DEIF A/S

Temperature transducers

Type TEMAX-3

4921220022C

TEMAX-3.4B

- *2 wire transducer for remote monitoring of 2, 3 or 4 temperatures*
- *Protected against R.F. magnetic fields*
- *Read-out of highest output*
- *Plug-in PCBs*
- *Protection: IP65*

Available types

Type	TEMAX-3.2B	TEMAX-3.3B	TEMAX-3.4B
For sensors	2 Pt100Ω sensors	3 Pt100Ω sensors	4 Pt100Ω sensors

Introduction

TEMAX-3 is intended for monitoring of 2 to 4 temperatures. TEMAX-3.2B and TEMAX-3.3B may later on at our factory be upgraded to 3 or 4 measuring points (type TEMAX-3.3B and TEMAX-3.4B respectively). The temperature transducers type TEMAX-3 are CE classified for residential, commercial and light industry plus industrial environment.

Application

TEMAX-3 is applied to monitor inputs from 2, 3 or 4 Pt100Ω resistance sensors, indicating the highest temperature on its built-in 240° indicating instrument.

Operating principle

TEMAX-3 is a 2 wire transducer with an output signal of 4...20mA.

The term "2-wire transducer" refers only to the output signal as the power for the electronics is transmitted through the two output wires and not by means of a separate auxiliary voltage (4 wire principle). TEMAX-3 is placed near the measuring points and the two output wires carry the power to supply the electronics as well as the output signal.

The output current can be considered as two components: a constant 4mA for the amplifier etc. of the transducer and a variable signal of 0...16mA, which changes proportionally to the measured input signal. The input signal corresponds to the output 4...20mA.

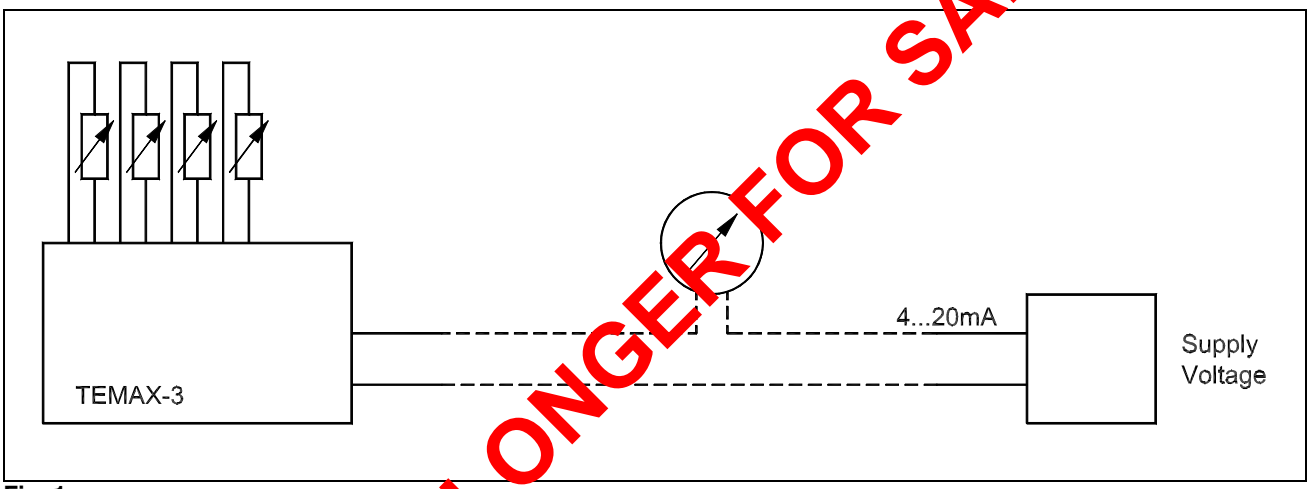


Fig. 1

Indicating instruments, recorders, controllers etc. can be connected as shown in series with the output circuit and the supply voltage.

The output current is proportional to the temperature and independent of varying supply voltage, lead resistance and load within the specified limits.

The 2, 3 or 4 temperatures are measured by means of Pt100Ω sensors connected in 2 wire couplings. Each sensor forms part of a wheatstone bridge, whose diagonal voltage is amplified by an operational amplifier.

The 2, 3 or 4 amplifier outputs are compared and the signal representing the highest temperature is selected. This signal controls an output amplifier which converts the signal into the 4...20mA constant current output.

Output under fault conditions

If one of the sensors or its leads is/are broken, TEMAX-3 will give an output higher than 20mA (max. 32mA).

In this case there will be no temperature measurement but a clear indication of fault.

If one of the sensors or the input leads is/are short-circuited, the other measurements remain unaffected but no typical change of the output signal will occur. However, such faults are not typical. Pt100Ω sensors are very reliable, and if they do fail, it is usually caused by physical damage resulting in an open circuit condition.

A short-circuit fault can only be detected by periodical activation of the push-buttons. At the actual point the meter will indicate less than 0°C.

Installation

In order to fully utilize the 2-wire system, the transducer should be placed near the measuring points to gain the following advantages:

- Noise suppression — The signal is transmitted at a high level and a relative insensitivity to noise and interference is thus achieved.
- Simple wiring — Only 2 wires are to be drawn from the transducer to the switchboard.

The Pt100Ω sensors are connected to the TEMAX-3 in "2-wire couplings". The resistance in the sensor leads is in series with the Pt100Ω sensor, and an error would consequently occur, if not allowed for. To avoid this error, the TEMAX-3 is adjusted to a fixed resistance of 0.35Ω for each sensor.

