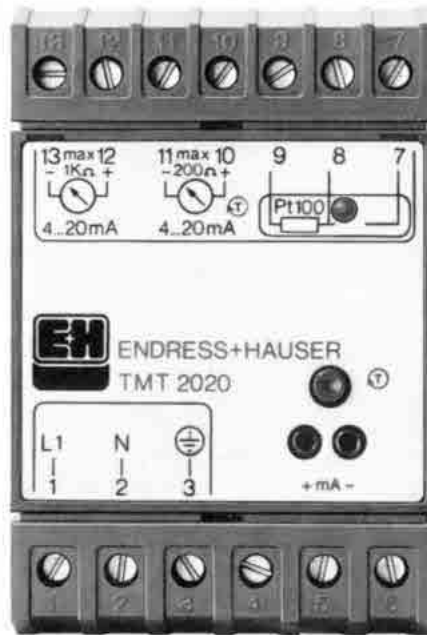


Temperature Transmitter for Pt 100 resistance thermometer

omnigrad TMT 2020

MINIPAC version



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Operation

The Omnigrad TMT 2020 is a temperature transmitter for Pt100 resistance thermometers. It has a linearised 4-20 mA output.

The transmitter is of Minipac design, only 50 mm wide, for mounting on a standard DIN rail.

The measuring range is defined by inserting a module (Lincard) in the appropriate socket inside the housing. Fourteen measuring ranges (Lincards) are available.

Using the front panel push-button connected to the auxiliary output temperature may be displayed on the remote Minipac display or the panel mounted display without interrupting the measuring circuit.

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System

The complete system the Omnigrad TMT 2020 transmitter itself comprises:

- a 3-wire resistance thermometer (with or without protective sheath) connected to the transmitter inputs;
- a Lincard which defines the temperature range;
- a digital display for direct temperature indication if necessary.

Inputs and outputs: Lincard

The measuring range associated with the input of each Omnigrad TMT 2020 is determined by its Lincard.

It establishes the temperature range providing an output current of 4 to 20 mA. For example, a Lincard with a range of 0°C to +50°C provides an output of 4 mA when the temperature of the Pt 100 connected to it is 0°C, and 20 mA when it is +50°C.

Since the relationship between the Pt100 resistance and the temperature is not completely linear, the Lincard also linearises the output signal in accordance to DIN IEC 751. The output current is thus directly proportional to the temperature measured by the thermal element.

No calibration is necessary, and the easy access provided by the Minipac housing permits a Lincard to be replaced at any time.

Fourteen measuring ranges are available: see list at the paragraph Technical Specifications.

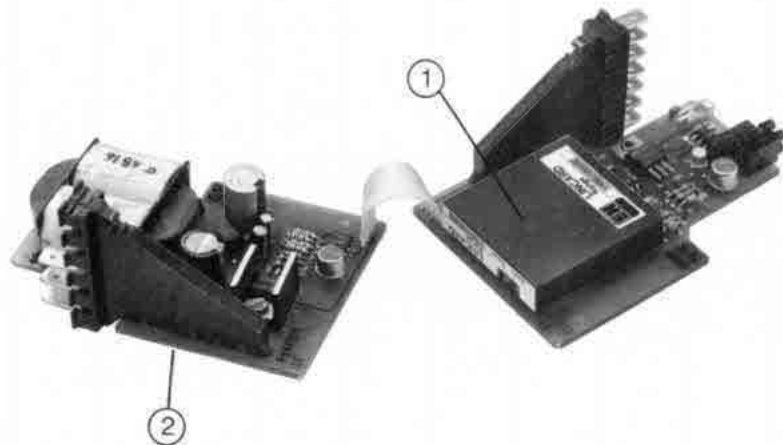
Changing Lincard

To open the instrument (see Figure 6), remove the two plug-in terminal strips and the entire black plastic block supporting the front panel. Carefully pull the two light plastic side pieces apart, and remove all circuitry from the case. Open out the two printed circuits (be careful with the flat interconnecting cable) and replace the Lincard as shown in Figure 1).

Place the two printed circuit boards together, and insert them into the light plastic side pieces, making sure that the printed circuits enter the appropriate slots.

Fig. 1
LINCARD housing and position links.

- ① Lincard
- ② Power supply links



Temperature display

If an external Omnigrad digital VU display of the Minipac or front panel type is connected to the auxiliary output 10-11 on the Omnigrad TMT 2020, a front panel push-button can be operated to display the temperature (or output current) without interrupting the measuring circuit. The current or temperature indication will depend on the range set on the VU display. Several transmitters may be connected in parallel to the same display. If they all have the same Lincard, e.g. the same measuring range, the VU must be set for that range (see corresponding VU specifications) to permit a direct temperature using indication. However, if the transmitters have different measuring ranges, the VU must be set so that it only indicates the current (4-20 mA).

