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Operating Manual MSF220V(VU)

updated: 2016-10-13/Fu/sm

- PTC-resistor relay

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1 Application and short description

The MSF220V is particularly suitable for the temperature monitoring at 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.

Approvals:

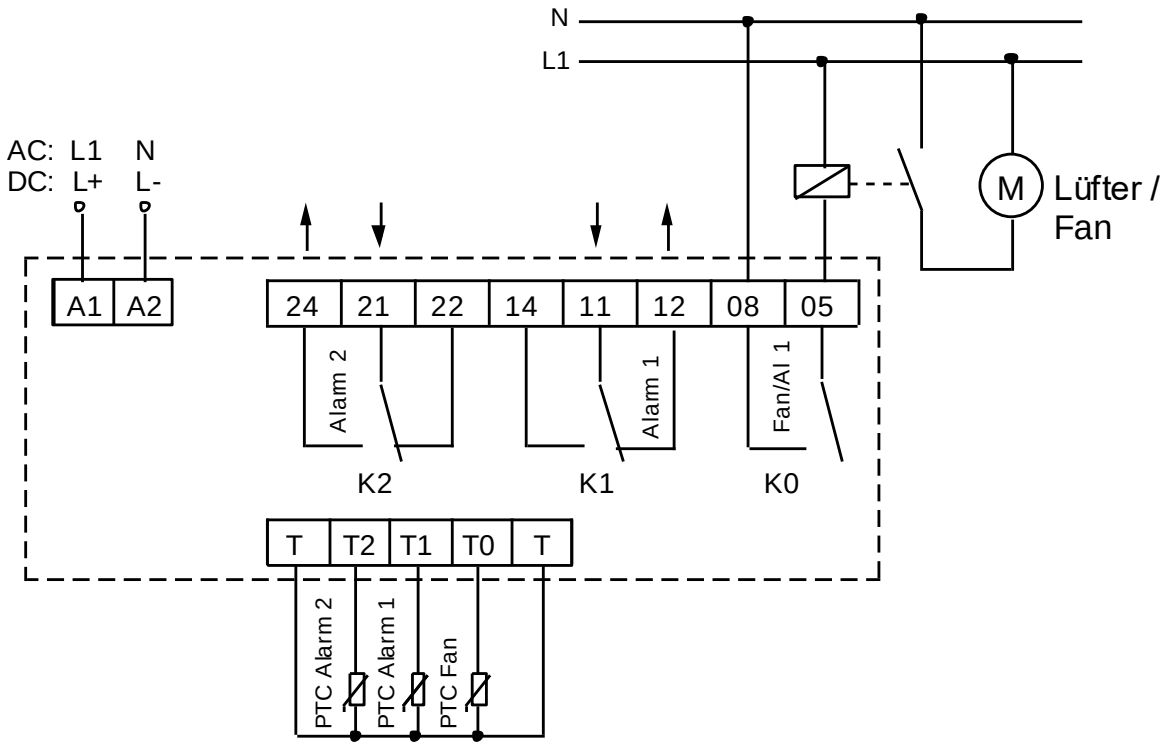
UL Recognized Component

2 Overview of functions and connection plan

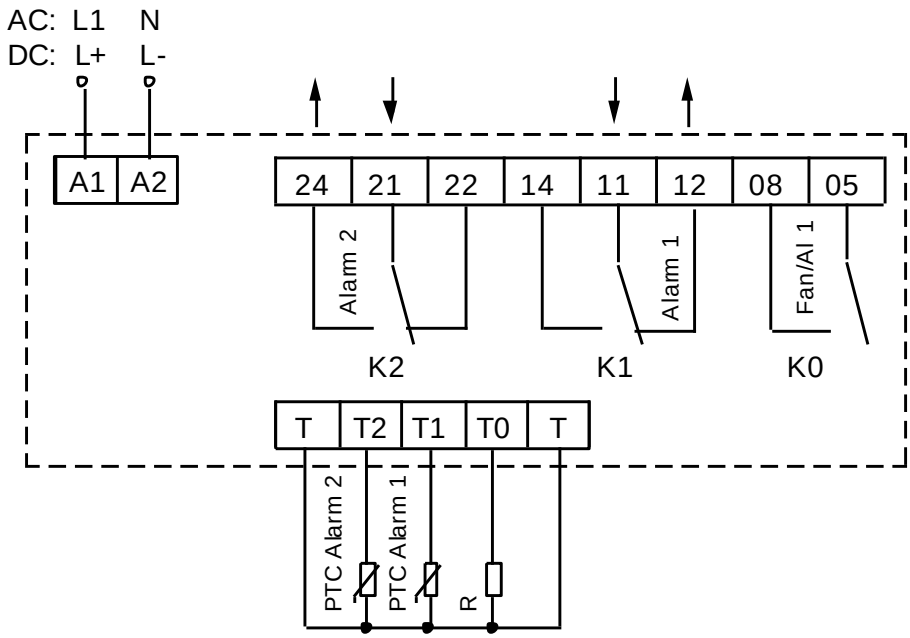
- 3 PTC-circuits
- MSF220VU for universal supply voltage AC/DC 24-240 V
- intelligent control of fan (relay K0, 1 normally-open contact)
- ALARM 1 in closed-circuit current mode (relay K1, 1 change-over contact) for pre alarm. Signals also error in any sensor and interruption of supply voltage.
- ALARM 2 in operation current mode (relay K2, 1 changeover contact). No signal when switching on and off the supply voltage.
- all output relays potentially separated from each other.
- monitoring of sensor lines
- TEST-button (stop possible before ALARM 2)
- Simply test function, sensor monitoring can be disengaged (for 10 minutes)
- LEDs for ON, sensor error, Fan, ALARM 1 and ALARM 2
- plug-in terminals
- housing for mounting on DIN-rail or wall-mount
- mounting height 55 mm

