

# HV/LV distribution transformers

## TRIHAL cast resin transformers

### thermal protection by PTC sensors



An optional thermal protection module is available on request.  
This will monitor the temperature of the windings and prevent overheating.

#### the standard thermal protection comprises:

■ **2 PTC sensors assemblies**, each one comprising three positive temperature coefficient thermistors connected in series: the first one gives an alarm 1 signal, the second an alarm 2 signal (LV tripping). The PTC sensor abruptly changes its resistance value at its operating temperature threshold. This is preset during manufacture and not adjustable. The rapid increase in resistance of the sensors at their operating temperature is detected by the Z electronic converter, to which they are connected. Sensors, one for alarm 1 and one for alarm 2 per phase are located in tubes between the magnetic core and the LV winding and can be withdrawn and replaced should this ever be necessary.

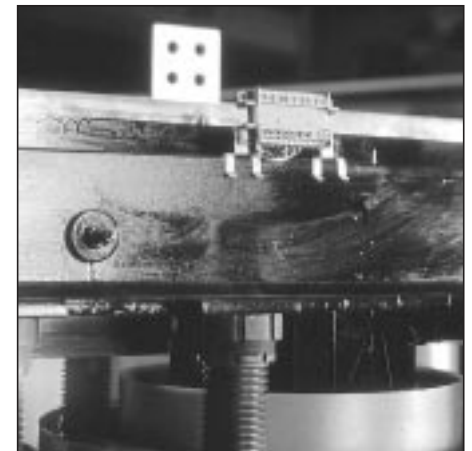
#### ■ **1 A Z electronic converter with 3 independent metering circuits.**

Two of these circuits respectively control the variation in resistance between the 2 PTC sensor units. When the temperature reaches one of the thresholds, information from Alarm 1 (or Alarm 2) is respectively processed by the 2 independent output relays equipped with a changeover switch contact; the position of these two relays is signalled by 2 red coloured LED's. The third metering circuit is shunted by an external or enclosure mounted resistance R; it can control a 3<sup>rd</sup> PTC sensor unit as long as this resistance is eliminated. In this case ("Forced Air" option on request), the FAN information is processed by a 3<sup>rd</sup> independent output relay equipped with a closing contact; the position of this relay is signalled by a yellow LED. A green coloured LED signals the presence of voltage to the enclosure. If any of these 3 probe circuits fails (breakage or short-circuit), a red LED marked SENSOR starts to flash, along with that of the incriminating circuit. The corresponding control, however, is not activated. The relay for each probe circuit can be tested during commissioning (LED display and contact switching, with activation of controls).

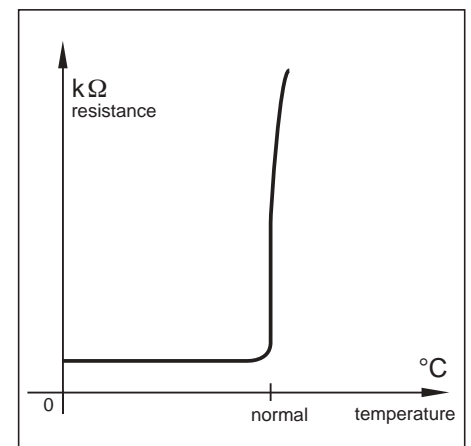


Z electronic converter

■ **a terminal board with plug-in connectors** in order to connect the PTC sensors to the electronic converter. The PTC sensors are supplied connected to the terminal board fixed on the upper core clamp of the transformer.



terminal-board with plug-in connectors connecting the PTC sensor and the Z electronic converter



