

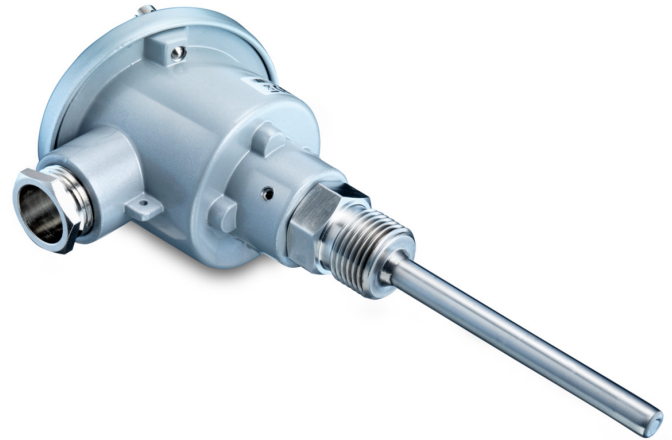
TCR6

Standard RTD temperature sensor

TCR6-####.####.####.####.####

Overview

- Housing DIN form B
- Immersion depth to 3000 mm
- 4 ... 20 mA or HART output
- Pt100 class A/B, Pt1000-configurable



EN 50155

Technical data

Performance characteristics

Pt100 accuracy class (EN 60751)	B ($\pm 0.3\text{ °C at }0\text{ °C}$) $\pm (0.3 + 0.005 \times t)\text{ °C}$ A ($\pm 0.15\text{ °C at }0\text{ °C}$) $\pm (0.15 + 0.002 \times t)\text{ °C}$ 1/3 B ($\pm 0.1\text{ °C at }0\text{ °C}$) $\pm 1/3 \times (0.3 + 0.005 \times t)\text{ °C}$ 1/6 B ($\pm 0.05\text{ °C at }0\text{ °C}$) $\pm 1/6 \times (0.3 + 0.005 \times t)\text{ °C}$
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Pt1000 accuracy class (EN 60751)	B ($\pm 0.3\text{ °C at }0\text{ °C}$) $\pm (0.3 + 0.005 \times t)\text{ °C}$ 1/3 B ($\pm 0.1\text{ °C at }0\text{ °C}$) $\pm 1/3 \times (0.3 + 0.005 \times t)\text{ °C}$
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Max. flow velocity	40 m/s , gases 5 m/s , liquids
Thermal response time, T50	$\leq 1.5\text{ s}$, $\varnothing 4\text{ mm}$ $\leq 6.1\text{ s}$, $\varnothing 6\text{ mm}$ $\leq 7.6\text{ s}$, $\varnothing 8\text{ mm}$ $\leq 13.6\text{ s}$, $\varnothing 8\text{ mm}$ with insert $\leq 11.1\text{ s}$, $\varnothing 10\text{ mm}$ $\leq 28.1\text{ s}$, $\varnothing 10\text{ mm}$ with insert

Process pressure	Refer to section "Operating conditions"
Process temperature	Refer to section "Operating conditions"

Process connection

Connection variants	Refer to section "Dimensional drawings"
Sensor length	20 ... 3000 mm
Sensor diameter outside	$\varnothing 6\text{ mm}$ $\varnothing 8\text{ mm}$ $\varnothing 10\text{ mm}$
Mounting position	Any, top, bottom, side
Standard response tip	$\varnothing 6\text{ mm}$ $\varnothing 8\text{ mm}$ $\varnothing 10\text{ mm}$
Fast response tip	$\varnothing 4\text{ mm}$
Sensor tube material	AISI 316L (1.4404)

Process connection

Surface roughness wetted parts	$Ra \leq 0.8\text{ }\mu\text{m}$
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Ambient conditions

Operating temperature range	-40 ... 160 °C , with Pt100 -40 ... 85 °C , with transmitter
Storage temperature range	-40 ... 85 °C
Degree of protection (EN 60529)	IP 65
Humidity	$\leq 100\text{ \% RH}$, condensing
Vibration (sinusoidal) (EN 60068-2-6)	1.6 mm p-p (2 ... 25 Hz), 4 g (25 ... 100 Hz), 1 octave / min.

