RTD temperature sensor with CANopen interface

- Single resistance thermometer Type Pt1000
- Process connections: G ½ or NPT ½
- Temperature measuring range: - 50...+ 150 °C
- Limit value monitoring function
- Access to measured value, device status and settings via the CANopen interface

Product variants described in the data sheet may differ from the product presentation and description.

Can be combined with

Type ME43
Fieldbus gateway

Type description

Resistance thermometers are the preferred choice for measuring the temperature of liquids and gases. The design offers reliable tightness under negative and positive pressure.

The measuring insert is equipped with a Pt1000 temperature sensor according to DIN EN 60751, Class A. The measured temperature value is digitised, linearised and made available via the CANopen digital communication interface (CAN slave) for further processing.

Instead of an analogue output, this device offers the CANopen digital interface. This allows bidirectional data transfer, e.g. with a CAN/Ethernet gateway or directly to a PLC that is equipped with a CAN interface. CAN devices can also be connected to the Bürkert büS digital communication interface. A driver used for data exchange and settings of the 8412 is integrated in the Bürkert PC tool Communicator.

Several useful auxiliary functions have been implemented through the DS 404 device profile.

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Visit product website

Table of contents

1. General technical data 3

2. Approvals and conformities 5

2.1. Conformity 5
2.2. Standards 5
2.3. Pressure Equipment Directive (PED) 5
Device used on a pipe 5
Device used on a vessel 5

3. Materials 5

3.1. Bürkert resistApp 5

4. Dimensions 6

5. Product operation 7

5.1. Functional overview 7

6. Product accessories 8

7. Ordering information 8

7.1. Bürkert eShop 8
7.2. Bürkert product filter 8
7.3. Ordering chart 9
7.4. Ordering chart accessories 9

DTS 1000416968 EN Version: - Status: RL (released | freigegeben | valide) printed: 28.10.2026

1. General technical data

Product properties	
Material	
Make sure the device materials are compatible with the fluid you are using. Further information can be found in chapter "3.1. Bürkert resistApp" on page 5.	
Non-wetted parts	
Housing	Stainless steel 1.4571 (316Ti)
Wetted parts	
Process connection	• G or NPT variant: stainless steel 1.4571 (316Ti) • Clamp variant: stainless steel 1.4435 (316L)
Protection tube	• G or NPT variant: stainless steel 1.4571 (316Ti) • Clamp variant: stainless steel 1.4435 (316L)
Dimensions	Further information can be found in chapter "4. Dimensions" on page 6.
Weight	Approx. 80 g for the variant with thread connection and 100 mm probe length The weight of the temperature sensor depends on the process connection and the insertion length.
Measuring element	Pt1000 temperature sensor, two-wire circuit
Measuring probe length	25, 30, 50, 100 or 150 mm
Measuring range	- 50...+ 150 °C (- 58...+ 302 °F)
Monitoring	• Measuring circuit – Underrange (freely selectable lower limit) – Overrange (freely selectable upper limit) • Probe short circuit • Probe break
Additional function	• Min./max. measured value memory • Fine adjustment • Toggling between °C, °F, °K • Decimal places selectable 0, 1, 2
Performance data	
Sampling rate	250 ms
Transmission behaviour	Temperature linear
Measuring resolution	12 Bit
Measurement deviation	• Tolerance class A according to EN 60751:2009 / IEC 60751:2008 • Max. ± 0.2 % of the measuring range span
Response time	• $t_{0.5}$ = 5 s; $t_{0.9}$ = 12 s, in water with a flow velocity of 0.4 m/s • $t_{0.5}$ = 40 s; $t_{0.9}$ = 110 s, in air with a flow velocity of 3.0 m/s
Electrical data	
Operating voltage	10...30 V DC, filtered and regulated
Power source (not supplied)	The auxiliary energy of the pressure sensor must meet SELV requirements; optionally, an energy-limited current circuit according to paragraph 9.3 of DIN EN 31010-1 and UL 61010-1 can be used.
DC reverse polarity protection	Yes
Overvoltage protection	Yes
Short circuit protection	Yes
Protection class	Class III according to EN 61140
Current consumption	Approx. max. 45 mA
Recommended connection cable	5-wire shielded cable, length depends on the transmission speed. The physical CAN transmission is standardized according to ISO 11898-2 (high-speed) and ISO 11898-3 (low-speed)
Medium data	
Fluid	Liquid and gaseous medium
Fluid pressure	Max. 40 bar
Product connections	
Process connection	• G ½ or NPT ½ screw-in thread according to EN 837 • Clamp ¾" according to DIN 32676 series B
Electrical connection	M12 × 1 male connector, 5-pin according to DIN IEC 60947-5-2

