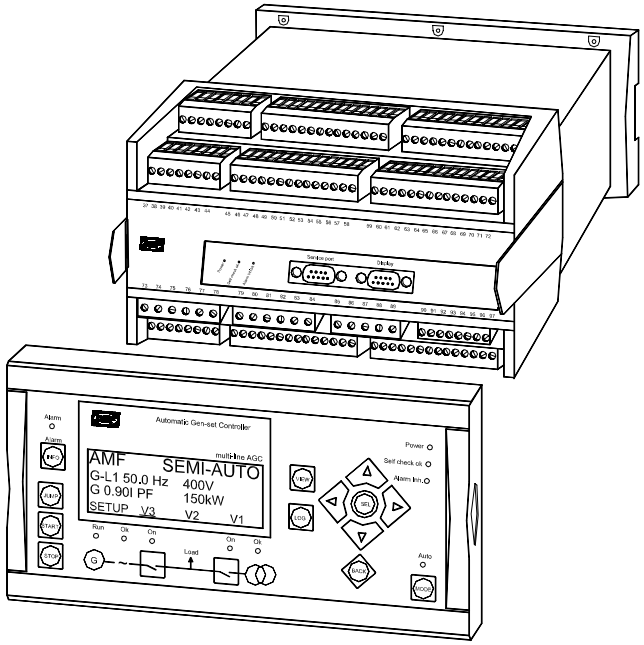
DEIF A/S

Description of options

Option C1,
Generator add-on protection package
Automatic Gen-set Controller

4189340383A
SW version 2.1X.X



- *Description of options*
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CE

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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

C1 option

Option C1 is a software option and therefore not related to any hardware apart from the standard installed hardware. Option C1 is a mix of frequency, voltage, overload, overcurrent, unbalance alarms and reactive power import/export protections as follows:

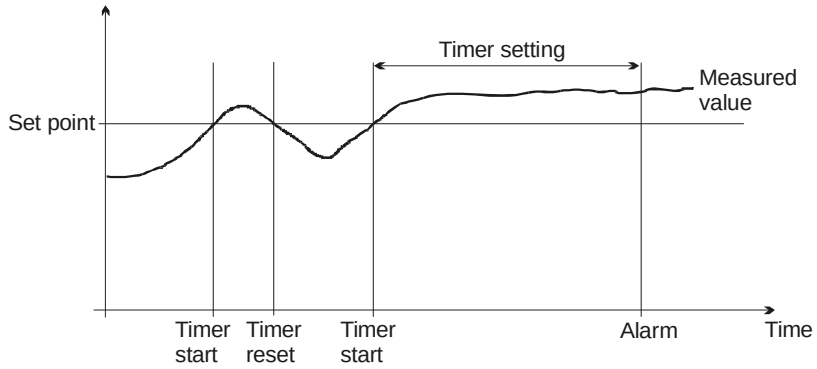
Protection	ANSI no.
Overvoltage	59
Undervoltage	27
Overfrequency	81
Underfrequency	81
Overload	32
Fast overcurrent	50/51
Current unbalance	60
Voltage asymmetry	60
Loss of excitation (reactive power import)	40
Overexcitation (reactive power export)	40

3. Functional description

Principle

The protections are all of the definite time type, i.e. a set point and time is selected.

If the function is e.g. overvoltage, the timer will be activated, if the set point is exceeded. If the voltage value goes below the set point value, before the timer runs out, then the timer will be stopped and reset.

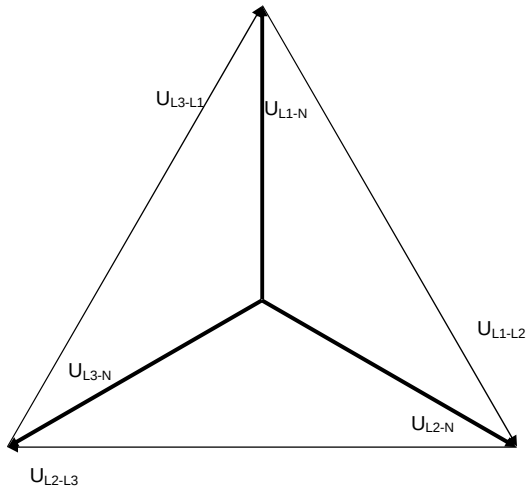


When the timer runs out, the output is activated.

