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JUMO

MEASUREMENT AND CONTROL

Pressure transmitter
JUMO dTRANS p01 CAN
Type 404381

Application

Pressure transmitters are used to measure relative (gauge) and absolute pressures in liquids or gases. The measuring device for the pressure transmitter is a piezo-resistive or thin-film strain gauge. The measured value of pressure is digitised and made available for further processing via the "CANopen" serial bus protocol (CAN slave).

The pressure transmitter provides the following functions:

– A/D conversion of the measured signal with 12 bit resolution and 0.5% accuracy

– Output of the measured value in 16 bit format (PDO) or in IEEE-float format (SDO)

– Adjustable scaling of the measured value e. g. in any unit or in %

– Filtering of the measured value, e. g. for damping, adjustable filter time constant

– Measurement output only on a change of pressure (trigger) – adjustable delta value

– Limit monitoring of the measurement against two freely adjustable limit values

– Out-of-limit condition initiates a high-priority alarm (emergency telegram)

– Defined response to error on sensor fault, electronics failure, or CAN-bus failure

– Setting of the CAN-module ID and the CAN baud rate either by DIL switch or in software (parameters via CAN-bus)

– All settings can be made using standard CANopen software tools.

Technical data

Reference conditions
to DIN 16 086 and IEC 770/5.3

Measurement ranges
see ordering details

Overload limits
ranges
0 — 25 bar   3 x full scale
(but max. 70 bar)
ranges
0 — 40 to 0 — 250 bar   2 x full scale
ranges
0 — 400 to 0 — 600 bar   1.5 x full scale

Bursting pressure
ranges 0 — 25 bar   ≥ 4 x full scale
(but max. 100 bar)
ranges
0 — 40 to 0 — 100 bar   8 x full scale
ranges
0 — 160 to 0 — 400 bar   5 x full scale
ranges
0 — 600 bar   3 x full scale

Parts in contact with fluid/gas
standard: st. steel,   Mat. Ref. 1.4571 /
                                                    1.4435
for ranges above 60 bar, Mat. Ref. 1.4571 /
                                                    1.4542

Output
CANopen protocol

12 bit resolution of measured value

**Zero offset
(adjustment accuracy)**
0.3% max. of full scale

Thermal hysteresis
± 0.5% max. of full scale
(in compensated temperature range)
± 1% max. for ranges   0 — 250 mbar
                                              0 — 400 mbar
                                              0 — 600 mbar

Ambient temperature error
in range 0 to +100°C
(compensated temperature range)
for ranges 250 and 400 mbar
zero: ≤ 0.02%/˚C typical,
                      ≤ 0.04% /˚C max.
span: ≤ 0.02%/˚C typical,
                      ≤ 0.04%/˚C max.
for ranges from 600 mbar
zero: ≤ 0.01%/˚C typical,
                      ≤ 0.03%/˚C max.
span: ≤ 0.01%/˚C typical,
                      ≤ 0.03%/˚C max.

Deviation from characteristic
≤ 0.5% of full scale (limit point adjustment)

Hysteresis
≤ 0.1% of full scale

Repeatability
≤ 0.1% of full scale

Response time
≤ 20 msec

Stability per year
≤ 0.5% of full scale (for nominal range under reference conditions)

Supply
18 — 36 V DC
max. current consumption approx. 45 mA
CAN-bus and electronics of the pressure transmitter are electrically isolated.

Cabling
screened 5-core cable.
In bus systems with more than two instruments, all instruments are connected in parallel. The bus cable must be run in a continuous loop.

Cable termination
At the end of the cable via a 120 Ω termination resistor.

Permitted ambient temperature
-20 to +85°C

Storage temperature
-40 to +85°C

Permitted temperature of medium
-40 to +120°C

Electromagnetic compatibility
electrostatic discharge:
IEC 1000-4-2 / EN 61000-4-2
±4 kV contact; ±8 kV air discharge;
±6 kV contact discharge to NAMUR
Electromagnetic fields:
IEC 1000-4-3 / EN 61000-4-3

