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Operating manual **GB**

MSF 220 V (VU)

Application

The PTC-resistor trip device MSF 220 V has been designed for monitoring dry-transformers. 3 PTC-circuits with different nominal-response-temperatures (NRT) can be connected to this unit, one for controlling a fan (forced cooling) and two for alarms.
Each PTC-circuit is monitored for break and short-circuit. This reduces the probability of false alarms.

Functions

- Supply-voltage AC 230 V = standard
  option: universal supply-voltage AC/DC 24...240 V
- 3 PTC resistor circuits, 1 to 6 PTC each (max. cold resistance of circuit 1500 Ω each)
- **Using without fan** (fixed resistor in T/T0): K0 switches with K1. K0 makes no signal when switching on the supply-voltage. Delivery from factory with fixed resistor 680 Ω between T/T0.
- **FAN-function**: potential-free contact K0 (no) for FAN. The relay picks up when sensors T/T0 reach NRT.
- **ALARM-1-function**: potential-free contact K1 (co) for ALARM 1. The relay releases when sensors T/T1 reach NRT. There is a short alarm-signal of K1 when switching-on the supply-voltage. ALARM 1 signals an interruption of power-supply or sensor-error.
- **ALARM-2-function**: potential-free contact K2 (co) for ALARM 2. The relay picks up when sensors T/T2 reach NRT.
- **Self-test** when switching-on (LEDs on for 2 s)
- LEDs signal state of relays and sensor-errors
- Sensor-monitoring for break and short-circuit
- Switch-back-delay of FAN 20 min., automatic extension at frequent demand
- **TEST-button** for testing relays and stop of fan-delay
- Plug-in terminals
- Housing for mounting on DIN-rail or wall-mount

Technical Data

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Type	MSF 220 V	MSF 220 VU
Order number	T 221736	T 221735
Supply voltage/frequency Us	AC 220-240V 50/60 Hz	AC/DC 24…240 V
Power consumption	P < 3 VA	P < 3 VA
Tolerance voltage Us	AC 0.9...1.1 Us	AC/DC 20…270 V
Tolerance frequency Us	48...62Hz	

PTC-resistor connection	3 x 1...6 PTC in series
Cut-out point	3,3...4,0 kΩ, typ. 3,65 kΩ
Reclosing point	1,5...1,65 kΩ, typ. 1,6 kΩ
Collective resistance of cold sensors	≤ 1.5 kΩ
Short-circuit monitoring	R_{min} > 50 Ω, R_k = 20…50 Ω
Terminal voltage (sensors)	≤ 2.5 V at ≤ 250 Ω ≤ 7.5 V at ≥ 4 kΩ
Terminal current (sensor)	≤ 2 mA

Relay output	K1 and K2 = 1co potential free K0 = 1no potential free	
Switching voltage max.	AC 400 V	
Switching current max.	AC 8 A	
Switching power max.	AC 1100 VA	
Rated continious current I_{th}	AC 6 A	
Rated operational current I_e		
AC15:	I_e= 2A, U_e= 400 V	I_e= 3 A, U_e= 250 V
DC13:	I_e = 2A, U_e = 24 V	
Mechanical contact life	5 x 10^7 operations	
Electrical contact life	2 x 10^5 operations (at max. switching capacity)	
Factor of reduction at cos = 0.3	0.5 x max. switching capacity	
Prefuse for device and contacts	4 A, time-lag (gL)	

Testing conditions	VDE 0160/VDE 0660
Rated insulation voltage	AC 250 V
Insulation	VDE 110 / III /2
Transformer	VDE 0551
Test voltage between supply voltage, relay outputs and sensor side	2.5 kV
On period	100 %
max. ambient temperature	-20 ... +60 °C
Climatic category	F (according to DIN 40 040)
EMC	EN 50081/EN 50082

Housing:	design V6
Dimensions (H x W x D)	90 x 105 x 58 mm
Material	Polyamid PA 66, UL 94 V-2
Protection housing/contacts	IP 20
Line connection	max. 2 x 1.5 mm^2 each
Panel inclination	any
Mounting	snapable on 35 mm standard rail according to DIN or assembly with screws M 4
Weight	app. 250 g

Installation - Putting into operation **GB**

Mounting and connection:

- mount on 35 mm mounting rail according to DIN 50 022
- wall-mount with 3x screws M4
- connect wires as per wiring scheme

Attention! Do not plug in or remove terminals with device alive

When installing the device into the switch-gear cabinet, please observe the max. admissible temperature. Care for both, sufficient clearance to other devices or sources of heat or enough forced draught.

Before switching on make sure that the operational voltage Us of the type-plate and the mains voltage are the same.

