bürkert
FLUID CONTROL SYSTEMS

RTD temperature sensor with CANopen interface

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

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

Can be combined with

Type ME43 ▶ Fieldbus gateway	
PLC With CANopen interface	

Integration into CANopen and büS networks

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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1. General Technical Data

Product properties	
Material	
Non wetted parts	
Housing	Stainless steel 1.4571 (316Ti)
Wetted parts	
Process connection	Stainless steel 1.4571 (316Ti)
Protection tube	Stainless steel 1.4571 (316Ti)
Dimensions	Detailed information can be found in chapter "3. Dimensions" on page 5.
Measurement element	Pt1000 temperature sensor, two-wire circuit
Probe length	50 or 100 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 functions	• Min./max. measured value memory • Fine adjustment • Toggling between °C, °F, °K • Decimal places selectable 0, 1, 2
Weight	Approx. 80 g for the version with thread connection and 100 mm probe length. The weight of the temperature sensor depends on the process connection and the insertion length.
Performance data	
Sampling rate	250 ms
Transmission behaviour	Temperature linear
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
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
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 section 9.3 of DIN EN 31010-1 and UL 61010-1 can be used.
Current consumption	Approx. max. 45 mA
DC reverse polarity protection	Yes
Overvoltage protection	Yes
Short circuit protection	Yes
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
Process/Port connection & communication	
Process connection	G ½" or NPT ½" screw-in thread
Electrical connection	M12 × 1 male connector, 5 pin according to DIN IEC 60947-5-2
Digital communication: CANopen	
Protocol	CiA DS 301, V4.02, CANopen slave
Profile	CiA DS 404, V1.2; measuring devices and closed-loop controllers
Baud rate	20 kbaud to 1 Mbaud, setting via LSS or SDO
Node ID	1 to 127 setting via LSS or SDO
PDO	0 Rx, 1 Tx

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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 certificates

Standards

Degree of protection	IP67, according to IEC/EN 60529 with female connector screwed on
Accuracy class	Class A according to IEC 60751
Protection class	Class III according to EN 61140

Directives

CE directives	The applied standards, which verify conformity with the EU Directives, can be found on the EU Type Examination Certificate and/or the EU Declaration of conformity (if applicable)
Electromagnetic compatibility (EMC)	CE conformity according to EN 61326-2-3 • Interference emission: class B • Immunity to interference: to industrial requirements
Pressure equipment directives	• 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 Detailed information on the pressure equipment directive can be found in chapter **"2.1. Pressure Equipment Directive" 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
Area of use	Indoors and outdoors (protect this device against electromagnetic interference, ultraviolet rays and the effects of climatic conditions)
Vibration resistance	According to EN 60068-2-6: • for 50 mm probe length: 10 g max. with 10…2000 Hz • for 100 mm probe length: 5 g max. with 10…300 Hz
Shock resistance	According to EN 60068-2-27: • for 50 mm probe length: 50 g, 3 ms • for 100 mm probe length: 30 g, 3 ms
Mounting position	Installation: unrestricted

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2. Approvals

2.1. Pressure Equipment Directive

The device conforms to Article 4, Paragraph 1 of the Pressure Equipment Directive 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, DN = nominal diameter of the pipe

