Changeover and monitoring module UMC107E

Changeover and monitoring module with single fault tolerance for medical IT systems

UMC107E – Typical example

Device features

- Complete solution for changeover and IT system monitoring up to 80/42 A
- Factory-made, tested module for installation that saves both time and costs
- Variable changeover period t ≤ 0.5…20 s
- Concise IT system monitoring (insulation, load, transformer temperature
- Connection monitoring
- Suitable for all common DIN rail systems
- Screwless-type connection technique
- Bus technology for easy installation and reduced fire load
- Clear menu structure with LC display allows easy parameter setting
- Power supply for MK2430/MK800
- Voluntary testing by TÜV Süddeutschland

Product description

The factory-made modules of the UMC107E series are used to change over (t ≤ 0.5 s) between two supply sources (AV/SV resp. SV/UPS) and for IT system monitoring in medical locations. Status indication and alarm texts on the alarm indicator and operator units takes place via BMS bus. The module is suitable for mounting onto all common DIN rail systems (equipment racks have to be provided by the customer).

Functions in accordance with IEC 60364-7-710 / DIN VDE 0100-710 (VDE 0100-710)

- Voltage monitoring with control function
  - on the preferred supply (Line 1)
  - on the second supply (Line 2)
  - at the output of the changeover module (Line 3)
- Variable changeover period t ≤ 0.5…20 s
- Protection against wrong operation by multiple interlocking
- Cables laid to resist short-circuits and earth faults
- Control circuit with single fault tolerance
- Automatic return on recovery of the voltage
- Functional testing including checking of the operating times
- Insulation, load current and temperature monitoring for IT systems in group 2 medical locations
- Monitoring of the system/PE connections of the insulation monitoring device
- Available with insulation monitoring for for main OP lighting circuits

Further measures to increase the electrical safety

- Continuous functional monitoring of the actuation devices and automatic processes (coil, control contacts, connections)
- Monitoring of essential connecting leads such as to
  - current transformers
  - transformer temperature sensors

Monitoring for short-circuits upstream and at the output of the changeover device and the pre-defined switching behaviour.

Single fault tolerance

The changeover modules continuously monitor the functions and in this way ensure that an individual, foreseeable error cannot lead to a failure of the power supply at the output of the automatic changeover and monitoring module (DIN VDE 0100-710: 2002-11 para. 710.521.6 control circuits).

Indications/messages

- Plain text messages display for all essential operating, fault and alarm messages.
- Information exchange between alarm indicator and operator units via BMS bus
- Common alarm contact with protective separation in accordance with EN 50178

Description of the changeover function

In fault-free condition, the preferred supply line is switched on. If the voltage drops below the set response value, changeover to the second supply will automatically take place. The changeover period can be set individually. In order to ensure operational readiness, the second line as well as the output of the changeover module (Line 3) are monitored too. On voltage recovery, return to the preferred supply line occurs automatically. Owing to variable delay times (return transfer time or pause time), the UMC meets the individual installation-specific requirements (e.g. coordination of several changeover modules, reduction of switching energy). The function of the changeover module can be tested via the test button.