Output signal

Without transmitter	1 x Pt100, 2-wire 1 x Pt100, 4-wire 2 x Pt100, 2-wire 1 x Pt1000, 2-wire
With transmitter	4 ... 20 mA , 2-wire 4 ... 20 mA , 2-wire + HART®

Housing

Style	DIN form B
Overall size	Refer to section "Dimensional drawings"
Material	Aluminium

Electrical connection

Connector	M12-A, 4-pin, nickel plated brass
Cable gland	M16x1.5, nickel plated brass M20x1.5, nickel plated brass

ATEX II 1G Ex ia IIC T4/T5

Maximum values for barrier selection, Ui	28 V DC
Maximum values for barrier selection, Ii	0.1 A

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ATEX II 1G Ex ia IIC T4/T5

Maximum values for barrier selection, Pi 0.7 W

Internal capacitance, Ci 36 nF

Internal inductance, Li 11 µH

Temperature class, T1 ... T4 - 20 < Tamb < 65 °C

Temperature class, T1 ... T5 - 20 < Tamb < 60 °C

ATEX II 3G Ex nA IIC T4/T5

Voltage supply range, Un 8 ... 30 V DC , with FlexTop 2202 / 2221
6.5 ... 30 V DC , with FlexTop 2211

ATEX II 3G Ex nA IIC T4/T5

Current rating, In ≤ 0.1 A

Temperature class, T1 ... T4 - 20 < Tamb < 70 °C

Temperature class, T1 ... T5 - 20 < Tamb < 60 °C

Compliance and approvals

EMC EN 61326-1

Railway applications EN 50155

Explosion protection ATEX II 1G Ex ia IIC T4/T5
ATEX II 3G Ex nA IIC T4/T5
Ex ia Simple apparatus, gas and dust

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Transmitter

FlexTop 2202

Input	Pt100
Input Accuracy	$\leq \pm 0.25\text{ }^{\circ}\text{C}$
Min. measuring span	25 °C
Output	4 ... 20 mA , 2-wire
Output Accuracy	$\leq \pm 0.1\text{ }%$, measuring span $\leq \pm 0.016\text{ mA}$
Power supply	8 ... 35 V DC
Programmability	With FlexProgrammer 9701
Please note	For further information please see data sheet for FlexTop 2202

FlexTop 2211

Input	Pt100 Pt1000
Input Accuracy	$\leq \pm 0.1\text{ }^{\circ}\text{C}$
Min. measuring span	25 °C
Output	4 ... 20 mA , 2-wire 20 ... 4 mA , programmable
Output Accuracy	$\leq \pm 0.1\text{ }%$, measuring span $\leq \pm 0.016\text{ mA}$
Power supply	8 ... 35 V DC
Programmability	With FlexProgrammer 9701
Please note	For further information please see data sheet for FlexTop 2211

FlexTop 2221

Input	Pt100 Pt1000
Input Accuracy	$\leq \pm 0.1\text{ }^{\circ}\text{C}$
Min. measuring span	25 °C
Output	4 ... 20 mA , 2-wire + HART® 20 ... 4 mA , programmable
Output Accuracy	$\leq \pm 0.1\text{ }%$, measuring span $\leq \pm 0.016\text{ mA}$
Power supply	8 ... 35 V DC
Programmability	With FlexProgrammer 9701 With HART® modem
Please note	For further information please see data sheet for FlexTop 2221

FlexTop 2212

Input	Pt100 Pt1000
Input Accuracy	$\leq \pm 0.06\text{ }^{\circ}\text{C}$
Min. measuring span	10 °C
Output	4 ... 20 mA , 2-wire 20 ... 4 mA , programmable
Output Accuracy	$\leq \pm 0.025\text{ }%$, measuring span $\leq \pm 0.004\text{ mA}$
Power supply	7 ... 40 V DC
Programmability	With FlexProgram
Please note	For further information please see data sheet for FlexTop 2212

