

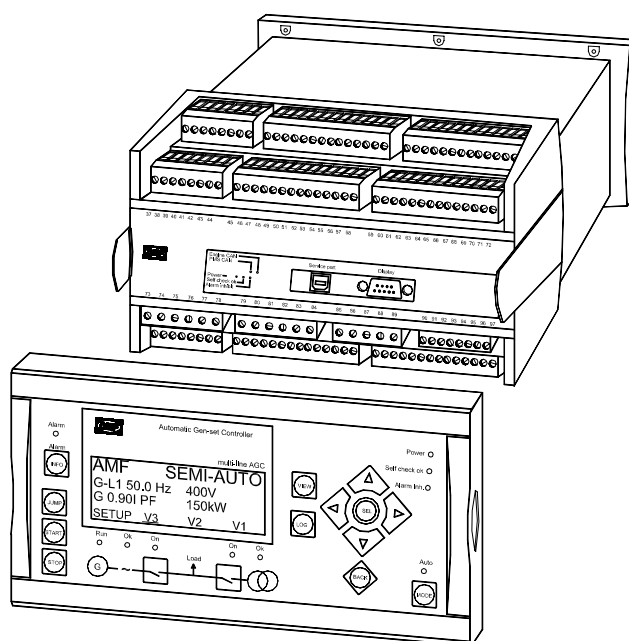
Description of options



Option C2, Generator add-on protection package Multi-line 2

4189340437A

SW version 3.0X.X



- Description of option
- Functional description
- Parameter list



Table of contents

1. WARNINGS AND LEGAL INFORMATION 3

LEGAL INFORMATION AND RESPONSIBILITY 3

ELECTROSTATIC DISCHARGE AWARENESS 3

SAFETY ISSUES 3

DEFINITIONS 3

2. DESCRIPTION OF OPTION 4

C2 OPTION..... 4

ANSI NUMBERS..... 4

3. FUNCTIONAL DESCRIPTIONS 5

VOLTAGE VECTOR SYSTEM 5

POSITIVE SEQUENCE 6

NEGATIVE SEQUENCE..... 6

ZERO SEQUENCE..... 6

ALARMS..... 6

4. PARAMETER LIST 7

NEGATIVE SEQUENCE..... 7

ZERO SEQUENCE..... 8

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

C2 option

Option C2 is a software option and therefore not related to any hardware apart from the standard installed hardware. Option C2 consists of negative sequence and zero sequence protections.

ANSI numbers

Protection	ANSI no.
Negative sequence current	46
Negative sequence voltage	47
Zero sequence current	51I ₀
Zero sequence voltage	59U ₀

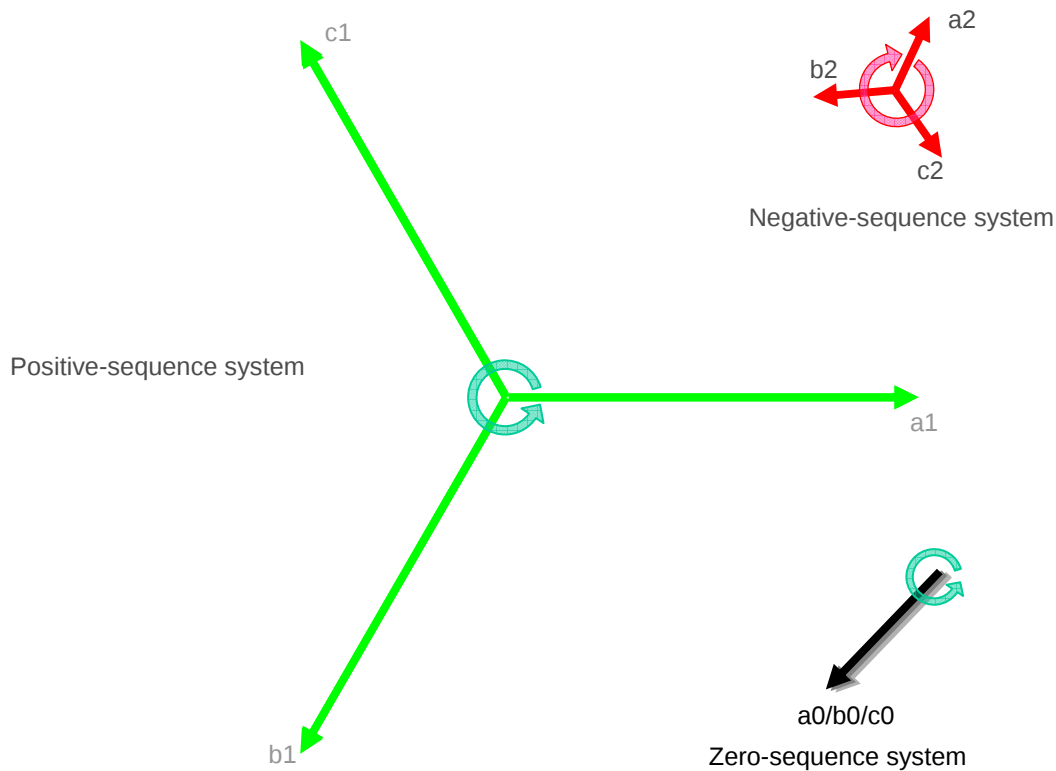
3. Functional descriptions

Voltage vector system

The measurements of the generator currents and voltages are split up in three theoretical systems:

- The positive sequence system with a positive direction of rotation.
- The negative sequence system with a negative direction of rotation.
- The zero sequence system with a positive direction of rotation.

