

Mineral-insulated resistance thermometers to EN 60 751

- for temperatures from -50 (-200) to +600°C
- flexible sheath with shock-protected sensor
- as single or twin resistance thermometer in 2-wire, 3-wire or 4-wire circuit
- fast response time
- application-specific fitting length

Thanks to their special properties, mineral-insulated resistance thermometers are used in chemical plants, power stations, pipelines, in engine construction, on test beds and in all applications where flexibility and problem-free replacement are required. The low-resistance internal copper conductors are embedded in compressed heat-resistant magnesium oxide inside a flexible thin-walled sheath in stainless steel.

The temperature sensor in 2-wire, 3-wire or 4-wire circuit is connected to the internal wires and fitted in the stainless steel protection tube. Protection tube and sheath are welded together. Diameters as small as 1.9mm are available.

The excellent heat transfer between the protection tube and the temperature sensor enables short response times ($t_{0.5}$ from 0.7sec) and high accuracy. The shock-proof construction ensures a long life. The flexible probe tube permits temperature measurement at points that are difficult to reach. The smallest bending radius is 5 times the external diameter.

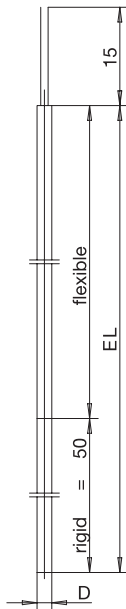
The measuring insert is normally fitted with a Pt100 temperature sensor to EN 60 751, Class B in 2-wire circuit. Versions with Pt500 or Pt1000 are also available. 3-wire or 4-wire circuit connections can be provided.



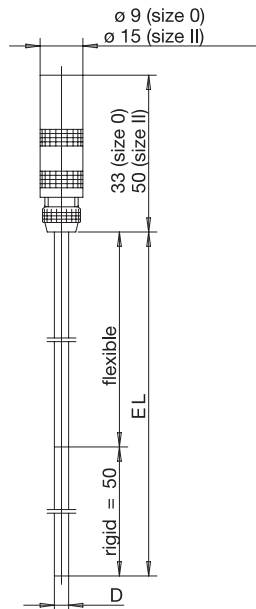
Technical data

Terminal head	Form J, aluminium die-casting, Pg9, IP54, ambient temperature -20 to +100°C Caution: reduced ambient temperature when using transmitters (see Data Sheet 90.2603)
Connection	cable ends available as: bare wires, with ferrules, receptacles or multipole connector
Connecting cable	silicone, ambient temperature -50 to +180°C Teflon, ambient temperature -190 to +260°C metal braiding, ambient temperature -50 to +350°C
Process connection	thread, stainless steel 1.4571
Protection tube	stainless steel 1.4541, 1.9mm, 3mm and 6mm dia.
Measuring insert	Pt100 temperature sensor, EN 60 751, Cl. B, 2-wire circuit
Response times	in water with 0.4m/sec / in air with 3m/sec 1.9mm dia.: water $t_{0.5} = 0.7\text{sec}$, $t_{0.9} = 2.1\text{sec}$ / air $t_{0.5} = 7.2\text{sec}$, $t_{0.9} = 20.5\text{sec}$ 3.0mm dia.: water $t_{0.5} = 1.3\text{sec}$, $t_{0.9} = 4.0\text{sec}$ / air $t_{0.5} = 13.5\text{sec}$, $t_{0.9} = 41.0\text{sec}$ 6.0mm dia.: water $t_{0.5} = 5.0\text{sec}$, $t_{0.9} = 11.5\text{sec}$ / air $t_{0.5} = 37.5\text{sec}$, $t_{0.9} = 117.5\text{sec}$
Transmitter	analog transmitter Type 902603/10, see Data Sheet 90.2603

