

UEGL.../4-V.4

Change-over module for main distribution boards



Product Information

Table of contents

1	Basic information about the change-over module UEGL for main building distribution boards (MDBD)	5
2	Purpose of use/types	5
2.1	Overview change-over modules – types	5
2.2	Designation code	6
2.3	Intended use	6
3	Functions	7
3.1	Components of the change-over module	8
3.1.1	Control voltage change-over device STU-107-V.3	8
3.1.2	Voltage monitoring device with change-over control SPR-107-V.4.....	8
3.1.3	Electrically locked and mechanically latched contactors/switch disconnectors	8
3.1.4	Back-up fuses	9
3.1.5	External peripheral devices for extension (optionally)	9
3.2	Change-over control	9
3.2.1	Basic information	9
3.2.2	Failure-free operation	9
3.2.3	Fault of the “preferred feeder” (line 1)	10
3.2.4	Fault of the “second feeder” (line 2)	10
3.3	Control voltage supply with integrated control voltage change-over	10
4	Displays and operating buttons	11
4.1	Voltage monitoring device with change-over control SPR-107-V.4.....	11
4.2	Control voltage change-over device STU-107-V.3	11
5	Messages/communication interface	12
6	Structure	12
6.1	Connection diagram of the SPR-107-V.4	12
6.2	Connection diagram of the STU-107-V.3	13
6.3	Structure and dimensions	14
7	Data sheets	15
8	Technical data	16

1 Basic information about the change-over module UEGL for main building distribution boards (MDBD)

NOTE: National standards and regional regulations may deviate and must be adhered to.

According to DIN VDE 0100-710 (VDE 0100 Part 710):2002-11, main building distribution boards must have an automatic change-over device to switch to a safety power supply. Generally, a supply of the connected systems via two independent lines of the low-voltage main distribution board must be provided:

- the preferred feeder (preferred line) = line 1
- the second feeder (line in reserve) = line 2.

The change-over module, type UEGL meets the following criteria:

- change-over device with voltage monitoring,
- control voltage supply and change-over (single fault security).

Two mechanically latched contactors with mutual (electrical) locking or two switch disconnectors with engine drive are used as switching devices (Tab. 1 on page 5).

The used SPR-107-V.4 (voltage monitoring device with change-over control) realizes the voltage monitoring and change-over control for 1 to 3-phase systems. The STU-107-V.3 (control voltage change-over device) serves as control voltage supply and change-over.

All states of the SPR-107-V.4 (operating and fault messages) can be forwarded to and displayed on adequate operating and annunciator terminals like e. g. ANZ 05 or annunciator and control panels of the series FolioTec via a communication interface (CAN bus). The STU-107-V.3 is monitored by the SPR-107-V.4.

2 Purpose of use/types

2.1 Overview change-over modules – types

The voltage monitoring device with change-over control SPR-107-V.4 and the control voltage change-over device STU-107-V.3 is used in all types. Depending on the rated operating current, there are the following change-over devices:

types	rated operating current	maximum back-up fuse	switching devices	number of poles
UEGL65/4-V.4	65 A	80 A gL/gG ¹⁾	two mechanically latched contactors with mutual electrical locking	4
UEGL80/4-V.4	95 A	100 A gL/gG ¹⁾		
UEGL100/4-V.4	100 A	The maximum back-up fuse corresponds to the rated operating current.	two switch disconnectors with engine drive	
UEGL160/4-V.4	160 A			
UEGL250/4-V.4	250 A			
UEGL400/4-V.4	400 A			
UEGL630/4-V.4	630 A			
UEGL-ST/4-V.4	(e. g. > 630 A)		project-specific circuit breakers	

¹⁾ Note chapter 3.1.4 on page 9

Tab. 1: Overview of the change-over modules

UEGL-ST/4-V.4

The UEGL-ST/4-V.4 is a pure control module consisting of:

- the voltage monitoring device with change-over control SPR-107-V.4 and
- the control voltage change-over device STU-107-V.3.

Switching devices are not part of the control module. The UEGL-ST/4-V.4 can be used for projects with rated operating currents of more than 630 A.