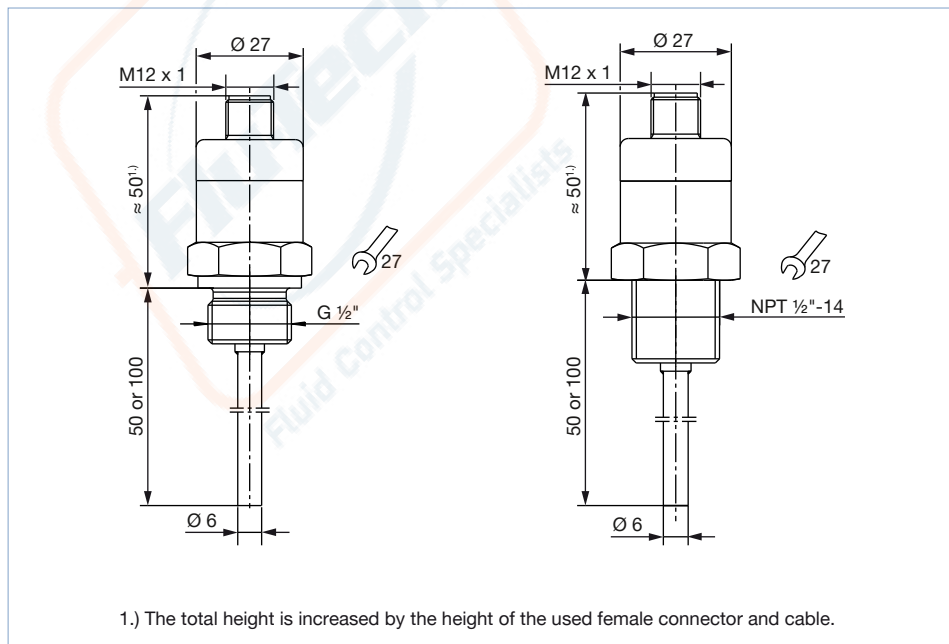| Type of fluid	Conditions
Fluid group 1, Article 4, Paragraph 1.c.i	DN ≤ 25
Fluid group 2, Article 4, Paragraph 1.c.i	DN ≤ 32 or PS*DN ≤ 1000
Fluid group 1, Article 4, Paragraph 1.c.ii	DN ≤ 25 or PS*DN ≤ 2000
Fluid group 2, Article 4, Paragraph 1.c.ii	DN ≤ 200 or PS ≤ 10 or PS*DN ≤ 5000

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, V = vessel volume

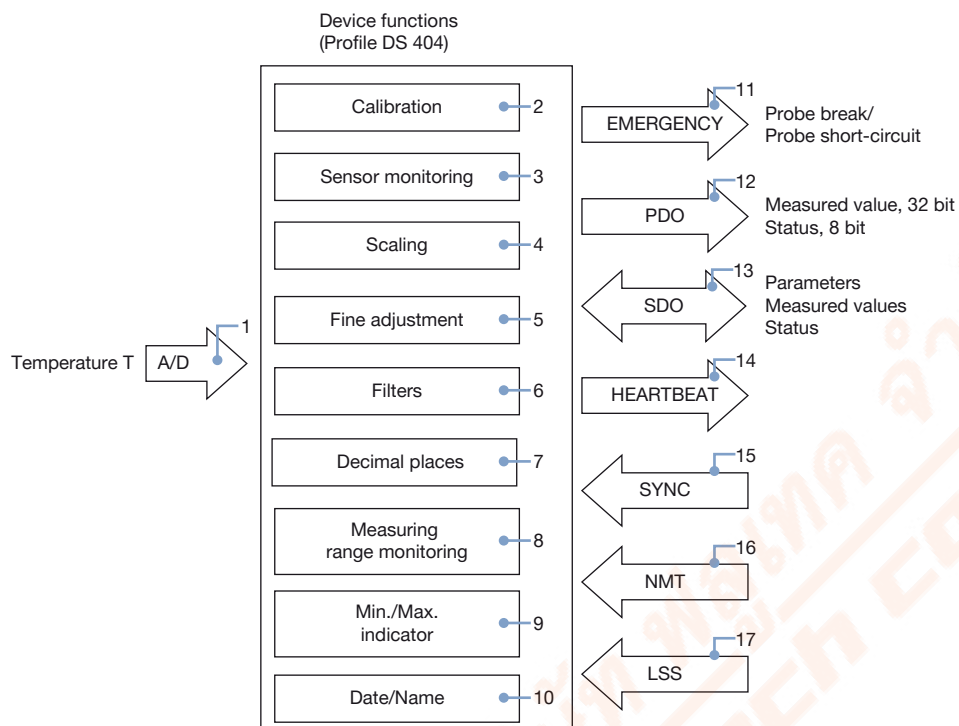| Type of fluid	Conditions
Fluid group 1, Article 4, Paragraph 1.a.i	V > 1 L and PS*V ≤ 25 bar.L or PS ≤ 200 bar
Fluid group 2, Article 4, Paragraph 1.a.i	V > 1 L and PS*V ≤ 50 bar.L or PS ≤ 1000 bar
Fluid group 1, Article 4, Paragraph 1.a.ii	V > 1 L and PS*V ≤ 200 bar.L or PS ≤ 500 bar
Fluid group 2,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