3 Connection Plan

3.1 Application with fan:



3.2 Application without fan:



4 Detailed description

The PTC-relay MSF220V has been designed for monitoring the temperature of 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.

Table of functions:

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 -> +7 s -> Test 2 (~~0 / ∞~~) Interrupt on release (Abbruch bei Loslassening)									

5 Assembly

Mount on 35 mm mounting rail EN 60715 or
Wall mounting with screws M4

6 Putting into operation

Connect wires as per connection plan

DANGER!

Hazardous voltage!
Will cause death or serious injury. Turn off and lock out all power supplying this device before working on this device.

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.

Attention!
Before switching on make sure that the supply voltage Us of the type plate and the mains voltage are the same!

- Apply mains voltage to terminals, AC to A1 and A2 (DC A1=+, A2=-).
- When device is ready for operation, relays K1 picks up (contact 11-14 closes), the green LED "ON" is alight.

In case of failure of supply voltage, the monitored unit is not protected any more. The operator must ensure, that a failure is detected, e.g. by monitoring Alarm 1 (K1) or by testing the unit regularly.

Even if no temperature warning is monitored with alarm 1, the function of the relay K1 has to be evaluated, otherwise the monitoring can fail unnoticed (missing supply- voltage, equipment failure etc.). When no sensor is connected to T/T1, a resistor (100Ω…1000Ω) must be mounted.

7 Trouble shooting

- 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 light up 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 (keep pressed). If no PTC resistors are connected, the relay K1 always signals an alarm
- For testing the PTC-input, the resistance has to be increased slowly, i.e. by means of a potentiometer (app. 10 kΩ). Rapid changes may be detected as sensor-error.
- **During normal operation testing the function with a short circuit in the sensor-input and/or by disconnecting the sensors (interrupt) is not possible**. Any manipulation will result in detecting a sensor-error (K1 releases and a sensor-error is displayed, **K0 and K2 do not switch**)
- **Test with interrupt and short circuit at the sensor-inputs is possible in test function 2**. Press Reset/Test-button until LED "ON" flashes rhythmically (approx. 15 s). The device will return to normal operation when pressing Set/Reset or automatically after 15 minutes.

