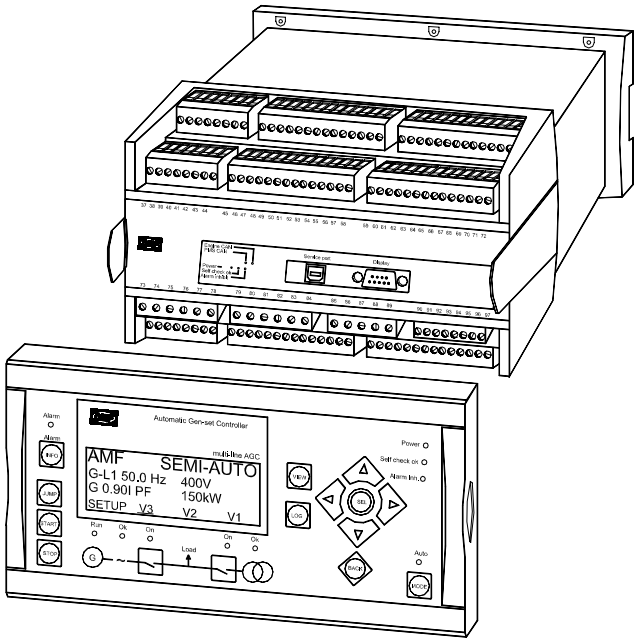
DEIF A/S

Description of options

Option C1, Generator add-on protection package Multi-line 2

4189340436A
SW version 3.0X.X



- *Description of option*
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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:

ANSI numbers

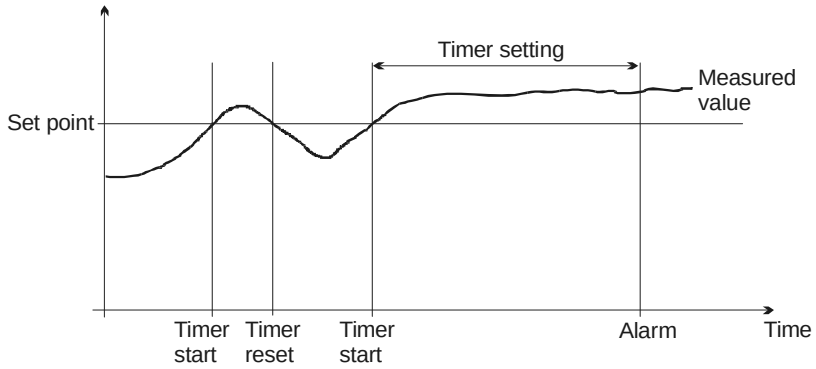
Protection	ANSI no.
Overvoltage, U>	59
Undervoltage, U<	27
Overfrequency, f>	81
Underfrequency, f<	81
Overload, P>	32
Fast overcurrent, I>>	50/51
Current unbalance	60
Voltage unbalance	60
Loss of excitation (reactive power import), -Q>	40
Overexcitation (reactive power export), Q>	40

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 falls below the set point value before the timer runs out, then the timer will be stopped and reset.

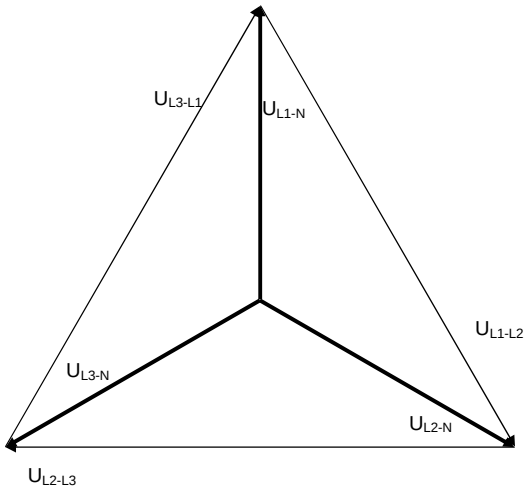


When the timer runs out, the output is activated.