3. Dimensions

Note:
Dimensions in mm

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

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4. Product operation

4.1. Functional overview

Device functions
(Profile DS 404)

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 measuring 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.

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5. Product accessories

Note:
To set up a device, please use the USB-büS interface Type 8923 in combination with the Bürkert software tool Communicator Type 8920.

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

Accessories	No.	Description
	1	Quick-Start
	2	Power supply:100…240 V AC/24 V DC 1 A and adaptors for power supply worldwide use
	3	büS terminating resistor on büS Y-splitter
	4	5 pin M12 male connector wired on free end cable
	5	büS connection cable with 5 pin M12 plug, micro USB B plug
	6	büS adapter with 5 pin M12 plug, A-coded to 5 pin M12 plug, A-coded
	7	büS stick (USB to büS/CANopen adaptor)
	8	büS service cable with 5 pin M12 plug, mini USB and circular plug-in connectors for power supply
	9	Magnetic key
	10	CD - Communicator (30-day license without registration, update and licensing over Bürkert home page). It is recommended to download and install the Communicator software from the homepage to use the latest version.

6. Ordering information

6.1. Bürkert eShop – Easy ordering and quick delivery

Bürkert eShop – Easy ordering and fast 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

6.2. 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

6.3. Ordering chart

Note:
All following versions have a 10…30 V DC operating voltage and a CANopen digital interface.

Process connection	Temperature range	Probe length	Article no.
	[°C]	[mm]	
G ½"	- 50…+ 150	50	574638 🛒
		100	574639 🛒
NPT ½"		50	574640 🛒
		100	574641 🛒

	Further versions on request		
🔧	**Process connection** Screw-in thread G ¼", G ⅜", M14 x 1.5, M18 x 1.5 and M20 x 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		

6.4. Ordering chart accessories

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

Description	Article no.
System connection	
Type ME43 Gateway / Interface	
büS/Ethernet (Profinet, Ethernet/IP, Modbus TCP, EtherCAT)	307390 🛒
büS/Profibus DP	307393 🛒
Interface accessories	
büS Stick Set	
[image] USB-büS-Interface Set 1, Type 8923. Detailed information can be found in chapter **"5. Product accessories" on page 7**.	772426 🛒
USB-büS Interface Set 2, Type 8923 (only büS Stick, cable and büS service cable)	772551 🛒
Connectors and sockets	
büS Y-connector, 5 pin M12 female to 5 pin M12 male and 5 pin M12 female	772420 🛒
büS Y-connector, 5 pin M12 female to 5 pin M12 male and 5 pin M12 female (power interrupt)	772421 🛒
büS adaptor M12 male A-coded - M12 male A-coded	772867 🛒
büS termination, 5 pin M12 male cable plug	772424 🛒
büS termination, 5 pin M12 female cable plug	772425 🛒
Extensions	
[image] 5 pin M12 female and male straight cable plug moulded on cable (0.5 m, shielded)	772403 🛒
5 pin M12 female and male straight cable plug moulded on cable (1 m, shielded)	772404 🛒
5 pin M12 female and male straight cable plug moulded on cable (3 m, shielded)	772405 🛒
5 pin M12 female and male straight cable plug moulded on cable (5 m, shielded)	772406 🛒
5 pin M12 female and male straight cable plug moulded on cable (10 m, shielded)	772407 🛒
5 pin M12 female and male straight cable plug moulded on cable (20 m, shielded)	772408 🛒
Software	
Software Bürkert Communicator	Download **Type 8920** ▶

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