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JUMO Instrument Co. Ltd.
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JUMO Process Control, Inc.
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JUMO SIRAS P21 AR

Process pressure transmitter

Brief description

The device is for measuring the system pressure of gases and liquids without solids content. It provides highly accurate measurements and readings, and is easy to use. You can use the device to safely monitor minimum and maximum ranges (pressures and fill levels). The integrated LCD display shows measured values as well as configuration and device data. The housing and sensor are manufactured from high-grade stainless steel.

The device can be programmed using the internal rotary knob and the display or via the HART® interface using a handheld device or using a PC. This enables you to adapt the device for various different types of measuring tasks. For operation via the HART® interface, there is a specially developed Windows™-based software that you can use.

The pressure transmitter with 4 to 20 mA and HART® protocol has been assessed in terms of functional safety and is certified by TÜV Nord according to DIN EN 61508/-1/-2/-3, edition 2.0. These measuring devices are suitable for process fill level monitoring and process pressure monitoring up to SIL 2. Please see the Safety Manual for further information on this topic.

For the differential pressure version, see data sheet 403024.



Type 403028/0-0-1-...

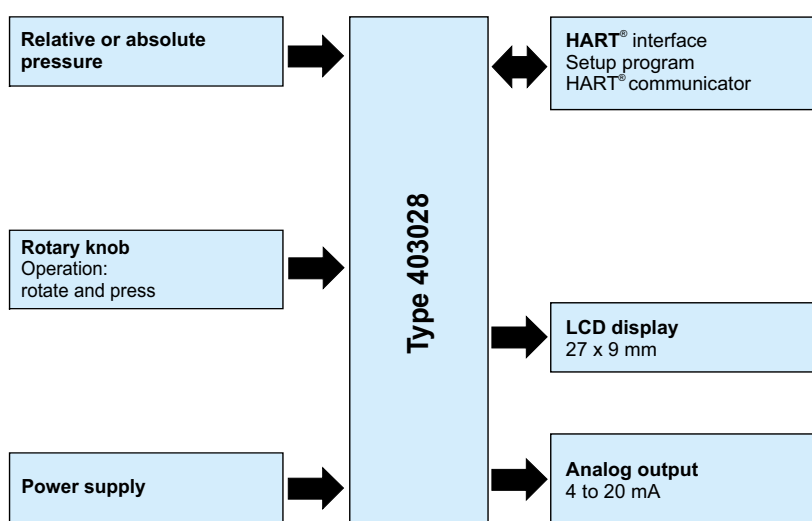


Type 403028/0-0-2-...



Type 403028/0-0-3-...

Block diagram



Special features

- Stainless steel housing
- SIL certified (TÜV Nord)
- HART® interface
- Explosion protection Ex ia (gas and dust) according to ATEX, NEPSI, and EAC – in preparation
- Linearity 0.05 %
- Turn down: 1:50
- -40 to +85 °C medium temperature
- Simple operation with rotary knob
- Setup program
- LCD display with bar graph
- Display scaling with selectable measuring units
- Displays sensor temperature, minimum pressure, maximum pressure, output current via HART® interface: electronics temperature and operating voltage

Approvals and approval marks (see technical data)



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Technical data

General Information

Reference conditions	DIN EN 60770 and DIN EN 61298
Ambient temperature	25 °C ±5 °C
Humidity	45 - 75 % RH
Ambient pressure	Constant, 860 to 1060 mbar (12.47 to 15.37 psi)
Position of measuring cell	Horizontal ±1°
Voltage supply	DC 24 V ±3 V
Sensor system	Silicon sensor with separating membrane made from stainless steel
Pressure transfer medium	Silicon oil
Admissible load changes	> 10 million
Position	
Installation position	Any
Calibration position	Device upright, process connection at the bottom
Position-dependent zero offset	Relative pressure: zero point correction is possible on-site or via setup Absolute pressure: manual readjustment is possible
Display	Dotmatrix LCD with 96 x 32 pixels, 7-segment digit display for pressure and temperature, pictograms for SIL, warning triangle, configuration locking, LED backlight, bargraph with 20 segments for analog output
Languages	German; English; French; Spanish, Russian
Alignment	Horizontal, can be rotated in 90° angle increments Housing rotatable by ±160°
Large display area	27 x 9 mm, font size 9 mm, 5-digit
Font color	Black
Displayable measuring units	
Input pressure	inH ₂ O, inHG, ftH ₂ O, mmH ₂ O, mmHG, psi, bar, mbar, kg/cm ² , kPa, TORR, MPa, mH ₂ O
Measured value	% or scaled with configured pressure or fill level measurement unit
Output current	mA
Sensor temperature	°C, °F
Additional display data	Minimum pressure, maximum pressure, errors, measuring range overflow Measuring range underflow, operating hours, device parameters
Operation on site setup program	With rotary knob and LCD Via HART [®] interface
Interface	Two-wire 4 to 20 mA with overlaid HART [®] signal, HART [®] protocol version 7 HART [®] signal is for configuration and remote diagnosis

