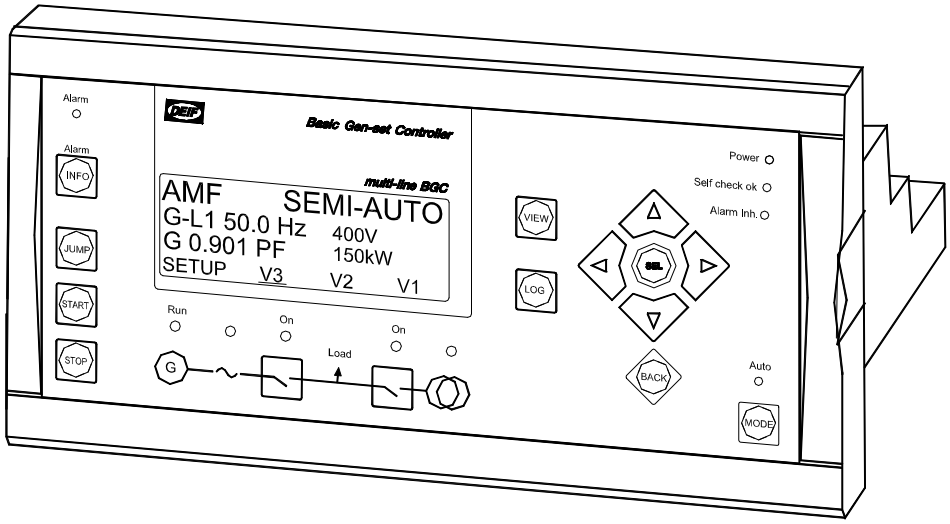
DEIF A/S

Description of options

Option D,
Voltage/VAr/PF control
Basic Gen-set Controller

4189340305D



- *Description of option*
- *Functional description*

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1. Warnings and legal information

This chapter includes important information about general legal issues relevant in the handling of DEIF products. Furthermore, some overall safety precautions will be introduced and recommended. Finally, the highlighted notes, which will be used throughout this document, are presented.

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 BGC unit, the company responsible for the installation or the operation of the set must be contacted.

The BGC units are not to be opened by unauthorized 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 BGC unit implies work with dangerous currents and voltages. Therefore, the installation of the BGC should only be carried out by authorized personnel who understand the risks involved in the working with live electrical equipment.

Notes

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

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2. Description of option

This option includes the voltage/VAr/PF control.

D1:

Selection between:

- Constant voltage
- Constant reactive power control
- Constant power factor control
- Reactive load sharing

D2:

- Constant voltage

3. Functional description

Controllers

See the Designer's Reference Handbook for further information about the function of the PI controller outputs

The outputs can be relay (option G2/G3 + M14) or analogue 20…0…20mA. (option G2/G3). In both cases, option D1 or D2 must be selected.

Option D1

The set point for voltage/reactive power/power factor is normally set from factory - voltage as the nominal setting and power factor set in the specific setting.

Voltage/power factor

4010 Nominal settings, level 1

No.	Setting		Min. setting	Max. setting	Factory setting
4014	Nominal settings	Generator volt.	100 V	25000 V	440 V

4020 Nominal settings, level 2

No.	Setting		Min. setting	Max. setting	Factory setting
4024	Nominal settings 2	Generator volt.	100 V	25000 V	440 V

3080 Fixed PF set point

No.	Setting		Min. setting	Max. setting	Factory setting
3082	Fixed power set point	PF set point	0.60	1.00	0.90

4800 Governor and AVR relay setting

No.	Setting		Min. setting	Max. setting	Factory setting
4801	Gov up relay	Output	Relay 0	Relay 5	Relay 0
4802	Gov down relay	Output	Relay 0	Relay 5	Relay 0
4803	AVR up relay	Output	Relay 0	Relay 5	Relay 0
4804	AVR down relay	Output	Relay 0	Relay 5	Relay 0

External set point

The binary input for external set point can be used to activate the use of an analogue input as reference.

