

# JUMO TAROS S47 P

## Pressure transmitter



Operating Manual



40207200T90Z001K000

V1.00/EN/00740059/2020-12-09



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# 1 Safety information

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## General

This manual contains information that must be observed in the interest of your own safety and to avoid material damage. This information is supported by symbols which are used in this manual as indicated.

Please read this manual before starting up the device. Store this manual in a place that is accessible to all users at all times.

If difficulties occur during startup, please do not intervene in any way that could jeopardize your warranty rights!

## Warning symbols



### DANGER!

This symbol indicates that **personal injury from electrocution** may occur if the appropriate precautionary measures are not taken.

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### WARNING!

This symbol in connection with the signal word indicates that **personal injury** may occur if the respective precautionary measures are not carried out.

---



### CAUTION!

This symbol in connection with the signal word indicates that **material damage or data loss** will occur if the respective precautionary measures are not taken.

---



### CAUTION!

This symbol indicates that **components could be destroyed** by electrostatic discharge (ESD = Electro Static Discharge) if the respective cautionary measures are not taken.

Only use the ESD packages intended for this purpose to return device inserts, assembly groups, or assembly components.

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## Note symbols



### NOTE!

This symbol refers to **important information** about the product, its handling, or additional benefits.

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### REFERENCE!

This symbol refers to **additional information** in other sections, chapters, or other manuals.

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### FURTHER INFORMATION!

This symbol is used in tables and indicates that **further information** is provided after the table.

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### DISPOSAL!

At the end of its service life, the device and any batteries present do not belong in the trash! Please ensure that they are **disposed of** properly and in an **environmentally friendly** manner.

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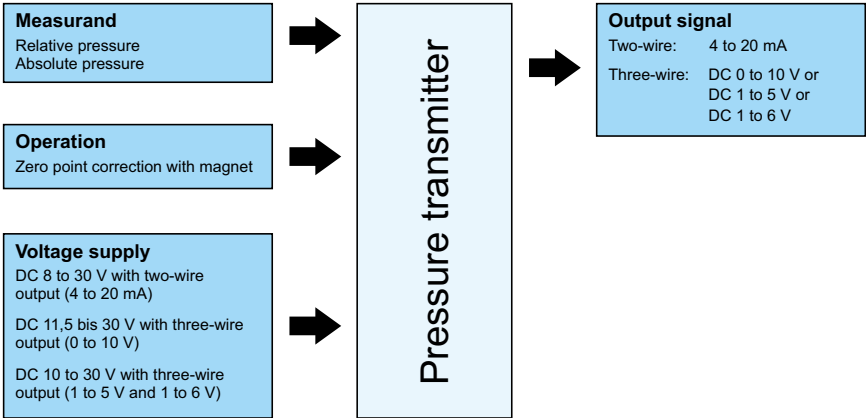
## 2.1 Description

The pressure transmitter is used to acquire relative and absolute pressures in liquid and gaseous media. The JUMO TAROS S47 P with an analog output signal has a pressure measuring cell with a piezoresistive silicon sensor. The pressure is converted into an electrical current or voltage signal and output via various electrical connections.

A built-in magnetoresistive switch (MRS) enables the user to adjust the zero point of the device externally using a magnet.

UL and EAC approvals for the pressure transmitter are currently being prepared.

## 2.2 Block diagram



# 3 Identifying the device version

## 3.1 Nameplate

### Position

The nameplate is laser-etched on the device surface.



GmbH&Co.KG, 36039 Fulda, Germany  
www.jumo.net

TAROS S47 P

Typ 402072/000 TN 00123456

—⊖ 0.. 0,1 bar rel.

—⊖ DC 8.. 30 V ⊕→ 4.. 20 mA

F-Nr. 0123456701020490123



### Contents

The nameplate shows important information. This includes:

Description	Designation on the nameplate	Example
Device type	Type	402072/000
Part no.	TN	00123456
Measuring range	—⊖	0 to 0.1 bar relative pressure
Voltage supply	—⊖	DC 8 to 30 V
Output signal	⊕→	4 to 20 mA
Fabrication number	F no.	0123456701020490123

### Device type (Typ)

Compare the specifications on the nameplate with your order documents. The supplied device version can be identified using the order code (⇒ chapter 3.2 "Order details", Page 7).

### Part no. (TN)

The part no. uniquely identifies an article in the catalog. It is important for communication between the customer and the sales department.

### Fabrication number (F-Nr)

Among other things, the fabrication number indicates the production date (year/week) and the hardware version number.

### Production date

Example: F-Nr = 01234567010**20**490123.

Here, we are looking at the 12th to the 15th digit (from the left).

In this example, the device was produced in the year **2020**, in the **49th** week.