2.2 Designation code

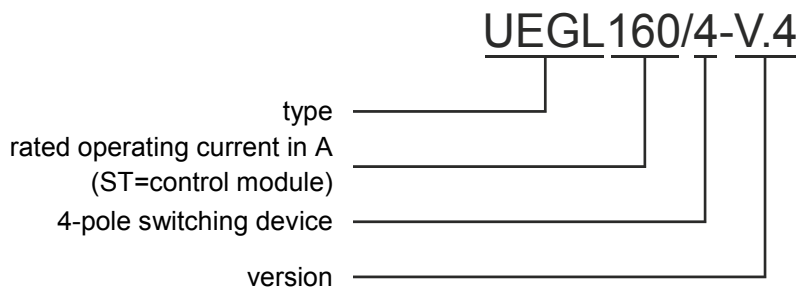


Fig. 1: Designation code

2.3 Intended use

Change-over modules of the type UEGL are intended as automatical 4-pole change-over devices according to DIN VDE 0100-710 (VDE 0100 Part 710):2002-11 Section 710.537.6.2 for the use in:

- main distribution boards and
- distribution boards for medical locations of groups 1 and 2.

The change-over devices recognize the failure of the preferred feeder (line 1) and switch automatically to the second feeder (line 2) in case of failure of line 1.

Consumers are connected between the outer conductors and the neutral conductor.

Only in consent with ESA Elektroschaltanlagen Grimma GmbH, the UEGL can also be used in non-medical locations. In this case, the Technical data (see chapter 8 on page 16) has to be adhered to mandatorily.

Other or further use of the UEGL is termed as **improper use**.

3 Functions

In the following, the components respective the devices as well as their functions in the change-over module UEGL are described.

NOTE: According to ÖVE/ÖNORM E 8007, Edition: 2007-12-01, line 1 corresponds to the “preferred line” and line 2 corresponds to the “line in reserve”.

NOTE: The abbreviations and designations used in the figure (Fig. 2) are referred to several times in this manual.

