IT system distribution cabinet TR-VITC

IT system distribution cabinet for operating theatres

IT system distribution cabinet TR-VITC

Device features

- Internal components
  - Isolating transformer (3150 to 8000 VA)
  - Changeover module with voltage monitoring 65/80 A
  - IT system monitoring
  - Two-pole circuit breakers B16A per circuit for 6 circuits
- Customers can save time and money as the distribution cabinets are supplied prewired
- Covering of sheet-steel according to DIN VDE 0100-710: 2002-11 para. 710.51.2.2
- Designed in accordance with the requirements of applicable standards
- Voluntary test of the changeover module by TÜV (German Technical Inspection Authority)
- Connection for alarm indicator and test combinations MK800/MK2430
- Connection for TM operator panels
- Variable changeover period t ≤ 0.5…20 s
- Screwless-type terminals
- Exchange of information via bus interface
- Short delivery times

Application

The IT system distribution cabinets of the TR-VITC series supply electrical power to group 2 medical locations, e.g. operating theatres. For

- socket-outlet circuits for medical electrical equipment and
- operating theatre luminaires circuits and similar lighting

supplied with nominal voltages exceeding AC 25 V or DC 60 V, the protective measure "Protection by insulation monitoring with indication in the IT system" is mandatory. Furthermore, a changeover module is required to change over automatically from the safety power supply source to a second supply source in case of failure.

Function

The distribution cabinets of the TR-VITC series contain an isolating transformer and a changeover and monitoring module of the UMC107E-65 resp. -80 series including all necessary monitoring equipment for IT systems in accordance with IEC 60364-7-710 / DIN VDE 0100-710

- Changeover modules with control function
- Insulation monitoring
- Load and temperature monitoring

On the secondary side of the isolating transformer, six two-pole circuit breakers are built-in. The socket outlets of the group 2 room are connected to these circuit breakers. For the purpose of heat dissipation, the transformer features conductive plates at the top and ventilation filters in the distribution cabinet door and/or in the distribution cabinet.

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

- Voltage monitoring with control function
  - on the preferred line (Line 1)
  - on the second line (Line 2)
  - at the output of the changeover module (Line 3)
- Variable changeover time t ≤ 0.5…20 s to change over from AV (normal power supply source) to SV (safety power supply source) resp. from SV to UPS (uninterruptible power supply source).
- Protection against wrong operation by multiple interlocking
- Cables are laid to resist short-circuits and earth faults
- Control circuit with single fault tolerance according to DIN VDE 0100-710
- Automatic return on voltage recovery
- Functional testing including checking of the operating times
- Insulation, load current and temperature monitoring for the IT system
- Monitoring of the system/PE connections of the insulation monitoring device
- Isolating transformer 3150 to 8000 VA for IT systems

Further measures to increase the electrical safety

- Continuous monitoring of the actuation devices and automatic processes (coil, control contacts, connections).

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

Changeover and monitoring module

In fault-free condition, the preferred supply line is switched on. If the voltage falls below the set value, a changeover to the second supply line 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 times or delay times), the changeover module meets the individual installation-specific requirements (e.g. coordination of several changeover modules, reduction of switching energy).

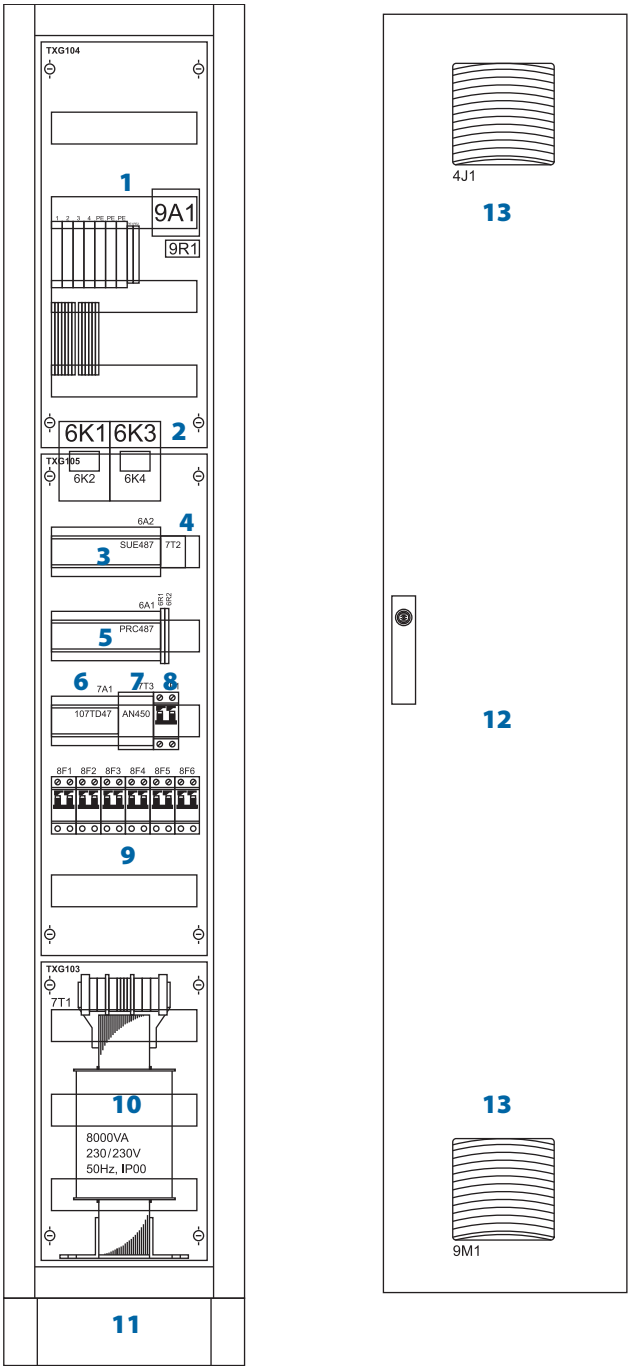
Insulation, load and temperature monitoring

The insulation monitoring device continuously monitors the insulation resistance, load current and the temperature of the IT system transformer. If one or several response values are undershot (insulation resistance) or overshot (load current, temperature), the alarm relay switches and a corresponding message occurs. The connections to the system and PE, as well as to the measuring current transformer and temperature sensor, are permanently monitored. In the event of wire breakage or short-circuit, a message will appear. The patented AMP measuring technique is used in order to exclude the possibility of insulation monitoring being impaired by DC components.