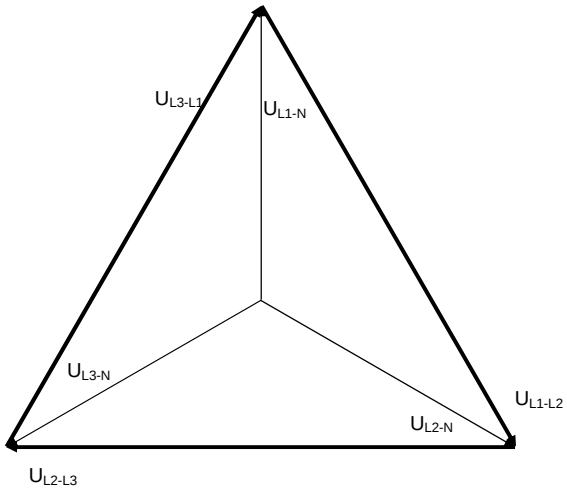
Phase – neutral voltage trip

If the voltage alarms must work based on phase-neutral measurements, it can be adjusted in menu 6420. Depending on the selections either phase-phase voltages or phase-neutral voltages will be used for the alarm monitoring.

Phase - neutral



Phase - phase



It can be seen in the vector diagram that there is a difference in voltage values at an error situation for the phase-neutral voltage and the phase-phase voltage.

The table shows the actual measurements at a 10% undervoltage situation in a 400/230 volts system.

	Phase - neutral	**Phase - phase**
Nominal voltage	**400/230**	**400/230**
Voltage, 10% error	380/**207**	**360**/185

It is clear that the alarm will occur at two different voltage levels, even though the alarm set point is 10% in both cases.

Example
The example below is from a 400V AC system. It shows that the phase-neutral voltage must change 20%, when the phase-phase voltage changes 40 volts (10%).

Example:

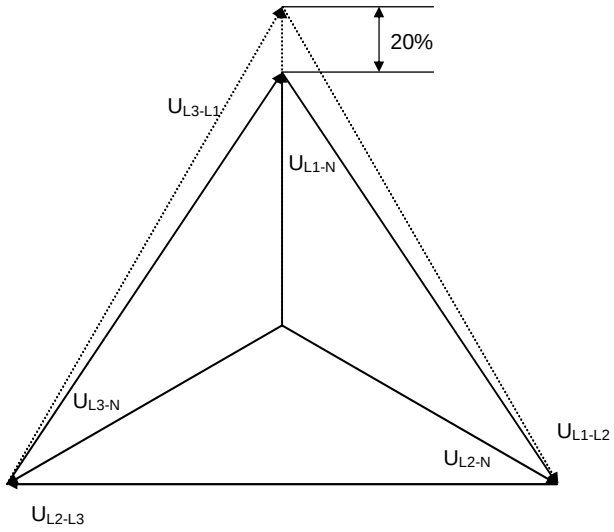
U_{NOM} = 400/230V AC

Error situation:

U_{L1L2} = 360V AC
U_{L3L1} = 360V AC

U_{L1-N} = 185V AC

ΔU_{PH-N} = 20%



Phase-neutral or phase-phase, both the generator protections and the busbar/mains protections use the selected voltage.

4. Parameter list

Parameter table description

The table consists of the following possible adjustments.

Set point: The alarm set point is adjusted in the set point menu. The setting is in Hz/sec.

Timer: The timer setting indicates the duration of the period between the alarm situation and the alarm occurrence.

Relay output A: A relay can be activated by the output A.

Relay output B: A relay can be activated by the output B.

Enable: The alarm can be activated or deactivated. ON means always activated, RUN means that the alarm has run status. This means it is activated when the running signal is present.

For further information about the structure of the parameter descriptions, please see the Designer's Reference Handbook.

Fast overcurrent protection

Alarm settings relate to the nominal current setting (setting 6013).

1070 Generator fast overcurrent 1 protection

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1071	Fast overcurr. 1	Set point	50.0%	350.0%	-	150.0%
1072	Fast overcurr. 1	Timer	0.0 s	100.0 s	-	0.0 s
1073	Fast overcurr. 1	Relay output A	R0 (none)	Option dependent	-	R0 (none)
1074	Fast overcurr. 1	Relay output B	R0 (none)		-	R0 (none)
1075	Fast overcurr. 1	Enable	OFF	ON	RUN	ON
1076	Fast overcurr. 1	Fail class	Alarm (1)	Trip MB (6)	-	Trip GB (3)