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Input

Relative pressure

Nominal measuring range/ Default setting measuring range ^a	Smallest measuring span	Overload capability	Burst pressure
-600 to 600 mbar	60 mbar	6 bar	12 bar
-1 to +2.5 bar	0.1 bar	15 bar	30 bar
-1 to +4 bar	0.1 bar	30 bar	60 bar
-1 to +10 bar	0.5 bar	60 bar	100 bar
-1 to +25 bar	0.5 bar	150 bar	250 bar
-1 to +100 bar	5 bar	300 bar	400 bar

^a The default setting of the measuring range corresponds to the nominal measuring range

Absolute pressure

Nominal measuring range/ Measuring range default setting ^a	Smallest measuring span	Overload capability	Burst pressure
0 to 600 mbar	60 mbar	6 bar	12 bar
0 to 2.5 bar	0.1 bar	15 bar	30 bar
0 to 4 bar	0.1 bar	30 bar	60 bar
0 to 10 bar	0.5 bar	60 bar	100 bar
0 to 25 bar	0.5 bar	150 bar	250 bar
0 to 100 bar	5 bar	300 bar	400 bar

^a The default setting of the measuring range corresponds to the nominal measuring range

Output

Analog output	
Output	4 to 20 mA, two-wire with HART [®] version 7
Step response time T63	≤200 ms without damping
Damping (digital filter 2nd order)	Adjustable 0 to 100 s
Burden 4 to 20 mA with HART [®]	≤ (U - 11.5 V) / 0.024 A; U Δ of the voltage supply Min. 250 Ω , max. 1100 Ω
Output signal limits	3.6 to 24 mA
Transmission behavior	Linear, square root extraction
Failure signal	According to NAMUR NE 43 Max. alarm: 21.6 mA Min. alarm: 3.6 mA
Reference accuracy	≤ ±0.05 % referring to 20 mA

Voltage supply

For version Explosion protection 0 (without)	DC 11.5 to 36 V
For Ex version	DC 12 to 28 V
Residual ripple	Residual ripple of voltage supply ≤3 % (without affecting the 4 to 20 mA signal)
Influence of voltage supply	≤ ±0.1 μ A / V

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Mechanical features

Process connection	
Material 20 (stainless steel) ^a	316 Ti
Process seal	
521	FPM profile seal G 1/4
523	FPM profile seal G 1/2
559	FPM profile seal M20 x 1.5
504, 512, 583	No seal
Measuring membranes	
Material 20 (stainless steel) ^{a, b}	316 L
Materials of housing	
Housing 1 (short, stainless steel)	Stainless steel 1.4404
Housing 2 (long, stainless steel)	Stainless steel 1.4404, seal VMQ
Housing 3 (precision casting)	Precision casting 1.4408
Lid 20 (stainless steel)	Precision casting 1.4408, seal FPM
Electrical connection 36 (round plug M12 × 1)	Brass, nickel-plated
Electrical connection 93 (cable fitting, metal)	Brass, nickel-plated
Rotary knob	PA
Weight	
Type 403028/0-0-1 (housing, short)	Approx. 550 g
Type 403028/0-0-2 (housing, long)	Approx. 850 g
Type 403028/0-0-3 (precision casting housing)	Approx. 1600 g

^a The device is not suitable for the heating oil medium.

