometer



+/-10V DC input using potentiometer

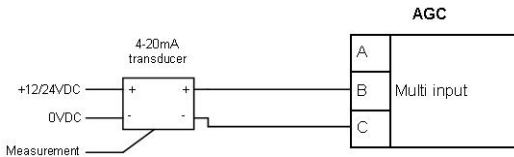


Multi inputs

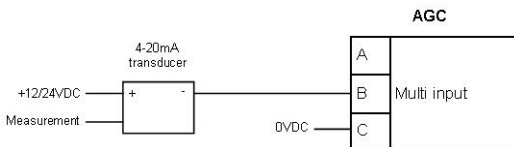
The multi inputs are placed in slot #7, the terminal numbers for the individual multi inputs can be seen in 'Input/output list'.

0(4)-20mA

Active transducer

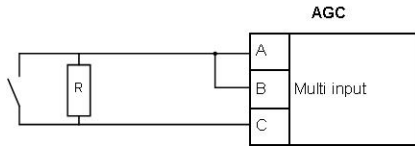


Passive transducer



If the passive sensor has its own battery supply, the voltage must not exceed 30V DC.

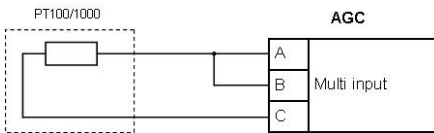
Digital inputs



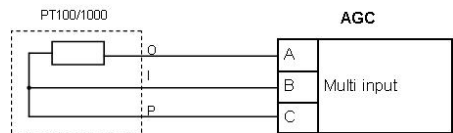
The resistor is only mounted, if wire fail supervision is required. The value of the resistor should be $270\Omega \pm 10\%$.

PT100/PT1000

2-wire

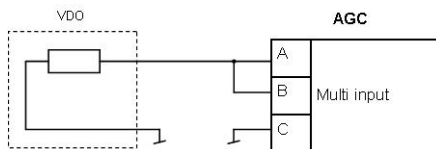


3-wire

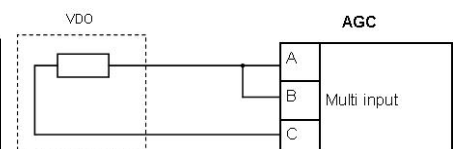


VDO

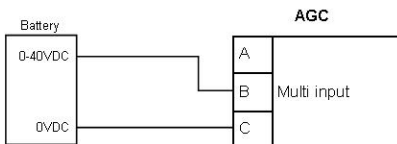
1-wire



2-wire



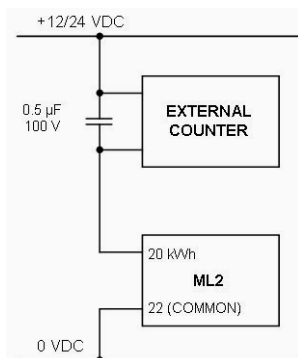
0-40V DC



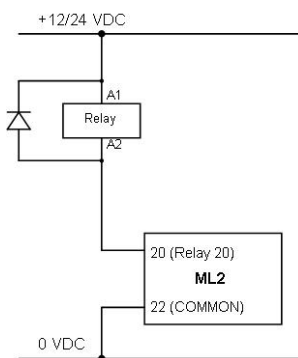
Open collector outputs

The open collector outputs can be used as kWh and kVArh counter outputs or as relay outputs. The outputs are low power outputs. For that reason one of the following circuits must be applied.

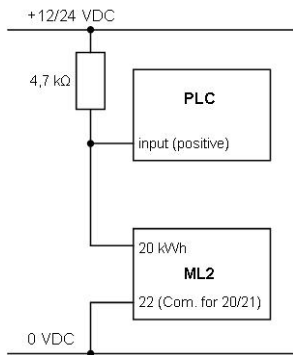
External counter:



Relay outputs:



Connection to PLC:



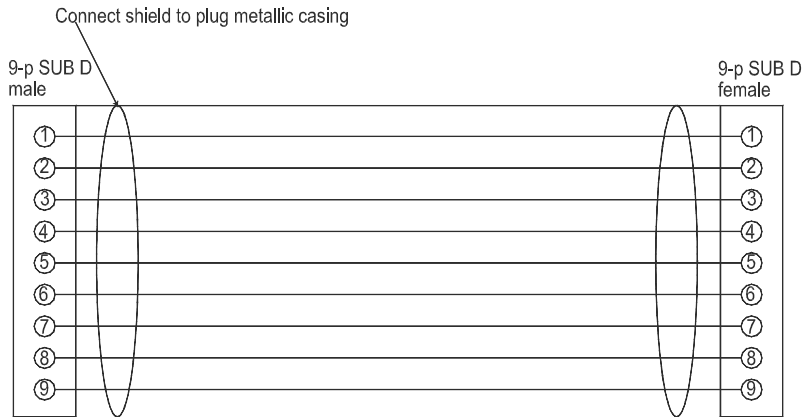
Remember to mount the free wheel diode.



