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Mineral-insulated thermocouples to DIN 43 710 and EN 60 584



- **for temperatures from -200 to +1200°C**
- **flexible sheath with shock-proof measuring insert**
- **protection tube diameter from 0.5mm**
- **fast response**
- **fitting length to suit application**

Thanks to their special properties, mineral-insulated thermocouples are used in chemical plant, power stations, pipelines, in engine construction and on test beds. The thermocouple wires are embedded in compressed fire-resistant magnesium oxide inside the flexible thin-walled sheath.

The excellent heat transfer between the sheath and the thermocouple enables short response times ($t_{0.5}$ from 0.15sec) and high measurement accuracy. The shock-proof construction ensures a long life. The minimum bending radius is 5 x the external diameter. The minimum fitting length EL is 50mm for 0.5mm to 2.0mm dia., and 100mm for 3.0 to 6.0mm dia.

The thermocouples are normally insulated from the sheath. The measuring insert is fitted with thermocouples to EN 60 584 or DIN 43 710. Versions with two thermocouples are also available.

Test pressure: 40 bar (helium) leakage test at the measurement point.

Insulation resistance: thermocouple against sheath at ambient temperature for lengths up to 1m: 200MΩ, for lengths 1m and above: 200MΩ x m.

Technical data

Connection	available with cable ends as: bare wires, with ferrules, receptacles or multipole connector (e.g. connectors that are free from thermal emf)
Compensating cable	silicone, ambient temperature -50 to +180°C PTFE, ambient temperature -190 to +260°C metal braiding, ambient temperature -20 to +350°C
Protection tube	stainless steel 1.4541, thermocouple Type L and Type J Inconel 2.4816 (Inconel 600) , thermocouple Type K
Measuring insert	insulated assembly: 1 x Fe-Con J, EN 60 584, Cl. 2, operating temperature -200 to +800°C 1 x Fe-Con L, DIN 43 710, Cl. 2, operating temperature -200 to +800°C 1 x NiCr-Ni K, EN 60 584, Cl. 2, operating temperature -200 to +1200°C 2 x Fe-Con L, DIN 43 710, Cl. 2, operating temperature -200 to +800°C 2 x NiCr-Ni K, EN 60 584, Cl. 2, operating temperature -200 to +1200°C
Response times	in water with 0.4m/sec / in air with 2m/sec 0.5mm dia: water $t_{0.5}$ = 0.15sec, $t_{0.9}$ = 0.30sec / air $t_{0.5}$ = 3.5sec, $t_{0.9}$ = 8.0sec 1.0mm dia: water $t_{0.5}$ = 0.20sec, $t_{0.9}$ = 0.60sec / air $t_{0.5}$ = 7.5sec, $t_{0.9}$ = 17.0sec 1.5mm dia: water $t_{0.5}$ = 0.40sec, $t_{0.9}$ = 0.90sec / air $t_{0.5}$ = 10.0sec, $t_{0.9}$ = 25.0sec 2.0mm dia: water $t_{0.5}$ = 0.80sec, $t_{0.9}$ = 2.60sec / air $t_{0.5}$ = 13.0sec, $t_{0.9}$ = 34.0sec 3.0mm dia: water $t_{0.5}$ = 1.00sec, $t_{0.9}$ = 2.80sec / air $t_{0.5}$ = 22.0sec, $t_{0.9}$ = 64.0sec 4.5mm dia: water $t_{0.5}$ = 2.50sec, $t_{0.9}$ = 6.50sec / air $t_{0.5}$ = 34.0sec, $t_{0.9}$ = 113.0sec 6.0mm dia: water $t_{0.5}$ = 3.00sec, $t_{0.9}$ = 9.00sec / air $t_{0.5}$ = 55.0sec, $t_{0.9}$ = 170.0sec

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Lead resistances in Ω/m at 20°C for mineral-insulated thermocouples

Diameter D in mm	1 thermocouple resistance in Ω/m	2 thermocouples resistance in Ω/m
Thermocouple Fe-Con L		
6.0	0.66	0.85
4.5	1.40	1.80
3.0	2.70	3.50
2.0	5.00	7.70
1.5	12.00	-
1.0	21.50	-
Thermocouple Fe-Con J		
6.0	0.54	-
3.0	2.10	-
2.0	8.60	-
1.5	15.00	-
1.0	34.00	-
Thermocouple NiCr-Ni K		
6.0	0.88	2.70
4.5	1.56	4.80
3.0	3.50	11.00
2.0	7.90	25.00
1.5	14.00	-
1.0	32.00	-
0.5	126.00	-

