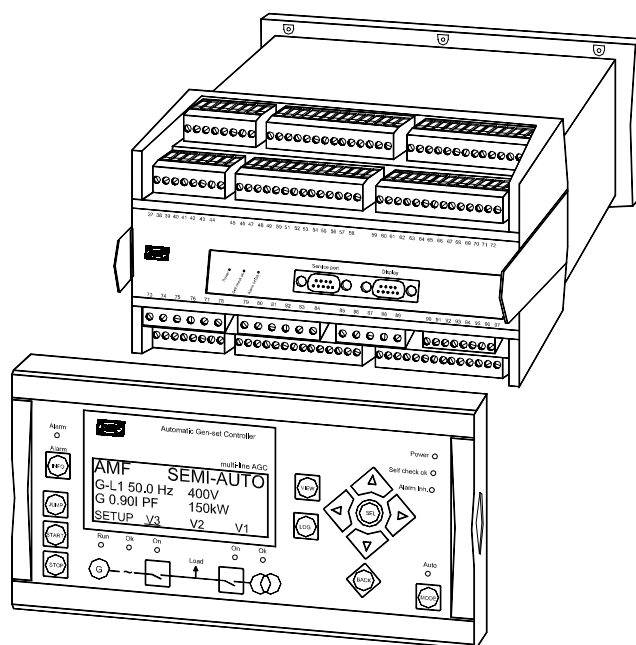


Description of options

Option D, Voltage/var/PF control Automatic Gen-set Controller

4189340384B

SW version 2.3X.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

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.

Option D1 includes the following:

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

3. Functional description

Regulators



The working principle of the PI regulator is described in the Designer's Reference Handbook.

The outputs for the AVR can be either analogue or digital. Please refer to the datasheet for further information about possible selections.

Set points

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

Voltage

No.	Setting		Min. setting	Max. setting	Factory setting
6014	Nominal settings	Generator volt.	100 V	25000 V	440 V

Power factor

No.	Setting		Min. setting	Max. setting	Factory setting
6552	Fixed set point	PF set point	0.60	1.00	0.90

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 also option G3 or G5)		X	



If option G3 is selected, then the gen-set will operate in var share mode, when the GB is closed and the MB is opened. 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 potmeter or a PLC.

The available running modes and their respective adjustment ranges:

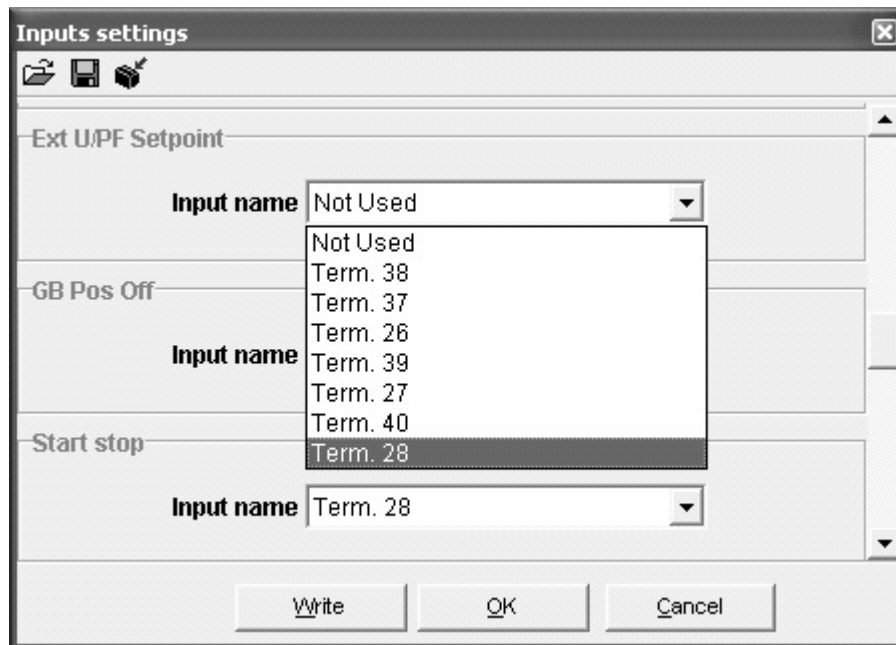
Mode	Comment	Terminal 'ext. U/Q set point'
Fixed voltage	Stand-alone generator or GB opened	+/-10V DC input ~ nominal voltage +/-10%
Fixed var	Fixed reactive power	0...10V DC input ~ 0...100% reactive power
Fixed PF	Fixed power factor	0...10V DC input ~ 1...0.6 inductive PF
var sharing	Island plant reactive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



0...100% relates to the nominal power (menu 6012) of the generator.

Input selection

In order to activate the input for the external set point, the digital input function 'ext. U/PF set point' must be selected as illustrated below.



Manual AVR control

The AVR can be given increase and decrease signals with digital inputs. The inputs can be used in manual mode and in semi-auto mode.

Manual mode

In manual mode the regulation is switched off. The output of the regulator will therefore not change depending on the voltage or vars/PF. The output will only change, if the manual up or manual down input is activated.

Semi-auto mode

In semi-auto mode the regulator is active, and the voltage or vars/PF is controlled according to the actual set point. If semi-auto is selected, the regulation is switched off when either the manual increase or decrease input is activated. Now an offset can be given to the voltage or vars/PF depending on the operation.

The regulation is activated as soon as the manual increase or manual decrease input is deactivated. This can be used during commissioning of the gen-set.



This function does not change the set point of the controller. It only gives an offset to the controller when the manual input is ON.



It is also possible to use manual governor control similar to the manual AVR control.

4. Parameter list

Controller settings



The dead band adjustment is only available, if the AVR is controlled with relay outputs from the controller unit.

2580 Voltage controller

No.	Setting		Min. setting	Max. setting	Factory setting
2581	Voltage control	Dead band	0.0%	10.0%	2.0%
2582	Voltage control	U K_p	0	1000	10
2583	Voltage control	U K_i	0	1000	10

2590 var controller (option D1)

No.	Setting		Min. setting	Max. setting	Factory setting
2591	var control	Dead band	0.0%	10.0%	2.0%
2592	var control	Q K_p	0	1000	10
2593	var control	Q K_i	0	1000	10



The var controller is used for power factor control, reactive power control and var's sharing.

2600 Analogue AVR offset

No.	Setting		Min. setting	Max. setting	Factory setting
2601	Analogue AVR	Offset	-100%	100%	0%

Regulation alarm

2610 AVR regulation failure

No.	Setting		Min. setting	Max. setting	Factory setting
2611	AVR reg. failure	Reg. error	1.0%	100.0%	30.0%
2612	AVR reg. failure	Timer	10.0 s	300.0 s	60.0 s
2613	AVR reg. failure	Output A	R0 (none)	Option dependent	R0 (none)
2614	AVR reg. failure	Output B	R0 (none)		R0 (none)

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

2640 Relay controls

No.	Setting		Min. setting	Max. setting	Factory setting
2643	Relay control	AVR ON time t_N	10 ms	3000 ms	100 ms
2644	Relay control	AVR per. time t_P	50 ms	15000 ms	500 ms



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

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