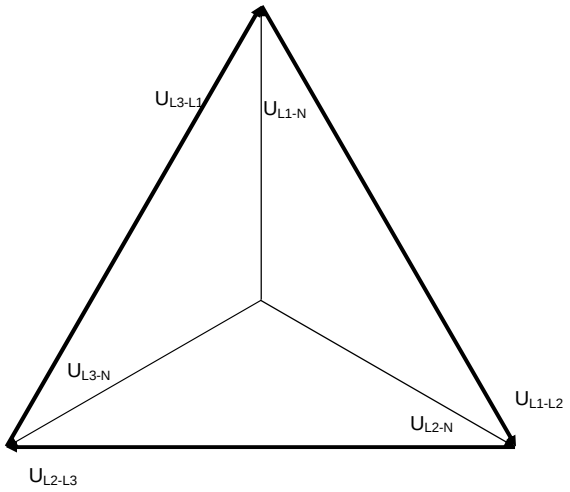
Phase-neutral voltage trip

If the voltage alarms must work based on phase-neutral measurements, please adjust menu 1200. Depending on the selections, either phase-phase voltages or phase-neutral voltages will be used for the alarm monitoring.

Phase-neutral



Phase-phase



As indicated in the vector diagram, 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 volt system.

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

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

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

Example:

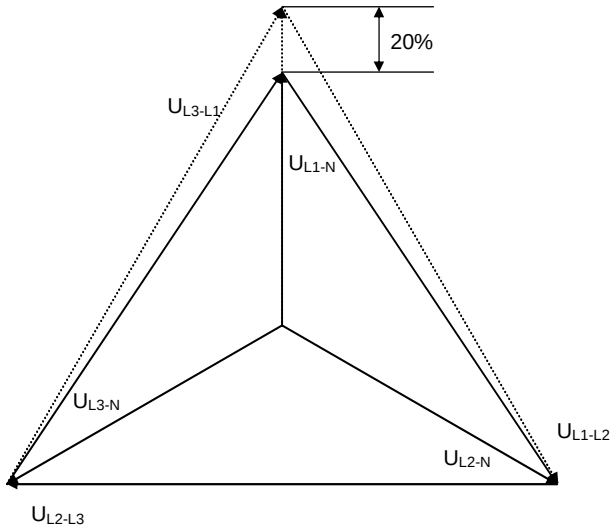
U_{NOM} = 400/230V AC

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

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.

1130 G I>> 1

No.	Setting			Min. setting	Max. setting	Factory setting
1131	G I>>	1	Set point	150.0%	350.0%	150.0%
1132	G I>>	1	Delay	0.0 s	100.0 s	2.0 s
1133	G I>>	1	Relay output A	Not used	Option dependent	Not used
1134	G I>>	1	Relay output B	Not used		Not used
1135	G I>>	1	Enable	OFF	ON	OFF
1136	G I>>	1	Fail class	Alarm (1)	Trip MB (6)	Trip GB (3)

1140 G I>> 2

No.	Setting			Min. setting	Max. setting	Factory setting
1141	G I>>	2	Set point	150.0%	350.0%	200.0%
1142	G I>>	2	Delay	0.0 s	100.0 s	0.5 s
1143	G I>>	2	Relay output A	Not used	Option dependent	Not used
1144	G I>>	2	Relay output B	Not used		Not used
1145	G I>>	2	Enable	OFF	ON	OFF
1146	G I>>	2	Fail class	Alarm (1)	Trip MB (6)	Trip GB (3)

Voltage protections

1200 G voltage trip

No.	Setting		Min. setting	Max. setting	Factory setting
1201	G 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.

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

1150 G U> 1

No.	Setting			Min. setting	Max. setting	Factory setting
1151	G U>	1	Set point	100.0%	120.0%	103.0%
1152	G U>	1	Delay	0.1 s	100.0 s	10.0 s
1153	G U>	1	Relay output A	Not used	Option dependent	Not used
1154	G U>	1	Relay output B	Not used		Not used
1155	G U>	1	Enable	OFF	ON	OFF
1156	G U>	1	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

1160 G U> 2

No.	Setting			Min. setting	Max. setting	Factory setting
1161	G U>	2	Set point	100.0%	120.0%	105.0%
1162	G U>	2	Delay	0.1 s	100.0 s	5.0 s
1163	G U>	2	Relay output A	Not used	Option dependent	Not used
1164	G U>	2	Relay output B	Not used		Not used
1165	G U>	2	Enable	OFF	ON	OFF
1166	G U>	2	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

1170 G U< 1

No.	Setting			Min. setting	Max. setting	Factory setting
1171	G U<	1	Set point	50.0%	100.0%	97.0%
1172	G U<	1	Delay	0.1 s	100.0 s	10.0 s
1173	G U<	1	Relay output A	Not used	Option dependent	Not used
1174	G U<	1	Relay output B	Not used		Not used
1175	G U<	1	Enable	OFF	ON	OFF
1176	G U<	1	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