- Apply mains voltage to terminals A1 and A2 (DC A1=+, A2=-, also connect PE)
- When device is ready for operation, relays K1 picks up, the green LED "ON" is alight

Trouble-shooting and remedies

- LED "ON" is not alight

  Make sure that supply voltage is connected correctly (+/-) to terminals A1/A2 and is the same as on the type plate
- LEDs FAN, ALARM 1 or ALARM 2 flash, LED SENSOR is alight and relay K1 doesn´t pick up:

  Check the PTC-sensors. Make sure they are connected correctly to T0, T1 and T2. All PTC must have a low resistance (pay attention to monitoring sensor-break and short-circuit; when using without fan a resistor 100 ... 1000 ohm in T/T0 is required)
- Testing the outputs can easily be realized by using the test-button. For K0 and K2 this also is possible when no sensors are connected - K1 remains released because of the detected sensor-error.
- For testing the PTC-input the resistance has to be increased slowly, i.e. by means of a potentiometer. Rapid changes (> 10 kΩ) may be detected as sensor-error.

Attention! Check PTC's only with measuring voltages of < 2.5 V.

- In case of any other malfunctions, replace device and send it in together with a description of the occurred malfunction.

Funktionstabelle / Table of Functions:

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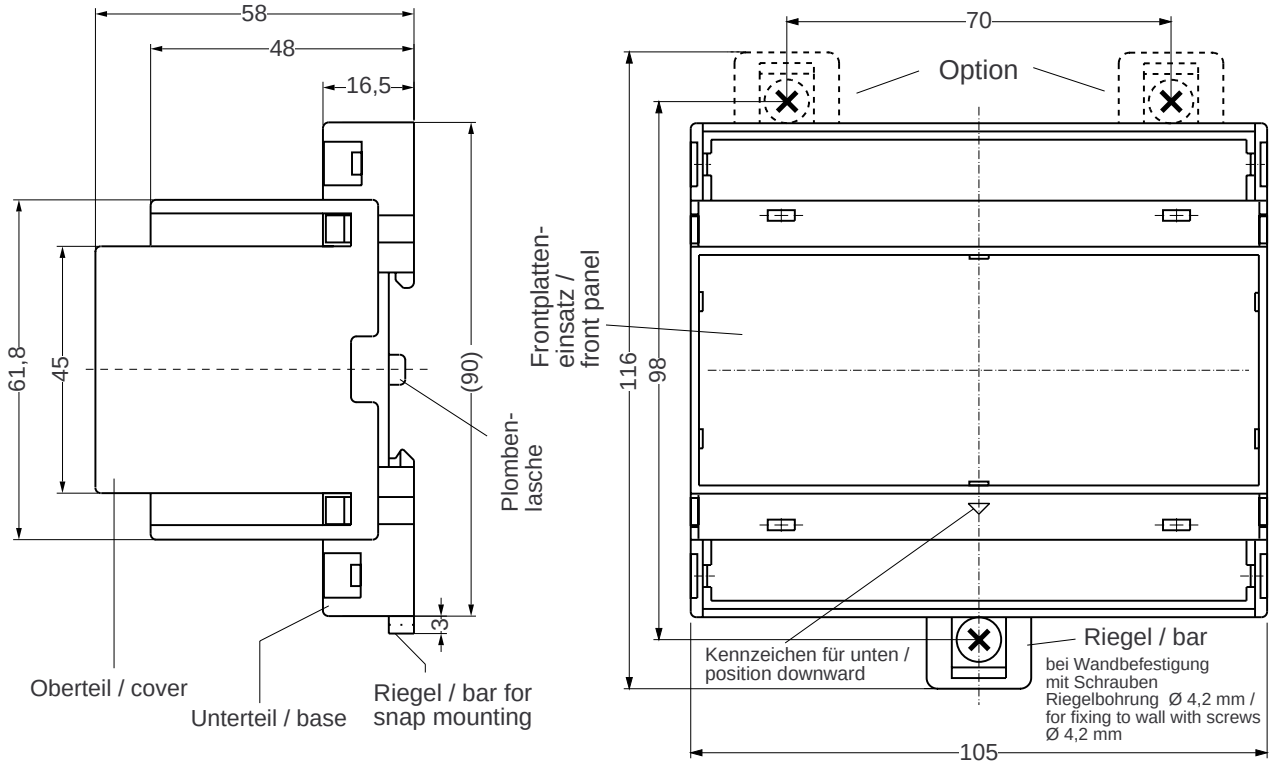
IN		OUT			LED				
		FAN / Alarm 1	Alarm 1	Alarm 2	FAN	Alarm 1	Alarm 2	Sensor	ON
	contact	05 - 08	11 - 12	21 - 24					
Power OFF		0	1	0	0	0	0	0	0
Power ON					2 s	2 s	2 s	2 s	1
Sensor 0	normal	0			0/ Flash*			0	1
(T / T0)	overload	1*			1			0	1
	0 / ∞		1		Flash			1	1
Sensor 1	normal		0			0		0	1
(T / T1)	overload	1	1		1	1		0	1
	0 / ∞		1			Flash		1	1
Sensor 2	normal			0			0	0	1
(T / T2)	overload			1			1	0	1
	0 / ∞		1	0 (1)			Flash	1	1
* = delayed switch back 20 - 60 min. (rückschaltverzögert 20 - 60 min.)									
LEDs Alarm 1 and Alarm 2 flash until Reset (blinken bis zu einem Reset oder Spannungsunterbrechung)									
Test: LED "ON" -flash -> +2 s -> FAN -> +3 s -> Alarm 1 -> +3s -> Alarm 2 Interrupt on release (Abbruch bei Loslassen)									