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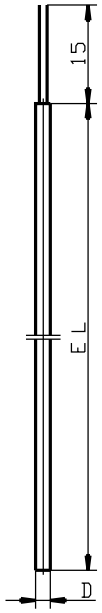
Dimensions



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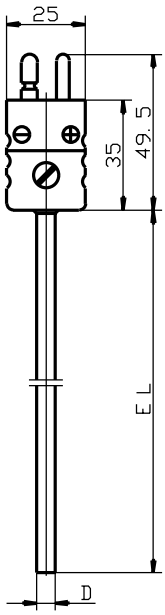

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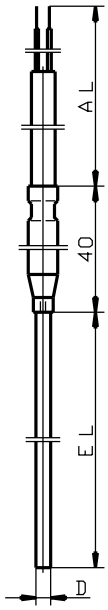

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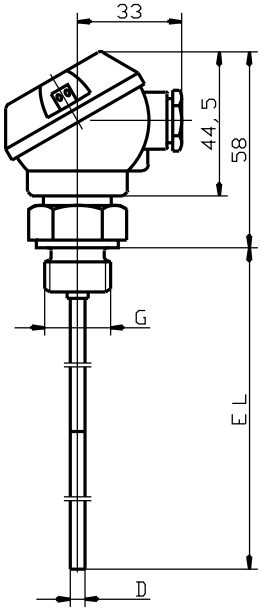

Type 901230/40

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Order details: Mineral-insulated thermocouples to DIN 43 710 and EN 60 584

(1) Basic version

		901210/10	Mineral-insulated thermocouple with bare connecting wires
		901240/20	Mineral-insulated thermocouple with standard flat emf-free connector





			(2) Measuring insert / operating temperature in °C
x	x	1040	1 x Fe-Con J, operating temperature -200 to +800°C, sheath, Mat. Ref. 1.4541
x	x	1042	1 x Fe-Con L, operating temperature -200 to +800°C, sheath, Mat. Ref. 1.4541
x	x	1043	1 x NiCr-Ni K, operating temperature -200 to +1200°C, sheath, Mat. Ref. 2.4816
x		2042	2 x Fe-Con L, operating temperature -200 to +800°C, sheath, Mat. Ref. 1.4541
x		2043	2 x NiCr-Ni K, operating temperature -200 to +1200°C, sheath, Mat. Ref. 2.4816
			(3) Protection tube diameter D in mm
	x	0.5	0.5mm, only with Type 1 x NiCr-Ni K
x	x	1	1mm
x	x	1.5	1.5mm
x	x	2	2mm
x	x	3	3mm
x	x	4.5	4.5mm
x	x	6	6mm
			(4) Fitting length EL in mm (50 ≤ EL ≤ 50000)
x	x	100	100mm
x	x	200	200mm
x	x	300	300mm
x	x	400	400mm
x	x	500	500mm
x	x	...	please specify in plain text (50mm steps)
			(5) Extra codes
x	x	000	no extra code
x	x	309	uninsulated assembly (thermocouple welded to tip)

	(1)		(2)		(3)		(4)		(5)
Order code		-		-		-		/	
Order example	901210/10	-	1042	-	3	-	200	/	000

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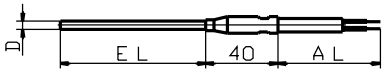
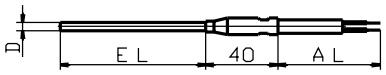
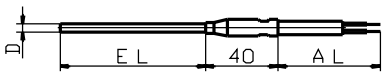
Order details: Mineral-insulated thermocouples to DIN 43 710 and EN 60 584

(1) Basic version

			901250/32	Mineral-insulated thermocouple with siliconized compensating cable
			901250/33	Mineral-insulated thermocouple with PTFE- insulated compensating cable
			901250/34	Mineral-insulated thermocouple and compensating cable with metal-braiding and glass silk insulation