1180 G U< 2

No.	Setting			Min. setting	Max. setting	Factory setting
1181	G U<	2	Set point	50.0%	100.0%	95.0%
1182	G U<	2	Delay	0.1 s	100.0 s	5.0 s
1183	G U<	2	Relay output A	Not used	Option dependent	Not used
1184	G U<	2	Relay output B	Not used		Not used
1185	G U<	2	Enable	OFF	ON	OFF
1186	G U<	2	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

1190 G U< 3

No.	Setting			Min. setting	Max. setting	Factory setting
1191	G U<	3	Set point	50.0%	100.0%	95.0%
1192	G U<	3	Delay	0.1 s	100.0 s	5.0 s
1193	G U<	3	Relay output A	Not used	Option dependent	Not used
1194	G U<	3	Relay output B	Not used		Not used
1195	G U<	3	Enable	OFF	ON	OFF
1196	G U<	3	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

Frequency protections

Frequency settings relate to nominal frequency setting.

1210 G f> 1

No.	Setting			Min. setting	Max. setting	Factory setting
1211	G f>	1	Set point	100.0%	120.0%	103.0%
1212	G f>	1	Delay	0.2 s	100.0 s	10.0 s
1213	G f>	1	Relay output A	Not used	Option dependent	Not used
1214	G f>	1	Relay output B	Not used		Not used
1215	G f>	1	Enable	OFF	ON	OFF
1216	G f>	1	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

1220 G f> 2

No.	Setting			Min. setting	Max. setting	Factory setting
1221	G f>	2	Set point	100.0%	120.0%	105.0%
1222	G f>	2	Delay	0.2 s	100.0 s	5.0 s
1223	G f>	2	Relay output A	Not used	Option dependent	Not used
1224	G f>	2	Relay output B	Not used		Not used
1225	G f>	2	Enable	OFF	ON	OFF
1226	G f>	2	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

1230 G f> 3

No.	Setting			Min. setting	Max. setting	Factory setting
1231	G f>	3	Set point	100.0%	120.0%	105.0%
1232	G f>	3	Delay	0.2 s	100.0 s	5.0 s
1233	G f>	3	Relay output A	Not used	Option dependent	Not used
1234	G f>	3	Relay output B	Not used		Not used
1235	G f>	3	Enable	OFF	ON	OFF
1236	G f>	3	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

1240 G f< 1

No.	Setting			Min. setting	Max. setting	Factory setting
1241	G f<	1	Set point	80.0%	100.0%	97.0%
1242	G f<	1	Delay	0.2 s	100.0 s	10.0 s
1243	G f<	1	Relay output A	Not used	Option dependent	Not used
1244	G f<	1	Relay output B	Not used		Not used
1245	G f<	1	Enable	OFF	ON	OFF
1246	G f<	1	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

1250 G f< 2

No.	Setting			Min. setting	Max. setting	Factory setting
1251	G f<	2	Set point	80.0%	100.0%	95.0%
1252	G f<	2	Delay	0.2 s	100.0 s	5.0 s
1253	G f<	2	Relay output A	Not used	Option dependent	Not used
1254	G f<	2	Relay output B	Not used		Not used
1255	G f<	2	Enable	OFF	ON	OFF
1256	G f<	2	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

1260 G f< 3

No.	Setting			Min. setting	Max. setting	Factory setting
1261	G f<	3	Set point	80.0%	100.0%	95.0%
1262	G f<	3	Delay	0.2 s	100.0 s	5.0 s
1263	G f<	3	Relay output A	Not used	Option dependent	Not used
1264	G f<	3	Relay output B	Not used		Not used
1265	G f<	3	Enable	OFF	ON	OFF
1266	G f<	3	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

Overload protections

Settings relate to nominal power.