^b The medium is not allowed to corrode the membrane material.

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Environmental influences

Ambient temperature range

Version	Ambient temperature range ^{a, b}
Connection 93 cable fitting (metal)	-40 to +85 °C
Connection 36 round plug M12 x 1	-25 to +85 °C

^a Operating temperature range of the LCD display: -20 to +85°C; outside of this range, the display will not work

^b It must be noted that, below -40 °C, there will be functional limitations. In safety-related applications, operation is only admissible if the ambient temperature is no lower than -40 °C.

Average temperature range

Average temperature range	
Standard	-40 to +85 °C

Protection type

Protection type	
Protection type	IP66/IP67 according to DIN EN 60529

Climate class

Climatic features according to DIN EN 60721-3-X	
Stationary use, weather-proof acc. to DIN EN 60721-3-3	from IE37: 3K7/3M3
Stationary use, not weather-proof acc. to DIN EN 60721-3-4	from IE42: 4K3/4M3
Transport acc. to DIN EN 60721-3-2	from IE23: 2K4/2M2

Electromagnetic compatibility

Electromagnetic compatibility acc. to DIN EN 61326-3-1, DIN EN 61326-2-3, DIN EN 60730-2-6 and NAMUR Recommendation NE 21	
Maximum deviation	≤ 0.5 % of span
Interference emission:	Class B
Interference immunity	Industry

Mechanical load

Admissible mechanical load:	
Vibration strength	2 G, 10 to 2000 Hz acc. to IEC 60068-2-6
Shock resistance	15 G for 6 ms acc. to IEC 60068-2-27

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Accuracy

Contains the maximum measurement deviation, including non-linearity after limiting point setting, hysteresis, non-repeatability, measurement deviation of the measuring range end value and measurement deviation at the measuring range start.

Nominal measuring range Relative pressure	-600 to +600 mbar	-1 to +2.5 bar	-1 to +4 bar	-1 to +10 bar	-1 to +25 bar	-1 to +100 bar	-1 to +250 bar	-1 to +400 bar
Reference accuracy (r) ^a								
in % MSP ^b spread ≤	≤2.5 : 1 ±0.05	≤5 : 1 ±0.05	≤10 : 1 ±0.05				≤5 : 1 ±0.1	
in % MSP ^b spread >	>2.5 : 1 ±0.02 x r	>2.5 : 1 ±0.02 x r	>10 : 1 0.005 x r				>5 : 1 ±0.02 x r	
Influence of the ambient temperature in the range								
-10 to +60 °C in % MS- p ^{a, b}	±(0.04 x r + 0.08)			±(0.03 x r + 0.03)		±(0.015 x r + 0.06)		
-30 to -10 °C and +60 to +85 °C in % MS- p ^{a, b}	±(0.08 x r + 0.16)			±(0.06 x r + 0.06)		±(0.03 x r + 0.12)		
-40 to -30 °C in % MS- p ^{a, b}	±(0.1 x r + 0.2)			±(0.07 x r + 0.07)		±(0.035 x r + 0.14)		
Basic accuracy ^c								
r = 1:1 in % MSP	±0.18			±0.12		±0.13		±0.16
r = 2:1 in % MSP	±0.22			±0.15		±0.15		±0.17
r = 3:1 in % MSP	±0.26	±0.25	±0.18		±0.16		±0.18	
r = 4:1 in % MSP	±0.30	±0.29	±0.21		±0.18		±0.20	
r = 5:1 in % MSP	±0.34	±0.33	±0.24		±0.19		±0.21	
Long-term stability in % MSP								
1 year	±0.05	±0.07	±0.05		±0.05			
5 years	±0.07	±0.12	±0.07		±0.07			
10 years	±0.10	±0.15	±0.10		±0.10			
Total deviation ^d								
1 year	±0.23	±0.25	±0.23	±0.17	±0.18		±0.21	
5 years	±0.25	±0.30	±0.25	±0.19	±0.20		±0.23	
10 years	±0.28	±0.33	±0.28	±0.22	±0.23		±0.26	

^a r = span of the nominal measuring range + adjusted measuring span

^b MSP = measuring span

^c The basic accuracy comprises the reference accuracy and the influence of the ambient temperature (pressure sensor and electronics error of the analog output of 0.05 %)

^d The total deviation is calculated based on the combined measuring accuracies of the basic accuracy (reference accuracy as well as the influence of ambient temperature and static pressure and the electronics error) and the long-term stability

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Contains the maximum measurement deviation, including non-linearity after limiting point setting, hysteresis, non-repeatability, measurement deviation of the measuring range end value and measurement deviation at the measuring range start.