FlexTop 2222

Input	Pt100 Pt1000
Input Accuracy	$\leq \pm 0.06\text{ }^{\circ}\text{C}$
Min. measuring span	10 °C
Output	4 ... 20 mA , 2-wire + HART® 20 ... 4 mA , programmable
Output Accuracy	$\leq \pm 0.025\text{ }%$, measuring span $\leq \pm 0.004\text{ mA}$
Power supply	7 ... 40 mA
Programmability	With FlexProgram With HART® modem
Please note	For further information please see data sheet for FlexTop 2222

Factory settings FlexTop 2202

Output range	0 ... 120 °C
Damping	0 s
Output at sensor fault	23 mA

Factory settings FlexTop 2211

Output range	0 ... 100 °C
Damping	0 s
Output at sensor fault	23 mA

Factory settings FlexTop 2221

Output range	0 ... 100 °C
Damping	0 s
Output at sensor fault	23 mA

Factory settings FlexTop 2212

Output range	0 ... 100 °C
Damping	0 s
Output at sensor fault	23 mA

Factory settings FlexTop 2222

Output range	0 ... 100 °C
Damping	0 s
Output at sensor fault	23 mA

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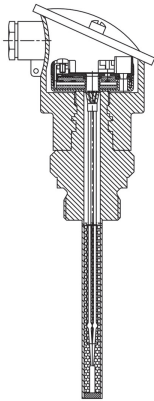
TCR6-####.####.####.####.####

Operating conditions

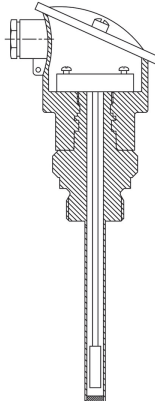
Ordering key	Process connection	BCID	Process pressure	Process temperature Standard @ Tamb ≤ 45 °C	Continuous Process temperature With cooling neck 71 mm @ Tamb ≤ 70 °C	Process temperature With cooling neck 142 mm / 213 mm @ Tamb ≤ 70 °C
			(bar)	(° C)	(° C)	(° C)
TCR6-####.####.##10.####.####	Sleeve Ø 6	T65	-1 ... 40	-50 ... 400	-50 ... 400	-50 ... 600
TCR6-####.####.##12.####.####	G 1/2 A DIN 3852-A	G44	-1 ... 100	-50 ... 400	-50 ... 400	-50 ... 600
TCR6-####.####.##13.####.####	R 1/2 ISO 7-1	R06	-1 ... 100	-50 ... 400	-50 ... 400	-50 ... 600
TCR6-####.####.##16.####.####	M18 × 1.5 ISO 261 / ISO 965	M07	-1 ... 100	-50 ... 400	-50 ... 400	-50 ... 600
TCR6-####.####.##17.####.####	M20 × 1.5 ISO 261 / ISO 965	M08	-1 ... 100	-50 ... 400	-50 ... 400	-50 ... 600
TCR6-####.####.##18.####.####	1/2-14 NPT	N02	-1 ... 100	-50 ... 400	-50 ... 400	-50 ... 600
TCR6-####.####.##23.####.####	G 1/2 A ISO 228-1 female thread	G23	-1 ... 100	-50 ... 400	-50 ... 400	-50 ... 600
TCR6-####.####.##24.####.####	G 3/4 A ISO 228-1 female thread	G24	-1 ... 100	-50 ... 400	-50 ... 400	-50 ... 600
TCR6-####.####.##33.####.####	Rotating male nipple G 1/2 A ISO 228-1	G06	-1 ... 100	-50 ... 400	-50 ... 400	-50 ... 600
TCR6-####.####.##35.####.####	Rotating male nipple G 3/4 A ISO 228-1	G10	-1 ... 100	-50 ... 400	-50 ... 400	-50 ... 600
TCR6-####.####.##36.####.####	Rotating male nipple G 1 A ISO 228-1	G11	-1 ... 100	-50 ... 400	-50 ... 400	-50 ... 600

A process temperature up to 600 °C is only possible with Pt100 element code 'C'.