DTS 1000416968 EN Version: - Status: RL (released | freigegeben | valide) printed: 28.10.2026

Digital communication: CANopen	
Protocol	CiA DS 301, V4.02, CANopen slave
Profile	CiA DS 404, V1.2; measuring devices and closed-loop controllers
Transmission speed (baud rate)	20 kBd to 1 MBd, setting via LSS or SDO
Node ID	1 to 127 setting via LSS or SDO
PDO	0 Rx, 1 Tx
SDO	1 Rx, 1 Tx
Emergency	Yes
Heartbeat	Yes (if active, then Node Guarding deactivated)
Node Guarding	Yes (if active, then Heartbeat deactivated)
LSS	Yes
SYNC	Yes
Operation and project planning	All parameters are accessible via the CANopen object directory (EDS) and can be set via standard CANopen software tools or Bürkert Communicator.
EDS (electronic data sheet)	• Device driver in Bürkert Communicator tool Type 8920, see "Bürkert Communicator" on the website in the Software chapter **Type 8920** ▸ • See "Device Description Files" on the website in the Software chapter **Type 8412** ▸
Factory setting	See "Operating Instructions Type 8412" on the website in the User Manuals chapter **Type 8412** ▸
Approvals and conformities	
Directives	
CE directive	Further information on the CE Directive can be found in chapter "2.2. Standards" on page 5.
Pressure Equipment Directive	• The device does not meet the requirements for "safety accessories" within the meaning of the Pressure Equipment Directive 2014/68/EU. • Complying with article 4, paragraph 1 of 2014/68/EU directive. Further information on the Pressure Equipment Directive can be found in chapter "2.3. Pressure Equipment Directive (PED)" on page 5.
Environment and installation	
Ambient temperature	• Operation: - 20...+ 85 °C (- 4...+ 185 °F) • Storage: - 40...+ 85 °C (- 40...+ 185 °F)
Temperature influence	≤ ± 0.0025 % of the measuring span per K deviation from 22 °C
Relative air humidity	• During operation: ≤ 100 %, without condensation on the outer housing surface of the device • During storage: ≤ 90 %, without condensation
Climate class	3K7 according to EN 60721-3-3
Application range	Indoor and outdoor Protect the device against electromagnetic interference, ultraviolet rays and, when installed outdoors, against the effects of climatic conditions.
Degree of protection according to IEC/EN 60529	IP67 with female connector screwed on
Mounting position	Installation: unrestricted

DTS 1000416968 EN Version: - Status: RL (released | freigegeben | valide) printed: 28.10.2026

2. Approvals and conformities

2.1. Conformity

In accordance with the Declaration of Conformity, the product is compliant with the EU Directives.

2.2. Standards

The applied standards which are used to demonstrate compliance with the EU Directives are listed in the EU-Type Examination Certificate and/or the EU Declaration of Conformity.

