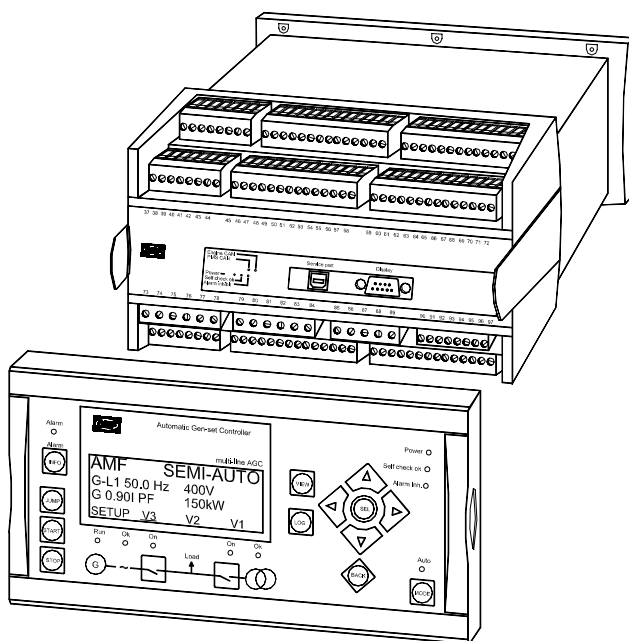


Description of options

Option D1, Voltage/VAr/PF control Multi-line 2

4189340438A

SW version 3.0X.X



- Description of option
- Functional description
- Parameter list



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1. 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 set 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 should only be carried out by authorised personnel who understand the risks involved in 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.

Definitions

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

Notes



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

Warning



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

2. Description of option

ANSI numbers

Function	ANSI no.
Voltage synchronisation matching	25, 90
Constant voltage control for stand-alone generator	90
Constant reactive power control for paralleling generator	90
Constant power factor control for paralleling generator	90
Reactive power load sharing for paralleling with other generators	90

D1 option

Option D1 is a combined software and hardware option. The specific hardware selection depends on the required interfacing to the automatic voltage regulator (AVR).

3. Functional description

Running mode selection

The unit selects the actual set point in one of two ways:

1. Automatic selection based on GB and MB feedback.
2. Manual selection based on digital inputs selection.

Automatic selection

When the automatic running mode selection is used, then the actual running mode is as indicated in the table:

	GB OFF	GB ON – MB OFF	GB ON – MB ON
Fixed voltage	X	X	
Fixed power factor			X
VAr sharing (requires option G3 or G5)		X	



VAr sharing mode is a mix of fixed voltage and VAr sharing. This means that the reactive load will be shared equally between the gen-sets AND the voltage will be maintained at the nominal value.

Manual selection

If the manual running mode selection is used, then the actual mode depends on the activated input.



The purpose of manual selection is to be able to use external set points, e.g. from an external potentiometer or a PLC.

The available running modes and their respective adjustment ranges:

Mode	Comment	Terminal 'ext. U/Q set point'
Fixed voltage	Stand-alone generator or GB opened	+/-10V DC input ~ nominal voltage +/-10%
Fixed VAr	Fixed reactive power	0-10V DC input ~ 0-100% reactive power
Fixed PF	Fixed power factor	0-10V DC input ~ 1-0.6 inductive PF



0-100% relates to the nominal power of the generator.

Input selection

In order to activate the input for the external set point, the digital input functions 'Ext. U control', 'Ext. PF control' or 'Ext. Q control' must be programmed in the PC utility software (USW) as illustrated below.

I/O settings

Inputs Outputs

Ext. Voltage control

I/O number / function Dig. input 111, Term 111

Ext. PF control

I/O number / function Dig. input 112, Term 112

Ext. Var control

I/O number / function Dig. input 113, Term 113

Close



Only one of the functions needs to be programmed.

Manual AVR control

Regarding manual control of the AVR, please refer to the chapter 'Manual governor and AVR control' in the Designer's Reference Handbook.

4. Parameter list

Controller output

2780 Reg. output

No.	Setting		Min. setting	Max. setting	Factory setting
2782	Reg. output	AVR	Relay	Analogue	Relay



Analogue selection is only available when option E1, EF2, EF4 or F2 is present.

Analogue controller settings



Menus 2640 to 2670 are only available when analogue output is selected in menu 2780.