frequency range 80 — 1000 MHz,
test field strength 10 V/m, 80% AM (1 kHz)
ENV 50204 900 MHz ±5 MHz, 10 V/m,
50% PM (200 Hz)
(The output signal of the pressure transmitter remains within the error limit of ±0.5% when subject to disturbance)
Transient disturbance (burst):
IEC 1000-4-4 / EN 61000-4-4
±2 kV, 1 minute to NAMUR; 2 minutes via capacitive coupling
(The output signal of the pressure transmitter may exceed the error limit by up to ±1.0% max. when subject to disturbance)
Immunity to voltage pulses (surge):
IEC 1000-4-5 / EN 61000-4-5
±500 V symmetrical
(The output signal of the pressure transmitter may exceed the error limit when subject to disturbance. The instrument is not permanently damaged or destroyed, and does not lose its measuring characteristics.)
Immunity to conductor-borne interference induced by high-frequency fields:
IEC 1000-4-6 / ENV 50141
frequency range 150kHz — 80 MHz,
test voltage 10 V, 80% AM (1 kHz)
frequency range 9kHz — 80 MHz to NAMUR
(The output signal of the pressure transmitter remains within the error limit of ±1.0% when subject to disturbance).
The pressure transmitter fulfills all requirements of EN 50 082-2 (CE mark) for use in industrial areas.

Interference emission
EN 55011, Class B, measurement distance 10 m
frequency range
  30— 230 MHz, 30 dBμV/m
230—1000 MHz, 40 dBμV/m quasi-peak value

Mechanical shock
100 g/1 msec

Mechanical vibration
10 g max. at 15 — 2000 Hz

Nominal position
upright vertical (pressure connection below); operating position unrestricted

Protection
IP65 to EN 60 529

Housing
st. steel, Mat. Ref. 1.4301
polycarbonate GF

Insulation resistance
100 MΩ; 50 V DC

Breakdown strength
(electrical connection to housing)
≥ 500 V_{eff}

Pressure connection
see ordering details;
other connections to special order

Weight
200 g

CAN-bus

Protocol
CANopen slave (to CiA DS 301)

Profile
Analogue input module
(to CiA DSP 401)

Baud rate
10 kbaud to 1 Mbaud

Module-ID
1—127

PDO
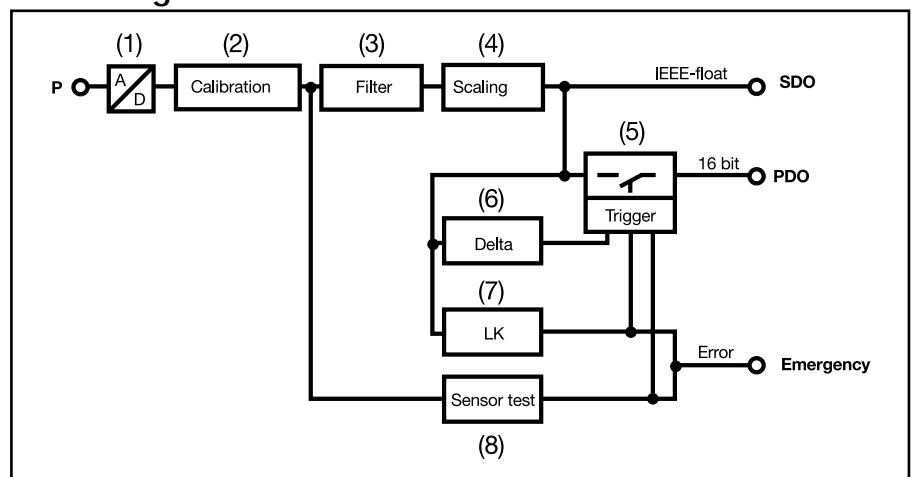0 Rx, 1 Tx

SDO
1 Rx, 1 Tx

Emergency
yes

Node guarding
yes

Operation and project planning
– all parameters are accessible via the CANopen object directory (EDS) and can be set using standard CANopen software tools
– baud rate and module-ID can also be set via DIL switches

Block diagram

Functions

The analogue signal from the pressure cell is digitised with a resolution of 12 bit (1). The pressure signal is digitally calibrated in the factory. (2). Undesirable signal fluctuations can be suppressed via the adjustable filter time constant (3). The output signal of the pressure transmitter can be set to any measurement unit (or % of range) (4). An event-controlled signal output is possible via the trigger (5). The trigger reacts to the following adjustable criteria:

– Delta: on an adjustable change of pressure
– LK (Limit comparator): on infringement of an adjustable upper or lower limit
– Sensor test: on a pressure cell fault

The "Limit comparator" and "Sensor test" signals trigger the high-priority emergency telegram.