2.3. Pressure Equipment Directive (PED)

The device conforms to article 4, paragraph 1 of the Pressure Equipment Directive (PED) 2014/68/EU under the following conditions:

Device used on a pipe

Note:

- The data in the table is independent of the chemical compatibility of the material and the fluid.
- PS = maximum admissible pressure (in bar), DN = nominal diameter of the pipe

Type of fluid	Conditions
Fluid group 1, article 4, paragraph 1.c.i	DN ≤ 25
Fluid group 2, article 4, paragraph 1.c.i	DN ≤ 32 or PS*DN ≤ 1000
Fluid group 1, article 4, paragraph 1.c.ii	DN ≤ 25 or PS*DN ≤ 2000
Fluid group 2, article 4, paragraph 1.c.ii	DN ≤ 200 or PS ≤ 10 or PS*DN ≤ 5000

Device used on a vessel

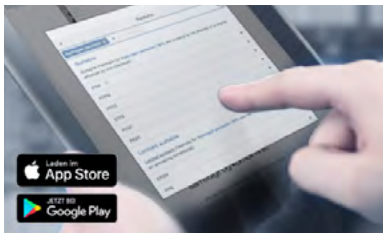
Note:

- The data in the table is independent of the chemical compatibility of the material and the fluid.
- PS = maximum admissible pressure (in bar), V = vessel volume

Type of fluid	Conditions
Fluid group 1, article 4, paragraph 1.a.i	V > 1 L and PS*V ≤ 25 bar.L or PS ≤ 200 bar
Fluid group 2, article 4, paragraph 1.a.i	V > 1 L and PS*V ≤ 50 bar.L or PS ≤ 1000 bar
Fluid group 1, article 4, paragraph 1.a.ii	V > 1 L and PS*V ≤ 200 bar.L or PS ≤ 500 bar
Fluid group 2, article 4, paragraph 1.a.ii	PS > 10 bar and PS*V ≤ 10000 bar.L or PS ≤ 1000 bar

3. Materials

3.1. Bürkert resistApp



Bürkert resistApp – Chemical resistance chart

You want to ensure the reliability and durability of the materials in your individual application case? Verify your combination of media and materials on our website or in our resistApp.

Start chemical resistance check

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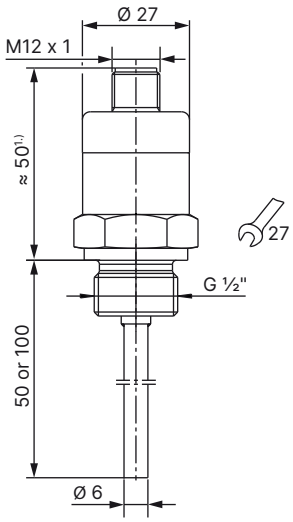
4. Dimensions

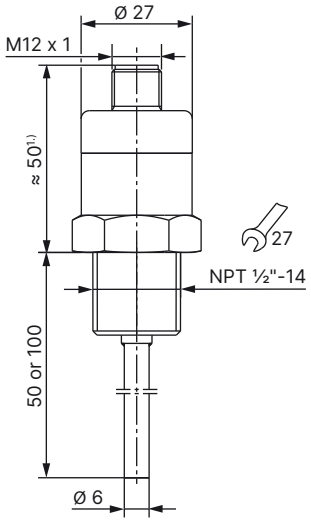
Note:
Dimensions in mm, unless otherwise stated

Process connection:

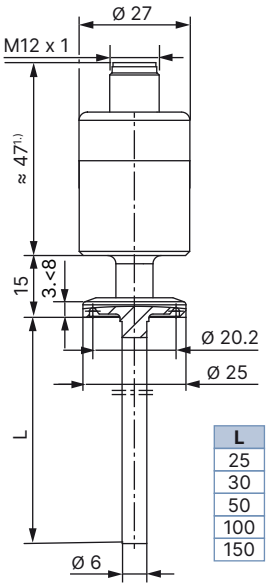
G ½
according to EN 837



NPT ½
according to EN 837



Clamp ¾"
according to DIN 32676 series B



L
25
30
50
100
150

1.) The total height is increased by the height of the used female connector and cable.