Nominal measuring range Absolute pressure	0 to 0.6 bar	0 to 2.5 bar	0 to 4 bar	0 to 10 bar	0 to 25 bar	0 to 100 bar
Reference accuracy (r) ^a						
in % MSP ^b spread ≤	≤2.5 : 1 ±0.075	≤5 : 1 ±0.05		≤10 : 1 ±0.05		≤10 : 1 ±0.05
in % MSP ^b spread >	>2.5 : 1 ±0.03 x r	>2.5 : 1 ±0.02 x r		≤10 : 1 ±0.005 x r		>10 : 1 0.005 x r
Influence of the ambient temperature in the range						
-10 to +60 °C in % MSP ^{a, b}	±(0.04 x r + 0.08)			±(0.03 x r + 0.03)		±(0.015 x r + 0.06)
-30 to -10 °C and +60 to +85 °C in % MSP ^{a, b}	±(0.08 x r + 0.16)			±(0.06 x r + 0.06)		±(0.06 x r + 0.06)
-40 to -30 °C in % MSP ^{a, b}	±(0.1 x r + 0.2)			±(0.07 x r + 0.07)		±(0.035 x r + 0.14)
Basic accuracy ^c						
r = 1:1 in % MSP	±0.18			±0.12		±0.13
r = 2:1 in % MSP	±0.22			±0.15		±0.15
r = 3:1 in % MSP	±0.26	±0.25		±0.18		±0.16
r = 4:1 in % MSP	±0.30	±0.29		±0.21		±0.18
r = 5:1 in % MSP	±0.34	±0.33		±0.24		±0.19
Long-term stability in % MSP						
1 year	±0.05	±0.07	±0.05			
5 years	±0.07	±0.12	±0.07			
10 years	±0.10	±0.15	±0.10			
Total deviation ^d						
1 year	±0.23	±0.25	±0.23	±0.17		±0.18
5 years	±0.25	±0.30	±0.25	±0.19		±0.20
10 years	±0.28	±0.33	±0.28	±0.22		±0.23

- ^a r = span of the nominal measuring range + adjusted measuring span
- ^b MSP = measuring span
- ^c The basic accuracy comprises the reference accuracy and the influence of the ambient temperature (pressure sensor and electronics error of the analog output of 0.05 %)
- ^d The total deviation is calculated based on the combined measuring accuracies of the basic accuracy (reference accuracy as well as the influence of ambient temperature and static pressure and the electronics error) and the long-term stability

Approvals and approval marks

SIL	
Test facility	TÜV Nord (German Technical Inspection Agency)
Certificate/test no.	SEBS-A.084722/14 V1.0
Inspection basis	DIN EN 61508/-1/-2/-3: 2011 DIN EN ISO 13849-1: 2016 DIN EN ISO 13849-2: 2013
Valid for	Entire JUMO SIRAS P21 device range