Electrical connection

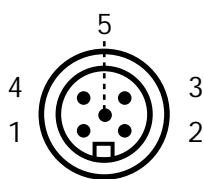| Connection			Pin
Supply 18 — 36 V DC		V+	2
		V-	3
Output CANopen		CAN_GND	1
		CAN_H	4
		CAN_L	5

Caution:
Earth the instrument at the pressure connection!
The CAN-bus and electronics of the pressure transmitter are electrically isolated.

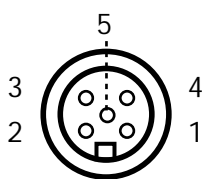## Round connector
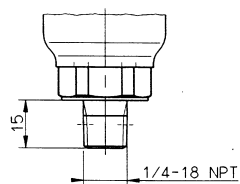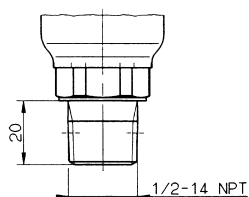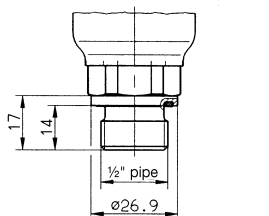
M12 x 1; 5-pole to IEC 60 947-5-2

Plug

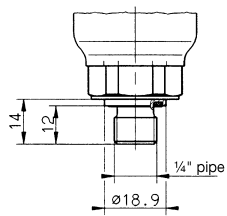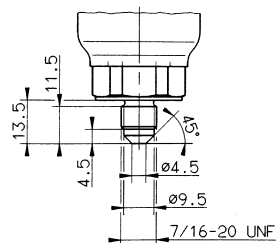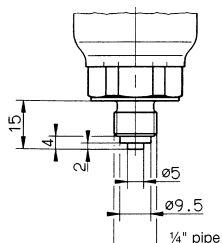**Socket**

Dimensions

NTS 511

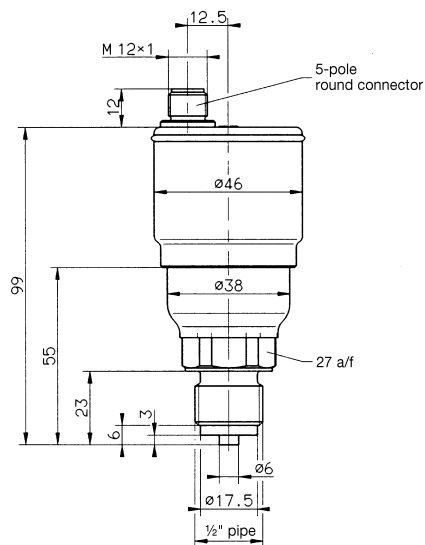NTS 512

NTS 523

NTS 521

NTS 562

NTS 502

404381/...-...-504-20-35

Ordering details

Basic type

404381   JUMO dTRANS p01 CAN pressure transmitter with sensor element in piezo-resistive or thin-film technology

		Input
451	0	0.25 bar gauge pressure
452	0	0.4 bar gauge pressure
453	0	0.6 bar gauge pressure
454	0	1.0 bar gauge pressure
455	0	1.6 bar gauge pressure
456	0	2.5 bar gauge pressure
457	0	4 bar gauge pressure
458	0	6 bar gauge pressure
459	0	10 bar gauge pressure
460	0	16 bar gauge pressure
461	0	25 bar gauge pressure
462	0	40 bar gauge pressure
463	0	60 bar gauge pressure
464	0	100 bar gauge pressure
465	0	160 bar gauge pressure
466	0	250 bar gauge pressure
467	0	400 bar gauge pressure
468	0	600 bar gauge pressure
487	0	0.6 bar absolute pressure
488	0	1.0 bar absolute pressure
489	0	1.6 bar absolute pressure
490	0	2.5 bar absolute pressure
491	0	4 bar absolute pressure
492	0	6 bar absolute pressure
493	0	10 bar absolute pressure
494	0	16 bar absolute pressure
495	0	25 bar absolute pressure
999		special range

Output

450   CANopen (digital)

Process connection

502	π" pipe pressure connection to EN 837
504	∫" pipe pressure connection to EN 837
511	1/4-18 NPT pressure connection to DIN 837
512	1/2-14 NPT pressure connection to DIN 837
521	π" pipe pressure connection to DIN 3852 T11
523	∫" pipe pressure connection to DIN 3852 T11
562	7/16-20 UNF pressure connection

Material of process connection

20   stainless steel

Electrical connection

36   by round connector M 12 x 1 to IEC 60 947-5-2

404381 / ☐ - 450 - ☐ - 20 - 36   **Ordering code**