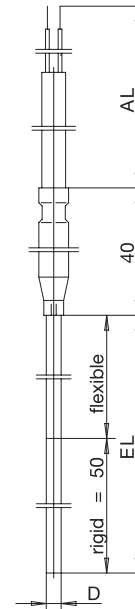
Dimensions



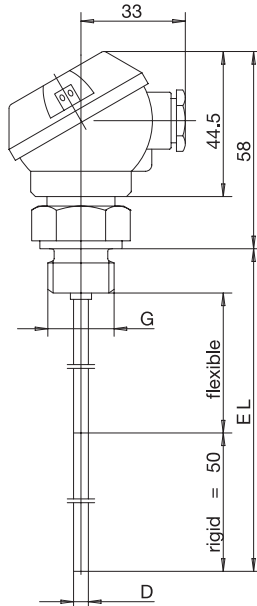
Type 902221/10



Type 902221/20





Type 90/1221/3x



Type 902221/40

Order details: Mineral-insulated resistance thermometers to EN 60 751

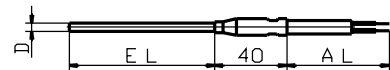
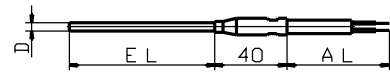
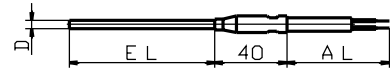
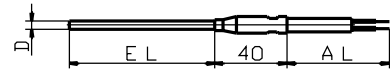
(1) Basic version						
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; border-right: 1px solid black; padding: 5px;">902221/10</td> <td style="padding: 5px;">Mineral-insulated resistance thermometer with bare connecting wires</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;">902221/20</td> <td style="padding: 5px;">Mineral-insulated resistance thermometer with Lemos connector</td> </tr> </table>	902221/10	Mineral-insulated resistance thermometer with bare connecting wires	902221/20	Mineral-insulated resistance thermometer with Lemos connector	
902221/10	Mineral-insulated resistance thermometer with bare connecting wires					
902221/20	Mineral-insulated resistance thermometer with Lemos connector					
						
	(2) Operating temperature in °C					
x x	150 -200 to +600°C					
x x	415 -50 to +600°C (standard)					
	(3) Measuring insert					
x x	1001 1 x Pt100 in 3-wire circuit					
x x	1003 1 x Pt100 in 2-wire circuit					
x x	1005 1 x Pt1000 in 2-wire circuit (only for -50 to +600°C)					
x x	1006 1 x Pt1000 in 3-wire circuit (only for -50 to +600°C)					
x x	1011 1 x Pt100 in 4-wire circuit					
x x	2001 2 x Pt100 in 3-wire circuit (only in conjunction with D 6mm)					
x x	2003 2 x Pt100 in 2-wire circuit					
	(4) Tolerance class to EN 60 751					
x x	1 Class B (standard)					
x x	2 Class A					
x x	3 Class 1/3 DIN					
	(5) Protection tube diameter D in mm					
x x	1.9 1.9mm, with Type 902221/20 incl. Lemos connector Size 0 (sheath 1.5mm dia.)					
x x	3 3.0mm, with Type 902221/20 incl. Lemos connector Size 0					
x x	6 6.0mm, with Type 902221/20 incl. Lemos connector Size 2					
	(6) Fitting length EL in mm (70 ≤ EL ≤ 1000)					
x x	100 100mm					
x x	200 200mm					
x x	300 300mm					
x x	... please specify in plain text (50mm steps)					

	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 15%;">(1)</td> <td style="text-align: center; width: 15%;">(2)</td> <td style="text-align: center; width: 15%;">(3)</td> <td style="text-align: center; width: 15%;">(4)</td> <td style="text-align: center; width: 15%;">(5)</td> <td style="text-align: center; width: 15%;">(6)</td> </tr> <tr> <td style="border: 1px solid black; width: 50px; height: 15px;"></td> <td style="border: 1px solid black; width: 50px; height: 15px;"></td> <td style="border: 1px solid black; width: 50px; height: 15px;"></td> <td style="border: 1px solid black; width: 50px; height: 15px;"></td> <td style="border: 1px solid black; width: 50px; height: 15px;"></td> <td style="border: 1px solid black; width: 50px; height: 15px;"></td> </tr> </table>	(1)	(2)	(3)	(4)	(5)	(6)						
(1)	(2)	(3)	(4)	(5)	(6)								
Order code	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">902221/20</td> <td style="width: 15%;">-</td> <td style="width: 15%;">415</td> <td style="width: 15%;">-</td> <td style="width: 15%;">1001</td> <td style="width: 15%;">-</td> <td style="width: 15%;">1</td> <td style="width: 15%;">-</td> <td style="width: 15%;">6</td> <td style="width: 15%;">-</td> <td style="width: 15%;">200</td> </tr> </table>	902221/20	-	415	-	1001	-	1	-	6	-	200	
902221/20	-	415	-	1001	-	1	-	6	-	200			
Order example													

Order details: Mineral-insulated resistance thermometers to EN 60 751

(1) Basic version

902221/30	Mineral-insulated resistance thermometer with PVC cable (cable temp. range -5 to +80 (+105°C))
902221/32	Mineral-insulated resistance thermometer with silicone cable (cable temp. range -50 to +180°C)
902221/33	Mineral-insulated resistance thermometer with Teflon cable (PTFE) (cable temp. range -190 to +260°C)
902221/34	Mineral-insulated resistance thermometer with metal-braided cable (cable temp. range -50 to +350°C)



(2) Operating temperature in °C

x	x	x	x	150	-200 to +600°C
x	x	x	x	415	-50 to +600°C (standard)

(3) Measuring insert

x	x	x	x	1001	1 x Pt100 in 3-wire circuit
x	x	x	x	1003	1 x Pt100 in 2-wire circuit
x	x	x	x	1005	1 x Pt1000 in 2-wire circuit (only for -50 to +600°C)
x	x	x	x	1006	1 x Pt1000 in 3-wire circuit (only for -50 to +600°C)
x	x	x	x	1011	1 x Pt100 in 4-wire circuit
x	x	x	x	2001	2 x Pt100 in 3-wire circuit (only in conjunction with D 6mm)
x	x	x	x	2003	2 x Pt100 in 2-wire circuit

