

JUMO GmbH & Co. KG
 Delivery address: Mackenrodtstraße 14
 36039 Fulda, Germany
 Postal address: 36035 Fulda, Germany
 Phone: +49 661 6003-0
 Fax: +49 661 6003-607
 E-mail: mail@jumo.net
 Internet: www.jumo.net

JUMO Instrument Co. Ltd.
 JUMO House
 Temple Bank, Riverway
 Harlow, Essex CM20 2DY, UK
 Phone: +44 1279 635533
 Fax: +44 1279 635262
 E-mail: sales@jumo.co.uk
 Internet: www.jumo.co.uk

JUMO Process Control, Inc.
 8 Technology Boulevard
 Canastota, NY 13032, USA
 Phone: 315-697-5866
 1-800-554-JUMO
 Fax: 315-697-5867
 E-mail: info.us@jumo.net
 Internet: www.jumousa.com



JUMO CANtrans pT

Pressure and Temperature Transmitter with CANopen output

General application

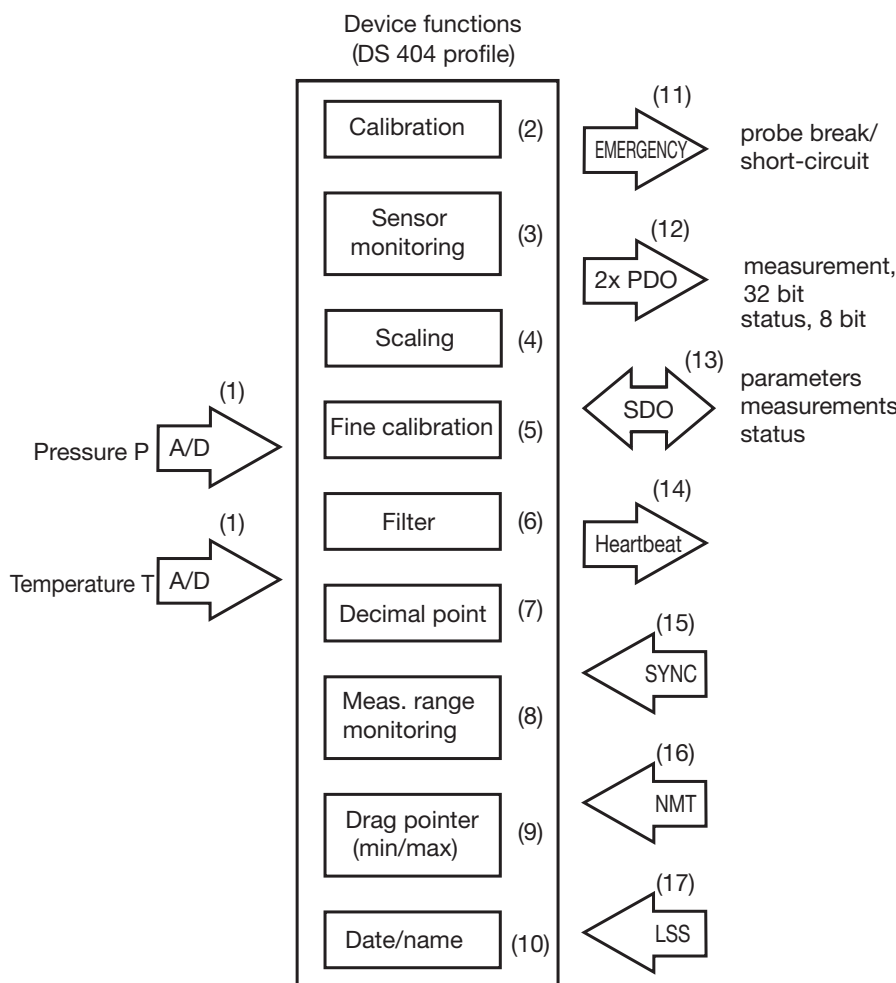
This pressure and temperature transmitter is used for measuring relative (gauge) and absolute pressures in liquids and gases. In addition, the integrated temperature sensor measures the temperature of the medium directly at the pressure diaphragm.

The pressure transmitter operates on the piezoresistive or thin-film strain gauge measuring principle. The temperature transmitter obtains the measurements from a Pt1000 sensor. The pressure and temperature measurements are digitized and made available for further processing via the CANopen serial bus protocol (CAN slave). Several useful extra functions are implemented through the DS 404 device profile. All setting can be made using standard CANopen software tools.

Further transmitters with CANopen output: see Data Sheets 402055 (pressure), 402056 (pressure) and 902910 (temperature).



