JUMO TAROS S46 H

Pressure Transmitter

Applications

- Food and beverage industry
- Sterilization and autoclaves
- Biogas and bioethanol manufacturing
- Pharmaceuticals, medicine, and biotechnology

Brief description

The pressure transmitter is used to acquire relative and absolute pressures in liquid and gaseous media.

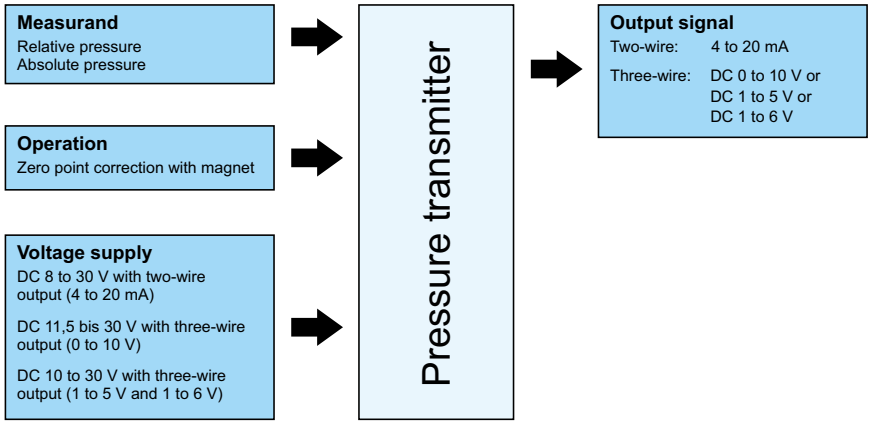
The JUMO TAROS S46 H with analog output signal has been developed specifically for hygienic applications. The pressure transmitter has a pressure measuring cell with a piezoresistive silicon sensor. The pressure is converted into an electrical current or voltage signal and output via various electrical connections.

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

The pressure transmitter is certified according to EHEDG in the versions with the process connections clamp, VARIVENT®, and JUMO PEKA; UL and EAC approvals are currently being prepared.

Type 402071

Block diagram



Special features

- High degree of accuracy
- For hygienic applications
- A large selection of process connections and electrical connections
- Zero point adjustment using a magnet
- Autoclave-compatible version available
- Average roughness value $R_a \leq 0.8$ µm for parts coming into contact with the medium
- Each device has its own calibration certificate

Approvals and approval marks (see "Technical data")

Technical data

Mechanical features

Materials of parts coming into contact with the pressurized medium	
Membrane	Stainless steel 1.4435 (316 L)
O-ring/sealing ring	FPM, others available as an optional extra (e.g. EPDM, VMQ)
Process connection	Stainless steel 1.4404 (316 L)
Welding ring	Stainless steel 1.4404 (316 L)
Materials of other parts	
Housing	Stainless steel 1.4301 (304)
Cover cap M12 × 1[a]	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)
Cable 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

[a] Included on autoclave-compatible variant.

Measuring range and accuracy

Measuring range	Linearity[a]	Accuracy at			Long-term stability[b]	Overload capability[c]	Burst pressure
		20 °C[d]	-20 to +80 °C[e]	-20 to +100 °C			
	% MSP[f]	% MSP	% MSP	% MSP	% MSP per year	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
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

[a] Linearity according to limit point setting

[b] Reference conditions EN 61298-1

[c] All measuring ranges are vacuum proof.

[d] Includes: linearity, hysteresis, repeatability, deviation of measuring range start value (offset) and measuring range end value

[e] 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

[f] MSP = measuring span

Electrical data

Voltage supply[a]	
Two-wire	
4 to 20 mA	DC 8 to 30 V, nominal voltage DC 24 V[b]
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

[a] 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".

[b] Maximum current consumption ≤ 30 mA.

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

[a] 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	≤ 3.6 mA and ≥ 21.5 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	≤ 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 MΩ at DC 500 V
Insulation voltage	AC 500 V

Environmental influences

Admissible temperatures	Ambient temperature	Medium temperature	Storage temperature
with MSP[a] ≤ 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[b]	-40 to +125 °C[c]	-40 to +100 °C

[a] MSP = measuring span

[b] Autoclave-compatible version: ≤ 140 °C for maximum 30 minutes.

[c] Use in CIP/SIP processes: maximum of 140 °C for 1 h/day without being destroyed.