2640 U control

No.	Setting		Min. setting	Max. setting	Factory setting
2641	U control	U Kp	0.00	60.00	0.5
2642	U control	U Ti	0.00 s	60.00 s	5.00 s
2643	U control	U Td	0.00 s	2.00 s	0.00 s

2650 Q control

No.	Setting		Min. setting	Max. setting	Factory setting
2651	Q control	Q Kp	0.00	60.00	0.5
2652	Q control	Q Ti	0.00 s	60.00 s	5.00 s
2653	Q control	Q Td	0.00 s	2.00 s	0.00 s



The reactive power [VAr] controller is used for power factor control and reactive power control.

2660 Q load sh. ctrl

No.	Setting		Min. setting	Max. setting	Factory setting
2661	Q load sh. ctrl	U Kp	0.00	60.00	0.5
2662	Q load sh. ctrl	U Ti	0.00 s	60.00 s	5.00 s
2663	Q load sh. ctrl	U Td	0.00 s	2.00 s	0.00 s
2664	Q load sh. ctrl	Q weight	0.0%	100.0%	10.0%



Menu 2660 is only available when option G3 or G5 is chosen.

2670 Analogue AVR

No.	Setting		Min. setting	Max. setting	Factory setting
2671	Analogue AVR	Offset	-100%	100%	0%

Relay controller settings

Menus 2690 to 2720 are only available when relay output is selected in menu 2780.

2690 U control

No.	Setting		Min. setting	Max. setting	Factory setting
2691	U control	U DB	0.0%	10.0%	2.0%
2692	U control	U Kp	0	100	10

2700 Q control

No.	Setting		Min. setting	Max. setting	Factory setting
2701	Q control	Q DB	0.0%	10.0%	2.0%
2702	Q control	Q Kp	0	100	10



The reactive power [VAr] controller is used for power factor control and reactive power control.

2710 Q load sh. ctrl

No.	Setting		Min. setting	Max. setting	Factory setting
2711	Q load sh. ctrl	U deadband	0.0%	10.0%	1.0%
2712	Q load sh. ctrl	U Kp	0	100	10
2713	Q load sh. ctrl	Q deadband	0.0%	10.0%	2.0%
2714	Q load sh. ctrl	Q weight	0.0%	100.0%	10.0%



Menu 2710 is only available when option G3 or G5 is chosen.

2720 Relay control

No.	Setting		Min. setting	Max. setting	Factory setting
2721	Relay control	AVR ON time t_N	10 ms	3000 ms	100 ms
2722	Relay control	AVR per time t_P	50 ms	15000 ms	500 ms
2723	Relay control	U increase	Not used	Option dependent	Not used
2724	Relay control	U decrease	Not used		Not used



Please refer to the Designer's Reference Handbook for a complete description of the relay regulation.

Regulation alarm

2680 AVR reg. failure

No.	Setting		Min. setting	Max. setting	Factory setting
2681	AVR reg. failure	Deadband	1.0%	100.0%	30.0%
2682	AVR reg. failure	Delay	10.0 s	300.0 s	60.0 s
2683	AVR reg. failure	Output A	Not used	Option dependent	Not used
2684	AVR reg. failure	Output B	Not used		Not used



The alarm is activated, if the difference between the measured value and the set point is outside the setting 'Deadband' for a longer time period than specified in the timer set point.

Nominal settings

6000 Nom. settings

No.	Setting			Min. setting	Max. setting	Factory setting
6001	Nom. settings 1	Nom. f	1	48Hz	62Hz	50Hz
6002	Nom. settings 1	Nom. P	1	10kW	20000kW	480kW
6003	Nom. settings 1	Nom. I	1	0A	9000A	867A
6004	Nom. settings 1	Nom. U	1	100V	25000V	400V
6005	Nom. settings 1	Nom. speed	1	100 rpm	4000 rpm	1500 rpm
6006	Nom. settings 1	Enable nom. set		1	4	1



Up to 4 sets of nominal settings are available, please refer to the Designer's Reference Handbook for a complete description.

PF control

7050 Fixed power set

No.	Setting		Min. setting	Max. setting	Factory setting
7052	Fixed power set	PF set point	0.60	1.00	0.90



The set points for voltage, reactive power and power factor are normally set by the switchboard manufacturer during commissioning.

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