				(2) Measuring insert / operating temperature in °C
x	x	x	1040	1 x Fe-Con J, operating temperature -200 to +800°C, sheath, Mat. Ref. 1.4541
x	x	x	1042	1 x Fe-Con L, operating temperature -200 to +800°C, sheath, Mat. Ref. 1.4541
x	x	x	1043	1 x NiCr-Ni K, operating temperature -200 to +1200°C, sheath, Mat. Ref. 2.4816
x		x	2042	2 x Fe-Con L, operating temperature -200 to +800°C, sheath, Mat. Ref. 1.4541
x		x	2043	2 x NiCr-Ni K, operating temperature -200 to +1200°C, sheath, Mat. Ref. 2.4816
				(3) Protection tube diameter D in mm
x	x	x	0.5	0.5mm, only with Type 1 x NiCr-Ni K
x	x	x	1	1mm
x	x	x	1.5	1.5mm
x	x	x	2	2mm
x	x	x	3	3mm
x	x	x	4.5	4.5mm
x	x	x	6	6mm
				(4) Fitting length EL in mm (50 ≤ EL ≤ 50000)
x	x	x	100	100mm
x	x	x	200	200mm
x	x	x	300	300mm
x	x	x	400	400mm
x	x	x	500	500mm
x	x	x	...	please specify in plain text (50mm steps)
				(5) Compensating cable end
x	x	x	03	bare cable ends
x	x	x	11	ferrules to DIN 46 228 Part 4 (standard)
x	x	x	13	receptacle 6.3 to DIN 46 247
x	x	x	80	multipole connector (please specify type in plain text)
				(6) Compensating cable length AL in mm (500 ≤ AL ≤ 500000)
x	x	x	2500	2500mm (standard)
x	x	x	...	please specify in plain text (500mm steps)
				(7) Extra codes
x	x	x	000	no extra code
x	x	x	309	uninsulated assembly (thermocouple welded to tip)
x	x	x	317	shielded compensating cable

	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
Order code		-		-		-		-		-		/		,...
Order example	901250/32	-	1042	-	3	-	200	-	11	-	2500	/	000[1]	

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

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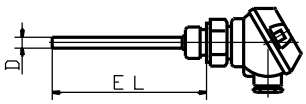
Order details: Mineral-insulated thermocouples to DIN 43 710 and EN 60 584

		(1) Basic version
	901230/40	Mineral-insulated thermocouple with terminal head Form J



		(2) Measuring insert / operating temperature in °C
x	1040	1 x Fe-Con J, operating temperature -200 to +800°C, sheath, Mat. Ref. 1.4541
x	1042	1 x Fe-Con L, operating temperature -200 to +800°C, sheath, Mat. Ref. 1.4541
x	1043	1 x NiCr-Ni K, operating temperature -200 to +1200°C, sheath, Mat. Ref. 2.4816
x	2042	2 x Fe-Con L, operating temperature -200 to +800°C, sheath, Mat. Ref. 1.4541
x	2043	2 x NiCr-Ni K, operating temperature -200 to +1200°C, sheath, Mat. Ref. 2.4816
		(3) Protection tube diameter D in mm
x	3	3mm
x	4.5	4.5mm
x	6	6mm
		(4) Fitting length EL in mm (50 ≤ EL ≤ 50000)
x	100	100mm
x	200	200mm
x	300	300mm
x	400	400mm
x	500	500mm
x	...	please specify in plain text (50mm steps)
		(5) Process connection
x	103	thread 3/8" pipe
x	104	thread 1/2" pipe
		(6) Extra codes
x	000	no extra code
x	309	uninsulated assembly (thermocouple welded to tip)

	(1)		(2)		(3)		(4)		(5)		(6)
Order code		-		-		-		-		/	
Order example	901230/40	-	1042	-	6	-	200	-	104	/	000

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Stock versions

(1)		(2)		(3)		(4)		(5)		(6)		(7)	Sales No.
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901250/32	-	1042	-	1,5	-	200	-	11	-	2500	/	000	90/00068438
901250/32	-	1043	-	6	-	100	-	11	-	2500	/	000	90/00056812
901250/32	-	1043	-	6	-	200	-	11	-	2500	/	000	90/00068427
901250/32	-	1043	-	3	-	100	-	11	-	2500	/	000	90/00056813
901250/32	-	1043	-	3	-	200	-	11	-	2500	/	000	90/00068441
901250/32	-	1043	-	3	-	300	-	11	-	2500	/	000	90/00068442
901250/32	-	1043	-	3	-	500	-	11	-	2500	/	000	90/00068443
901250/32	-	1043	-	1,5	-	100	-	11	-	2500	/	000	90/00049205
901250/32	-	1043	-	1,5	-	200	-	11	-	2500	/	000	90/00068436
901250/32	-	1043	-	1,5	-	500	-	11	-	2500	/	000	90/00068437
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Stock versions

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