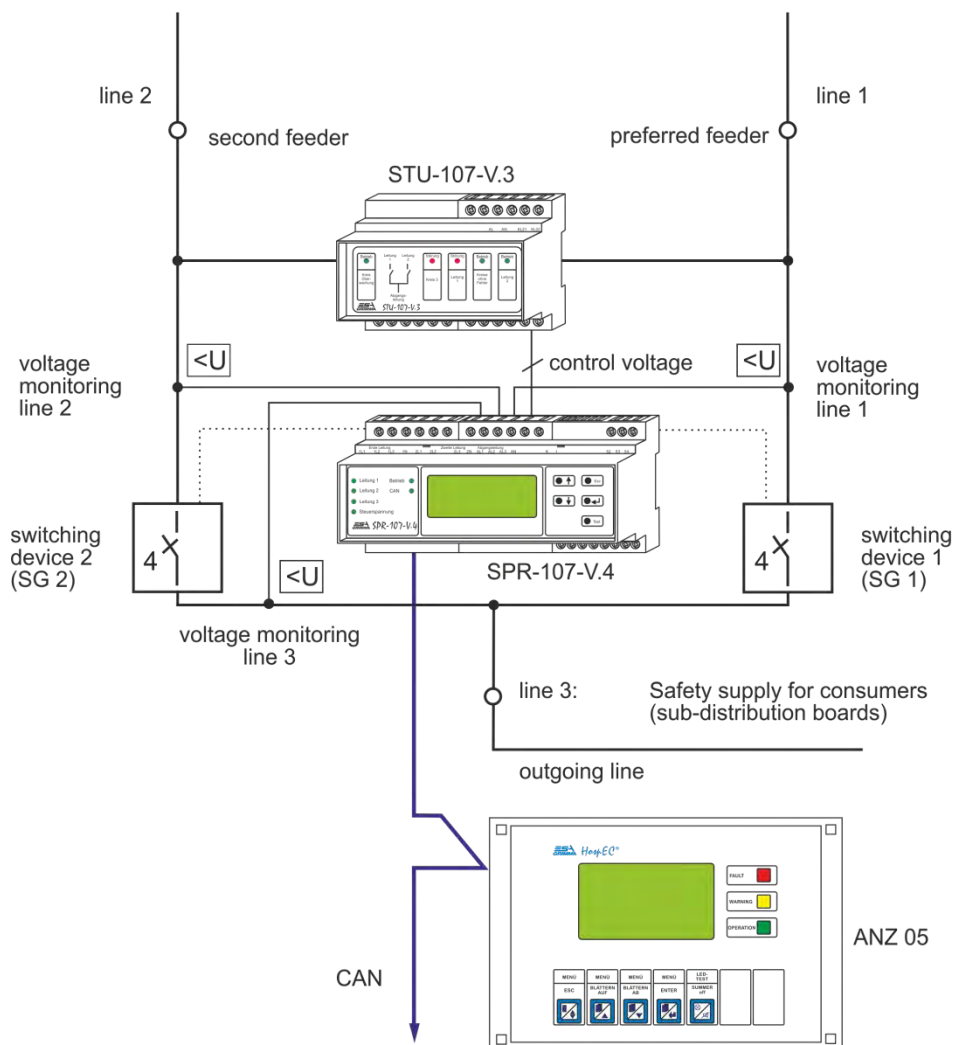


Fig. 2: Basic presentation of a change-over module with contactors and ANZ 05

3.1 Components of the change-over module

3.1.1 Control voltage change-over device STU-107-V.3

The STU-107-V.3 provides a safe supply voltage for the consumer connected to the device (control circuit). The safe supply voltage is created of one given independent voltage supply (line 1 or line 2) by the switching to it.

In addition, there is a wire breakage monitoring. This can be used to monitor any control circuit (AC 230 V, 50 Hz). The device is therefore appropriate to ensure the control voltage of change-over and monitoring modules according to DIN VDE 0100-710 (VDE 0100 Part 710):2002-11. All parameters to be monitored are displayed by the LEDs on the device. State and fault messages are issued additionally via the potential-free contacts of the signal relay.

3.1.2 Voltage monitoring device with change-over control SPR-107-V.4

The SPR-107-V.4 is used in automatic change-over modules (type UEGL) as control and monitoring device for the change-over between general power supply (GS) and safety power supply (SS) according to:

- DIN VDE 0100-710 (VDE 0100 Part 710):2002-11, Section. 710.537.6.2
- ÖVE/ÖNORM E 8007 Edition: 2007-12-01.

It serves for:

- voltage monitoring of three lines; as 1 resp. 3-phase system up to 500 V AC
- control of switching devices with wire breakage monitoring of the control lines
- change-over to a second safe system in $t \leq 0,5$ s to $t < 20$ s (parameterizable) in case of failure or falling of the voltage at at least one outer conductor
- issuing of fault messages via potential-free contacts of a signal relay

All operating and fault messages are indicated by the LEDs and the display. The device can be parameterized via the integrated menu. All settings and commands are saved in a non-volatile memory.

3.1.3 Electrically locked and mechanically latched contactors/switch disconnectors

Depending on the rated operating current, the following switching devices are used as default devices:

rated operating current	switching devices (part of the delivery)
65 A ... 80 A	two mechanically latched contactors (4-pole) with mutual electrical locking (see Fig. 2 on page 7)
100 A ... 630 A	two switch disconnectors with engine drive
> 630 A	project-specific circuit breakers (optionally)

Tab. 2: Switching devices dependent on rated operating current

The change-over control and the behaviour of the contactors resp. the switch disconnectors (up to max. of 630 A) are described in chapter 3.2 from page 9 onwards.

3.1.4 Back-up fuses

The dimensioning of the back-up fuses located in front of the change-over device has to meet the requirement that overload and short-circuit protection of the change-over device as well as the selectivity of the following overcurrent devices is guaranteed.

Subject to the explanations in DIN VDE 0100-710 (VDE 0100 Part 710):2002-11 Section 710.537.6 (Automatic change-over modules) and the manufacturer's information for load switch devices (contactors), the value I_v for the maximum possible back-up fuses for the contactor is calculated with:

$$I_v = \text{"manufacturer's information max. back-up fuse contactor"} \text{ (in A, for AC-3)} \times 0,45$$

The rated operating current I_e for the change-over device is calculated with:

$$I_e = \text{"manufacturer's information rated operating current for contactor contacts"} \text{ (in A, for AC-3)} \times 0,45$$

The information about the maximum number of used back-up fuses can be found in Tab. 1 on page 5.

3.1.5 External peripheral devices for extension (optionally)

Different external peripheral devices can be connected to the change-over device via standard fieldbus (CAN).

External peripheral devices are for example:

- ANZ 05 as on-site displaying and operating device
- annunciator and control panels, series FolioTec
- digital I/O-devices, series MPM via potential-free (messaging) contacts
- protocol transformer (gateways CAN-Modbus®)

It is possible to send operating, warning and fault messages to the building services control system (BSCS).

3.2 Change-over control

3.2.1 Basic information

Basically, the technical regulations and guidelines approved by the legislator and the manufacturer according to the state of art are valuable for the installation and the operation of electro-technical systems including the standards for power current systems in hospitals and other medical locations. Furthermore, the local provisions have to be adhered to including the general safety notes and instructions as well as the accident prevention regulations.