## 3 Identifying the device version

### 3.2 Order details

	<b>(1) Basic type</b>
402072	JUMO TAROS S47 P – pressure transmitter
	<b>(2) Basic type extension</b>
000	None
051	Relative-pressure version without zero point adjustment
999	Special version
	<b>(3) Input</b>
478	-1 to 0 bar relative pressure
479	-1 to +0.6 bar relative pressure
449	-1 to +1 bar relative pressure
480	-1 to +1.5 bar relative pressure
481	-1 to +3 bar relative pressure
482	-1 to +5 bar relative pressure
483	-1 to +9 bar relative pressure
484	-1 to +15 bar relative pressure
485	-1 to +24 bar relative pressure
428	-0.4 to +0.4 bar relative pressure
427	-0.1 to +0.1 bar relative pressure
425	0 to 0.1 bar relative pressure
426	0 to 0.16 bar relative pressure
451	0 to 0.25 bar relative pressure
452	0 to 0.4 bar relative pressure
453	0 to 0.6 bar relative pressure
454	0 to 1 bar relative pressure
455	0 to 1.6 bar relative pressure
456	0 to 2.5 bar relative pressure
457	0 to 4 bar relative pressure
458	0 to 6 bar relative pressure
459	0 to 10 bar relative pressure
460	0 bar to 16 bar relative pressure
461	0 bar to 25 bar relative pressure
462	0 bar to 40 bar relative pressure
463	0 bar to 60 bar relative pressure
464	0 bar to 100 bar relative pressure
487	0 to 0.6 bar absolute pressure
488	0 to 1 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
500	0 to 5 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

### 3 Identifying the device version

---

505	0 to 40 bar absolute pressure
998	Special measuring range for absolute pressure
999	Special measuring range for relative pressure
<b>(4) Output</b>	
405	4 to 20 mA, two-wire
415	DC 0 to 10 V, three-wire
418	DC 1 to 5 V, three-wire
420	DC 1 to 6 V, three-wire
<b>(5) Process connection</b>	
502	G 1/4 DIN EN 837
504	G 1/2 DIN EN 837
511	1/4-18 NPT DIN EN 837
512	1/2-14 NPT DIN EN 837
521	G 1/4 DIN 3852-11
523	G 1/2 DIN 3852-11
562	7/16-20 UNF
571	G 3/4 front-flush DIN EN ISO 228-1
574	G 1/2 front-flush with double seal
575	G 3/4 front-flush with double seal
576	G 1 front-flush with double seal
<b>(6) Process connection material</b>	
20	Stainless steel
<b>(7) Electrical connection</b>	
12	Attached cable, shielded
36	Round plug M12 × 1
61	Line socket DIN EN 175301-803, form A
75	Terminal head
<b>(8) Measuring system, filling medium</b>	
01	Silicone oil
<b>(9) Extra codes</b>	
000	None
374	Inspection certificate 3.1 EN 10204 – material
462	Inverted output signal
624	Oil and grease free
769	Calibration certificate



## 3 Identifying the device version

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Order code                    (1)            (2)            (3)            (4)            (5)            (6)            (7)            (8)            (9)  
                                  □ / □ - □ - □ - □ - □ - □ - □ - □ / □  
Order example            402072 / 000 - 491 - 405 - 504 - 20 - 61 - 01 / 000

### 3.3 Accessories

Item	Part no.
Line socket, 4-pole, M12 × 1, straight, with 2-m PVC cable, without pressure compensation	00404585
Line socket, 4-pole, M12 × 1, angled, with 2-m PVC cable, without pressure compensation	00409334
Magnetic pin for simple adjustment of zero point	00736330

# 4 Mounting

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## 4.1 General information



### NOTE!

Check that the device is compatible with the measurement medium ⇒ chapter 8.4 "Environmental influences", Page 20.

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### Mounting site

- Ensure that the device is fastened safely and with low vibrations
- Avoid direct sunlight
- Please note the admissible ambient temperatures at the installation position ⇒ chapter 8.4 "Environmental influences", Page 20