Block diagram



Operation

- (1) The analog signals from the pressure cell and the temperature sensor are digitized.
- (2) The pressure and temperature signals are digitally calibrated at the factory.
- (3) The sensor monitoring facility continuously checks the correct performance of the sensor signal and triggers high-priority emergency telegrams in the event of an error.
- (4) The pressure measurement can be scaled to any dimensional unit (or in % of range). The temperature can be switched from °C to °F.
- (5) Fine calibration features an auto-zeroing function and a freely adjustable shift of the characteristic.
- (6) Undesirable signal fluctuations can be suppressed through the (adjustable) filter constant.
- (7) The measurements are output with a freely selectable decimal place.
- (8) Range monitoring features freely selectable upper and lower limits. The result is output as a status byte with the measurement in the PDO telegram.
- (9) The drag pointer function stores the minimum and maximum pressure and temperature measurements.
- (10) Date and name of the last servicing action can be stored.
- (11) An emergency telegram is triggered in the event of a sensor fault.
- (12) The two PDO telegrams contain the 32-bit measurement and the 8-bit status for pressure and temperature respectively.

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The measurement that is output can be controlled by means of different trigger conditions.

- (13) Parameters can be set through SDO telegrams, and measurements and status can be requested.
- (14) The heartbeat signal can be used to additionally monitor the transmitter function.
- (15) The transmission of measurements can additionally be controlled through the Sync command.
- (16) NMT telegrams serve to control the operational state of the transmitter.
- (17) The CAN module ID and CAN baud rate are set via LSS or SDO, as selected.

Technical data, pressure**Reference conditions**

to DIN 16086 and IEC 770/5.3

Measurement ranges

see order details

Overload limit

ranges
0 – 0.25 bar to 0 – 25 bar
3× full scale

ranges
0 – 40 to 0 – 250 bar
2× full scale

ranges
0 – 400 to 0 – 600 bar
1.5× full scale

Bursting pressure

ranges
0 – 0.25 bar to 0 – 40 bar
≤ 4× full scale

ranges
0 – 60 to 0 – 100 bar
8× full scale

ranges
0 – 160 to 0 – 400 bar
5× full scale

Parts in contact with medium

standard: stainless steel,
Mat. Ref. 1.4571/1.4435
for range ≥ 60 bar,
Mat. Ref. 1.4571/1.4542

Output

CANopen as per CiA DS 301 V4.02
measurement resolution: 12 bit
can be switched to any dimensional unit and %

Zero offset

≤ 0.3 % of full scale

Thermal hysteresis

≤ ± 0.5 % of full scale
(within compensated temperature range)
≤ ± 1 % for ranges

0 – 250 mbar
0 – 400 mbar
0 – 600 mbar

Ambient temperature effect

within range 0 to +100 °C
(compensated temperature range)

for ranges 250 and 400 mbar
zero: ≤ 0.03 %/°C typical,
≤ 0.05 %/°C max.

span: ≤ 0.02 %/°C typical,
≤ 0.04 %/°C max.

for ranges above 600 mbar
zero: ≤ 0.02 %/°C typical,
≤ 0.04 %/°C max.

span: ≤ 0.02 %/°C typical,
≤ 0.04 %/°C max.

Deviation from characteristic

≤ 0.5 % of full scale
(limit point setting)

Hysteresis

≤ 0.1 % of full scale

Repeatability

≤ 0.05 % of full scale

Cycle time

1 msec
optionally 0.5 msec (11 bit)

Stability per year

≤ 0.5 % of full scale

Technical data, temperature**Temperature sensor**

Pt1000, EN 60751

Range limits

-50 to +125 °C

Cycle time

250 msec

Accuracy

Class B to EN 60751
±0.2 % of full scale

Output

CANopen as per CiA DS 301 V4.02
linear with temperature, in °C,
can be switched over to °F or K

Technical data, general**Permissible ambient temperature**

-20 to +85 °C

Storage temperature

-40 to +85 °C

Permissible temperature of medium

standard version:
-40 to +125 °C

Electromagnetic compatibility

EN 61326
interference emission: Class B
immunity to interference: to industrial requirements

Electrical connection

5-pole terminal box M12 × 1
recommended connecting cable:
screened 5-wire cable

Supply

10 – 30 V DC
max. current drawn: approx. 45 mA

Supply voltage error

≤ 0.03% per V

Mechanical shock

(to IEC 68-2-27)
100 g/5 msec

Mechanical vibration

(to IEC 68-2-6)
max. 20 g at 15 – 2000 Hz

Enclosure protection

with connector screwed on:
IP67 to EN 60529

Housing

stainless steel, Mat. Ref. 1.4305

Process connection

see order details;
other connections on request

Nominal position

unrestricted

Weight

approx. 120 gm
(with pressure connection G 3/4)

CANbus**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

Module (node) ID

1 – 127
setting via LSS or SDO

PDO

0 Rx, 2 Tx

SDO

1 Rx, 1 Tx

Emergency

yes

Heartbeat

yes

LSS

yes

SYNC

yes

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Operation and project design

All parameters are accessible via the CANopen object directory (EDS) and can be set using standard CANopen software tools.