Bauform V 6 / Design V 6:



Anschlussplan / Wiring Scheme:

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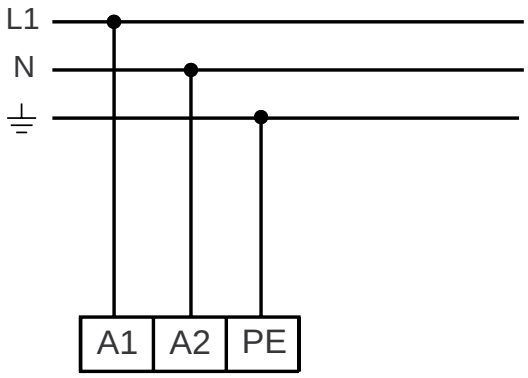
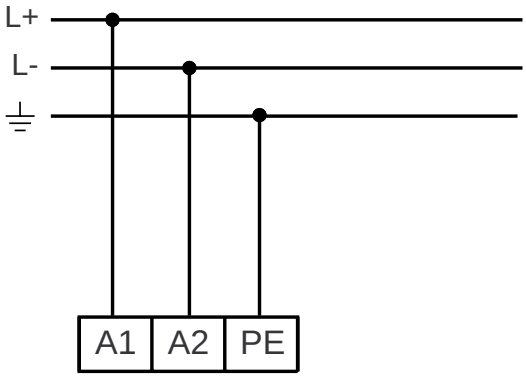
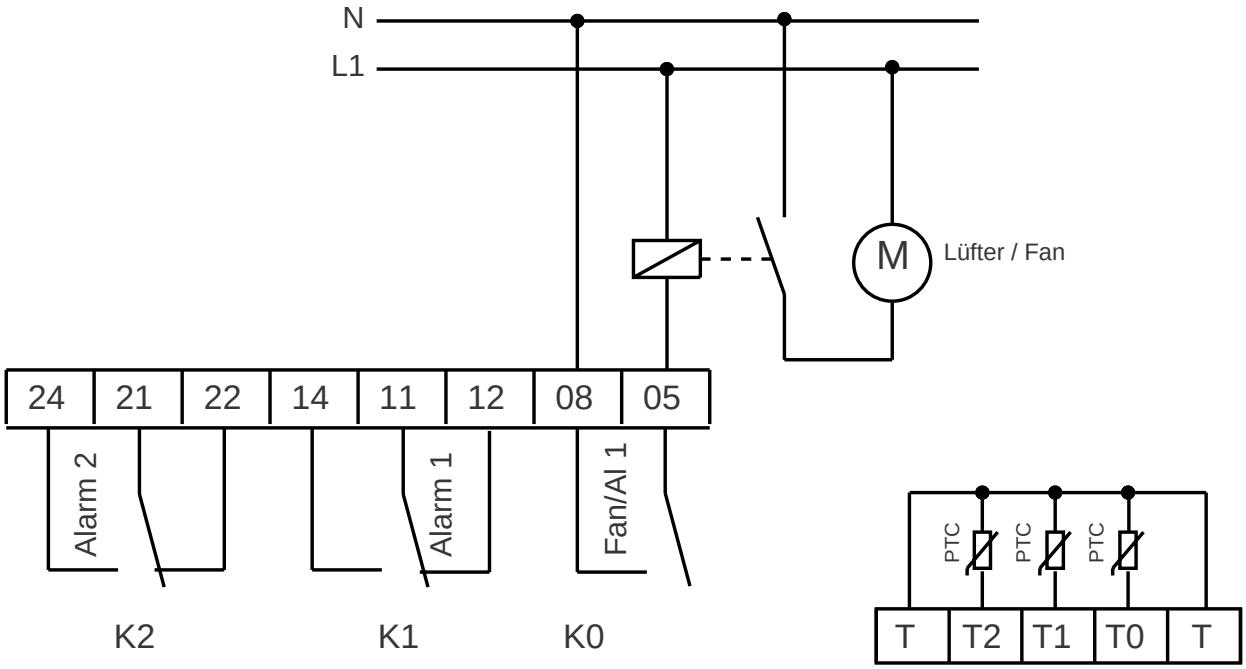
AC-Versorgung / AC-supply



DC-Versorgung / DC-supply



Betrieb mit Lüfter / using with fan



Betrieb ohne Lüfter / using without fan