

Screw-in Resistance Thermometer

PT-100

Application

- for temperatures from -50 to +300°C
- highly resistant to shock and vibration
- connector locked in for reliable contact, IP65 or IP69K protection
- available with transmitter
- GL approval for Type 902004/20 ...



Screw-in Resistance Thermometer with Plug Connector

Shockproof screw-in resistance thermometers enable temperature measurement under pressure in motors, compressors, plant engineering and in ship building.

The connection between the protection fitting and the connecting cable incorporates a locking system and has IP65 or IP69K protection rating when assembled.

The measuring insert is normally fitted with a PT-100 temperature sensor to EN 60 751, Class B in 2-wire circuit. Versions with PT-500 or PT-1000 as well as semiconductor or NTC temperature sensors (only on Types 902004/10 and .../15) can also be supplied. With Types 902004/20 and .../21, there is a choice between 2-wire and 4-wire circuit connections.

Types 902004/25 to .../29 are available with transmitter (output 4 – 20mA).

Technical Data

Connection

Type 902004/10 plug connector with gold-plated contacts, IP65 when assembled
Type 902004/15 connector DIN 72 585, IP69K when assembled
Types 902004/20, ... /25 and .../28, connector EN 175301-803, Pg9
Types 902004/21, ... /26 and .../29, connector EN 175301-803, Pg11
max. conductor cross-section 1.5mm², IP65, ambient temperature -40 to +125°C,
version with transmitter: ambient temperature -40 to +85°C

Process connection

thread, stainless steel 1.4301 / 1.4571

Protection tube

stainless steel 1.4301, 6mm and 7.5mm dia. stepped down to 4mm
brass 2.0401, 7.5mm dia. stepped down to 4mm
stainless steel 1.4571, 8mm and 6mm dia. stepped down to 3.3mm,
pressure loading 50bar max. at 200°C (Types 902004/20 and .../21)

Measuring insert

PT-100 temperature sensor, EN 60 751, Class B in 2-wire circuit
(replaceable on Types 902004/20 and .../21)¹

Protection

IP65, IP69K when assembled (Type 902004/15)

Response times

Type 902004/10: $t_{0.5} = 1.2\text{sec}$, $t_{0.9} = 6\text{sec}$, in water with 0.2m/sec, 4mm dia.
Type 902004/15: $t_{0.5} = 1.2\text{sec}$, $t_{0.9} = 6\text{sec}$, in water with 0.2m/sec, 4mm dia.
Types 902004/20 and .../21: $t_{0.5} = 15\text{sec}$, $t_{0.9} = 45\text{sec}$, in water with 0.2m/sec, 8mm dia.
 $t_{0.5} = 23\text{sec}$, $t_{0.9} = 59\text{sec}$, in oil with 0.2m/sec, 8mm dia.
Types 902004/25 to .../29: $t_{0.5} = <2\text{sec}$, $t_{0.9} = <4\text{sec}$, in water with 0.2m/sec, 6mm dia.

Vibration strength

Germanischer Lloyd Application Category D Characteristic 2

Approvals

Types 902004/20 and .../21 GL Germanischer Lloyd

Accessories

pockets, Data Sheet 90.9721
mating plug for Type 902004/10 with or without siliconized connecting cable, 2.5m long,
Data Sheet 90.9726, mating plug for Type 902004/15 on request
mating plug for extra code 42 4 (machinery plug M 12x1) with PVC connecting cable, 2 m long

¹ On Types 902004/20 and ... /21, shortting lengths in conjunction with unfavorable installation conditions (heat conduction error) may result in the tolerance class being exceeded.