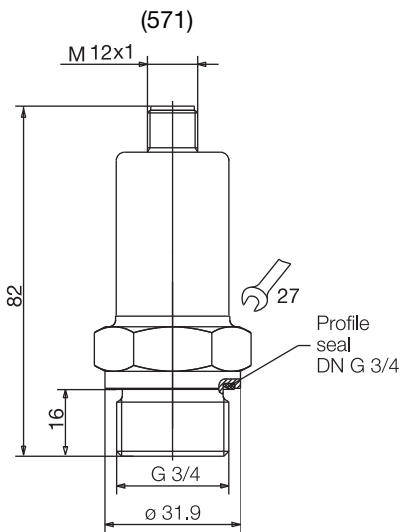
EDS (electronic data sheet)

yes
 available free of charge as a download file:
 www.jumo.net -> Product information

Factory setting

see Operating Instructions B40.2055.0
 available free of charge as a download file:
 www.jumo.net -> Product information

Dimensions



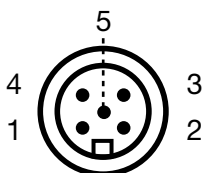
Electrical connection

Connection		Terminal assignment	
		M12 connector	Terminal box with moulded cable Sales No. 00337625
Supply 10 – 30 V DC		V+ V-	2 3 white blue
Output CANopen		screen CAN_H CAN_L	1 4 5 brown black grey

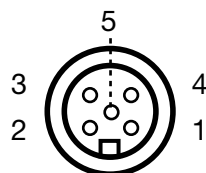
Circular connector

M12 x 1; 5-pole to IEC 60947-5-2

Plug



Socket



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**Order details**

	(1)	Basic type
402057		Pressure and temperature transmitter JUMO CANtrans pT
	(2)	Basic type extension
000		none
	(3)	Input, pressure
451		0 to 0.25 bar gauge pressure
452		0 to 0.4 bar gauge pressure
453		0 to 0.6 bar gauge pressure
454		0 to 1.0 bar gauge pressure
455		0 to 1.6 bar gauge pressure
456		0 to 2.5 bar gauge pressure
457		0 to 4 bar gauge pressure
458		0 to 6 bar gauge pressure
459		0 to 10 bar gauge pressure
460		0 to 16 bar gauge pressure
461		0 to 25 bar gauge pressure
462		0 to 40 bar gauge pressure
463		0 to 60 bar gauge pressure
464		0 to 100 bar gauge pressure
478		-1 to 0 bar gauge pressure
479		-1 to 0.6 bar gauge pressure
480		-1 to 1.5 bar gauge pressure
481		-1 to 3 bar gauge pressure
482		-1 to 5 bar gauge pressure
483		-1 to 9 bar gauge pressure
484		-1 to 15 bar gauge pressure
485		-1 to 24 bar gauge pressure
487		0 to 0.6 bar absolute pressure
488		0 to 1.0 bar absolute pressure
489		0 to 1.6 bar absolute pressure
490		0 to 2.5 bar absolute pressure
491		0 to 4 bar absolute pressure
492		0 to 6 bar absolute pressure
493		0 to 10 bar absolute pressure
494		0 to 16 bar absolute pressure
495		0 to 25 bar absolute pressure
998		special range: absolute pressure
999		special range: gauge pressure
	(4)	Input, temperature
999		-50 to +125 °C (can be switched to °F or K)
	(5)	Output
450		CANopen
	(6)	Process connection (front-flush)
571		G 3/4
999		special connection (only front-flush)
	(7)	Material of process connection
20		stainless steel
	(8)	Electrical connection
36		circular connector M12 × 1/5-pole

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	(9)	Extra code
000		none

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

Oder example 402057 / 000 - 462 - 999 - 450 - 571 - 20 - 36 / 000

Accessories

Designation	Part no.
5-pole terminal box M12 × 1, straight, with 5 m moulded cable	00337625
5-pole terminal box M12 × 1, angled, with 2 m moulded cable	00375164
5-pole terminal box M12 × 1, straight, no cable, assembly by customer	00419130
5-pole terminal box M12 × 1, angled, no cable, assembly by customer	00419133
Tee	00419129
Termination resistor for CAN bus, with plug	00461591
Extension cable 2 m, 5-pole, M12 × 1	00461589
PC CAN interface USB	00449941
PC configuration software for CANopen	00449942
EDS file, for download (www.jumo.net -> Product information)	
Operating Instructions, for download (www.jumo.net -> Product information)	