3.2.2 Failure-free operation

During the failure-free operation of the system, the consumers of line 1 are fed. The state of the switching device 1 (SG 1) is the following:

Electrically locked and mechanically latched contactors	The contactor is activated and mechanically latched. A failure of the supply by failure of the contactor coil or interruption of the connection line is excluded by the mechanical latching of the contactors.
Switch disconnector with engine drive	The switch disconnector is closed.

Line 2 is operational. The state of both feeders as well as the outgoing line (line 3) are monitored constantly by the SPR-107-V.t. Occurring faults are reported instantly.

3.2.3 Fault of the “preferred feeder” (line 1)

If the voltage on line 1 deviates from the set limit values (settings SPR-107-V.4), the automatic switching to line 2 is triggered.

The software of the SPR-107-V.4 conducts a plausibility test to check if the respective activated switching device works properly. By this, the failure of a latching component can be detected and a change-over prevented by instant constant activation of the contactor.

When switching from line 1 to line 2 or the other way round, all voltages, auxiliary contacts, latching components and switching elements are monitored.

The switching devices are activated by relays. All control functions can be set according to the respectively used type of the switching devices. The control circuits have a wire breakage monitoring integrated in the device (depending on the external connections).

3.2.4 Fault of the “second feeder” (line 2)

The failure of line 2 has no influence on the voltage supply of further sub-distribution boards (line 3) as long as the voltage on line 1 is stable.

The failure is reported. There is no change-over triggered.

3.3 Control voltage supply with integrated control voltage change-over

There is an additional control voltage change-over by the device STU-107-V.3 for a safe voltage supply of the SPR-107-V.4.

The voltage values of both independent given voltage supplies (line 1 and line 2) are constantly monitored by the STU-107-V.3.

During normal operation, the devices are supplied via line 2. If the voltage on this line falls below the limit value of 195 V, the controlling is switched automatically to line 1 by the STU-107-V.3. The failure of line 2 is reported via potential-free contacts and processed in the SPR-107-V.4.

4 Displays and operating buttons

4.1 Voltage monitoring device with change-over control SPR-107-V.4

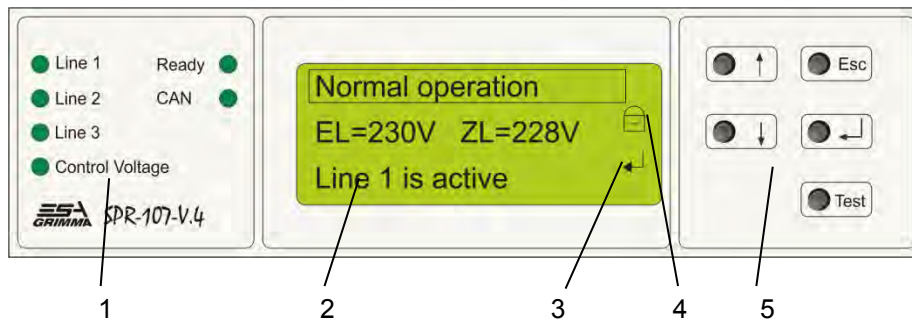


Fig. 3: Front view SPR-107-V.4 in normal operation (no errors or faults)

- | | |
|------------------------------------|--|
| 1 state LEDs | 4 menu release (= locked, = released) |
| 2 state messages | 5 operating buttons |
| 3 display of the activated buttons | |

If the device is in normal operation i. e. it operates without any errors or faults (