Messages displayed in plain text

The unique status, warning and fault messages are displayed in plain text. The required MK2430, MK800 alarm indicator and test combinations or TM alarm indicator and operator panel need to be installed at a suitable place in the medical location, so that it can be permanently monitored by the medical staff. A two-wire bus cable is required to connect the TR-VITC distribution board to the alarm indicator panels.

Design



1 - Terminal area
2 - Switching elements changeover module
3 - Voltage monitoring device SUE487
4 - Current transformer load monitoring
5 - Control devices PRC487
6 - Insulation, load and temperature monitoring device 107TD47
7 - Power supply unit for MK2430/MK800 alarm indicator and operator panels
8 - Circuit breakers for the power supply of the devices
9 - 6 outgoing circuits (IT system) with two-pole circuit-breakers
10 - IT system transformer
11 - Plinth (option)
12 - Front door
13 - Filter SK3325 200

Design details TR-VITC distribution board

Distribution cabinet

Cabinet range	Striebel & John, Triline R
Cabinet type	1/8 R 4
Degree of protection	IP42
Protection class	Class I (earthed)
Ventilation	filters in the distribution cabinet door, on top and bottom
Panel construction	partition between the different types of supply systems
Cable entry	incoming and outgoing cables from above
Doors and walls	sheet steel 1.5…2 mm
Door	right-hinged
Door lock	lock with latch
Paint finish	RAL 7035
Plinth	sheet steel, height 100 mm, RAL 7005

Installation data

Type of assembly	floor-mounted cabinet with door and plinth
Type of installation	free-standing
Transporttrennung	keine
Dimensions W x H x D	374 mm x 2013 mm x 425 mm

Type of wiring

Terminal area	at the top
Cable duct	none
Protective/neutral conductor	PE terminals, disconnect terminal ≤ 10 mm²
Busbars	none
Conductor colours	acc. to IEC 60446
Conductors	halogen-free

Labelling

Devices	adhesive labels, IEC 61346-2
Distribution cabinet	adhesive labels, black type on a white
System type labelling	according to IEC

System data

Type of distribution system	IT system (TNS system optional)
Nominal voltage	N/PE/ AC 230 V

For product standards refer to the table “Technical data”

Ordering information

Type	Nominal power	Weight	Power consumption	Art. No.
TR-VITC-3150	3150 VA	130 kg	248 W	on request
TR-VITC-4000	4000 VA	143 kg	234 W	on request
TR-VITC-5000	5000 VA	145 kg	275 W	on request
TR-VITC-6300	6300 VA	150 kg	314 W	on request
TR-VITC-8000	8000 VA	160 kg	350 W	on request

Other versions on request

Technical data floor-mounted distribution board TR-VITC

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage	AC 400 V
Rated impulse voltage/pollution degree	4 kV/3

Poweer 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 DIN VDE 0100-710)	29 A/42 A
Rated operational current I_e of the module (AC-3)	65 A/80 A
Fuse	80 A/100 A
Utilization category	AC-3
Two-pole circuit breakers	6 x B 16 A
Changeover period, adjustable	≤ 0.5 s…20 s

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

isolating transformer

Classification of insulation	t_a 40/B
Insulation	double insulation
Ambient temperature	≤ 40 °C
Nominal power	6300/8000 VA
Rated frequency	50…60 Hz
Rated input voltage	AC 230 V
Rated output voltage	AC 230/115 V
Making current I_E	< 12 x $\hat{I}_n$
Leakage current	≤ 0.5 mA
No-load input current i_0	≤ 3 %
Short-circuit voltage u_k	≤ 3 %
Screening	between primary and secondary winding

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…90
Factory-set device address	PRC487: 4 – 107TD47: 3
Display, characters	LCD, illuminated, 2 x 16 characters

Switching elements (alarm contacts)

Number of changeover contacts	2
Operating principle	N/C operation (1 x N/C or N/O operation selectable)

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 section

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 section

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

Outgoing circuits

Connection	cage clamp spring terminal
Connection properties rigid/flexible/conductor sizes	0.08…2.5 mm²/4 mm²/AWG 28-12
Stripping length	6…7 mm

General data

EMC immunity	acc. to EN 61000-6-2
EMC emission	acc. to EN 61000-6-4
Product standards	
Insulation monitoring	IEC 61557-8
Load and temperature monitoring	IEC 60364-7-710; DIN VDE 0100-710
Changeover module	IEC 60364-7-710; DIN VDE 0100-710 IEC 60947-6-1
Distribution cabinet	IEC 60439-1
Isolating transformer	IEC 60364-7-710; DIN VDE 0100-710; IEC 61558-1
Isolating transformer	IEC 60364-7-710; DIN VDE 0100-710; IEC 61558-1 IEC 61558-2-15
Classification of climatic conditions acc. to IEC 60721	
Stationary use	3K5
Transport	2K3
Long-time storage	1K4
Ambient temperature, operation	- 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
Schematic diagram/circuit diagram	Documentation will be created according to project-specific and customer-specific requirements
Weight/power consumption	see ordering information