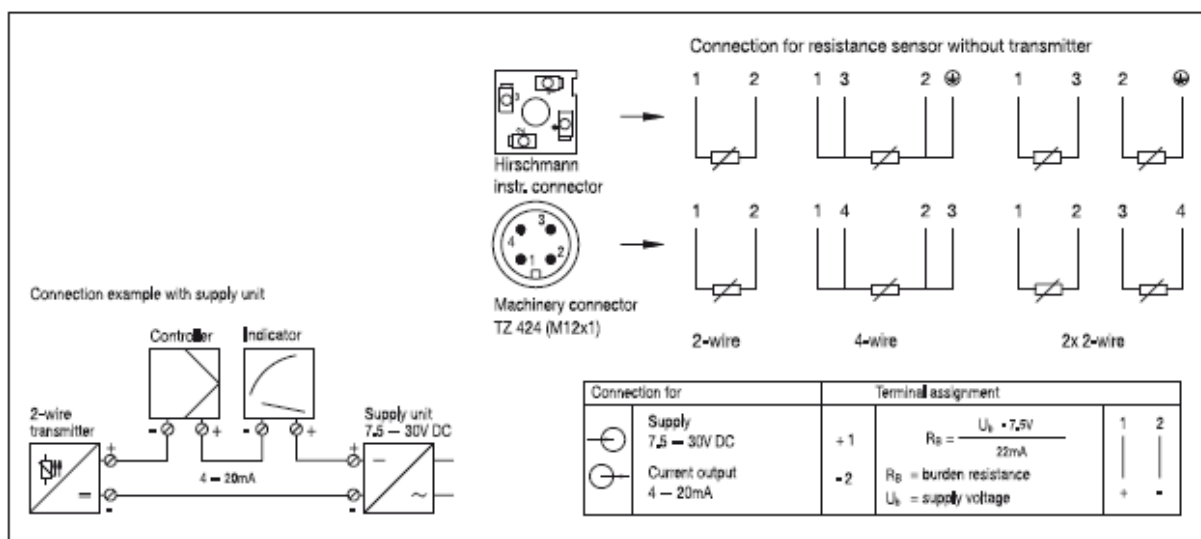
Screw-in Resistance Thermometer

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Technical Data

| Transmitter | | Input |
|-------------|--|--|
| | | Measurement input |
| | | PT-100 EN 60 751) |
| | | Measurement range limits |
| | | -50 to +260°C |
| | | Measurement span |
| | | 25 to 310°C (also see "zero point shift") |
| | | Zero point shift |
| | | see Data Sheet 95.6530, page 7/10 |
| | | on spans < 75°C fixed zero point setting: -40°C, -20°C, 0°C, 20°C, 40°C |
| | | on spans ≥ 75°C: ±50°C |
| | | Sensor current |
| | | ≤ 0.5 mA |
| | | Sampling rate |
| | | continuous measurement because of analog signal path |
| | | Measurement circuit monitoring |
| | | Underrange |
| | | falling to ≤ 3.6mA |
| | | Overrange |
| | | rising to ≥ 22mA to < 28mA (24mA typical) |
| | | Probe short circuit |
| | | ≤ 3.6mA |
| | | Probe and lead break |
| | | positive: ≥ 22mA to < 28mA (24mA typical) |
| | | Output |
| | | Output signal |
| | | proportional DC current 4 – 20mA |
| | | Transfer characteristic |
| | | linear with temperature |
| | | Transfer accuracy |
| | | ≤ ±0.1% |
| | | Damping of ripple on 24V supply, amplitude 10V/50Hz, burden 470 Ω/load 10M Ω |
| | | 40dB |
| | | Burden (R _B) |
| | | R _B = (U _B - 7.5V) / 22mA |
| | | Burden error |
| | | ≤ ±0.02% / 100 Ω ¹ |
| | | Settling time on temperature change |
| | | ≤ 10msec |
| | | Calibration conditions |
| | | 24V DC / approx. 22°C |
| | | Calibration accuracy |
| | | ≤ ±0.2% ^{1,2} or ≤ ±0.2°C |
| | | Overall accuracy: sensor/calibration |
| | | ±0.4°C (typical) at 20°C / 24V DC supply voltage |
| | | Supply |
| | | Supply voltage (U _B) |
| | | 7.5 – 30V DC |
| | | Reverse polarity protection |
| | | yes |
| | | Supply voltage error |
| | | ≤ ±0.01% per V deviation from 24V ¹ |
| | | Ambient conditions |
| | | Operating temperature range |
| | | -40 to +85°C |
| | | Storage temperature range |
| | | -40 to +100°C |
| | | Temperature error |
| | | ≤ ±0.01% per °C deviation from 22°C ¹ |
| | | Climatic conditions similar to EN 60 654 Class D1 |
| | | relative humidity ≤ 95% annual mean, no condensation |
| | | EMC interference emission/immunity |
| | | EN 613 26 Class B / to industrial requirements |