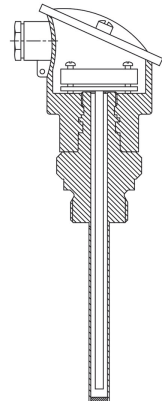
Dimensional drawings (mm)



With embedded sensor



With cable sensor insert



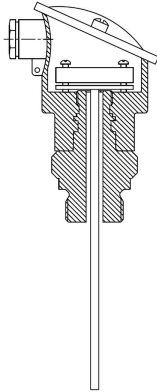
With DIN 43762 insert

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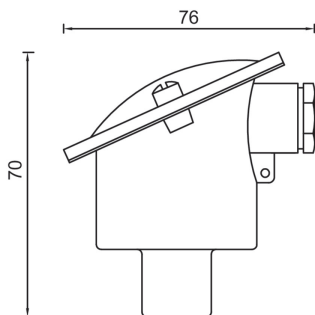
TCR6-####.####.####.####.####

Dimensional drawings (mm)

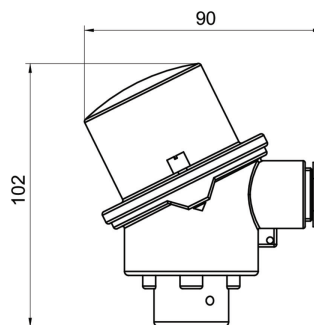


With insert DIN 43762, no immersion tube

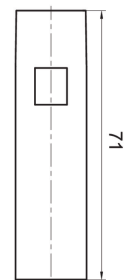
Housing



DIN Form B housing

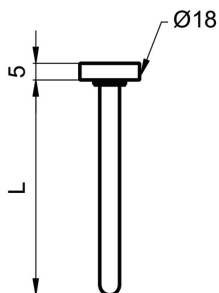


DIN Form B housing, dual transmitter

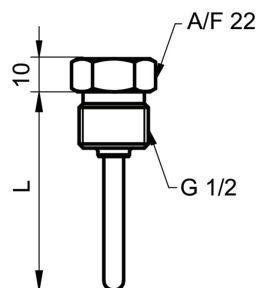


Cooling neck

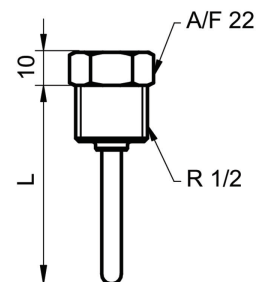
Process connection



Without thread (BCID: T65)



G 1/2 A DIN 3852-A (BCID: G44)



R 1/2 ISO 7/1 (BCID: R01)

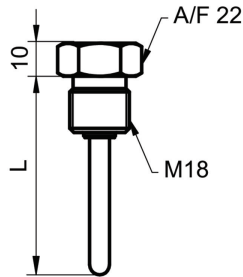
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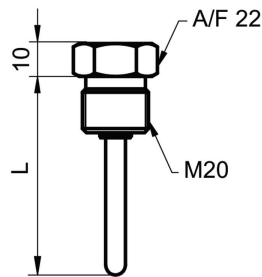
TCR6-####.####.####.####.####

Dimensional drawings (mm)

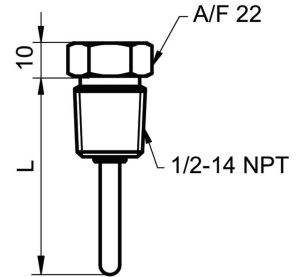
Process connection



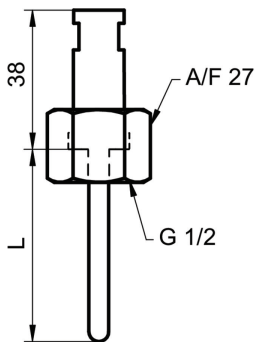
M18 × 1.5 ISO 261 / ISO 965 (BCID: M07)