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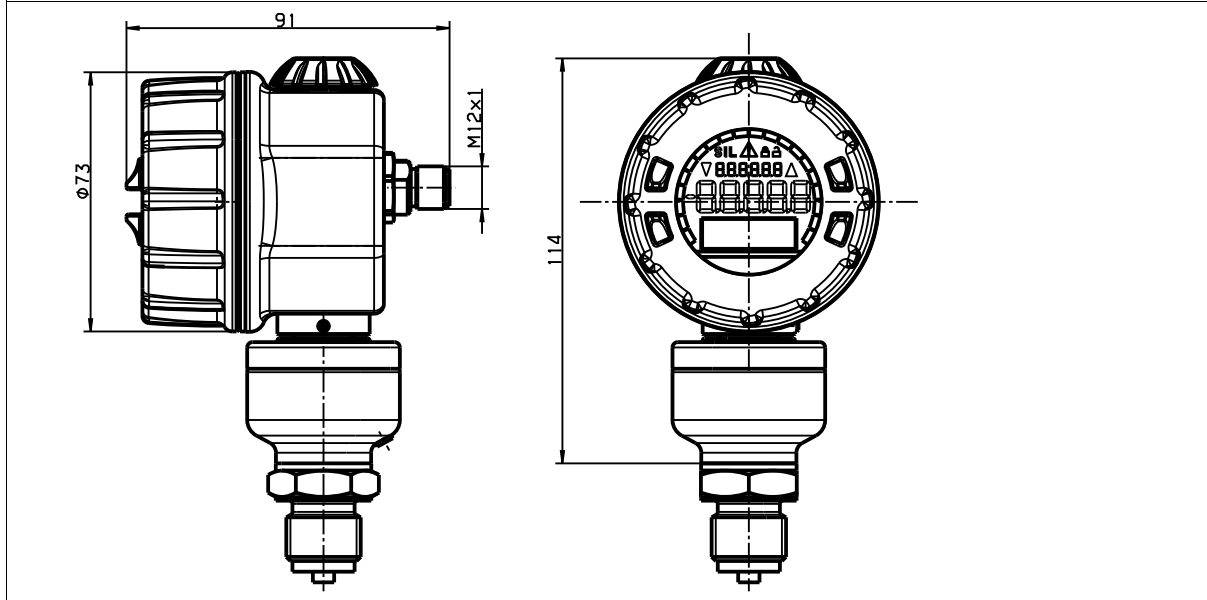
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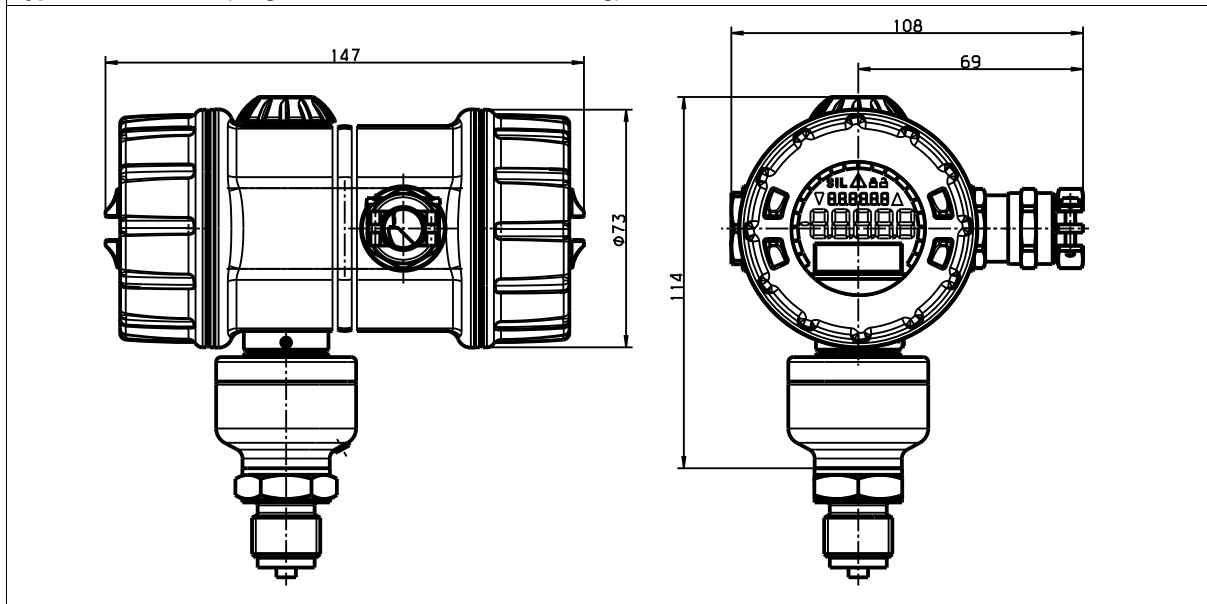