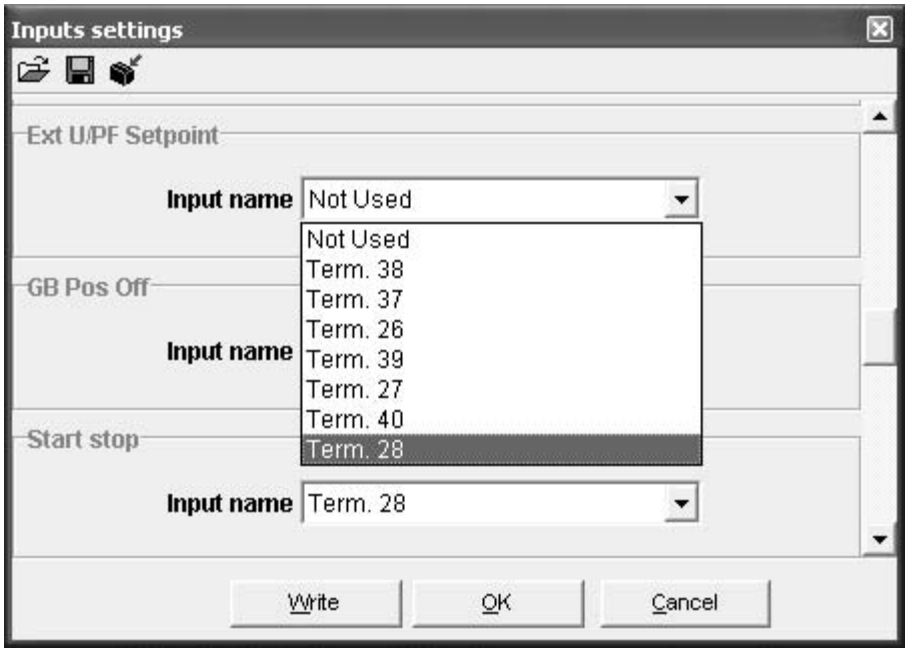
The set point input is terminal 75(+) and 76(-), and the signal level is +/-10V DC.

Mode	Terminal "ext U/Q set point"
Fixed voltage (stand-alone generator)	+/-10V DC input ~ nominal voltage +/-10%
Fixed VAr (fixed reactive power)	Only through modbus/profibus
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%

External VAr set point is only possible through Modbus/Profibus

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.



2140 Voltage controller (options D1 and D2)

No.	Setting		Min. setting	Max. setting	Factory setting
2141	Voltage control	Deadband	0.0%	10.0%	2.0%
2142	Voltage control	U K_P	0	1000	250
2143	Voltage control	U K_I	0	1000	160

The voltage controller is active, when the generator is running in island mode.
Voltage dead band % settings relate to nominal generator voltage.

2150 VAr controller (option D1)

No.	Setting		Min. setting	Max. setting	Factory setting
2151	VAr control	Deadband	0.0%	10.0%	2.0%
2152	VAr control	Q K_P	0	1000	250
2153	VAr control	Q K_I	0	1000	160

VAr deadband % settings relate to nominal generator power value, i.e. it is assumed that the generator VAr value is identical to the kW value. This is not entirely correct, but the assumption is made for control purposes only. The VAr controller is active, when the generator is parallel to mains controlling the PF.

2190 AVR regulation failure

No.	Setting		Min. setting	Max. setting	Factory setting
2191	AVR reg. failure	Reg error	1.0%	100.0%	30.0%
2192	AVR reg. failure	Timer	10.0 s	300.0 s	60.0 s
2193	AVR reg. failure	Output A	R0 (none)	R3 (relay3)	R0 (none)
2194	AVR reg. failure	Output B	R0 (none)	R3 (relay3)	R0 (none)
2195	AVR reg. failure	Fail class	1 Alarm	6 Trip of MB	2 Warning

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.

2210 Analogue AVR offset

No.	Setting		Min. setting	Max. setting	Factory setting
2211	Analogue AVR	Offset	-100%	100%	0%

Relay controls

This setting is used to tune in the AVR ON time, when relay outputs are being used for control. The total relay ON time will depend on the deviation from the set point. t_N is the minimum time period the relay can be activated for.