### Installation position

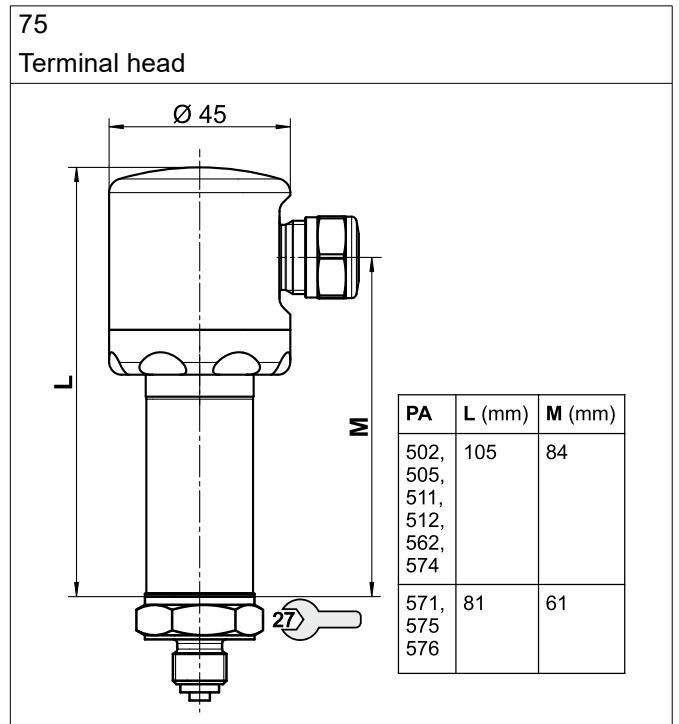
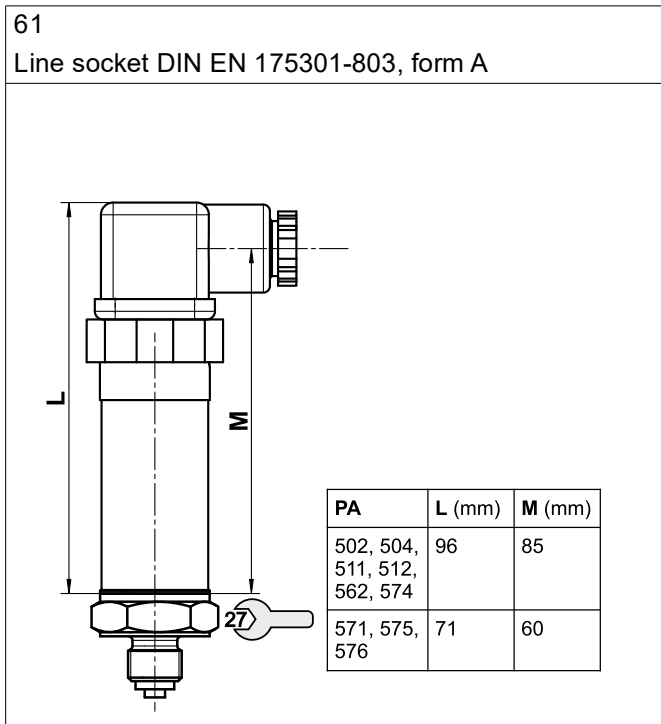
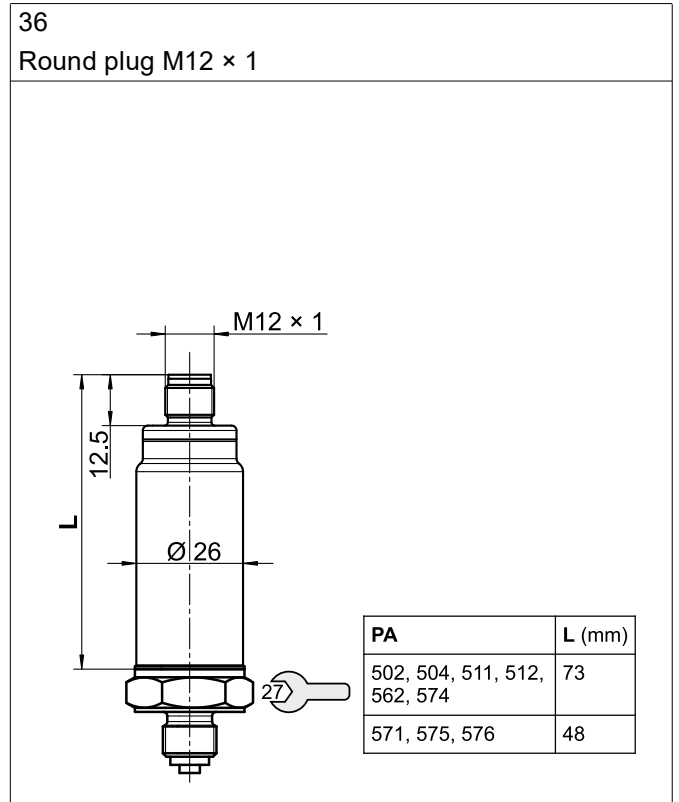
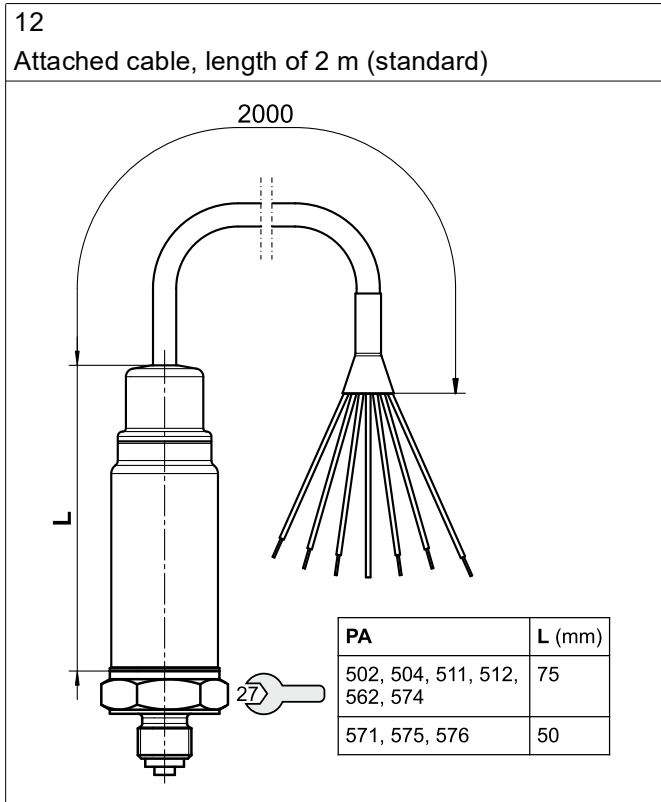
The device can be installed in any position.