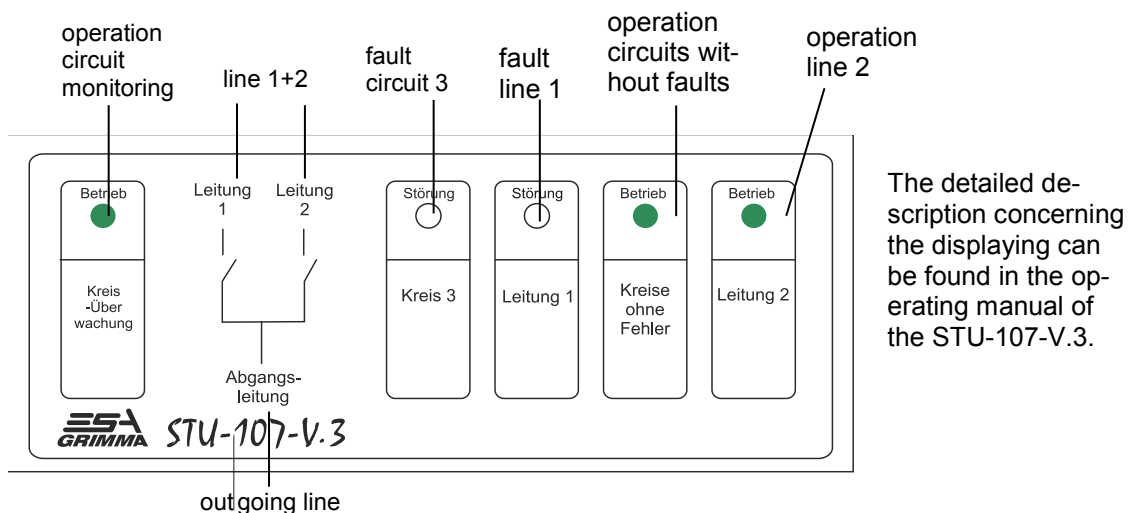
Fig. 3), the “**basic display**” appears.

- First line: the operation state,
- second line: the voltages on line 1 (PF) and 2 (SF) and
- third line: recent feeding

are displayed.

The detailed description concerning operation, messages and possible reasons for faults can be found in the operating manual of the SPR-107-V.4.

4.2 Control voltage change-over device STU-107-V.3



The detailed description concerning the displaying can be found in the operating manual of the STU-107-V.3.

Fig. 4: Front view of the STU-107-V.3 in normal operation (no errors or faults)

5 Messages/communication interface

Operating and fault messages are indicated by the LEDs and the display of the SPR-107-V.4 as well as by the LEDs of the STU-107-V.3. Operating and fault messages are also reported by the potential-free change-over contact (NC/NO contact) of the signal relay integrated in the SPR-107-V.4.

Measured values and operating and fault states can be forwarded to external peripheral devices (e. g. ANZ 05/panels) as well as sent to the building services control system (BSCS) by the communication interface (CAN).

More detailed fault messages can be found in the operating manuals of the SPR-107-V.4 and STU-107-V.3.