Maximum load on the open collector outputs is 10mA at 24V DC.

Display cable (option J)

A standard computer extension cable can be used (9-pole SUB-D male/female plugs) or a cable can be tailored.

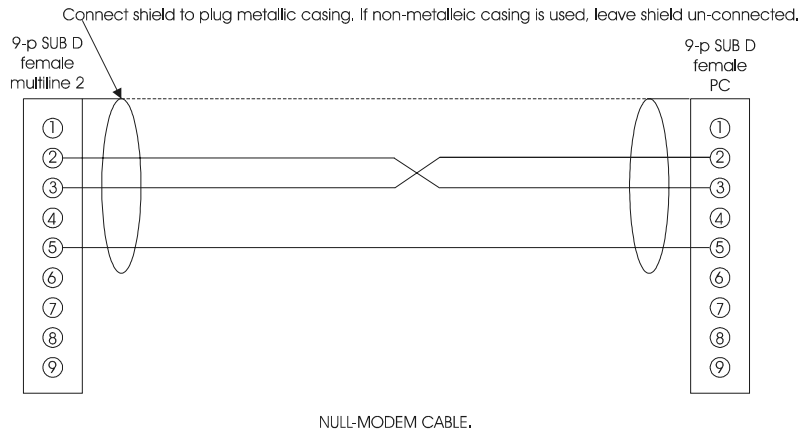


Wires min. 0.22 m², max. cable length 6 m.

Cable types: Belden 9540, BICC H8146, Brand Rex BE57540 or equivalent.

Serial cable for PC with utility software (option J3)

A standard computer null-modem cable can be used (9-pole SUB-D female/female plugs), or a cable can be tailored.



7. Technical information

Technical specifications

Accuracy:	Class 1.0 Class 0.5 with option Q1 Positive, negative and zero sequence alarms: Class 1.0 within 5% voltage asymmetry Class 1.0 for neg. seq. current Fast overcurrent: 3% of 350%*In Analogue outputs: Class 1.0 according to total range (To IEC 688)
Operating temp.:	CE: -25-70°C (-13...158° F) UL: -25-50°C (-13...122° F)
Climate:	Class HSE, to DIN 40040
Meas. voltage:	100-690V AC +/-20%
Consumption:	Max. 0.25VA/phase
Meas. current:	-/1 or -/5A AC
Consumption:	Max. 0.3VA/phase
Current overload:	4 x I _n continuously 20 x I _n , 10 sec. (max. 75A) 80 x I _n , 1 sec. (max. 300A)

Meas. frequency: 30...70Hz

Aux. supply: Terminals 1 and 2:
12/24V DC (8...36V continuously, 6V 1 sec.)
Max. 11W consumption

Terminals 98 and 99:
12/24V DC (8...36V continuously, 6V 1 sec.)
Max. 5W consumption

Binary inputs: Optocoupler, bi-directional
ON: 8-36V DC
Impedance: 4.7k Ω
OFF: <2V DC

Analogue inputs: -10-+10V DC:
Not galvanically separated
Impedance: 100k Ω

0(4)-20mA:
Impedance: 50 Ω
Not galvanically separated

RPM (MPU): 2...70V AC, 10...10000Hz,
250...3000 Ω

Multi inputs: 0(4)-20mA:
0-20mA, +/-1%
Not galvanically separated

Binary:
Max. resistance for ON detection: 100 Ω

Not galvanically separated

PT100/1000:
-40-250°C, +/-1%
Not galvanically separated
To IEC 751 and EN60751

VDO:
0-1700Ω, +/-2%
Not galvanically separated

V DC:
0-40V DC, +/-1%
Not galvanically separated

Relay outputs: Electrical rating:
250V AC/30V DC, 5A

Thermal rating @ 50°C:
2A: Continuously
4A: $t_{ON} = 5 \text{ sec.}$, $t_{OFF} = 15 \text{ sec.}$

(Unit status output: 1A)

Open collector outputs: Supply 8-36V DC, max. 10mA

Analogue outputs: 0(4)-20mA and +/-25mA
Galvanically separated
Active output (internal supply)
Load max. 500Ω

Update rate:
Transducer output: 250 ms
Regulator output: 100 ms

Load sharing lines: -5-0-+5V DC

Galv. separation: Between AC voltage, AC current and other I/Os:
3250V AC, 50Hz, 1 min.

Between analogue outputs and other I/Os:
500V DC, 1 min.

Between binary input groups and other I/Os:
500V DC, 1 min.