As a result of the generator's power production to the consumers, the positive sequence system represents the fault-free part of the voltages and currents. The negative sequence system, which rotates in the opposite direction of the generator, is used by the protections negative sequence current and negative sequence voltage to prevent the generator from overheating. The zero sequence system is used for detection of earth faults.



Positive sequence

The voltages and currents in the positive sequence system are desirable, because they can be used by the consumers.

Negative sequence

A negative sequence current increases the risk of dangerous overheating in the generator, which could lead to general damage.

The negative sequence currents and voltages can occur e.g. in the event of single phase loads, unbalanced line short circuits and open conductors, unbalanced phase-phase or phase-neutral loads.

Especially the negative sequence currents can produce harmful overheating inside the generator. The reason is that these currents produce a magnetic field counter-rotating to the rotor. This field crosses the rotor at twice the rotor velocity, inducing double-frequency currents in the field system and in the rotor body.

Zero sequence

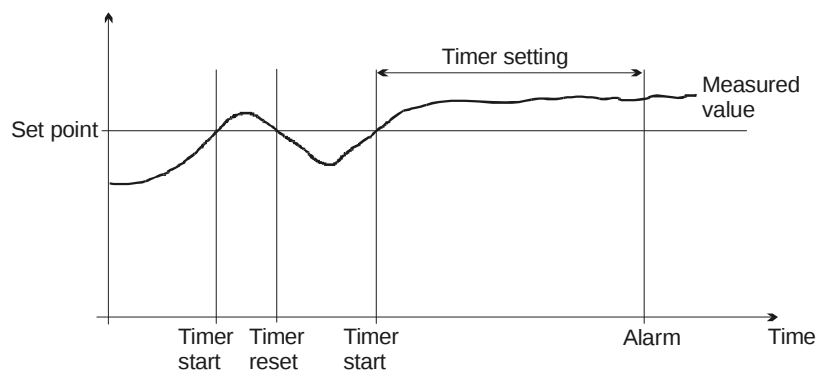
Zero sequence is used to detect an earth fault (earth current or neutral voltage). It is performed by measuring the vectorial displacement of the zero value (star point) for both current and voltage. The zero sequence measurement can therefore replace the more well-known methods, namely those using zero voltage measurement or summation transformers (zero sequence transformers).

Alarms

All settings are stated in percent of the nominal generator value.

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

If the function is e.g. overvoltage, then 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, the timer will be stopped and reset.



When the timer runs out, the output is activated. The total delay will be the delay setting + the reaction time.

4. Parameter list



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

Negative sequence

1540 G neg. seq. I

No.	Setting		Min. setting	Max. setting	Factory setting
1541	G neg. seq. I	Set point	1.0%	100.0%	20.0%
1542	G neg. seq. I	Delay	0.2 s	100.0 s	0.5 s
1543	G neg. seq. I	Relay output A	Not used	Option dependent	Not used
1544	G neg. seq. I	Relay output B	Not used		Not used
1545	G neg. seq. I	Enable	OFF	ON	OFF
1546	G neg. seq. I	Fail class	Alarm (1)	Trip MB (6)	Trip MB (6)



Settings relate to nominal current.

1550 G neg. seq. U

No.	Setting		Min. setting	Max. setting	Factory setting
1551	G neg. seq. U	Set point	1.0%	100.0%	5.0%
1552	G neg. seq. U	Delay	0.2 s	100.0 s	0.5 s
1553	G neg. seq. U	Relay output A	Not used	Option dependent	Not used
1554	G neg. seq. U	Relay output B	Not used		Not used
1555	G neg. seq. U	Enable	OFF	ON	OFF
1556	G neg. seq. U	Fail class	Alarm (1)	Trip MB (6)	Trip MB (6)



Settings relate to nominal voltage.

1560 Neg. seq. select

No.	Setting		Min. setting	Max. setting	Factory setting
1561	Neg. seq. select	Set point	G measurement	BB measurement	G measurement

Zero sequence

1570 G zero seq. I

No.	Setting		Min. setting	Max. setting	Factory setting
1571	G zero seq. I	Set point	0.0%	100.0%	20.0%
1572	G zero seq. I	Delay	0.2 s	100.0 s	0.5 s
1573	G zero seq. I	Relay output A	Not used	Option dependent	Not used
1574	G zero seq. I	Relay output B	Not used		Not used
1575	G zero seq. I	Enable	OFF	ON	OFF
1576	G zero seq. I	Fail class	Alarm (1)	Trip MB (6)	Trip MB (6)



Settings relate to nominal current.

1580 G zero seq. U

No.	Setting		Min. setting	Max. setting	Factory setting
1581	G zero seq. U	Set point	0.0%	100.0%	5.0%
1582	G zero seq. U	Delay	0.2 s	100.0 s	0.5 s
1583	G zero seq. U	Relay output A	Not used	Option dependent	Not used
1584	G zero seq. U	Relay output B	Not used		Not used
1585	G zero seq. U	Enable	OFF	ON	OFF
1586	G zero seq. U	Fail class	Alarm (1)	Trip MB (6)	Trip MB (6)



Settings relate to nominal voltage.

1590 Zero seq. select

No.	Setting		Min. setting	Max. setting	Factory setting
1591	Zero seq. select	Set point	G measure-ment	BB measure-ment	G measurement

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