1080 Generator fast overcurrent 2 protection

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1081	Fast overcurr. 2	Set point	50.0%	200.0%	-	350.0%
1082	Fast overcurr. 2	Timer	0.1 s	100.0 s	-	1.0 s
1083	Fast overcurr. 2	Relay output A	R0 (none)	Option dependent	-	R0 (none)
1084	Fast overcurr. 2	Relay output B	R0 (none)		-	R0 (none)
1085	Fast overcurr. 2	Enable	OFF	ON	RUN	ON
1086	Fast overcurr. 2	Fail class	Alarm (1)	Trip MB (6)	-	Trip GB (3)

Voltage protections

6420 Voltage trip measurement

No.	Setting		Min. setting	Max. setting	Factory setting
6420	Voltage trip	Set point	Phase-phase	Phase-neutral	Phase-phase

The voltage protection functions are as default set to be based on phase-phase measurements, but can be selected to be phase-neutral based.

When phase-phase tripping is selected, the voltage alarms relate to the nominal voltage, menu 6014.
When phase-neutral tripping is selected, the voltage alarms relate to the nominal voltage (menu 6014) divided by √3.

1100 Generator high voltage 1 protection

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1101	Gen. high volt. 1	Set point	100.0%	120.0%	-	103.0%
1102	Gen. high volt. 1	Timer	0.1 s	100.0 s	-	10.0 s
1103	Gen. high volt. 1	Relay output A	R0 (none)	Option dependent	-	R0 (none)
1104	Gen. high volt. 1	Relay output B	R0 (none)		-	R0 (none)
1105	Gen. high volt. 1	Enable	OFF	ON	RUN	OFF
1106	Gen. high volt. 1	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

1110 Generator high voltage 2 protection

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1111	Gen. high volt. 2	Set point	100.0%	120.0%	-	105.0%
1112	Gen. high volt. 2	Timer	0.1 s	100.0 s	-	5.0 s
1113	Gen. high volt. 2	Relay output A	R0 (none)	Option dependent	-	R0 (none)
1114	Gen. high volt. 2	Relay output B	R0 (none)		-	R0 (none)
1115	Gen. high volt. 2	Enable	OFF	ON	RUN	OFF
1116	Gen. high volt. 2	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

1120 Generator low voltage 1 protection

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1121	Gen. low volt. 1	Set point	80.0%	100.0%	-	97.0%
1122	Gen. low volt. 1	Timer	0.1 s	100.0 s	-	10.0 s
1123	Gen. low volt. 1	Relay output A	R0 (none)	Option dependent	-	R0 (none)
1124	Gen. low volt. 1	Relay output B	R0 (none)		-	R0 (none)
1125	Gen. low volt. 1	Enable	OFF	ON	RUN	OFF
1126	Gen. low volt. 1	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

1130 Generator low voltage 2 protection

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1131	Gen. low volt. 2	Set point	50.0%	100.0%	-	95.0%
1132	Gen. low volt. 2	Timer	0.1 s	100.0 s	-	5.0 s
1133	Gen. low volt. 2	Relay output A	R0 (none)	Option dependent	-	R0 (none)
1134	Gen. low volt. 2	Relay output B	R0 (none)		-	R0 (none)
1135	Gen. low volt. 2	Enable	OFF	ON	RUN	OFF
1136	Gen. low volt. 2	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

Frequency protections

Frequency settings relate to nominal frequency setting (setting 6011).

1140 Generator high frequency 1 protection

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1141	Gen. high freq. 1	Set point	100.0%	120.0%	-	103.0%
1142	Gen. high freq. 1	Timer	0.2 s	100.0 s	-	10.0 s
1143	Gen. high freq. 1	Relay output A	R0 (none)	Option dependent	-	R0 (none)
1144	Gen. high freq. 1	Relay output B	R0 (none)		-	R0 (none)
1145	Gen. high freq. 1	Enable	OFF	ON	RUN	OFF
1146	Gen. high freq. 1	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

1150 Generator high frequency 2 protection

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1151	Gen. high freq. 2	Set point	100.0%	120.0%	-	105.0%
1152	Gen. high freq. 2	Timer	0.2 s	100.0 s	-	5.0 s
1153	Gen. high freq. 2	Relay output A	R0 (none)	Option dependent	-	R0 (none)
1154	Gen. high freq. 2	Relay output B	R0 (none)		-	R0 (none)
1155	Gen. high freq. 2	Enable	OFF	ON	RUN	OFF
1156	Gen. high freq. 2	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