We recommend the "upright" installation position, as shown below:



## 4.2 Dimensions

### 4.2.1 Transmitter with electrical connections

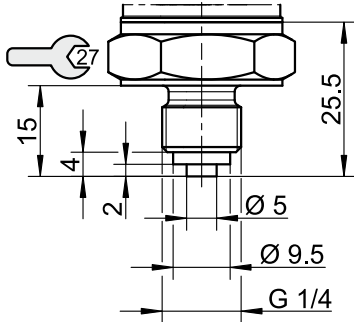


PA = process connection

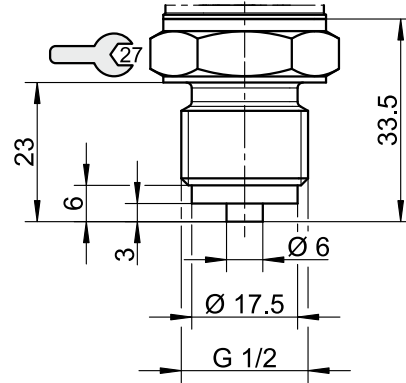
# 4 Mounting

## 4.2.2 Process connections, not front-flush

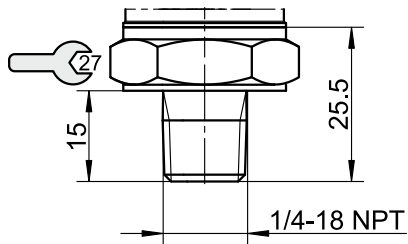
**502**  
G 1/4 DIN EN 837



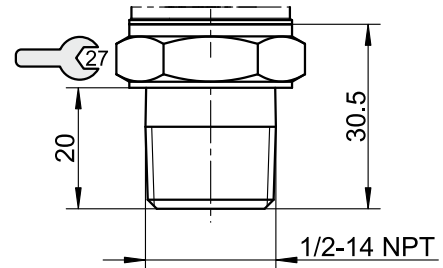
**504**  
G 1/2 DIN EN 837



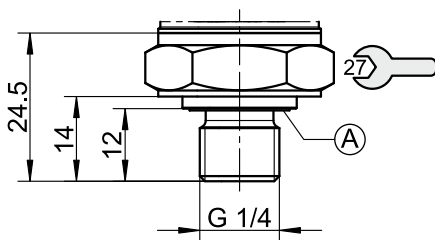
**511**  
1/4-18 NPT DIN EN 837



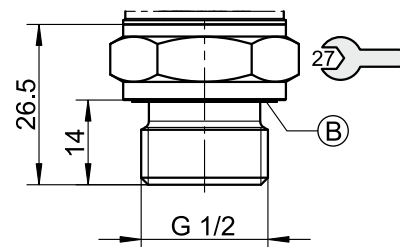
**512**  
1/2-14 NPT DIN EN 837



**521**  
G 1/4 DIN 3852-11



**523**  
G 1/2 DIN 3852-11

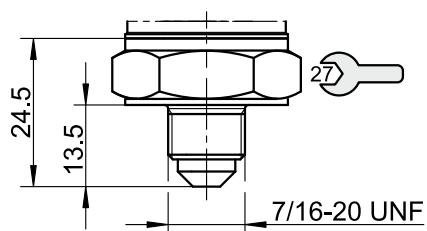


(A) Profile sealing ring G 1/4

(B) Profile sealing ring G 1/2

**562**

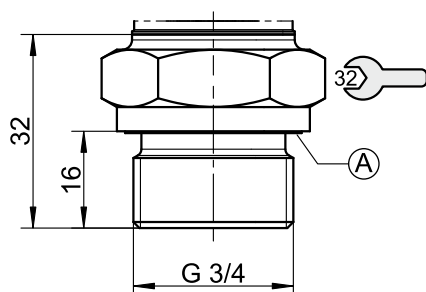
7/16-20 UNF



## 4.2.3 Process connections, front-flush

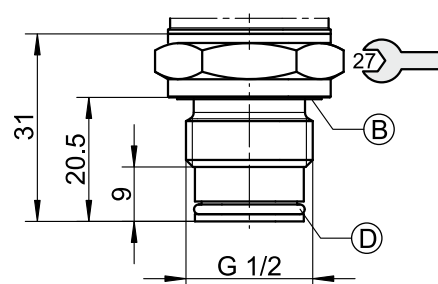
**571**

G 3/4 DIN EN ISO 228-1



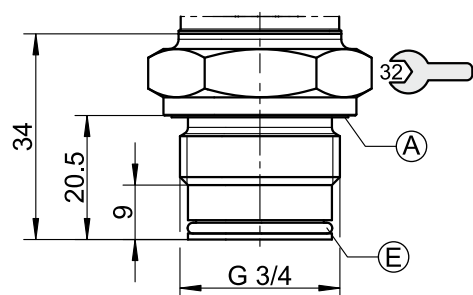
**574**

G 1/2 with double seal



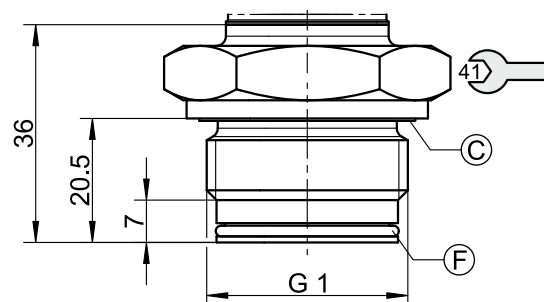
**575**

G 3/4 with double seal



**576**

G 1 with double seal



- Ⓐ Profile sealing ring G 3/4
- Ⓑ Profile sealing ring G 1/2
- Ⓒ Profile sealing ring G 1

- Ⓓ O-ring 15.1 × 1.6
- Ⓔ O-ring 20.35 × 1.78
- Ⓕ O-ring 26.7 × 1.78

# 5 Electrical connection

## 5.1 Installation notes



### NOTE!

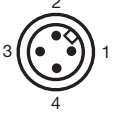
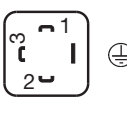
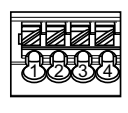


The electrical connection must only be performed by qualified personnel.

The electromagnetic compatibility meets standard DIN EN 61326.

Do not connect any additional loads to the voltage supply of the device.