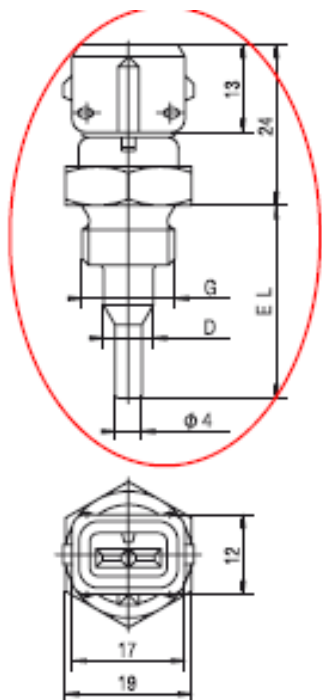
Connection Diagram



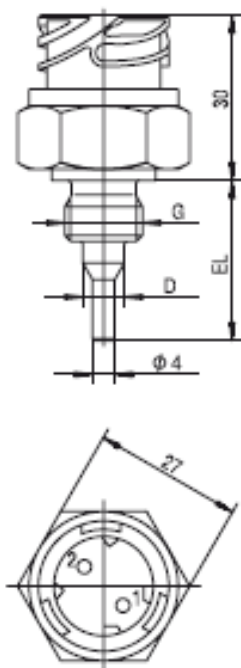
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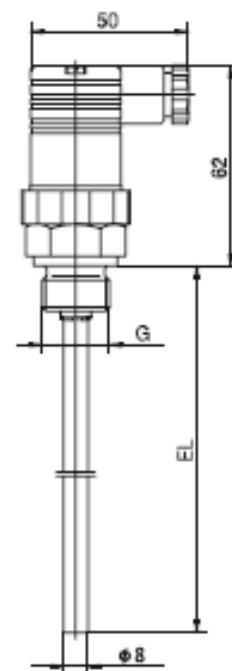
Dimensions



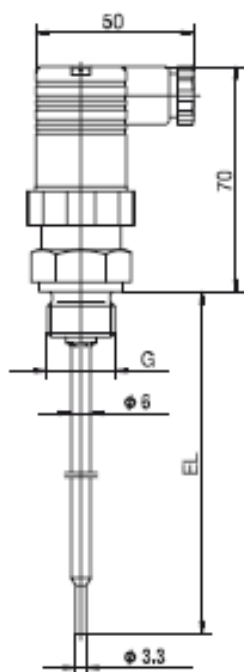
Type 902004/10



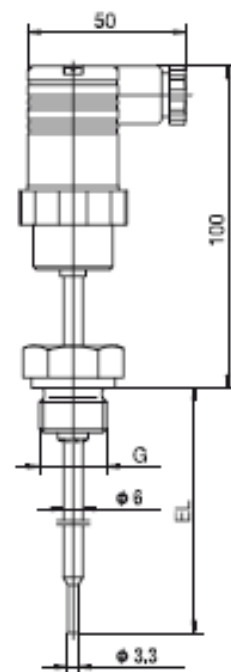
Type 902004/15



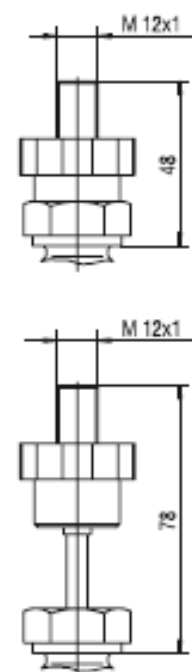
Type 902004/20
Type 902004/21



Type 902004/25
Type 902004/26



Type 902004/28
Type 902004/29



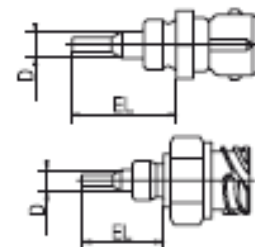
with extra code 424

Screw-in Resistance Thermometer

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Order details: Screw-in resistance thermo meters with plug connector