1160 Generator low frequency 1 protection

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1161	Gen. low freq. 1	Set point	80.0%	100.0%	-	97.0%
1162	Gen. low freq. 1	Timer	0.2 s	100.0 s	-	10.0 s
1163	Gen. low freq. 1	Relay output A	R0 (none)	Option dependent	-	R0 (none)
1164	Gen. low freq. 1	Relay output B	R0 (none)		-	R0 (none)
1165	Gen. low freq. 1	Enable	OFF	ON	RUN	OFF
1166	Gen. low freq. 1	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

1170 Generator low frequency 2 protection

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1171	Gen. low freq. 2	Set point	80.0%	100.0%	-	95.0%
1172	Gen. low freq. 2	Timer	0.2 s	100.0 s	-	5.0 s
1173	Gen. low freq. 2	Relay output A	R0 (none)	Option dependent	-	R0 (none)
1174	Gen. low freq. 2	Relay output B	R0 (none)		-	R0 (none)
1175	Gen. low freq. 2	Enable	OFF	ON	RUN	OFF
1176	Gen. low freq. 2	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

Overload protections

Settings relate to nominal power (menu 6012).

1260 Generator overload 1 protection

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1261	Overload 1	Set point	1.0%	200.0%	-	100.0%
1262	Overload 1	Timer	0.1 s	100.0 s	-	10.0 s
1263	Overload 1	Relay output A	R0 (none)	Option dependent	-	R0 (none)
1264	Overload 1	Relay output B	R0 (none)		-	R0 (none)
1265	Overload 1	Enable	OFF	ON	RUN	OFF
1266	Overload 1	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

1270 Generator overload 2 protection

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1271	Overload 2	Set point	1.0%	200.0%	-	110.0%
1272	Overload 2	Timer	0.1 s	100.0 s	-	5.0 s
1273	Overload 2	Relay output A	R0 (none)	Option dependent	-	R0 (none)
1274	Overload 2	Relay output B	R0 (none)		-	R0 (none)
1275	Overload 2	Enable	OFF	ON	RUN	OFF
1276	Overload 2	Fail class	Alarm (1)	Trip MB (6)	-	Trip GB (3)

Current unbalance protection

1280 Generator current unbalance protection

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1281	Current unbalance	Set point	0.0%	100.0%	-	30.0%
1282	Current unbalance	Timer	0.1 s	100.0 s	-	10.0 s
1283	Current unbalance	Relay output A	R0 (none)	Option dependent	-	R0 (none)
1284	Current unbalance	Relay output B	R0 (none)		-	R0 (none)
1285	Current unbalance	Enable	OFF	ON	RUN	OFF
1286	Current unbalance	Fail class	Alarm (1)	Trip MB (6)	-	Trip GB (3)

Settings relate to nominal current (menu 6013).

Voltage asymmetry protection

1290 Generator voltage unbalance protection

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1291	Voltage unbalance	Set point	0.0%	50.0%	-	10.0%
1292	Voltage unbalance	Timer	0.1 s	100.0 s	-	10.0 s
1293	Voltage unbalance	Relay output A	R0 (none)	Option dependent	-	R0 (none)
1294	Voltage unbalance	Relay output B	R0 (none)		-	R0 (none)
1295	Voltage unbalance	Enable	OFF	ON	RUN	OFF
1296	Voltage unbalance	Fail class	Alarm (1)	Trip MB (6)	-	Trip GB (3)

Settings relate to nominal voltage (menu 6014).

var import (loss of excitation) protection

1300 var import protection

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1301	var import	Set point	0.0%	150.0%	-	50.0%
1302	var import	Timer	0.1 s	100.0 s	-	10.0 s
1303	var import	Relay output A	R0 (none)	Option dependent	-	R0 (none)
1304	var import	Relay output B	R0 (none)		-	R0 (none)
1305	var import	Enable	OFF	ON	RUN	OFF
1306	var import	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

Settings relate to nominal power (menu 6012).

var export (overexcitation) protection

1310 var export

No.	Setting		Min. setting	Max. setting	Third setting	Factory setting
1311	var export	Set point	0.0%	100.0%	-	60.0%
1312	var export	Timer	0.1 s	100.0 s	-	10.0 s
1313	var export	Relay output A	R0 (none)	Option dependent	-	R0 (none)
1314	var export	Relay output B	R0 (none)		-	R0 (none)
1315	var export	Enable	OFF	ON	RUN	OFF
1316	var export	Fail class	Alarm (1)	Trip MB (6)	-	Warning (2)

Settings relate to nominal power (menu 6012).