The device is not suitable for installation in potentially explosive areas.

## 5.2 Connection diagram

Connection	Terminal assignment <sup>a</sup>				
					
	12 Attached cable	36 Round plug M12 × 1	61 Cable socket	75 Terminal head	
<b>4 to 20 mA, 2-wire (output 405)</b>					
Voltage supply DC 8 to 30 V	U <sub>B</sub> /S+	White	1	1	1
	0 V/S-	Black	3	2	2
<b>DC 0 to 10 V, 3-wire (output 415)</b>					
Voltage supply DC 11.5 V to 30 V	U <sub>B</sub>	White	1	1	1
	0 V/S-	Black	2	2	2
	S+	Yellow	3	3	3
<b>DC 1 to 5 V, three-wire (output 418)</b>					
<b>DC 1 to 6 V, three-wire (output 420)</b>					
Voltage supply DC 10 to 30 V	U <sub>B</sub>	White	1	1	1
	0 V/S-	Black	2	2	2
	S+	Yellow	3	3	3
Functional bonding conductor FB <sup>b</sup> (all output variants)		Shield/green	4		4

<sup>a</sup> Figure: Connection to the pressure transmitter

<sup>b</sup> As a basic principle, the device is grounded via the process connection. Alternatively, the device can also be grounded via the electrical connection on all variants. However, grounding via both the process connection **and** the electrical connection is not admissible.

Admissible effect on the "attached cable" variant	
Smallest bending radius (fixed)	40 mm
Max. tensile force on the cable	20 N

## 6.1 Zero point adjustment

### General information

In the case of device versions designed for relative pressure, there is the option of a simple pressure/zero point adjustment (offset) using a magnet (remanence  $B_R \geq 1$  T, e.g. NdFeB dia. 4 mm × 10 mm). This actuates a magnetoresistive switch inside the device when approaching it. A suitable magnet is available from JUMO as an accessory (part no. 00736330).