(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	3	Class 1/3 DIN

(5) Protection tube diameter D in mm

x	x	x	x	1.9	1.9mm (sheath 1.5mm dia.)
x	x	x	x	3	3mm
x	x	x	x	6	6mm

(6) Fitting length EL in mm (70 ≤ EL ≤ 1000)

x	x	x	x	100	100mm
x	x	x	x	200	200mm
x	x	x	x	300	300mm
x	x	x	x	...	please specify in plain text (50mm steps)

(7) Connecting cable end

x	x	x	x	03	bare cable ends
x	x	x	x	11	ferrules to DIN 46 228 Part 4 (standard)
x	x	x	x	13	receptacle 6.3 to DIN 46 247
x	x	x	x	80	multipole connector (please specify type in plain text)

(8) Connecting cable length AL in mm (500 ≤ AL ≤ 500000)

x	x	x	x	2500	2500mm
x	x	x	x	...	please specify in plain text (500mm steps)

(9) Extra codes

x	x	x	x	000	no extra code
x	x	x	x	317	shielded connecting cable

Order code (1) (2) (3) (4) (5) (6) (7) (8) (9) ,...

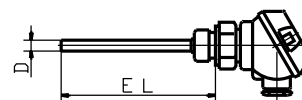
Order example 902221/32 - 415 - 1001 - 1 - 3 - 200 - 11 - 2500 / 000¹

1. List extra codes in sequence, separated by commas.

Order details: Mineral-insulated resistance thermometers to EN 60 751

(1) Basic version

	902221/40	Mineral-insulated resistance thermometer with terminal head Form J
		(2) Operating temperature in °C
x	150	-200 to +600°C
x	415	-50 to +600°C (standard)
		(3) Measuring insert
x	1001	1 x Pt100 in 3-wire circuit
x	1003	1 x Pt100 in 2-wire circuit
x	1005	1 x Pt1000 in 2-wire circuit (only for -50 to +600°C)
x	1006	1 x Pt1000 in 3-wire circuit (only for -50 to +600°C)
x	1011	1 x Pt100 in 4-wire circuit
x	2003	2 x Pt100 in 2-wire circuit
		(4) Tolerance class to EN 60 751
x	1	Class B (standard)
x	2	Class A
x	3	Class 1/3 DIN
		(5) Protection tube diameter D in mm
x	3	3mm
x	6	6mm
		(6) Fitting length EL in mm (100 ≤ EL ≤ 10000)
x	100	100mm
x	200	200mm
x	300	300mm
x	...	please specify in plain text (50mm steps)
		(7) Process connection
x	104	thread 1/2" pipe
x	105	thread 3/4" pipe
		(8) Extra codes
x	000	no extra code
x	330	1 x analog transmitter Type 902603/10 (please specify range in plain text)



Order code (1) - (2) - (3) - (4) - (5) - (6) - (7) / (8) , ...

Order example 902221/40 - 415 - 1001 - 1 - 6 - 100 - 104 / 000¹

1. List extra codes in sequence, separated by commas.

Stock versions:

	(1)	(2)	(3)	(4)	(5)	(6)	Sales No.
	902221/20	150	1003	1	1.9	300	90/00066527
	902221/20	415	1011	1	3	300	90/00055770
	902221/20	415	1011	1	6	300	90/00055773

Stock versions:

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	Sales No.
	902221/32	150	1011	1	1.9	300	11	2500	/ 000	90/00066531
	902221/32	415	1003	1	3	100	11	2500	/ 000	90/00068243
	902221/32	415	1003	1	3	200	11	2500	/ 000	90/00068244
	902221/32	415	1003	1	3	300	11	2500	/ 000	90/00055763
	902221/32	415	1001	1	3	100	11	2500	/ 000	90/00068247
	902221/32	415	1001	1	3	300	11	2500	/ 000	90/00055764
	902221/32	415	1001	1	3	500	11	2500	/ 000	90/00068248
	902221/32	415	2003	1	3	300	11	2500	/ 000	90/00055765
	902221/32	415	1001	1	6	300	11	2500	/ 000	90/00055767
	902221/32	415	1001	1	6	500	11	2500	/ 000	90/00068250

Stock versions:

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	Sales No.
902221/40	415	1003	1	3	100	104	000	90/00066731
902221/40	415	1003	1	3	200	104	000	90/00066732
902221/40	415	1003	1	3	300	104	000	90/00057512
902221/40	415	1003	1	6	200	104	000	90/00068252
902221/40	415	1003	1	6	300	104	000	90/00055775
902221/40	415	1011	1	6	300	104	000	90/00055776
902221/40	415	2003	1	6	300	104	000	90/00055777