Response times:	Reverse power:	150 ms
	Overcurrent:	200 ms
	Fast overcurrent:	40 ms
	Over-/undervoltage:	150 ms
	Over-/underfrequency:	300 ms
	df/dt(ROCOF):	75 ms
	Vector jump:	20 ms
	Positive sequence:	75 ms
	Overload:	200 ms
	Current unbalance:	200 ms
	Voltage unbalance:	200 ms
	React. power import/export:	200 ms
	Negative sequence:	600 ms
	Zero sequence:	400 ms
	Overspeed:	400 ms
	Digital inputs:	250 ms
	Emergency stop:	200 ms
	Multi inputs:	800 ms
	Wire failure:	600 ms
Mounting:	DIN-rail mount or base mount with 6 screws	
Safety:	To EN 61010-1, installation category (overvoltage category) III, 600V, pollution degree 2	
EMC/CE:	To EN 61000-6-1/2/3/4 SS4631503 (PL4) and IEC 255-3	
Material:	All plastic materials are self-extinguishing according to UL94 (V1)	
Plug connections:	AC current:	4.0 mm ² multi stranded
	Other:	1.5 mm ² and 2.5 mm ² multi stranded
	Display:	9-pole Sub-D female
	Service port:	USB A-B
Protection:	Unit:	IP20
	Display:	IP52 (IP54 with gasket: Option L)
	To IEC 529 and EN 60529	

Approvals: CE, UL 508

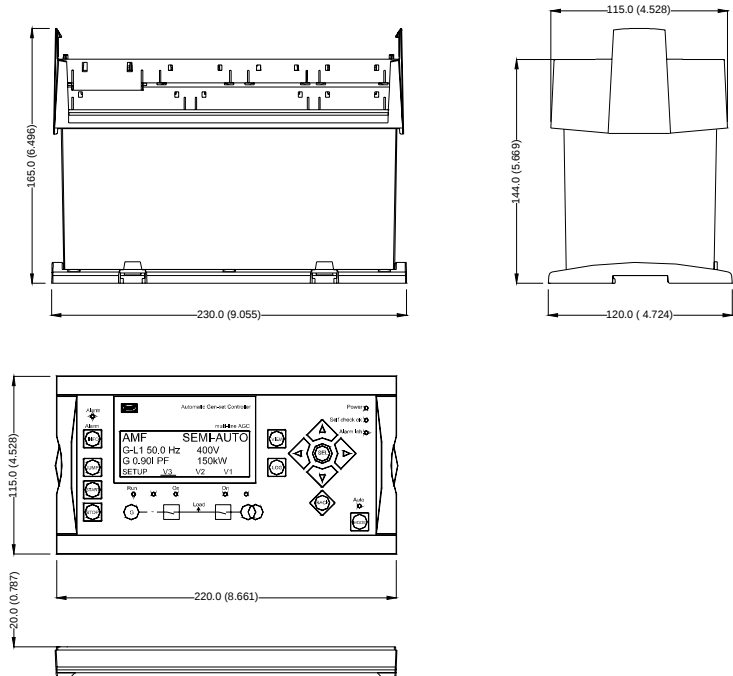
Governors: Multi-line 2 interfaces to all governors, including GAC, Barber-Colman, Woodward and Cummins

See interfacing guide at www.deif.com

Weight:

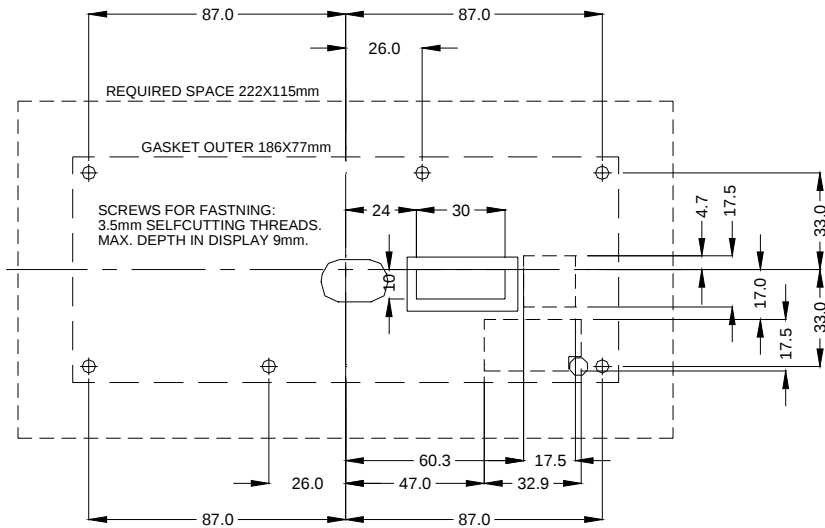
Main unit:	1.6 kg (3.5 lbs.)
Option J1/J3/J6:	0.2 kg (0.4 lbs.)
Option J2:	0.4 kg (0.9 lbs.)

Unit dimensions



Dimensions are given in mm (inches).

Panel cutout



Dimensions are given in mm.

DEIF A/S reserves the right to change any of the above