6 Structure

6.1 Connection diagram of the SPR-107-V.4

connection for 3-phase monitoring

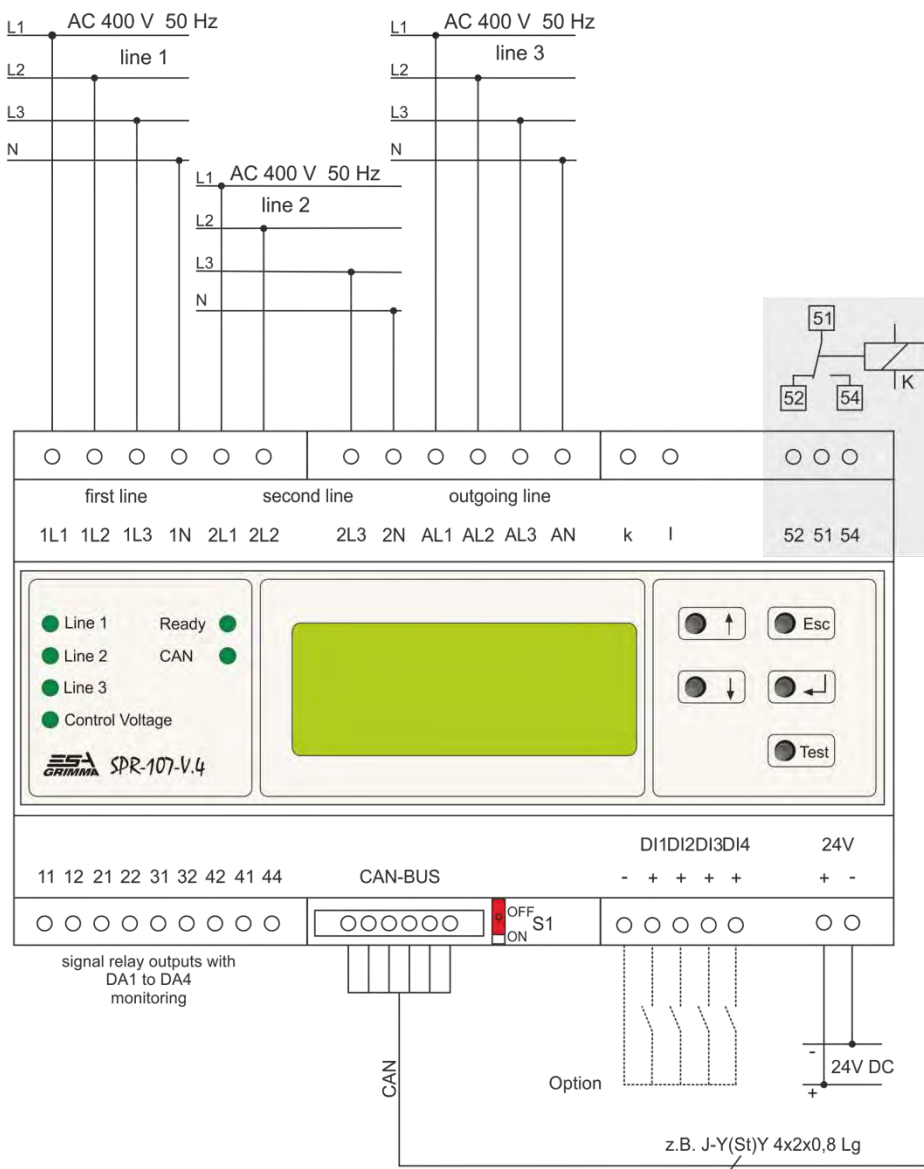


Fig. 5: Connection diagram of the SPR-107-V.4 in a 3-phase change-over device 400 V AC