The mentioned 0.35Ω corresponds to 2 x 15 m - 1.5 mm² or 2 x 10 m - 1.0 mm^2 wires, etc.

In order to simplify the TEMAX-3, it is not provided with variable lead compensations and check resistors. The lead resistance should be as close as possible to the mentioned 0.35Ω to ensure highest achievable accuracy.

Deviations from the 0.35Ω will cause an error of +1°C per +0.38Ω, without recalibration.

Mechanical construction

The transducer is housed in a polycarbonate case (to IP65, i.e. protected against water jets) with a transparent cover and 4 watertight push-buttons.

The case is fitted with 5 PG9 cable glands and has an internal terminal block for connection of up to 4 mm² wires.

All electrical components are protected against mechanical damage and dust by means of the thermoplastic case with plug-in PCBs and a metal cover plate.

The transducer is furthermore equipped with a built-in indicating instrument, 48 x 48 mm with 240° scale.

Electrical construction

TEMAX-3 consists of a base board plus 4-6 plug-in PCBs, which are individually calibrated, facilitating service and repair in the event of faulty function:

- Amplifiers for the Pt100Ω sensors (2-4 PCBs)
- Voltage supply and output amplifier (1 PCB)
- Built-in push-button function (1 PCB)

General technical specifications

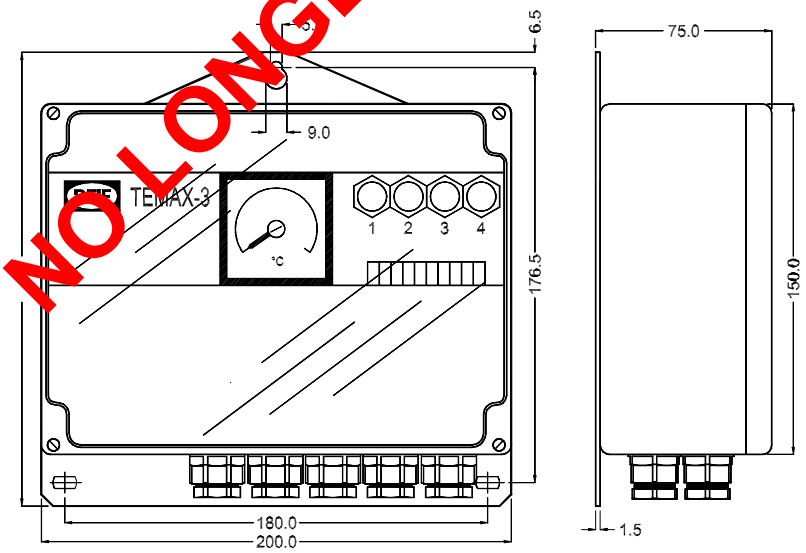
Temperature:	-10...55°C (nominal) -25...70°C (operating) -40...70°C (storage).
Temperature drift:	Max. 0.2% per 10°C.
Test voltage:	2000V AC - 50Hz - 1 min. between mounting plate and input/output. 500V AC - 50Hz - 1 min. between inner screen and input/output.
R.F. electromagnetic fields:	To IEC 801-3 (27...1000MHz, 10V per meter).
Climate:	Class HSE, to DIN 40040.
EMC:	To EN 50081-1/2, EN 50082-1/2, SS4361503 (PL4) and IEC 255-22-1 (class 3).
Protection:	Case: IP65, to IEC 529 and EN 60529.
Materials:	Case: light grey polycarbonate. With 5 PG9 glands and internal terminal block.
Connections:	Cable diametre: 4...10 mm. Wire diametre: max. 4 mm². Extra terminals are provided for looping of any screens from the input/output cables.
Mounting:	For base mounting. Position as required, however, vertical mounting recommended to reduce any ingress of liquid and dust etc. via the cable glands.

Technical specifications

Measuring range:	0...150°C or 0...200°C (other ranges on request).
Temperature sensor:	Pt100Ω, 2 wire.
Lead compensation:	Adjusted for lead resistance 0.35Ω corresponding to a pair of 15 m - 1.5 mm^2 or 10 m - 1 mm^2 copper connecting leads.
Lead compensation resistance:	None.
Maximum continuous overload:	Max. 36V DC (refers to all inputs and output).
Output:	4...20mA constant current. The temperature of any input can be read on the built-in instrument.
Maximum output:	32mA on extended input (e.g. open circuit or disconnected sensor).
Ripple on output:	Max. 0.5% pp at V_S = 2 V_{pp} (10...400Hz).
Output non-linearity:	Max. 0.1%.
Accuracy:	Class 1.0 (1%) ±0.5°C (-10...15...30...55°C), to IEC 688 and EN 60688.
Comparison accuracy:	0.5°C.
Auxiliary voltage (V_S):	13...36V DC at 0.1 V_{pp} ripple. 14...36V DC at 2 V_{pp} ripple.
Max. ripple (V_R):	5 V_{pp}.
Load on output (R_L):	Depends on the aux. voltage V_S: $max.\ R_L = \frac{V_S - (0.5\ V\ + 13)}{0.02}$ (OHMS)
Aux. voltage influence:	Max. 0.1% from 13...36V DC at 0.1V_{pp} ripple.
Response time:	Approx. 1 s for 100% change of input, approx. 2.5 s on initial energisation (for deviation 0.5%).

Dimensions

All dimensions in mm.



Weight: approx. 1.200 kg

TEMAX-3.4B (TEMAX-3.3B, TEMAX-3.2B)

Order specifications

	Type	Measuring range
Example:	TEMAX-3.3B	0…200°C

Due to our continuous development we reserve the right to supply equipment which may vary from the described.

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