Dimensions

Type 403028/0-0-1 (short, stainless steel, with M12 connection)



Type 403028/000-0-2 (long, stainless steel, with cable fitting)



M20 x 1.5 cable fitting

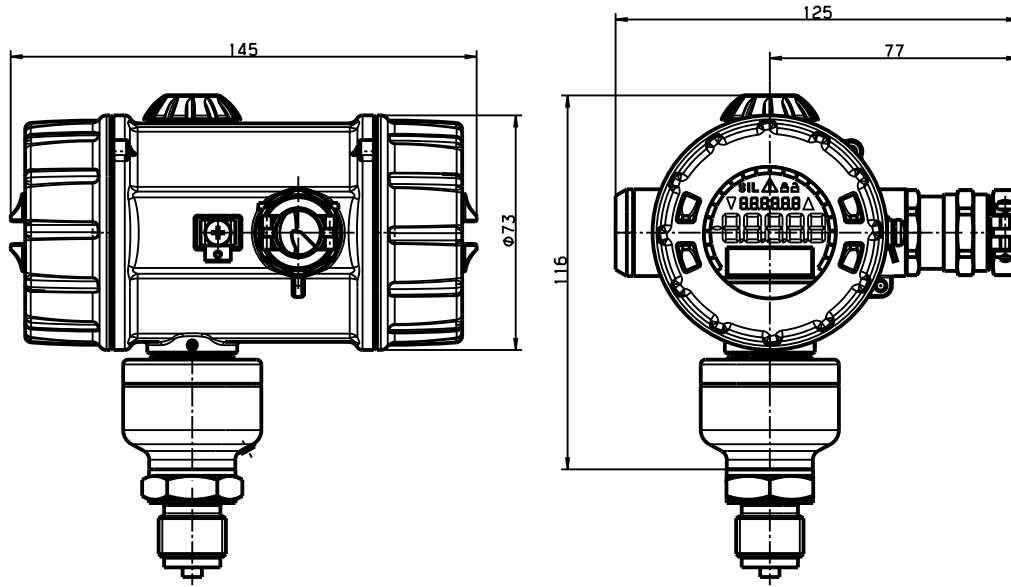
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Type 403028/000-0-3 (precision casting, with cable fitting)



Cable fitting M20 x 1.5 Ex-d version

Process connections

<p>504 G 1/2 according to DIN EN 837 --</p>	<p>512 1/2-14 NPT --</p>	<p>521 G 1/4 FPM profile seal G 1/4</p>
<p>523 G 1/2 FPM profile seal G 1/2</p>	<p>559 M20 x 1.5 DIN 3852-11 FPM profile seal M20 x 1.5</p>	<p>583 M20 x 1.5 with pin --</p>

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Connection diagram

The connection diagram in the data sheet provides information on product selection.

For the electrical connection, only use the installation instructions or the operating manual.

Terminal assignment for cable fitting

Connection	Terminal assignment
	93 cable fitting
Voltage supply DC 11.5 to 36 V for non-Ex version DC 12 to 28 V for Ex version	1 L+ 2 L-
Output 4 to 20 mA, two-wire load-independent current of 4 to 20 mA in voltage supply	1 L+ 2 L-
Test connection for current output Internal resistance of the ammeter $\leq 10 \Omega$	TEST + TEST -
Test connection for HART® The burden must be present!	HART + HART -
Functional ground	3

M12 terminal assignment – short housing

Connection	Terminal assignment	Color assignment ^a
	36 round plug M12 × 1	
Voltage supply DC 11.5 to 36 V for non-Ex version DC 12 to 28 V for Ex version	1 L+ 3 L-	Brown Blue
Output 4 to 20 mA, two-wire load-independent current of 4 to 20 mA in voltage supply	1 L+ 3 L-	Brown Blue
Functional ground	4	Black

^a The color coding is only valid for A-coded standard cables!