Description of the IT system monitoring function

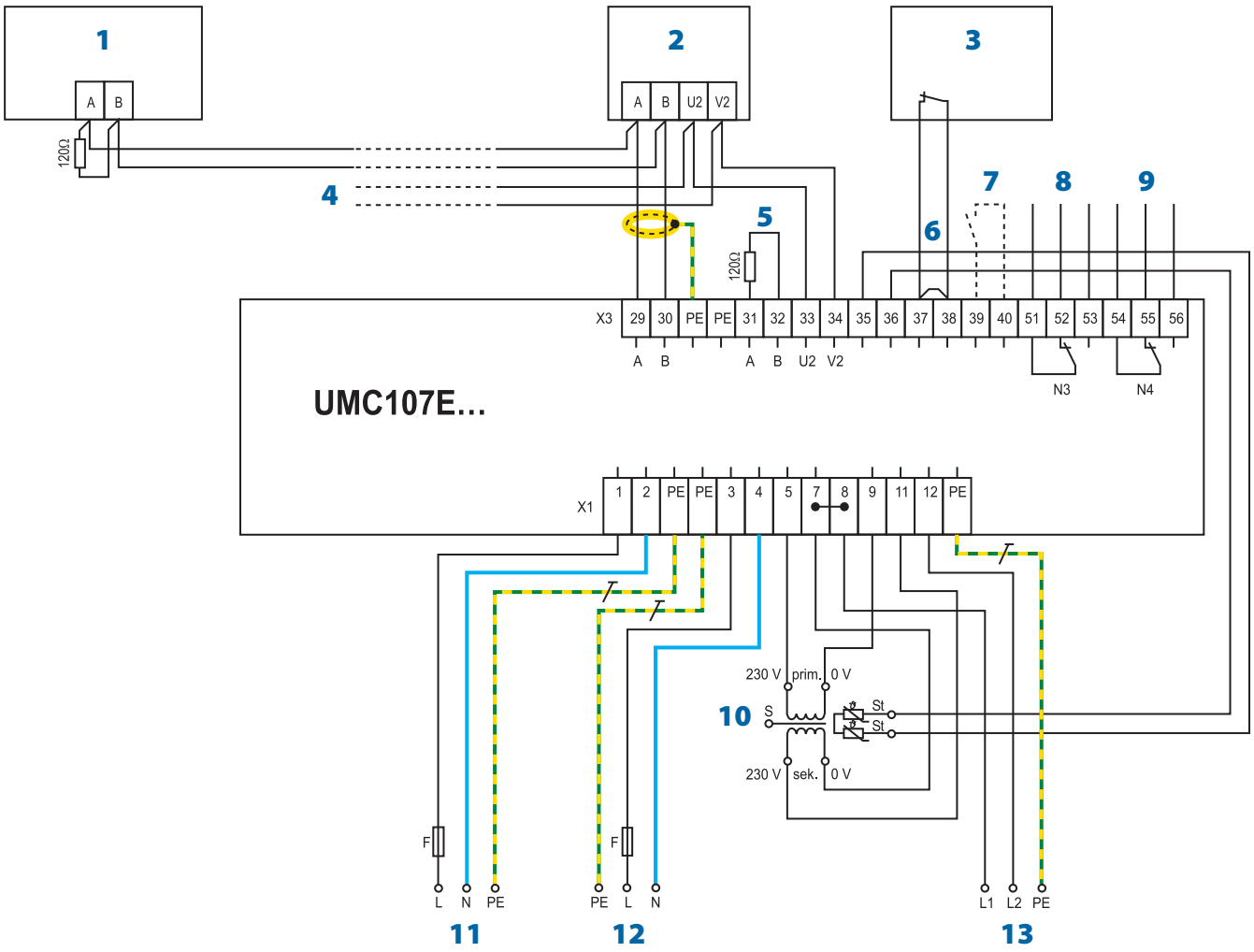
In group 2 medical locations safe and reliable operation must be guaranteed in case of an insulation fault or transient overload. Therefore, in this case, IT systems are used for the supply of electrical loads to monitor the insulation, load and temperature of isolating transformers.

Insulation monitoring with the AMP measuring principle avoids that DC components which can be caused by electronic devices influence the measurement. If the insulation resistance falls below the set response value or if the load current or the transformer temperature exceed the threshold value, an alarm message is indicated and the common alarm contact switches.

Continuous self monitoring of the monitoring module, the measuring leads for insulation, load and temperature monitoring, provides high availability of the system. Interactive device monitoring via the bus informs about device failure.

The test button can be used to simulate faults and in this way check the function of the monitoring module.

Wiring diagram



1 - Other devices connected to the BMS bus
2 - Remote alarm indicator and test combination MK…
3 - Insulation monitoring main OP light
4 - Other MK…
5 - Remove the terminating resistor, if additional bus devices are connected here
6 - Before connecting an insulation monitoring device for main OP lights, remove the bridge
7 - Manual/automatic control
8 - Common alarm control and indicating device PRC487
9 - Common alarm insulation monitoring device 107TD47
10 - Isolating transformer for IT system s230/230 V
11 - Preferred supply (Line 1) AC 230 V 50 Hz
12 - Second supply (Line 2) AC 230 V 50 Hz
13 - IT system AC 230 V 50 Hz

Technical data changeover and monitoring module UMC107E

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 250 V
Rated impulse voltage/pollution degree	4 kV/3

Power unit / switching elements

Switching elements	latched contactors
Rated operational voltage U_e	AC 230 V
Operating range U_e	0.8…1.15 x U_e
Frequency f_e	50…60 Hz
Rated operational current I_e (acc. to IEC 60364-7-710)	see ordering information
Fuse	see ordering information
Utilization category	AC-3
Changeover period, adjustable	≤ 0.5 s…20 s

Supply voltage devices

Supply voltage devices U_S	AC 230 V
Operating range of U_S	0.8…1.15 x U_e
Frequency range of U_S	50…60 Hz
Power consumption	see ordering information