6.2 Connection diagram of the STU-107-V.3

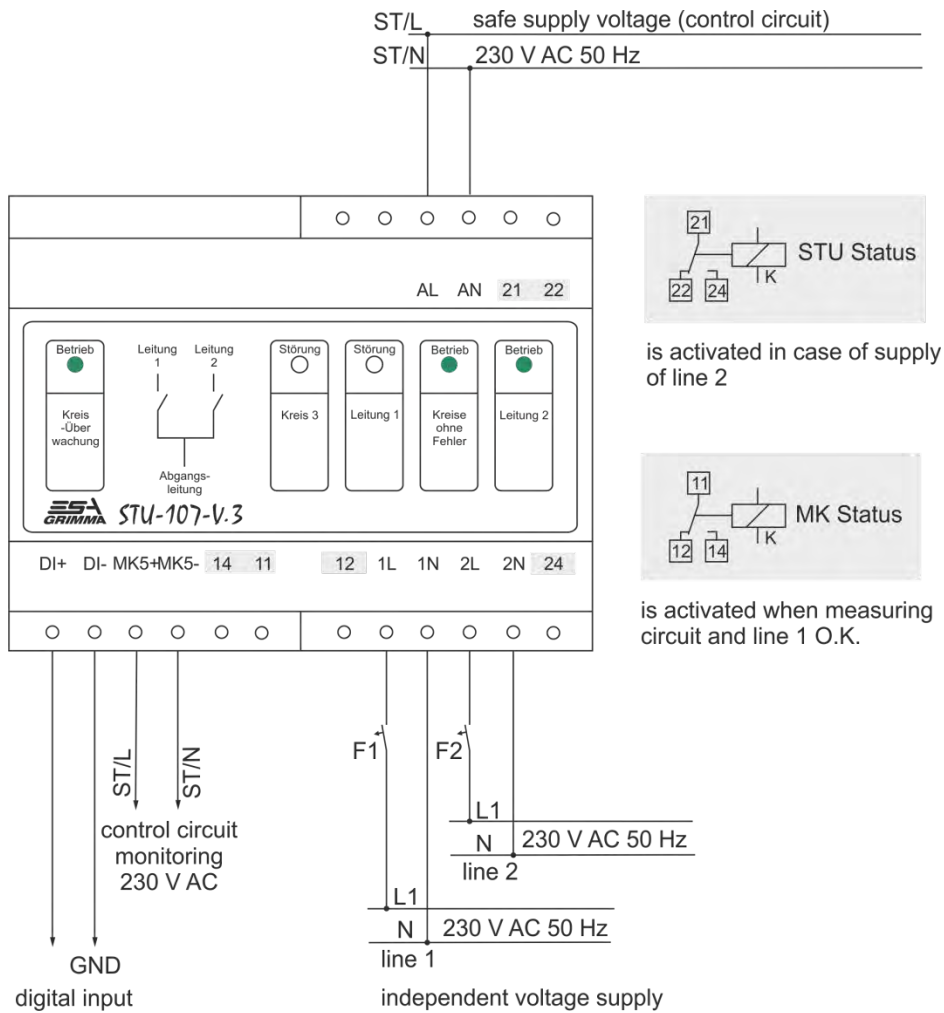


Fig. 6: Connection diagram of the STU-107-V.3

6.3 Structure and dimensions

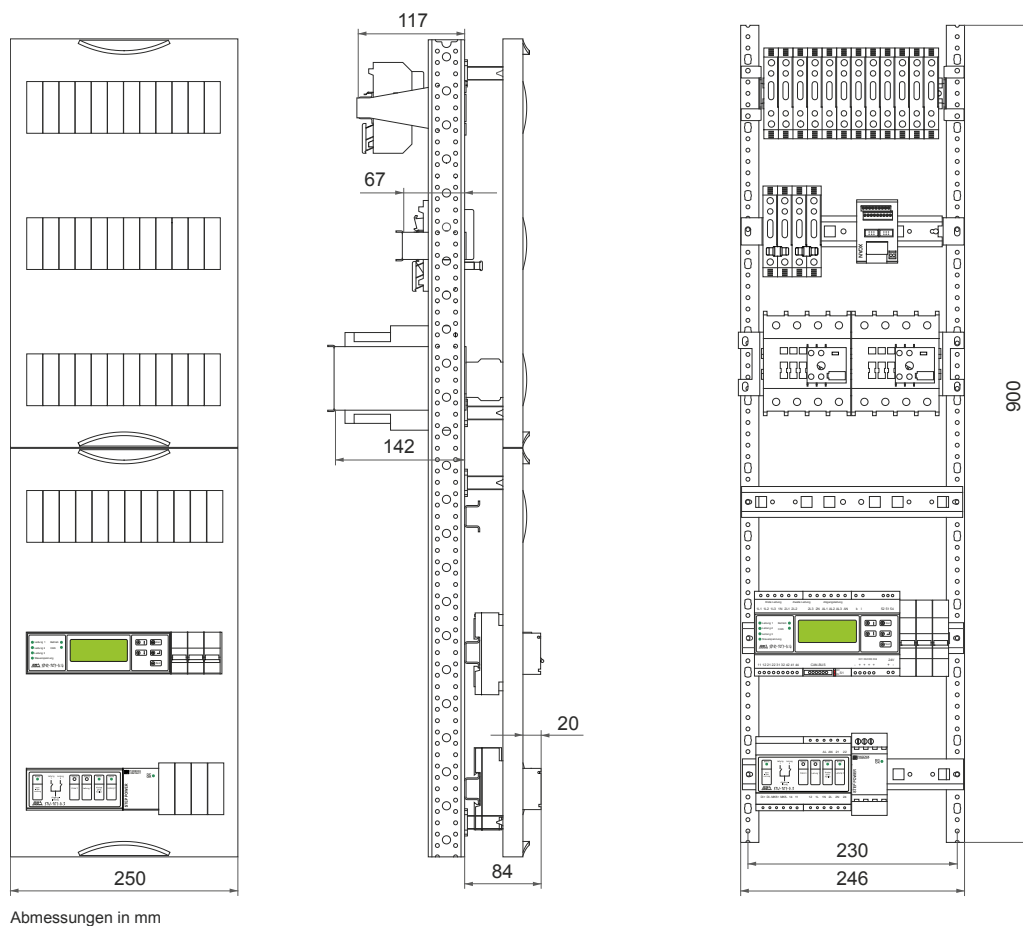


Fig. 7: Structure of a UEGL65/4-V.4 resp. UEGL80/4-V.4 (example*)