| (1) Basic version | |
|--------------------------------------|---|
| 902004/10 | Screw-in resistance thermometer with plug connector |
| 902004/15 | Screw-in resistance thermometer with connector DIN 72 585 |
| (2) Operating temperature in °C | |
| x | 384 -50 to +240°C |
| x | 390 -50 to +300°C |
| (3) Measuring insert | |
| x x | 1003 1 x PT-100 in 2-wire circuit |
| x x | 1004 1 x PT-500 in 2-wire circuit |
| x x | 1005 1 x PT-1000 in 2-wire circuit |
| x x | 1601 1 x KTY 11-6 in 2-wire circuit |
| (4) Tolerance class to EN 60 751 | |
| x x | 0 KTY temperature sensor |
| x x | 1 Class B (standard) |
| x x | 2 Class A |
| (5) Protection tube diameter D in mm | |
| x x | 6 6mm with EL = 60mm |
| x x | 7.5 7.5mm stepped down to 4mm with EL = 29mm |
| (6) Fitting length EL in mm | |
| x x | 29 29mm |
| x x | 60 60mm |
| (7) Process connection | |
| x x | 103 G 3/8 thread |
| x x | 121 M 14x1.5 thread |
| x x | 141 1/8-27NPT thread |
| x x | 542 R 3/8 DIN 2999 thread |
| x x | 543 R 1/2 DIN 2999 thread, only with EL = 60mm |
| (8) Protection tube material | |
| x x | 21 stainless steel 1.4301 |
| x x | 50 brass 2.0401 |



| Order code | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---------------|-----------|-------|--------|-----|-----|------|-------|------|
| Order example | 902004/10 | - 390 | - 1003 | - 1 | - 6 | - 29 | - 103 | - 21 |

¹ List extra codes in sequence, separated by commas.

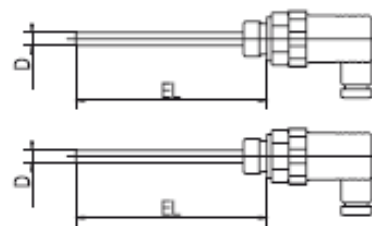
Screw-in Resistance Thermometer

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Order details: Screw-in resistance thermo meters with plug connector

(1) Basic version

| | | |
|-----|-----------|--|
| | 902004/20 | Screw-in resistance thermometer with terminal box, Pg9, to EN 175301-803 (DIN 43 650) |
| | 902004/21 | Screw-in resistance thermometer with terminal box, Pg11, to EN 175301-803 (DIN 43 650) |
| x x | 380 | (2) Operating temperature in °C -50 to +200°C |
| x x | 1003 | (3) Measuring insert 1 x PT-100 in 2-wire circuit |
| x x | 1011 | 1 x PT-100 in 4-wire circuit |
| x x | 2003 | 2 x PT-100 in 2-wire circuit |
| x x | 1 | (4) Tolerance class to EN 60 751 Class B (standard) |
| x x | 2 | Class A |
| x x | 8 | (5) Protection tube diameter D in mm 8mm |
| x x | 50 | (6) Fitting length EL in mm (50 ≤ EL ≤ 250) 50mm |
| x x | 100 | 100mm |
| x x | 150 | 150mm |
| x x | 200 | 200mm |
| x x | 250 | 250mm (without GL approval) |
| x x | ... | please specify in plain text (in 50mm steps) |
| x x | 102 | (7) Process connection G 1/4 thread |
| x x | 103 | G 3/8 thread |
| x x | 104 | G 1/2 thread |
| x x | 126 | M 18x1.5 thread |
| x x | 128 | M 20x1.5 thread |
| x x | 144 | 1/2-14NPT thread |
| x x | 26 | (8) Protection tube material stainless steel 1.4571 |
| x x | 000 | (9) Extra code no extra code |
| x x | 062 | GL approval (max. fitting length EL = 200mm) |
| x | 424 | machinery plug M 12x1 |



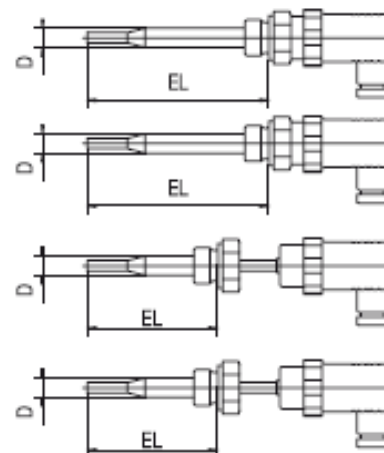
| | | | | | | | | | |
|---------------|-----------|-------|--------|-----|-----|------|-------|--------|------------------|
| Order code | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Order example | 902004/20 | - 380 | - 1003 | - 1 | - 8 | - 50 | - 102 | - 26 / | 000 ¹ |