1450 G P> 1

No.	Setting			Min. setting	Max. setting	Factory setting
1451	G P>	1	Set point	1.0%	200.0%	100.0%
1452	G P>	1	Delay	0.1 s	100.0 s	10.0 s
1453	G P>	1	Relay output A	Not used	Option dependent	Not used
1454	G P>	1	Relay output B	Not used		Not used
1455	G P>	1	Enable	OFF	ON	OFF
1456	G P>	1	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

1460 G P> 2

No.	Setting			Min. setting	Max. setting	Factory setting
1461	G P>	2	Set point	1.0%	200.0%	110.0%
1462	G P>	2	Delay	0.1 s	100.0 s	5.0 s
1463	G P>	2	Relay output A	Not used	Option dependent	Not used
1464	G P>	2	Relay output B	Not used		Not used
1465	G P>	2	Enable	OFF	ON	OFF
1466	G P>	2	Fail class	Alarm (1)	Trip MB (6)	Trip GB (3)

1470 G P> 3

No.	Setting			Min. setting	Max. setting	Factory setting
1471	G P>	3	Set point	1.0%	200.0%	100.0%
1472	G P>	3	Delay	0.1 s	100.0 s	10.0 s
1473	G P>	3	Relay output A	Not used	Option dependent	Not used
1474	G P>	3	Relay output B	Not used		Not used
1475	G P>	3	Enable	OFF	ON	OFF
1476	G P>	3	Fail class	Alarm (1)	Trip MB (6)	Trip GB (3)

1480 G P> 4

No.	Setting			Min. setting	Max. setting	Factory setting
1481	G P>	4	Set point	1.0%	200.0%	110.0%
1482	G P>	4	Delay	0.1 s	100.0 s	5.0 s
1483	G P>	4	Relay output A	Not used	Option dependent	Not used
1484	G P>	4	Relay output B	Not used		Not used
1485	G P>	4	Enable	OFF	ON	OFF
1486	G P>	4	Fail class	Alarm (1)	Trip MB (6)	Trip GB (3)

1490 G P> 5

No.	Setting			Min. setting	Max. setting	Factory setting
1491	G P>	5	Set point	1.0%	200.0%	100.0%
1492	G P>	5	Delay	0.1 s	100.0 s	10.0 s
1493	G P>	5	Relay output A	Not used	Option dependent	Not used
1494	G P>	5	Relay output B	Not used		Not used
1495	G P>	5	Enable	OFF	ON	OFF
1496	G P>	5	Fail class	Alarm (1)	Trip MB (6)	Trip GB (3)

Current unbalance protection

1500 Unbalance curr.

No.	Setting		Min. setting	Max. setting	Factory setting
1501	Unbalance curr.	Set point	0.0%	100.0%	30.0%
1502	Unbalance curr.	Delay	0.1 s	100.0 s	10.0 s
1503	Unbalance curr.	Relay output A	Not used	Option dependent	Not used
1504	Unbalance curr.	Relay output B	Not used		Not used
1505	Unbalance curr.	Enable	OFF	ON	OFF
1506	Unbalance curr.	Fail class	Alarm (1)	Trip MB (6)	Trip GB (3)

Settings relate to nominal current.

Voltage asymmetry protection

1510 Unbalance volt.

No.	Setting		Min. setting	Max. setting	Factory setting
1511	Unbalance volt.	Set point	0.0%	50.0%	10.0%
1512	Unbalance volt.	Delay	0.1 s	100.0 s	10.0 s
1513	Unbalance volt.	Relay output A	Not used	Option dependent	Not used
1514	Unbalance volt.	Relay output B	Not used		Not used
1515	Unbalance volt.	Enable	OFF	ON	OFF
1516	Unbalance volt.	Fail class	Alarm (1)	Trip MB (6)	Trip GB (3)

Settings relate to nominal voltage.

Reactive power import (loss of excitation) protection

1520 G –Q>

No.	Setting		Min. setting	Max. setting	Factory setting
1521	G –Q>	Set point	0.0%	150.0%	50.0%
1522	G –Q>	Delay	0.1 s	100.0 s	10.0 s
1523	G –Q>	Relay output A	Not used	Option dependent	Not used
1524	G –Q>	Relay output B	Not used		Not used
1525	G –Q>	Enable	OFF	ON	OFF
1526	G –Q>	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

Settings relate to nominal power.

Reactive power export (overexcitation) protection

1530 G Q>

No.	Setting		Min. setting	Max. setting	Factory setting
1531	G Q>	Set point	0.0%	100.0%	60.0%
1532	G Q>	Delay	0.1 s	100.0 s	10.0 s
1533	G Q>	Relay output A	Not used	Option dependent	Not used
1534	G Q>	Relay output B	Not used		Not used
1535	G Q>	Enable	OFF	ON	OFF
1536	G Q>	Fail class	Alarm (1)	Trip MB (6)	Warning (2)

Settings relate to nominal power.