This provides a quick and simple way to correct zero point offsets caused by the installation or zero point offsets that have arisen following autoclaving, for example.

### Requirements

The following conditions must be met in order to carry out a successful zero point adjustment:

- The adjustment must take place within a **timeframe of a maximum of 2 seconds** once the device is switched on.
- The pressure at the device at the point of the zero point adjustment must **not deviate more than  $\pm 10$  %** from the positive pressure measuring range of the device<sup>1</sup>.

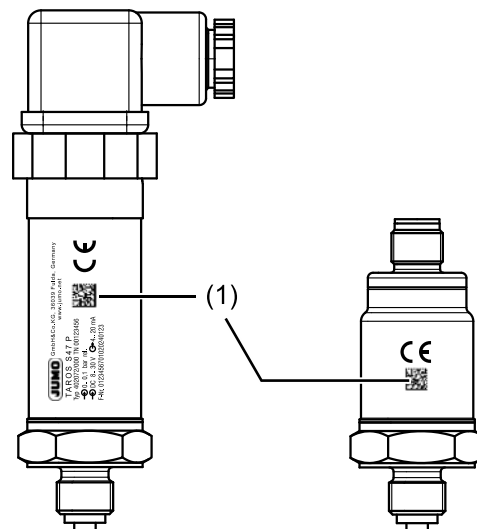
### Procedure

1. Hold the magnet at the position of the QR code (1) on the nameplate of the device.
2. Switch on the voltage supply for the device.

*The device recognizes the magnet (within the first 2 seconds) and automatically re-adjusts the zero point. As a result, the switch-on time is slightly delayed*

3. Remove the magnet from the housing and keep it for further use.

*The zero point adjustment is complete. The new zero point is permanently saved. However, you can carry out a further zero point adjustment at any time.*



### NOTE!

If the magnetic field is not applied within the timeframe of approx. 2 seconds after the device is switched on, it will not affect the zero point of the device.

A further zero point adjustment can only take place once the device has been switched off and switched back on again.

<sup>1</sup> Example 1: Measuring range 0 to 1 bar rel.; deviation from ambient pressure max.  $\pm 0.1$  bar.  
 Example 2: Measuring range -1 to +0.6 bar rel.; deviation from ambient pressure max.  $\pm 0.1$  bar.  
 Example 3: Measuring range -1 to 5 bar rel.; deviation from ambient pressure max.  $\pm 0.5$  bar.

## 7 Maintenance, cleaning and returns

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### 7.1 Maintenance

The pressure transmitter is maintenance-free.

In the event of a malfunction, please return the device to the manufacturer together with accurate fault information.

### 7.2 Manual cleaning for maintenance or storage

The pressure transmitter – especially the parts in contact with the product – must not be damaged. Any damage to the stainless steel membrane must be avoided. The cleaning agent must not attack the surface and seals.

Note the protection type of the device.

### 7.3 Returns



#### **NOTE!**

In case of abnormalities, please send the device to the manufacturer together with a completed cover note for product returns. You can download a blank copy of this cover note online at:

**<http://produktuecksendung.jumo.info>**

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## 8.1 Mechanical features

Materials of parts coming into contact with the pressurized medium	
Membrane	Stainless steel 1.4435 (316L)
O-ring/sealing ring	FPM, others available as an optional extra (e.g. EPDM, VMQ)
Process connection	Stainless steel 1.4571 (316Ti)
Welding ring	Stainless steel 1.4404 (316L)
Materials of other parts	
Housing	Stainless steel 1.4301 (304)
Electrical connection	
Attached cable	Cable fitting made from stainless steel 1.4301 (304); PUR cable with and without pressure compensation
Round plug M12 × 1	Threaded bushing made from stainless steel 1.4301 (304)
Line socket	Holding ring/connector fastener made from high-quality plastic, comparable with PBT GF30 V0
Terminal head	Stainless steel 1.4301 (304); cable fitting: stainless steel
Rated position	Upright, with downward process connection
Operating position	Any, but there may be a zero offset relative to the rated position