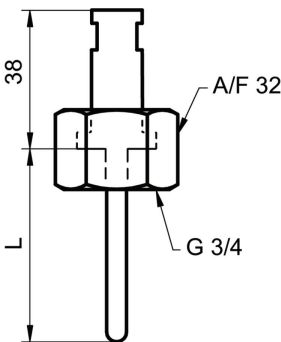
M20 × 1.5 ISO 261 / ISO 965 (BCID: M08)



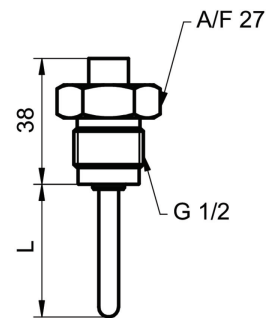
1/2-14 NPT (BCID: N02)



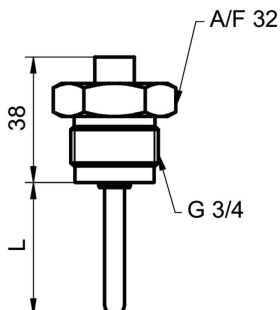
Rotating female union G 1/2 A ISO 228-1
(BCID: G23)



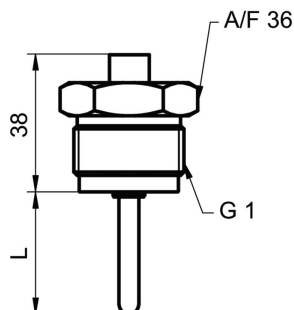
Rotating female union G 3/4 A ISO 228-1
(BCID: G24)



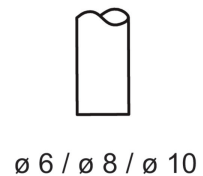
Rotating male nipple G 1/2 A ISO 228-1 (G06)



Rotating male nipple G 3/4 A ISO 228-1 (G10)



Rotating male nipple G 1 A ISO 228-1 (G11)



Standard response tip

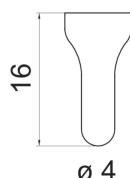
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Dimensional drawings (mm)

Process connection



Fast response tip

Electrical connection

Output type	Equivalent circuit	Electrical connection	Function	Pin assignment
Pt100 (Single element)			Pt100 11	1, 2
			Pt100 12	3, 4
			Pt100 11	1, 2
			Pt100 12	3, 4
			Frame ground	Plug thread
Pt100 (Double element)			Pt100 11	1
			Pt100 12	2
			Pt100 21	3
			Pt100 22	4
			Pt100 11	1
			Pt100 12	2
			Pt100 21	3
			Pt100 22	4
			Frame ground	Plug thread
4 ... 20 mA, 2-wire			+Vs	1
			lout	2
			+Vs	1
			lout	3
			N.C.	2, 4
			Frame ground	Plug thread
2 x 4 ... 20 mA, 2-wire			+Vs1	1
			lout1	2
			+Vs2	3
			lout2	4

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Standard RTD temperature sensor

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Ordering information

Ordering key - Configuration possibilities see website

Product	TCR6	-	####	.	#	#	#	#	.	#	#	##	.	#	#	#	#	.	####
	TCR6																		
Electrical connection/Housing																			
Electrical connection: M12-A, 4-pin Housing: DIN form B	1120																		
Electrical connection: M16x1.5 cable gland, nickel plated brass Housing: DIN form B	1520																		
Electrical connection: M16x1.5 cable gland, nickel plated brass, shielded Housing: DIN form B	1620																		
Electrical connection: M20x1.5 cable gland, nickel plated brass Housing: DIN form B	1720																		
Electrical connection: M16x1.5 cable gland, nickel plated brass Housing: DIN form B for dual transmitter	2520																		
Electrical connection: M16x1.5 cable gland, nickel plated brass, shielded Housing: DIN form B for dual transmitter	2620																		
Electrical connection: M20x1.5 cable gland, nickel plated brass Housing: DIN form B for dual transmitter	2720																		
Transmitter / socket																			
Flying leads	0																		
Ceramic socket Pt100	1																		
Transmitter 2202 4 ... 20 mA, accuracy $\pm 0,25$ °C	2																		
Transmitter 2211 4 ... 20 mA, accuracy $\pm 0,10$ °C	3																		
Transmitter 2221 4 ... 20 mA + HART®, accuracy $\pm 0,10$ °C	4																		
Transmitter 2212 4 ... 20 mA, accuracy $< \pm 0.06$ °C	6																		
Transmitter 2222 4 ... 20 mA + HART®, accuracy $< \pm 0.06$ °C	7																		
2 x Transmitter 2202 4 ... 20 mA, accuracy $\pm 0,25$ °C	A																		
2 x Transmitter 2212 4 ... 20 mA, accuracy $< \pm 0.06$ °C	D																		
2 x Transmitter 2222 4 ... 20 mA + HART®, accuracy $< \pm 0.06$ °C	E																		
Safety																			
Standard	0																		
Ex ia IIC T4/T5 1G (Gas)	1																		
Ex nA II T4/T5 3G (Gas)	3																		
Ex ia Simple apparatus, gas and dust	9																		
Configuration																			
No configuration	0																		
Configuration of temperature range	1																		