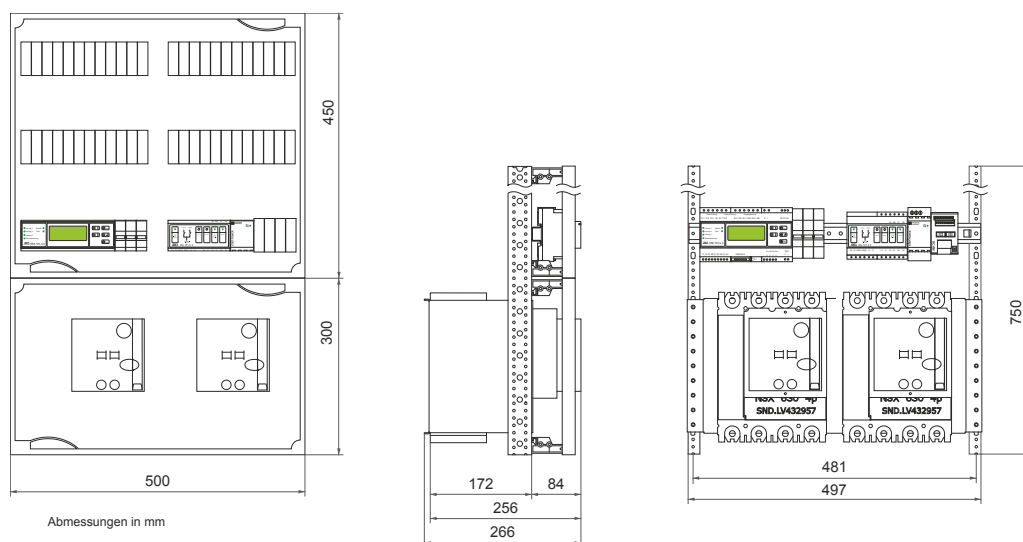


Fig. 8: Structure of a UEGL100/4-V.4 (up to UEGL630/4-V.4) (example*)

* versions, e. g. dimensions, contactor/switching device may deviate from the figure

7 Data sheets

The following data sheets are available and must be adhered to:

- operating manual: SPR-107-V.4
- operating manual: STU-107-V.3
- circuit and connection diagram of the respective change-over device
- operating manual: ANZ 05 (optionally, resp. further connected external annunciator and control devices/displaying devices)

8 Technical data

Versions of UEGL	
with electrically locked and mechanically latched contactors	UEGL65/4-V.4, UEGL80/4-V.4
with switch disconnecter with engine drive	UEGL100/4-V.4 ... UEGL630/4-V.4
with project-specific circuit breakers	UEGL-ST/4-V.4
Operating data	
rated operating current	dependent on type 65 A...630 A, >630 A (project-specific)
operating voltage	AC 230 V/AC 400 V, 50/60 Hz
control voltage	AC 230 V, 50/60 Hz
Voltage monitoring with change-over control	
voltage monitoring (line 1, 2 and 3)	
monitored system	3/N AC 0...500 V, 50...60 Hz
setting area undervoltage	AC 150-230 V/260...400 V (parameterizable)
setting area overvoltage	AC 230-260 V/400...460 V (parameterizable)
Switching times	
switching time t_{vh}	0...300 s (parameterizable)
reverse switching time t_{vr}	0...300 s (parameterizable)
no-load switching time (pause time) t_{nu}	0...300 s (parameterizable)
Communication interface/protocol	
interface/protocol	CAN/CAN (2.0) according to ISO 11898
Electromagnetic compatibility (EMC)	
interference immunity according to EN 61000-6-2:2005 EMC Generic standards - Immunity for industrial environments	
emitted interference according to EN 61000-3-2 and EN 61000-3-3 and EN 61326-1	
emissions according to EN 55011	limit value class B
Environmental conditions	
operation temperature according to EN 61557-8: 1997	-5...+45°C
storage temperature according to EN 61557-8: 1997	-25...+70°C
climate class according to IEC 721	3K5, without condensation and icing
Displays and messaging outputs	
messaging outputs (SPR-107-V.4)	1 change-over (potential-free)
display	operating and fault messages via LEDs on the STU-107-V.3
.....	operating and fault messages via clear text and LEDs on the SPR-107-V.4
.....	via standard fieldbus (CAN) on peripheral displaying devices
Installation conditions	
IP code according to EN 60259	IP00
protection class	I (grounded) / II (protective insulated)
flammability class	UL94V-0
weight	depending on type
device dimensions in mm (HxWxD)	depending on type

Standards

DIN VDE 0100-710 (VDE 0100 Part 710):2002-11
ÖVE/ÖNORM E 8007 Edition: 2007-12-11
IEC 60364-7-710:2002-11
GOST 12.2.007.0-75
GOST-R 51321.1-2007
DIN IEC 61557-9 8/2007
DIN EN 61557-1 12/2007
DIN EN 61557-8 12/2007

Order data

Change-over module with electrically locked and mechanically latched contactors:

UEGL65/4-V.4art. no.: 0070087.05
UEGL80/4-V.4art. no.: 0070088.05

Change-over module with switch disconnectors with engine drive:

UEGL100/4-V.4art. no.: 0070024.06
UEGL160/4-V.4art. no.: 0070026.05
UEGL250/4-V.4art. no.: 0070027.05
UEGL400/4-V.4art. no.: 0070028.05
UEGL630/4-V.4art. no.: 0070029.05

Control module with project-specific circuit breakers:

UEGL-ST/4-V.4art. no.: 0070023.03

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boards
Product Information

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