Use in CIP/SIP processes	The transmitter will withstand a medium temperature of 140 °C for 1 h/day without being destroyed.
Autoclave-compatible version	
Device versions	Basic type extension 045, only with round plug M12 × 1
Sterilization conditions	Complete transmitter with screwed-on protective cap
Process duration	≤ 30 minutes
Sterilization temperature	≤ 140 °C
Ambient pressure during sterilization	≤ 3.6 bar absolute
Depending on how often the CIP/SIP cleaning or the autoclaving is carried out, the long-term stability may differ from the specifications given in the table on page 3.	

Resistance to climatic conditions	100 % relative humidity including condensation on the device's outer case; 90 % relative humidity without condensation
Degree of protection	According to DIN EN 60529
Types with attached cable	IP68[a] (IP66/IP68)
Types with round plug M12 × 1	IP67 (IP66/IP67)
Types with cable 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 –
Noise immunity	Industrial requirements
Process media	Liquid and gaseous media which are compatible with the materials of the parts coming into contact with the pressurized medium

[a] For 1 h at a depth of 2 m.

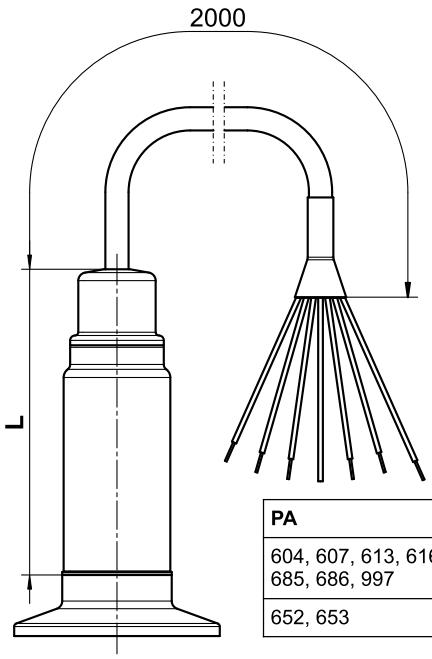
Approvals and approval marks

Approval mark	Test facility	Certificate/certification number	Inspection basis	Valid for
EHEDG	Research Center Weihenstephan for Brewing and Food Quality	EL Class 1/EHEDG-C2000058	EHEDG design specifications (doc. 8 – Hygienic Design Principles) EHEDG tests for verifying ease of cleaning (doc. 2, Third Edition, July 2004, updated June 2007)	Process connection 613 Clamp DN 25, 32, 40 with Tri-Clamp seals Combifit International B.V.
				Process connection 616 Clamp DN 50 with Tri-Clamp seals Combifit International B.V.
				Process connection 685 VARIVENT® DN 32/25 with EPDM O-ring
				Process connection 686 VARIVENT® DN 50/40 with EPDM O-ring
				Process connection 997 JUMO PEKA with FKM O-ring
EAC	In preparation			
UL				

Dimensions

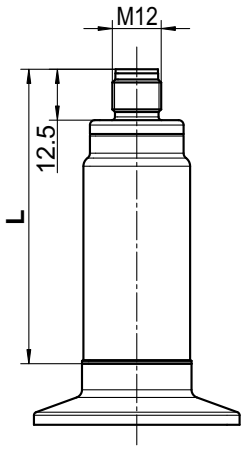
Transmitter with electrical connections

12
Attached cable, length of 2 m (standard)



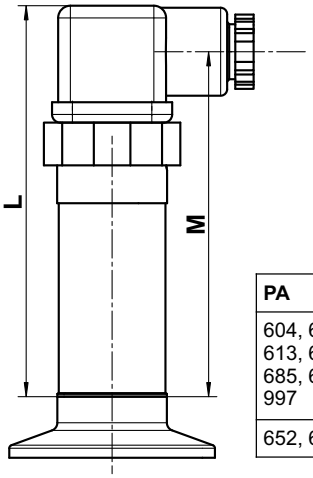
PA	L (mm)
604, 607, 613, 616, 685, 686, 997	75
652, 653	50