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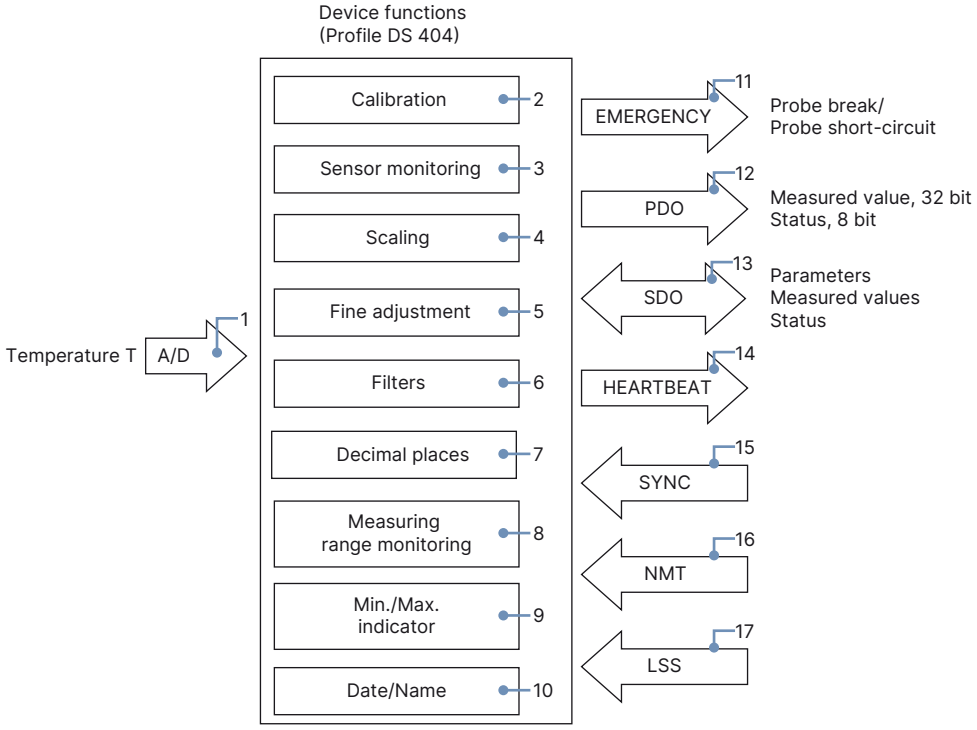
5. Product operation

5.1. Functional overview



No.	Description
1	The measured temperature value is digitized.
2	The temperature signal is adjusted digitally per default.
3	The sensor monitoring continuously checks the correct function of the sensor signal and triggers high-priority emergency frames in the event of an error.
4	The measured temperature value can be scaled to any measurement units (or in % of the measuring range).
5	The fine adjustment features a freely adjustable characteristic line offset.
6	Undesired signal fluctuations can be suppressed using the adjustable filter constant.
7	The measurement output has a freely selectable decimal place.
8	Free choice of upper and lower limits for range monitoring. The result is given as a status byte in addition to the measurement in the PDO frame.
9	The drag pointer (“min./max. index”) function records the minimum and maximum temperature values.
10	The date and name of the last maintenance operation can be saved.
11	The emergency frame is triggered in the event of a sensor fault.
12	The PDO frame contains a 32-bit measurement and a 8-bit status. The measurement output can be controlled by means of different trigger conditions.
13	SDO frames can be used to set parameters and to request measured values and statuses.
14	The heartbeat signal can be used to additionally monitor the function of the transmitter.
15	The sync command can also be used to control the transfer of the measured values.
16	The NMT frames are for the purpose of controlling the operating status of the transmitter.
17	The CAN Node ID and the CAN baud rate are set either with LSS or SDO.

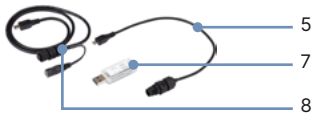
DTS 1000416968 EN Version: - Status: RL (released | freigegeben | valide) printed: 28.10.2026

DTS 1000416968 EN Version: - Status: RL (released | freigegeben | valide) printed: 28.10.2026

6. Product accessories

Note:
To configure a device, use the USB-büS-Interface set Type 8923 and the Bürkert Communicator software Type 8920.