Further information can be obtained under the heading 'PI controller' in the Designer's Reference Handbook.

No.	Setting		Min. setting	Max. setting	Factory setting
2223	Relay control	AVR ON time t_N	10 ms	3000 ms	100 ms
2224	Relay control	AVR per. time t_P	50 ms	15000 ms	500 ms

Option D2

The set point for voltage is normally set from factory - voltage as the nominal setting and power factor set in the specific setting.

Voltage

4010 Nominal settings, level 1

No.	Setting		Min. setting	Max. setting	Factory setting
4014	Nominal settings	Generator volt.	100 V	25000 V	440 V

4020 Nominal settings, level 2

No.	Setting		Min. setting	Max. setting	Factory setting
4024	Nominal settings 2	Generator volt.	100 V	25000 V	440 V

External set point

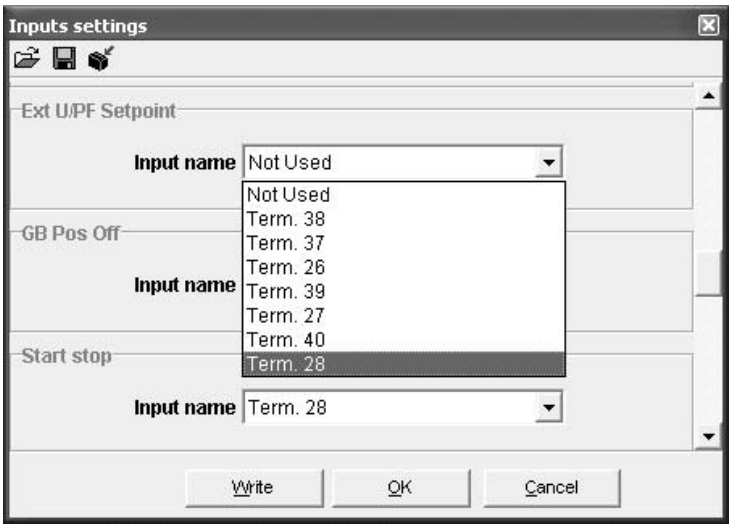
The binary input for external set point can be used to activate the use of an analogue input as reference.

The set point input is terminal 75(+) and 76(-), and the signal level is +/-10 VDC.

Mode	Terminal "ext. U/Q set point"
Fixed voltage (stand-alone generator)	+/-10V DC input ~ nominal voltage +/-10%

Input selection

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



2140 Voltage controller (option D)

No.	Setting		Min. setting	Max. setting	Factory setting
2141	Voltage control	Deadband	0.0%	10.0%	2.0%
2142	Voltage control	U K_P	0	1000	250
2143	Voltage control	U K_I	0	1000	160

The voltage controller is active when the generator is in island mode.
Voltage deadband % settings relate to nominal generator voltage.

2190 AVR regulation failure

No.	Setting		Min. setting	Max. setting	Factory setting
2191	AVR reg. failure	Reg error	1.0%	100.0%	30.0%
2192	AVR reg. failure	Timer	10.0 s	360.0 s	60.0 s
2193	AVR reg. failure	Output A	R0 (none)	R3 (relay3)	R0 (none)
2194	AVR reg. failure	Output B	R0 (none)	R3 (relay3)	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.

2210 Analogue AVR offset

No.	Setting		Min. setting	Max. setting	Factory setting
2211	Analogue AVR	Offset	-100%	100%	0%

Relay controls

This setting is used to tune in the AVR ON time, when relay outputs are being used for control. The total relay ON time will depend on the deviation from the set point. t_N is the minimum time period the relay can be activated for.

No.	Setting		Min. setting	Max. setting	Factory setting
2223	Relay control	AVR ON time t_N	10 ms	3000 ms	100 ms
2224	Relay control	AVR per. time t_P	50 ms	15000 ms	500 ms