36
Round plug M12 × 1



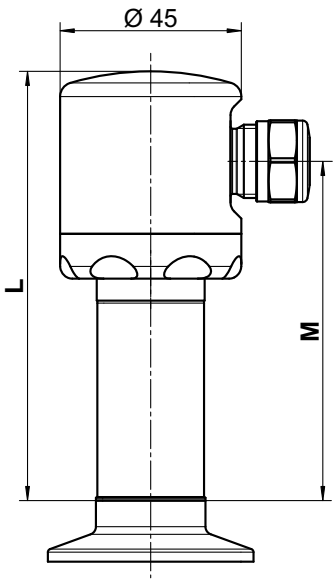
PA	L (mm)
604, 607, 613, 616, 685, 686, 997	73
652, 653	48

61
Cable socket DIN EN 175301-803, form A



PA	L (mm)	M (mm)
604, 607, 613, 616, 685, 686, 997	96	85
652, 653	71	60

75
Terminal head

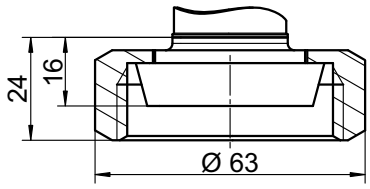


PA	L (mm)	M (mm)
604, 607, 613, 616, 685, 686, 997	106	86
652, 653	81	61

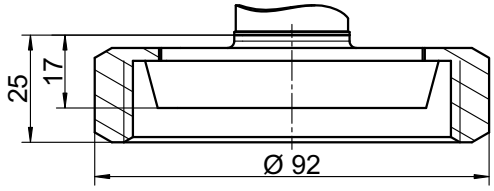
PA = process connection

Process connections

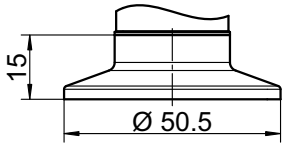
604
Taper socket with union nut DN 25



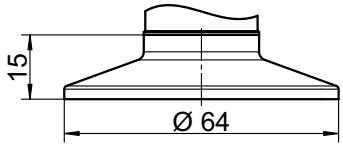
607
Taper socket with union nut DN 50



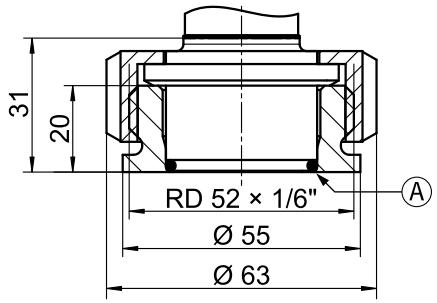
613
Clamping socket (clamp) DN 25, 32, 40



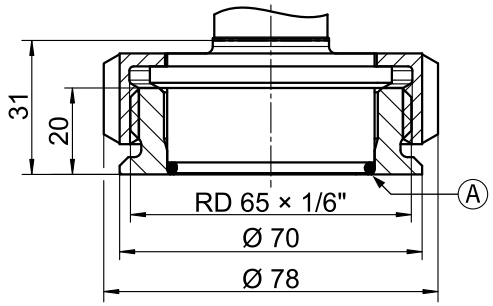
616
Clamping socket (clamp) DN 50



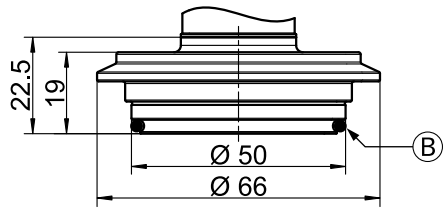
652
Tank connection with grooved union nut DN 25 (including welding socket)



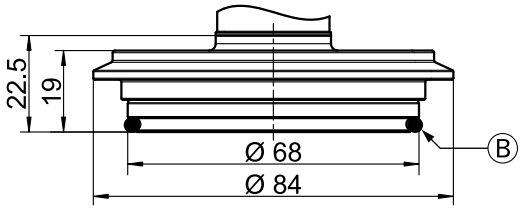
653
Tank connection with grooved union nut DN 40 (including welding socket)



685
VARIVENT® connection DN 32/25



686
VARIVENT® connection DN 50/40



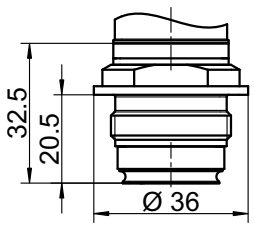
Ⓐ Sealing ring, FPM

Ⓑ Sealing ring, EPDM[a]

[a] EHEDG conformity according to "EHEDG Position Paper" is only ensured with EPDM.

997

JUMO PEKA



NOTE

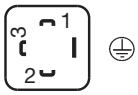
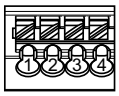
Detailed specifications on the JUMO PEKA process connection system can be found in data sheet 409711.