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

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

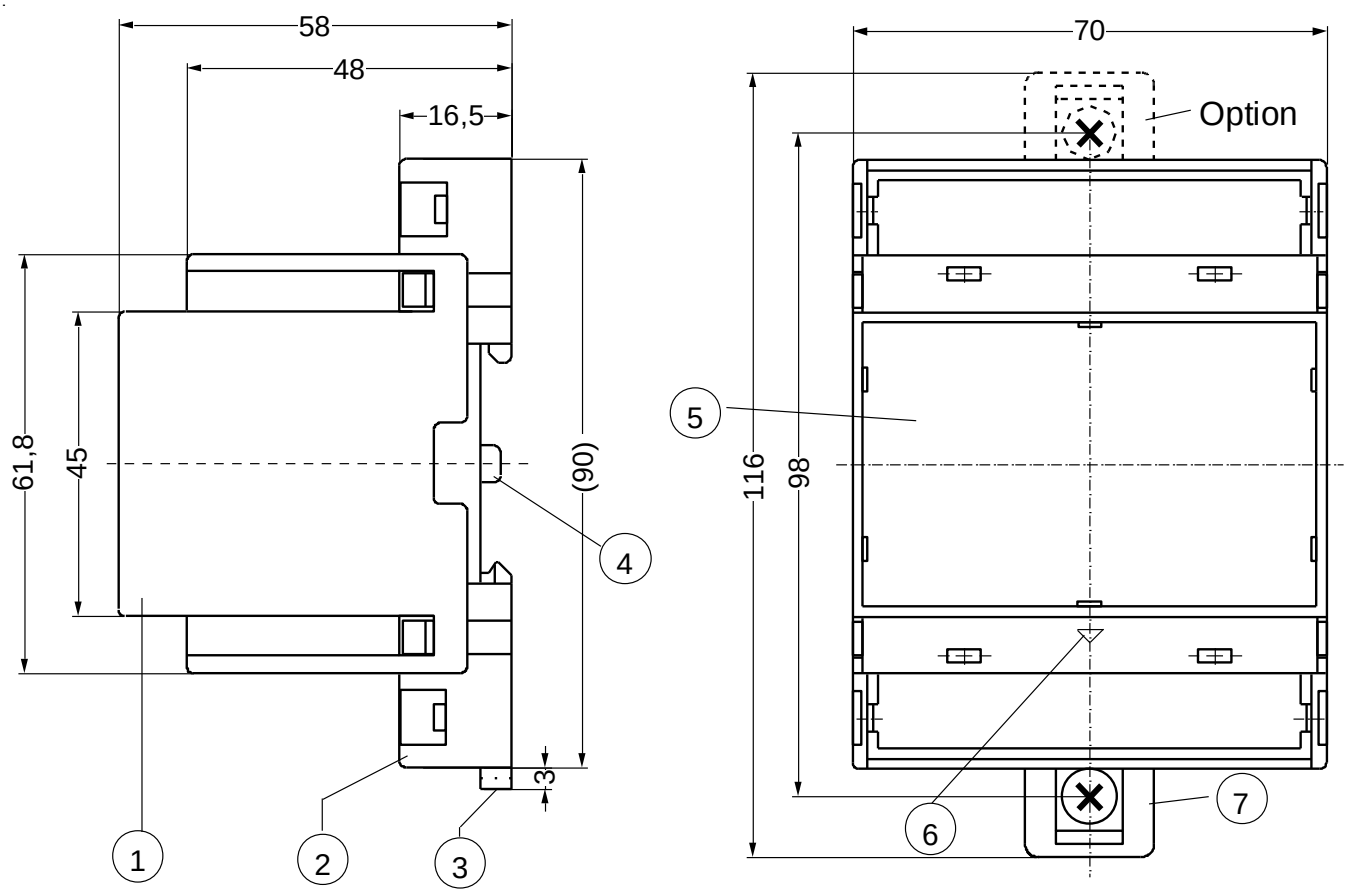
8 Technical data

Type	MSF220V	MSF220VU
Order number	T 221738	T 221737
Supply voltage/frequency Us	AC 220-240V 50/60 Hz	AC/DC 24…240 V
Power consumption	P < 3 VA	P < 5 VA < 2 W
Tolerance voltage Us	AC 0.9...1.1 Us	AC/DC 20…270 V
Tolerance frequency Us	48...62Hz	40…70 Hz
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} > 40 Ω, R_k = 20…40 Ω	
Terminal voltage (sensors)	≤ 2.5 V at ≤ 250 Ω ≤ 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 415 V	
Switching current max.	AC 6 A	
Switching power max.	AC 2000 VA 120 W at DC 24 V	
Rated operational current I_e	AC-15: I_e= 2A, U_e= 400 V I_e= 3 A, U_e= 250 V DC-13: I_e = 2A, U_e = 24 V	
Mechanical contact life	3 x 10^7 operations	
Electrical contact life	1 x 10^5 operations (at 230 V / 6 A)	
Factor of reduction at cos φ = 0.3	0.5 x max. switching capacity	
Fuse for device and contacts	4 A, time-lag (gL)	
UL electrical ratings	250 V ac, 3 A, general use 240 V ac, 1/4 hp, 2.9 FLA 120 V ac, 1/10 hp, 3.0 FLA C 300	
Testing conditions	EN 50178 / EN 60947	
Rated insulation voltage	AC 300 V	
Pollution degree	2	
Overvoltage category	III	
Rated impulse voltage	4000 V	
EMC	EN 61000-6-2 / EN 61000-6-3	
On period	100 %	
max. ambient temperature	-20 ... +60 °C / -20…+70 °C	
Housing:	design V4	
Material	Polyamid PA66, UL 94 V-2	
Mounting height / Width	55 mm / 4 TE	
Dimensions (H x W x D)	90 x 70 x 58 mm	
Protection housing/contacts	IP 30 / IP 20	
Tightening torque	0,5 Nm	
Line connection solid wire	1 x 0.5 ... 1.5 mm^2	
Stranded wire with insulated ferrules	1 x 0.14 mm^2 …1 mm^2	
Mounting	snap able on 35 mm standard rail according to EN 60715 or assembly with screws M 4	
Weight	app. 250 g	

Subject to technical modifications

9 Form V4

dimensions in mm



1 Upper part
2 Lower part
3 Bar for snap mounting
4 Latch for sealing
5 Front panel
6 Position downward
7 Bar for fixing to wall with screws, Ø 4.2 mm