Control and indicating device PRC487

Display, characters	LCD, illuminated, 2 x 16 characters
Control inputs	≤ DC 5 V

Voltage monitoring

Response value undervoltage, adjustable	0.7…0.9 x U_e
Response value overvoltage	1.15 x U_e
Response time t_{an}	50…250 ms
Response time t_{off} adjustable (50 ms steps)	0…9950 ms
Return transfer time t_{on} adjustable (1 s steps)	0…249 s
Pause time, adjustable (50 ms steps)	0…9950 ms

A-ISOMETER® 107TD47

Display, characters	LCD, illuminated, 2 x 16 characters
Test button	internal/ external

Insulation monitoring 107TD47

Response value R_{an} adjustable	50…500 kΩ
Relative percentage error	0…+10 %
Hysteresis	≤ 25 %
Response time t_{an} at R_F = 0.5 x R_{an} and C_e = 1µF	≤ 3 s
Measuring voltage U_m	≤ 12 V
Measuring current I_m (at R_F = 0 Ω)	≤ 50 µA
Internal DC resistance R_i	≥ 240 kΩ
Impedance Z_i at 50 Hz	≥ 200 kΩ
Permissible extraneous DC voltage U_{fg}	≤ DC 375 V
Permissible system leakage capacitance C_e	≤ 5 µF

Load monitoring 107TD47

Response value, adjustable	5…50 A
Hysteresis	≤ 4 %
Temperature influence	≤ 0.15 % / °C

Temperature monitoring 107TD47

Response value	4 kΩ
Release value	1.6 kΩ
PTC resistors acc. to DIN 44081	max. 6 in series

Interface

Interface/protocol	RS-485/BMS
Baud rate	9.6 kbit / s
Cable length	≤ 1200 m
Recommended cable (shielded, shield connected to PE on one side)	min. J-Y(St)Y 2 x 0.6
Terminating resistor	120 Ω (0.25 W)
Device address, BMS bus	PRC487: 2…90 – 107TD47: 2…30
Factory-set device address	PRC487: 4 – 107TD47: 3

Switching elements (alarm contacts PRC487)

Number of changeover contacts	1 changeover contact
Operating principle	N/C operation

Switching elements (alarm contacts 107TD47)

Number of changeover contacts	1 changeover contact
Operating principle, adjustable	N/C or N/O operation

Contact data acc. to IEC 60947-5-1

Rated operational voltage U_e	AC 230 V / DC 220 V
Rated operational current I_e	AC 5 A / DC 0.2 A
Utilization category	AC 14/DC 12
Electrical service life, number of cycles	10.000
Minimum contact load	1 mA at AC / DC > 10 V

Terminals

Control unit

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	0.08…2.5 mm²/AWG 28-12
Stripping length	8…9 mm

Power supply unit

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	6…35 mm²/AWG 8-2
Stripping length	23 mm

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Classification of climatic conditions acc. to IEC 60721	
Stationary use	3K5
Transport	2K3
Long-time storage	1K4
Operating temperature	-10 °C…+55 °C
Classification of mechanical conditions acc. to IEC 60721	
Stationary use	3M4
Transport	2M1
Long-time storage	1M3
Operating mode	continuous operation
Mounting position	vertical
Degree of protection, internal components (IEC 60529)	IP30
Degree of protection, terminals (IEC 60529)	IP20
Mounting into standard distribution panels	see table “Dimensions and weights”
Flammability class	UL94V-0
Product standards	IEC 60364-7-710 / DIN VDE 0100-710 (VDE 0100-710)
Operating manual	TGH1322
Weight	table “Dimensions and weights”

Ordering information

Type	Rated operational current I_e (AC-3) changeover module	Rated operational current I_e acc. to DIN VDE 0100-710	Permissible max. fuse	Recommended rated power of transformer	Max. power consumption	Art. No.
UMC107E65	65 A	29 A	80 A gL/gG	3.15…6.3 kVA	19 W	B 9205 6002
UMC107E65-0L	65 A	29 A	80 A gL/gG	3.15…6.3 kVA	21 W	B 9205 6005
UMC107E80	80 A	42 A	100 A gL/gG	8 kVA	19 W	B 9205 6003
UMC107E80-0L	80 A	42 A	100 A gL/gG	8 kVA	21 W	B 9205 6006

Dimension and weights

Type	Dimensions fields/rows (W/H/D mm)	Recommended cabinet depth	Weight approx.
UMC107E65	1/6 (250/900/220)	300 mm	14 kg
UMC107E65-0L	1/6 (250/900/220)	300 mm	15 kg
UMC107E80	1/6 (250/900/230)	300 mm	15 kg
UMC107E80-0L	1/6 (250/900/230)	300 mm	16 kg