Other process connections upon request!

Connection diagram

Transmitter

The connection diagram in the data sheet provides preliminary information about the connection options. For the electrical connection, only use the installation instructions or the operating manual. The knowledge and the correct technical compliance with the safety information and warnings contained in these documents are mandatory for mounting, electrical connection, and startup as well as for safety during operation.

Connection		**Terminal assignment**[a]			
					
		12 Attached cable	36 Round plug M12 × 1	61 Cable socket	75 Terminal head
4 to 20 mA, 2-wire (output 405)					
Voltage supply DC 8 to 30 V	U_B/S+	White	1	1	1
	0 V/S-	Black	3	2	2
DC 0 to 10 V, 3-wire (output 415)					
Voltage supply DC 11.5 V to 30 V	U_B	White	1	1	1
	0 V/S-	Black	2	2	2
	S+	Yellow	3	3	3
DC 1 to 5 V, three-wire (output 418) **DC 1 to 6 V, three-wire (output 420)**					
Voltage supply DC 10 to 30 V	U_B	White	1	1	1
	0 V/S-	Black	2	2	2
	S+	Yellow	3	3	3

Functional bonding conductor FB[b] (all output variants)		Shield/green	4		4

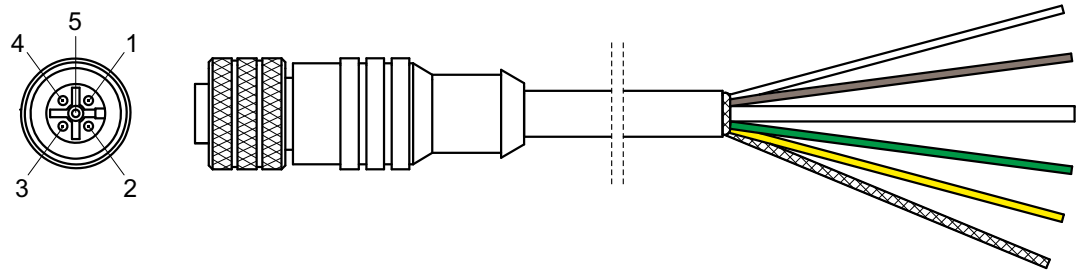
[a] Figure: Connection to the pressure transmitter

[b] 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

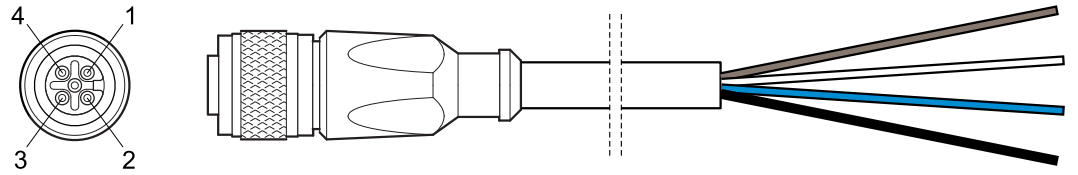
Accessories

Cable socket M12×1 with pressure compensation (part no. 00512341)

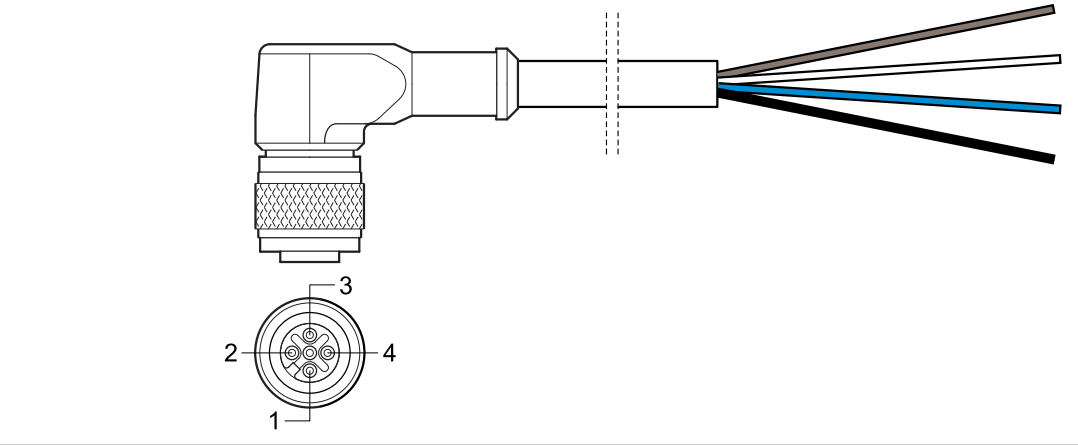
Figure	Pin	Color
	1	White
	2	Brown
	5[a]	Colorless
	3	Green
	4	Yellow
	Shielding	

[a] Hose for pressure equalization.