## 8.2 Measuring range and accuracy

Measuring range	Linearity <sup>a</sup>	Accuracy at			Long-term stability <sup>b</sup>	Overload capability <sup>c</sup>	Burst pressure
	% MSP <sup>f</sup>	20 °C <sup>d</sup>	-20 to +80 °C <sup>e</sup>	-20 to +100 °C			
		% MSP	% MSP	% MSP	bar	bar	
-1 to 0 bar relative pressure	0.15	0.3	1	1.2	≤ 0.15	10	20
-1 to +0.6 bar relative pressure	0.15	0.3	1	1.2	≤ 0.15	10	20
-1 bar to +1 bar relative pressure	0.15	0.3	1	1.2	≤ 0.15	10	20
-1 to +1.5 bar relative pressure	0.15	0.3	1	1.2	≤ 0.15	20	40
-1 to +3 bar relative pressure	0.1	0.25	0.75	0.8	≤ 0.1	25	50
-1 to +5 bar relative pressure	0.1	0.25	0.75	0.8	≤ 0.1	50	60
-1 to +9 bar relative pressure	0.1	0.25	0.75	0.8	≤ 0.1	50	60
-1 to +15 bar relative pressure	0.1	0.25	0.75	0.8	≤ 0.1	120	200
-1 to +24 bar relative pressure	0.1	0.25	0.75	0.8	≤ 0.1	120	200
-0.4 to +0.4 bar relative pressure	0.15	0.4	1	1.2	≤ 0.2	10	20
-0.1 to +0.1 bar relative pressure	0.2	0.5	1	1.2	≤ 0.2	6	10
0 to 0.1 bar relative pressure	0.25	0.75	1.2	1.5	≤ 0.2	1.5	3
0 to 0.16 bar relative pressure	0.25	0.75	1.2	1.5	≤ 0.2	6	10
0 to 0.25 bar relative pressure	0.25	0.5	1	1.2	≤ 0.2	6	10
0 to 0.4 bar relative pressure	0.15	0.4	1	1.2	≤ 0.15	10	20
0 to 0.6 bar relative pressure	0.15	0.4	1	1.2	≤ 0.15	10	20
0 to 1 bar relative pressure	0.15	0.3	1	1.2	≤ 0.15	10	20
0 to 1.6 bar relative pressure	0.15	0.3	1	1.2	≤ 0.15	20	40
0 to 2.5 bar relative pressure	0.15	0.3	1	1.2	≤ 0.1	20	40
0 to 4 bar relative pressure	0.1	0.25	0.75	0.8	≤ 0.1	25	50

## 8 Technical data

Measuring range	Linearity <sup>a</sup>  % MSP <sup>f</sup>	Accuracy at			Long-term stability <sup>b</sup>  % MSP per year	Overload capability <sup>c</sup>  bar	Burst pressure  bar
		20 °C <sup>d</sup>  % MSP	-20 to +80 °C <sup>e</sup>  % MSP	-20 to +100 °C  % MSP			
0 to 6 bar relative pressure	0.1	0.25	0.75	0.8	≤ 0.1	50	60
0 to 10 bar relative pressure	0.1	0.25	0.75	0.8	≤ 0.1	50	60
0 bar to 16 bar relative pressure	0.1	0.25	0.75	0.8	≤ 0.1	120	200
0 bar to 25 bar relative pressure	0.1	0.25	0.75	0.8	≤ 0.1	120	200
0 bar to 40 bar relative pressure	0.1	0.25	0.75	0.8	≤ 0.1	300	400
0 bar to 60 bar relative pressure	0.1	0.25	0.75	0.8	≤ 0.1	300	400
0 bar to 100 bar relative pressure	0.1	0.25	0.75	0.8	≤ 0.1	300	400
0 to 0.6 bar absolute pressure	0.15	0.4	1	1.2	≤ 0.15	10	20
0 to 1 bar absolute pressure	0.15	0.3	1	1.2	≤ 0.15	10	20
0 to 1.6 bar absolute pressure	0.15	0.3	1	1.2	≤ 0.15	20	40
0 to 2.5 bar absolute pressure	0.15	0.3	1	1.2	≤ 0.1	20	40
0 to 4 bar absolute pressure	0.1	0.25	0.75	0.8	≤ 0.1	25	50
0 to 5 bar absolute pressure	0.1	0.25	0.75	0.8	≤ 0.1	25	50
0 to 6 bar absolute pressure	0.1	0.25	0.75	0.8	≤ 0.1	50	60
0 to 10 bar absolute pressure	0.1	0.25	0.75	0.8	≤ 0.1	50	60
0 to 16 bar absolute pressure	0.1	0.25	0.75	0.8	≤ 0.1	120	200
0 to 25 bar absolute pressure	0.1	0.25	0.75	0.8	≤ 0.1	120	200
0 to 40 bar absolute pressure	0.1	0.25	0.75	0.8	≤ 0.1	200	300

<sup>a</sup> Linearity according to limit point setting

<sup>b</sup> Reference conditions EN 61298-1

<sup>c</sup> All measuring ranges are vacuum proof.