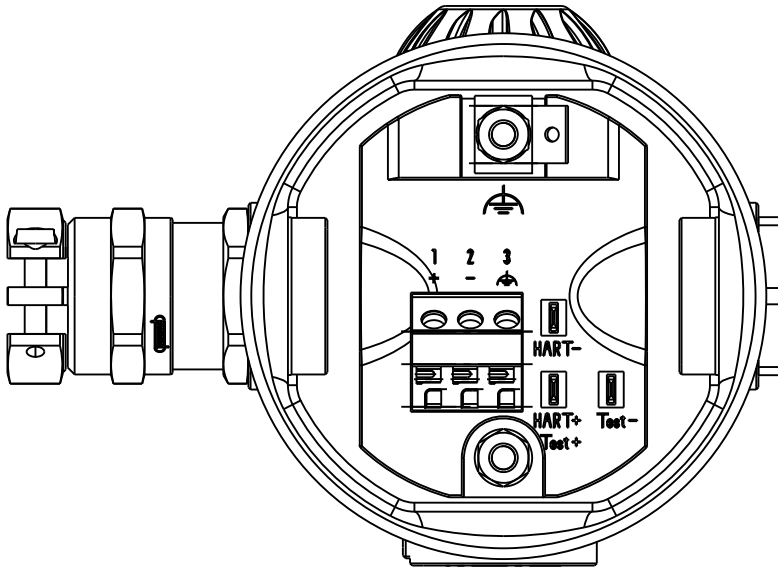
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Connection in housing and cable fitting



Round plug M12 × 1, short design type



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Order details

	(1) Basic type
403028	JUMO SIRAS P21 AR – process pressure transmitter
	(2) Basic type extension
000	None
	(3) Explosion protection
0	None
1	ATEX, IECEx ia (in preparation)
2	ATEX, IECEx ia + d combined release (in preparation)
	(4) Housing
1	Short, stainless steel, with M12 connection ^a
2	Long, stainless steel, with cable fitting
3	Long, precision casting, with cable fitting
	(5) Electrical connection
36	Round plug M12 × 1
93	Metal cable fitting
	(6) Lid material
20	CrNi (stainless steel)
	(7) Display
1	With display (LCD)
	(8) Operation
1	With rotary knob
	(9) Input – nominal measuring range
450	-600 to +600 mbar relative pressure
473	-1 to +2.5 bar relative pressure
513	-1 to +4 bar relative pressure
472	-1 to +10 bar relative pressure
514	-1 to +25 bar relative pressure
515	-1 to +100 bar relative pressure
508	-1 to +250 bar relative pressure (in preparation)
509	-1 to +400 bar relative pressure (in preparation)
487	0 to 0.6 bar absolute pressure
490	0 to 2.5 bar absolute pressure
491	0 to 4 bar absolute pressure
493	0 to 10 bar absolute pressure
495	0 to 25 bar absolute pressure
507	0 to 100 bar absolute pressure
	(10) Output
410	4 to 20 mA, two-wire with HART [®] protocol

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(11) Process connection	
504	G 1/2 according to DIN EN 837
512	1/2-14 NPT
521	G 1/4
523	G 1/2
559	M20 x 1.5 DIN 3852-11
583	M20 x 1.5 with pin
(12) Medium temperature	
1	-40 to 85 °C
(13) Process connection material	
20	CrNi (stainless steel)
(14) Measuring system filling medium	
01	Silicon oil
(15) Extra codes	
000	Without extra code
100	Customer-specific configuration
624	Oil and grease-free
634	With TAG number

^a The short housing is only available with the electrical connection round plug M12 × 1.

Order code (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15)
 Order example 403028 / 000 - 0 - 1 - 36 - 20 - 1 - 1 - 450 - 410 - 504 - 1 - 20 - 01 / 000

Accessories

Designation	Part no.
4-pole cable box, straight, M12 × 1 with 2 m PVC cable	00404585
4-pole cable box, angled, M12 × 1 with 2 m PVC cable	00409334
HART [®] modem USB ^a	00443447
Measuring device holder for wall and 2" pipe	00597711
Ex-i repeater power supply and input isolating amplifier 707530/38	00577948

^a The HART[®] modem forms the connection between the HART[®] interface of the pressure transmitter and the USB interface of a PC.

Software

Designation	Part no.:
JUMO setup program SIRAS P21 series	00770008
Device Description (DD); available via the FieldComm Group website	