characteristic curve diagram of a PTC sensor

Merlin Gerin

Square D

Telemecanique

**Schneider**  
**Electric**

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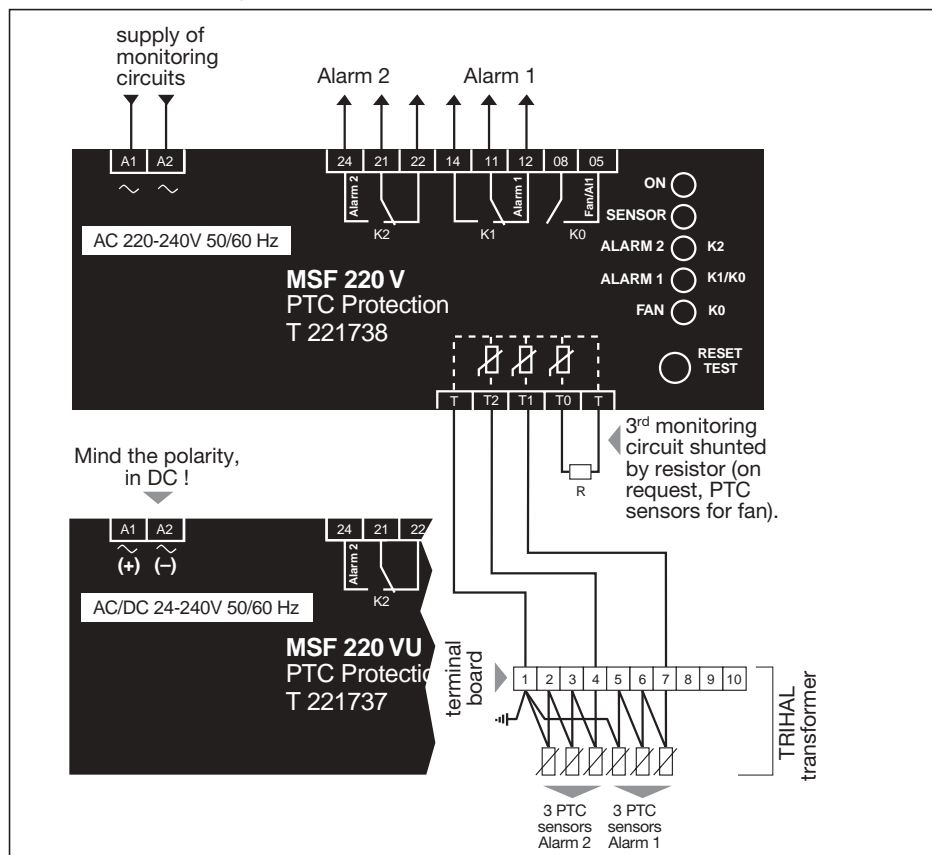


## Z converter technical data

monitoring circuits	supply voltage <sup>(1)</sup>	AC 230 V*
	tolerance voltage	- 15 % to + 10 %
	frequency	48 to 62 Hz
	input	< 5 VA
	maximum resistance of a PTC sensors circuit before operation of the converter	≤ 1500 W
output contacts: alarm 1 and alarm 2	maximum switching voltage	AC 415 V
	maximum switching current	5 A
	switching power	AC 2000 VA (ohmic load)
	continuous rated current	AC 2 A
	rated service current	AC 2 A under 400 V
	advised above fuse	4 A rapid
	contact life	mechanical 3 x 10 <sup>7</sup> operations
		electrical 10 <sup>5</sup> operations
	contacts load	0.50 max with power factor = 0.30
	reduction ratio	
Z electronic converter	admissible ambient temperatures range	0° C to + 55° C
	dimensions (H x L x P)	90 x 70 x 60 mm
	weight	250 g
	protection index	terminal board IP 20
		protective housing IP 20
	maximum capacity on a terminal connection	1 x 2.5 mm <sup>2</sup> rigid
	fixing	either on a DIN 35 mm rail or with M4 screw

(1) must be specified at the order.

\*standard version. Other voltage on request: AC/DC 24 to 240V, tolerance ± 15 %.



## power supply

Monitoring circuits have to be supplied from an auxiliary supply (standard: AC 220 to 240 V). If no suitable supply is available they may be supplied from the transformers secondary voltage.

## installation

**Z converter should never be installed on the transformer or inside its metal enclosure due to the limit on operating temperature (see table opposite).**

■ it can be installed in the low voltage switch-board or on a wall in a vertical or horizontal position (see table opposite for fixing details).

■ **it is advised, especially for an installation in a low voltage switchboard, to keep a minimal clearance of 2 cm to other equipment or heat sources and to ensure adequate ventilation.**

**Take care also to the highest voltage according to insulation voltage.**

### connections:

The PTC sensors are supplied connected to the terminal board fixed on the upper core clamp of the transformer.

The wiring from to the terminal board of the electronic converter is not supplied by France Transfo (see chart opposite).

**the following guidelines in connection wiring should be followed:**

- maximum length of connection: ..... 40 metres
- minimum conductor area: ..... 0.5 sq mm
- screened cables should be used if wiring passes near power conductors.
- terminal tightening: 0.5 Nm max.
- no fixings should be made on the transformer.
- the following minimum clearances to live conductors must be maintained:

system highest voltage (kV)	minimum clearance (mm)
7.2	270
12	450
17.5	450
24	450
36	650

**connection diagram of the Z thermal protection module**  
(usual case of utilization)  
Shown unenergized

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Due to the evolution of standards and materials, the present document will bind us only after confirmation from technical department.

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