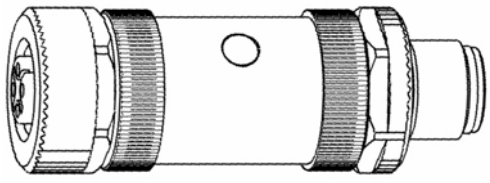
Line socket, 4-pole, M12 × 1, without pressure compensation, straight (part no. 00404585)

Figure	Pin	Color
	1	Brown
	2	White
	3	Blue
	4	Black

Line socket, 4-pole, M12 × 1, without pressure compensation, angled (part no. 00409334)

Figure	Pin	Color
	1	Brown
	2	White
	3	Blue
	4	Black

Pressure compensation adapter M12×1 (part no. 00739821)

Figure


Order details

	(1)	**Basic type**
402071		JUMO TAROS S46 H – pressure transmitter
	(2)	**Basic type extension**
000		None
045		Autoclave-compatible version[a, b]
051		Relative-pressure version without zero point adjustment
999		Special version
	(3)	**Input**
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
505		0 to 40 bar absolute pressure
998		Special measuring range for absolute pressure
999		Special measuring range for relative pressure
	(4)	**Output**

405		4 to 20 mA, 2-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
	(5)	**Process connection**
604		Taper socket with union nut DN 25, DIN 11851 (dairy pipe fitting)[c]
607		Taper socket with union nut DN 50, DIN 11851 (dairy pipe fitting)[d]
613		Clamping socket (clamp) DN 25, 32, 40, DIN 32676[e]
616		Clamping socket (clamp) DN 50, DIN 32676, 2" ISO 2852[e]
652		Tank connection with grooved union nut DN 25[c]
653		Tank connection with grooved union nut DN 40[c]
685		VARIVENT® connection DN 32/25
686		VARIVENT® connection DN 50/40
997		JUMO PEKA hygienic process connection
	(6)	**Process connection material**
53		Stainless steel 1.4404/1.4435
	(7)	**Electrical connection**
12		Attached cable, shielded, length of 2 m
36		Round plug M12 × 1
61		Cable socket DIN EN 175301-803, form A
75		Terminal head
	(8)	**Measuring system, filling medium**
01		Silicone oil
	(9)	**Extra codes**
000		None
374		Inspection certificate 3.1 EN 10204 – material
452		Parts wetted by medium electrolytically polished
462		Inverted output signal
624		Oil and grease free
870		Inspection certificate 3.1 EN 10204 – surface
871		Inspection certificate 3.1 EN 10204 – accuracy
872		Declaration of compliance with the order 2.1 EN 10204 – material
873		Declaration of compliance with the order 2.1 EN 10204 – surface
874		Declaration of compliance with the order 2.1 EN 10204 – accuracy
875		Declaration of compliance with the order 2.1 EN 10204 – data sheet

[a] Only with round plug M12 × 1 (electrical connection 36).

[b] If the devices work with relative pressure, the relative pressure is compensated using round plug M12 × 1. To ensure reliable pressure compensation, use a corresponding mating connector with pressure equalization hose in the cable (part no. 00512341). Alternatively, a pressure compensation adapter (part no. 00739821) can be used.

[c] Only possible with measuring ranges up to 40 bar.

[d] Only possible with measuring ranges up to 25 bar.

[e] The maximum measuring range that can be used is based on the clamp's pressure stage.

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)
Order code		/		-		-		-		-		-		-		/	
Order example	402071	/	999	-	453	-	405	-	613	-	53	-	36	-	01	/	374,870

Accessories

Item	Part no.
Cable socket, 4-pole, M12 × 1, straight, with 5 m PVC cable, with PA pressure equalization hose	00512341
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
End cap M12 × 1 (for autoclave-compatible version)	00736095
Pressure compensation adapter M12 × 1	00739821