See **Software manual Type 8920** ▶ for more information.

Accessories	No.	Description
USB-büS-Interface set 1 	**1**	Quick-Start
	2	Power supply: 100...240 V AC/24 V DC 1 A and adapters for power supply worldwide use
	3	büS terminating resistor on büS Y-splitter
	4	5-pin M12 male connector wired on free end cable, cable length: 0.2 m
	5	büS connection cable with 5-pin M12 male connector, micro USB B plug, cable length: 0.3 m
	6	büS adapter with 5-pin M12 male connector, A-coded to 5-pin M12 male connector, A-coded
	7	büS stick (USB to büS/CANopen adapter)
	8	büS service cable with 5-pin M12 female connector, mini USB plug and circular female connector for power supply, cable length: 0.7 m
	9	Magnetic key
USB-büS-Interface set 2  		The Bürkert Communicator software can be downloaded from our website under the "Software" heading of **Type 8920** ▶.

7. Ordering information

7.1. Bürkert eShop

Bürkert eShop – Easy ordering and quick delivery

You want to find your desired Bürkert product or spare part quickly and order directly? Our online shop is available for you 24/7. Sign up and enjoy all the benefits.

Order online now

7.2. Bürkert product filter

Bürkert product filter – Get quickly to the right product

You want to select products comfortably based on your technical requirements?
Use the Bürkert product filter and find suitable articles for your application quickly and easily.

Try out our product filter

7.3. Ordering chart

Note:
The following variants have a 10...30 V DC operating voltage and a digital CANopen interface.

Temperature range [°C]	Process connection	Probe length [mm]	Article no.
- 50...+ 150	G ½	50	574638
		100	574639
	NPT ½	50	574640
		100	574641
	Clamp ¾"	25	574320
		30	574321
		50	572034
		100	572035
		150	572036

Further variants on request

Process connection Screw-in thread G ¼, G ⅜, M14 × 1.5, M18 × 1.5 and M20 × 1.5	**Temperature** - 50...+ 450 °C
Additional • Pt1000 temperature sensor, two-wire circuit, class B according to EN 60751:2009 / IEC 60751:2008 • Insertion length: 150, 200 or 250 mm	

7.4. Ordering chart accessories

Note:
- büS communication specifications are based on CANopen.
- The following accessories can be used for CANopen as well.

Description			Article no.
System Connect			
Type ME43 Gateway/Interface			
Industrial Ethernet gateway (PROFINET IO, EtherNet/IP, Modbus TCP, EtherCAT®)			307390
PROFIBUS gateway (PROFIBUS DPV1)			307393
Interface accessories			
USB-büS-Interface set			
	USB-büS-Interface set 1 (Type 8923) Further information can be found in chapter "6. Product accessories" on page 8.		772426
USB-büS-Interface set 2 (Type 8923) Further information can be found in chapter "6. Product accessories" on page 8.			772551
Connectors			
büS Y-distributor (M12 female connector, 5-pin to M12 male and female connectors, 5-pin)			772420
büS Y-distributor with power interrupt (M12 female connector, 5-pin to M12 male and female connectors, 5-pin)			772421
büS adapter (M12 male connector, 5-pin, A-coded to M12 male connector, 5-pin, A-coded)			772867
büS terminating resistor 120 ohms, M12 male connector, 5-pin			772424
büS terminating resistor 120 ohms, M12 female connector, 5-pin			772425
Extensions			
	M12 female and male connectors, 5-pin, straight, moulded on büS cable, shielded	0.5 m	772403
		1 m	772404
		3 m	772405
		5 m	772406
		10 m	772407
		20 m	772408

DTS 1000416968 EN Version: - Status: RL (released | freigegeben | valide) printed: 28.10.2026

Description	Article no.
Software	
Software Bürkert Communicator	Download **Type 8920** ▸

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