The push-button T (see Figure in the front page) on the front panel of each Omnigrad TMT 2020 is used to select the output to be displayed.

If several push-buttons are pressed simultaneously on different units, the units concerned are not affected, but the readout on the Omnigrad VU will be meaningless.

The VU displays are very simple to calibrate, since the zero and full-scale values (4 and 20 mA) are simulated internally and selected using encoded slide switches. The position of the decimal point can also be selected from a sub-panel (see corresponding specifications for details).

The auxiliary output has no effect on the normal 4-20 mA output.

Installing Omnigrad TMT 2020

The equipment is normally installed on symmetrical DIN standard rails in accordance to EN 50022-35x15 or EN 50022-35x7.5. See Figure 2).

If transmitters are positioned side by side with no spacing between them, the ambient working temperature must not exceed 50°C at a distance of 1 cm above the housing (with a minimum spacing of 15 mm between units, the temperature may reach 60°C).

A case to IP55 is available for installation in dusty and humid environments. It can take two Omnigrad TMT 2020 units (Figure 3).

The installation should be protected from direct sun light, since the internal temperature must not exceed 60°C. To maintain protection to IP55, seal cable entries thoroughly and tighten the cover.

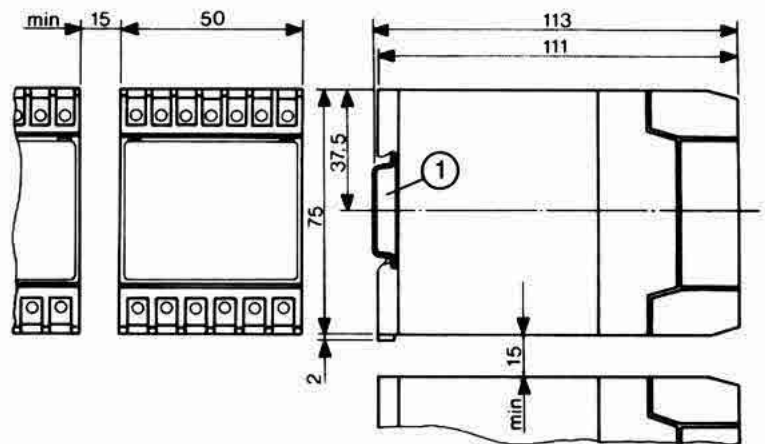


Fig. 2 - TMT 2020 dimensions.

- ① Standard 35 x 7.5 rail.

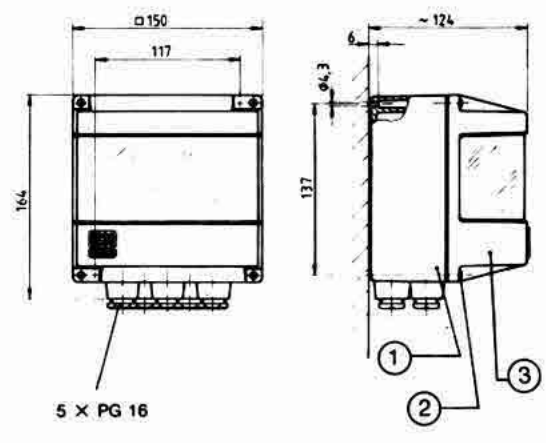


Fig. 3 - Sealed housing for Omnigrad TMT 2020. IP 55 degree of protection (DIN 40050). Weight 0.5 kg.

- ① ABS
 ② Stainless steel
 ③ Impact-resistant, transparent PMMA

Electrical connections

Figure 4 shows the simple electrical connections to be made. The Pt 100 resistance thermometer is connected to terminals 7, 8 and 9. Terminals 12 and 13 provide the analogue output, and terminals 10 and 11 an auxiliary output for an external display (this output is activated by push-button T). The power supply is connected to terminals 1, 2 and 3.

Connection to mains supply

Note the power supply voltage shown on the label on the terminal block side. Check the voltage at the place of installation.

Adjusting power supply voltage

Depending on the version, the equipment power supply voltage can be adjusted using internal links BR1, BR2 and BR3 on the printed circuit (see Figure 5) to change the connections, as shown in Table 1. Note: Correct the label after making an adjustment.

TABLE 1

Vac	Hz	BR1	BR2	BR3	Transform.
220	50/60	OPEN	CLOSED	OPEN	T 10074
110		CLOSED	OPEN	CLOSED	
240	50/60	OPEN	CLOSED	OPEN	T 10075
120		CLOSED	OPEN	CLOSED	
200	50/60	OPEN	CLOSED	OPEN	T 10076
100		CLOSED	OPEN	CLOSED	
48	50/60	OPEN	CLOSED	OPEN	T 10077
24		CLOSED	OPEN	CLOSED	



Fig. 4
TMT 2020 electrical connections.