<sup>d</sup> Includes: linearity, hysteresis, repeatability, deviation of measuring range start value (offset) and measuring range end value

<sup>e</sup> Includes: linearity, hysteresis, repeatability, deviation of measuring range start value (offset) and measuring range end value, thermal effect on measuring range start (offset) and measuring span

<sup>f</sup> MSP = measuring span

## 8.3 Electrical data

Voltage supply <sup>a</sup>	
Two-wire	
4 to 20 mA	DC 8 to 30 V, nominal voltage DC 24 V <sup>b</sup>
Three-wire	
DC 0 to 10 V	DC 11.5 V to 30 V, nominal voltage DC 24 V
DC 1 to 5 V	DC 10 V to 30 V, nominal voltage DC 24 V
DC 1 to 6 V	DC 10 V to 30 V, nominal voltage DC 24 V

<sup>a</sup> The auxiliary energy of the pressure transmitter must meet SELV requirements. Furthermore, the device must be equipped with an electrical circuit that meets the requirements of EN 61010-1 with regard to "Limited-energy circuits".

<sup>b</sup> Maximum current consumption  $\leq 30$  mA.

Burden/load <sup>a</sup>	
Two-wire	
4 to 20 mA	$R_L \leq (U_B - 8 \text{ V}) \div 0.02 \text{ A } (\Omega)$
Three-wire	
DC 0 to 10 V	$R_L \geq 10 \text{ k}\Omega$
DC 1 to 5 V	$R_L \geq 10 \text{ k}\Omega$
DC 1 to 6 V	$R_L \geq 10 \text{ k}\Omega$

<sup>a</sup> Maximum effect  $< 0.5$  %.

Behavior if measured value is out of range	Error signal in the case of	NAMUR exceedance, linear
Two-wire		
4 to 20 mA	$\leq 3.6 \text{ mA}$ and $\geq 21.5 \text{ mA}$	3.8 to 20.5 mA
Three-wire		
DC 0 to 10 V	10.7 V	0 to 10.5 V
DC 1 to 5 V	5.7 V	0.8 to 5.5 V
DC 1 to 6 V	6.7 V	0.8 to 6.5 V

Behavior after power on	Ready for operation after $< 120$ ms
Voltage supply influence	$\leq 0.02$ %/V
Reverse voltage protection	$U_B$ to 0 V (all output variants)
Short-circuit resistance	S+ to 0 V (only voltage variants)
Overvoltage protection	The operating voltage must be restricted to max. 33 V
Step response of 90 % (according to DIN 16068 Point 3.3.8)	$< 5$ ms

Insulation resistance	$> 100 \text{ M}\Omega$ at DC 500 V
Insulation voltage	AC 500 V

## 8 Technical data

### 8.4 Environmental influences

Admissible temperatures	Ambient temperature	Medium temperature	Storage temperature
with MSP <sup>a</sup> ≤ 0.4 bar	-20 to +85 °C	-20 °C to +125 °C	-20 to +100 °C
with MSP > 0.4 bar	-40 to +85 °C	-40 to +125 °C	-40 to +100 °C

<sup>a</sup> MSP = measuring span

Resistance to climatic conditions	100 % relative humidity including condensation on the device's outer case; 90 % relative humidity without condensation
Protection type	According to DIN EN 60529
Types with attached cable	IP68 <sup>a</sup> (IP66/IP68)
Types with round plug M12 × 1	IP67 (IP66/IP67)
Types with line socket	IP65
Types with terminal head	IP69 (IP66/IP69)
Admissible mechanical load	
Vibration resistance	20 g at 10 to 2000 Hz, 10 cycles per axis, device in X, Y, Z axis, industrial requirement according to IEC 60068-2-6
Shock resistance	50 g for 11 ms and 100 g for 1 ms, industrial requirement according to IEC 60068-2-27
Electromagnetic compatibility (EMC)	According to DIN EN 61326-2-3
Interference emission	Class A – only for industrial use –
Interference immunity	Industrial requirement
Process media	Liquid and gaseous media which are compatible with the materials of the parts coming into contact with the pressurized medium

<sup>a</sup> For 1 h at a depth of 2 m.

						
产品组别 Product group: 402072	产品中有害物质的名称及含量 China EEP Hazardous Substances Information					
部件名称 Component Name	铅 ( Pb )	汞 ( Hg )	镉 ( Cd )	六价铬 ( Cr(VI) )	多溴联苯 ( PBB )	多溴二苯醚 ( PBDE )
外壳 Housing (Gehäuse)	○	○	○	○	○	○
过程连接 Process connection (Prozessanschluss)	X	○	○	○	○	○
螺母 Nuts (Mutter)	○	○	○	○	○	○
螺栓 Screw (Schraube)	○	○	○	○	○	○
<p>本表格依据SJ/T 11364的规定编制。 This table is prepared in accordance with the provisions SJ/T 11364. ○：表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。 Indicate the hazardous substances in all homogeneous materials' for the part is below the limit of the GB/T 26572.</p> <p>×：表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572规定的限量要求。 Indicate the hazardous substances in at least one homogeneous materials' of the part is exceeded the limit of the GB/T 26572.</p>						

## 9 China RoHS

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