Screw-in Resistance Thermometer

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Order details: Screw-in resistance thermometers with plug connector

| (1) Basic version | |
|-------------------|--|
| 902004/25 | Screw-in resistance thermometer with analog transmitter and terminal box Pg9 to EN 175301-803 (DIN 43 650) (please specify range in plain text) |
| 902004/26 | Screw-in resistance thermometer with analog transmitter and terminal box Pg11 to EN 175301-803 (DIN 43 650) (please specify range in plain text) |
| 902004/28 | Screw-in resistance thermometer with analog transmitter and terminal box Pg9 to EN 175301-803 (DIN 43 650), version with extension for elevated temperatures (please specify range in plain text) |
| 902004/29 | Screw-in resistance thermometer with analog transmitter and terminal box Pg11 to EN 175301-803 (DIN 43 650), version with extension for elevated temperatures (please specify range in plain text) |
| x x | (2) Operating temperature in °C |
| x x | 370 -50 to +150°C |
| x x | 386 -50 to +260°C |
| x x x x | (3) Measuring insert |
| x x x x | 1003 1 x PT-100 in 2-wire circuit |
| x x x x | (4) Tolerance class to EN 60 751 |
| x x x x | 1 Class B (standard) |
| x x x x | 2 Class A |
| x x x x | (5) Protection tube diameter D in mm |
| x x x x | 6 6mm stepped down to 3.3 mm |
| x x x x | (6) Fitting length EL in mm (50 ≤ EL ≤ 250) |
| x x x x | 50 50mm |
| x x x x | 100 100mm |
| x x x x | 150 150mm |
| x x x x | 200 200mm |
| x x x x | 250 250mm |
| x x x x | ... please specify in plain text (in 50mm steps) |
| x x x x | (7) Process connection |
| x x x x | 102 G 1/4 thread |
| x x x x | 103 G 3/8 thread |
| x x x x | 104 G 1/2 thread |
| x x x x | 126 M 18x1.5 thread |
| x x x x | 128 M 20x1.5 thread |
| x x x x | 144 1/2-14NPT thread |
| x x x x | (8) Protection tube material |
| x x x x | 26 stainless steel 1. 4571 |
| x x x x | (9) Extra code |
| x x x x | 000 no extra code |
| x x x x | 424 machinery plug M 12x1 |



| Order code | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | | | | | | | | |
|---------------|-----------|-----|-----|-----|------|-----|-----|-----|-----|---|----|---|-----|---|----|---|-----|
| Order example | 902004/25 | - | 370 | - | 1003 | - | 1 | - | 6 | - | 50 | - | 102 | - | 26 | / | 000 |

Screw-in Resistance Thermometer

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Stock versions

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | Sales No. |
|-----------|-----|------|-----|-----|-----|-----|-----|-------------|
| 902004/10 | 390 | 1003 | 1 | 7.5 | 29 | 121 | 21 | 90/00446901 |
| 902004/10 | 390 | 1003 | 1 | 7.5 | 29 | 121 | 50 | 90/00447301 |

Stock versions

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | Sales No. |
|-----------|-----|------|-----|-----|-----|-----|------|-----|-------------|
| 902004/20 | 380 | 1003 | 1 | 8 | 50 | 104 | 26 / | 000 | 90/00365259 |
| 902004/20 | 380 | 1003 | 1 | 8 | 100 | 104 | 26 / | 000 | 90/00368414 |
| 902004/20 | 380 | 1003 | 1 | 8 | 150 | 104 | 26 / | 000 | 90/00368416 |

Accessories

Mating plug for Type 902004/10 with siliconized connecting cable, 2.5m long
 Mating plug for Type 902004/15
 Mating plug for extra code 424 (machinery plug M 12x1) with PVC connecting cable, 2m long

Sales No.
 90/00308880
 90/00439715
 90/00404585

Local Distributor / Partner:



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