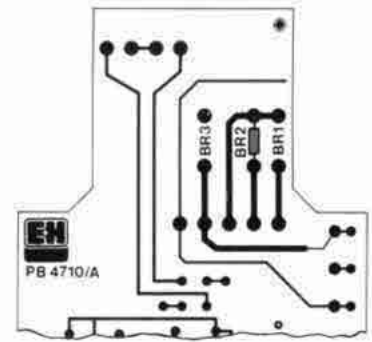
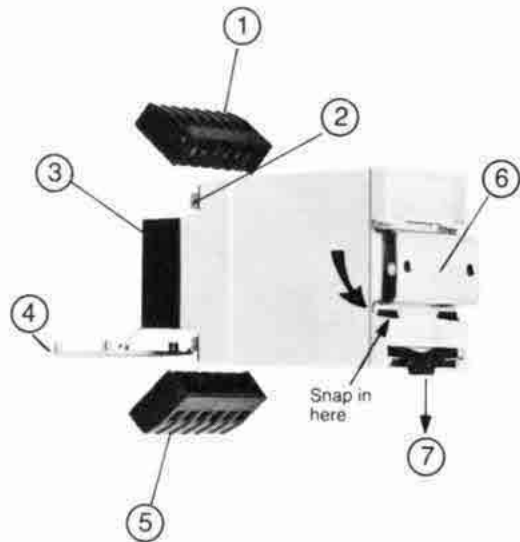


Fig. 5
Links for adjusting power supply voltage.

Fig. 6
Assembling and dismantling the TMT 2020.

- ① Removable terminal block for signal leads
- ② Connector – AMP plug
- ③ Calibration elements behind front panel
- ④ Tilting front panel complete with calibration symbols
- ⑤ Removable terminals block for relay contacts
- ⑥ Standard rail
- ⑦ Pull ring to dismantle equipment



Technical specification

Mechanical specification

Housing:

Suitable for series mounting (Minipac version) width 50 mm.
In light grey plastic with blue front panel.

Mounting:

on EN 50022 - 35x7.5 or EN 20022 - 35x15 rails

Dimensions:

see Figure 2

Weight:

0.3 kg approx

Degree of protection (DIN 40050):

IP 40 housing and IP 20 terminals

Electrical specification

Terminal blocks:

Two black, removable, 1 to 6 connections

Maximum cross-section of cable:

Up to 1x2.5 mm² or 2x1.5 mm²

Without terminal block:

0.8x6.3 mm blades (DIN 46244)

Power supply voltage:

220 VAC +20% - 15% 50/60 Hz

110 VAC +20% - 15% 50/60 Hz (internal links)

Optional versions:

240, 200 and 48 VAC - 120, 100 and 24 VAC - +20% - 15%
50/60 Hz

Consumption:

3.5 VA max

Operating check:

Green diode on front panel

Insulation between output and power supply:

1500 V (IEC 348)

Input specification

Input:

1 Pt100 3-wire input

Input measuring range:

defined by Lincard plugged into printed circuit

Measuring range

0 to + 50°C

0 to +100°C

0 to +150°C

0 to +200°C

0 to +300°C

0 to +400°C

0 to +600°C

Measuring range

- 100 to + 50°C

- 50 to +100°C

- 20 to + 60°C

+100 to +200°C

+100 to +300°C

+200 to +400°C

+200 to +500°C

Minimum change for full scale range (Special Lincard):

25 Ω

Resistance of Pt 100 connecting wires:

100 Ω max. (not for minimum range)

Technical specification

Output specification

Outputs:

Normal output 4-20 mA linearised (proportional to temperature) in accordance with DIN IEC 751. Maximum load 1 K Ω

Auxiliary output 4-20 mA linearised. Activated using front panel push-button. Maximum load 200 Ω

Accuracy rating:

$\leq \pm 0.1\%$ of full-scale

Ambient temperature:

Operation 0 to +50°C - Storage -20 to +55°C

Effect of ambient temperature:

$\leq \pm 0.005\%/^{\circ}\text{C}$ (full-scale)

Response time for step from 4 to 20 mA:

0.5 s

Effect of power supply voltage:

10 ppm/V (full-scale)

Residual effect of probe connection:

0.03°C per 1 ohm of 3-wire Pt 100 connecting wire

Immunity to radio frequencies:

$\leq \pm 1\%$ in the 144 MHz band with a power of 1.5 W at 1 m

All information is subject to change without notice.

Export Division

Endress+Hauser
GmbH+Co
PO Box 1261
D-7864 Maulburg
FR of Germany
Tel 07622/28-0
Telex 77 32 26
Telefax 07622/28438

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