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Standard RTD temperature sensor

TCR6-####.####.####.####.####

Ordering information

Ordering key - Configuration possibilities see website

	TCR6	-	####	.	#	#	#	#	.	#	#	##	.	#	#	#	#	.	####
Sensor element																			
1 x Pt100, 1/1 B EN 60751																			1
2 x Pt100, 1/1 B EN 60751																			2
1 x Pt100, 1/3 B EN 60751																			5
2 x Pt100, 1/3 B EN 60751																			6
1 x Pt100, 1/6 B EN 60751																			7
2 x Pt100, 1/6 B EN 60751																			8
1 x Pt100, 1/1 A EN 60751																			A
2 x Pt100, 1/1 A EN 60751																			B
1 x Pt100, 1/1 B EN 60751, < 600°C																			C
1 x Pt1000, 1/1 B EN 60751																			J
1 x Pt1000, 1/3 B EN 60751																			K
Sensor insert type																			
Sensor tube with embedded sensor element 2-wire																			1
Sensor tube with embedded sensor element 4-wire																			2
Sensor tube with embedded 2x2-wire sensor element																			4
Spring loaded insert 2-wire																			5
Spring loaded insert 4-wire																			6
Spring loaded insert 2x2-wire																			7
Cable sensor Pt100 1/1 B EN 60751																			A
Cable sensor Pt100 1/3 B EN 60751																			B
Cable sensor Pt100 1/6 B EN 60751																			C
Cable sensor Pt100 1/1 A EN 60751																			D
Cooling neck																			
Without																			0
71 mm.																			1
142 mm.																			2
213 mm.																			3
Process connection																			
Tube without connection																			10
G 1/2 A DIN 3852-A (G44)																			12
R 1/2 ISO 7/1 (R01)																			13
M18 × 1.5 ISO 261 / ISO 965 (M07)																			16
M20 × 1.5 ISO 261 / ISO 965 (M08)																			17
1/2-14 NPT (N02)																			18
G 1/2 A ISO 228-1 female thread (G23)																			23
G 3/4 A ISO 228-1 female thread (G24)																			24
Rotating male nipple G 1/2 A ISO 228-1 (G06)																			33
Rotating male nipple G 3/4 A ISO 228-1 (G10)																			35
Rotating male nipple G 1 A ISO 228-1 (G11)																			36
Seal																			
Without seal																			0
Seal NBR																			1
Sensor diameter																			
Ø6.0 mm, welded																			5
Ø8.0 mm, welded																			6
Ø10.0 mm, welded																			8
No immersion tube, for insert only																			9

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Ordering information

Ordering key - Configuration possibilities see website

TCR6 - #### . # # # # . # # ## . # # # # . ####

Sensor tip

Standard response tip	1
Fast response tip, ø 4 mm tip	2
Insert only, open, no immersion tube below process connection	A

Approvals

Standard approvals	0
Railway EN 50155	4

Sensor tube length (mm)

20 - 3000	####
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