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JUMO DELOS SI

Electronic pressure switch with display

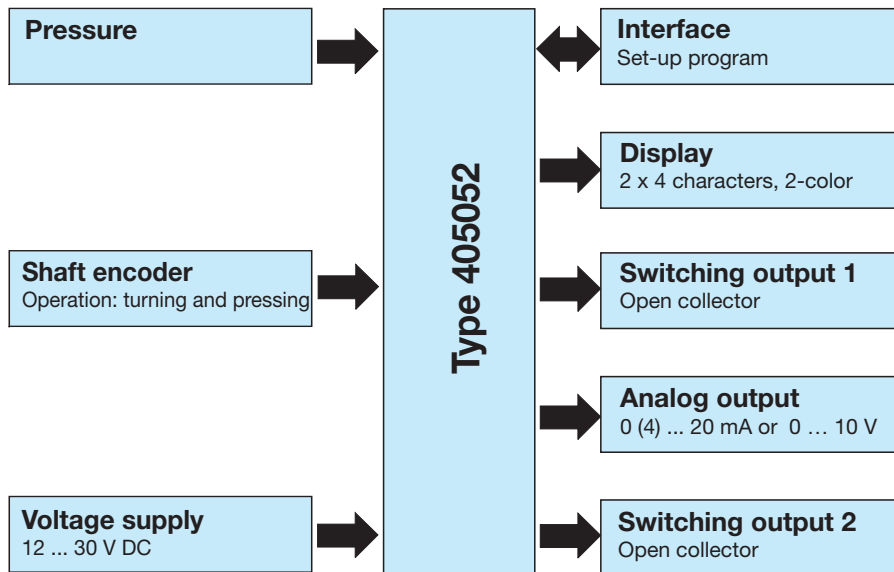
Brief description

The high-precision, electronic pressure switch JUMO DELOS SI provides flexible application due to its switching outputs, analog output and an LC display to visualize the process pressure and switching contact statuses. Due to its stainless steel housing and the sealless measuring system, it is also perfectly suitable for use in hygienically sensible areas. A variant of this system in a high-temperature design resistant to temperatures of up to 200°C can be used especially for measuring tasks on hot media and lines. Depending on the application, the following output variants are available: 1 x PNP or 2 x PNP switching output or 1 x PNP switching output and one analog output signal. The configuration of the output signal and the measuring range can be customized.



Type 405052

Block diagram



Special features

- Linearity 0.1%
- Measuring range scaling 1 : 4
- Two-colour display with alarm function
- Analog output can be freely configured
- up to 200°C medium temperature
- programming is either local or via set-up

Approval/approval marks (see Technical Data)



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Technical data

General information

Reference conditions	DIN 16086 and DIN EN 60770
Probe system	Silicium probe with stainless steel separating diaphragm
Pressure transfer means	synthetic oil, conforming FDA standards
admissible load changes	> 10 million
Installation position	any
Calibration position	Device upright, process connection at the bottom
Zero point offset depending on position	Local zero point correction or via set-up (20% of the nominal measuring range).
- Basic type 000 standard	≤ 1 mbar
- Basic type 004 high-temperature design	≤ 10 mbar
Display	LCD with background lighting
Alignment	Display can be mirror-imaged by 180° via software Housing can be rotated through 320° (use the supplied tools)
Size	Display 16 x 26 mm / font size 7 mm / 4-digit
Color	Standard operation: amber Error: red (text "Err", error code 1...9 flashes) Setup interface occupied: red
Switching status display	K1, K2
Measuring unit	mbar, bar, kPa, MPa, psi, %
Operation	
local	Via operating element beneath the locking screw
Setup interface	Pin 5 of the M 12 x 1 round pin plug

Input

All measuring ranges can be overloaded up to -1 bar (vacuum resistant)

Relative pressure							
Measuring range	0.4	1	4	10	25	60	bar
Overload capability	1.6	4	16	40	100	240	
Burst pressure	2	5	20	50	125	300	
Measuring range	-0.4...0.4	-1...1	-1...3	-1...9	-1...24		bar
Overload capability	1.6	4	16	40	100		
Burst pressure	2	5	20	50	125		
Absolute pressure							
Measuring range	0.4	1	4	10	25	60	bar
Overload capability	1.6	4	16	40	100	240	
Burst pressure	2	5	20	50	125	300	

Outputs

All analog outputs in 3-wire technology / Open Collector, PNP circuit

Analog output	
can be freely configured	4...20 mA + 1 x PNP switching output as standard, see (4), page 8 0...20 mA + 1 x PNP switching output 0...10 V + 1 x PNP switching output
Jump response time T90	≤ 100 ms
Switching output	
Number	1 x PNP switching output 2 x PNP switching output
Switching type	N/O / N/C
Switching function	Window / hysteresis

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Switching capacity - Voltage drop from UB - Contact rating - Switching cycles Response time Short-circuit proof	PNP ≤ 2 V ON ≤ 250 mA / OFF ≤ 1 mA > 10 million ≤ 20 ms Yes
Load check, current - Period duration - Periodic protective circuit with over-current	2 s; T _{ON} 40 ms f = 0.5 Hz Display: Err3 switching output K 1, Err4 switching output K 2
Adjustment range Analog output	turn down 1 : 4
Switching output - Switching point - Release point - Damping - Delay	0.5...100% / incremental width 0.1% 0...95% / incremental width 0.1% 0...99 s 0...9.9 s
Apparent ohmic resistance 4...20 mA 0...20 mA 0...10 V	$R_I \geq (U_B - 6.5V) / 0.022$ A $R_I \geq (U_B - 6.5V) / 0.022$ A $R \geq 10$ KW

Mechanical properties

Process connection Material Surface Process seal - Process connection 521.523, 571, 575, 576, 652 - Process connection 997 JUMO PEKA	Stainless steel 316 L $R_a \leq 0.8 \mu\text{m}$ All flange connections are welded and do not require seals. FPM as standard FPM, VMQ, EPDM as an option, see data sheet 40.9711
Measuring membranes Material Surface	Stainless steel 316 L $R_a \leq 0.8 \mu\text{m}$
Casing Material Surface Threaded sleeve M 12 x 1 Housing seal Display	Stainless steel 316 L $R_a \leq 0.8 \mu\text{m}$ Stainless steel 316 L VMQ silicone PA (Polyamide)
Locking screw of the operating element Material Surface Seal	Aluminum 3.2315 Anodized surface VMQ silicone
Weight	0.2 kg with process connection G $\frac{1}{2}$, type 504

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Ambient conditions

Admissible temperatures	
Medium to be measured	-25...+100°C (+135°C max 1 hour / day)
- with basic type extension 004	-25...+200°C
Environment	-25...+75°C
- Ambient temperature -50°C	restricted function: only stationary use, danger of cable break, display without function
Storage	-40...+85°C
Admissible air humidity	
- during operation	100% including condensation of the outer housing of the device
- during storage	90% without condensation
Admissible mechanical load	
- Vibration resistance	20 g, 10...2000 Hz as per IEC 60068-2-6
- Shock resistance	50 g for 11 ms / 100 g for 1 ms as per IEC 60068-2-27
Electromagnetic compatibility	(only with 4-pin connection cable and grounded housing)
- emitted interference	Class A as per EN 61326
- interference resistance	Performance characteristic A as per EN 61326
Protection type	IP 67 as per DIN 60529

Accuracy

Relative pressure							
Nominal measuring range	0.4	1	4	10	25	60	bar
Linearity ^a	0.15	0.15	0.1	0.1	0.1	0.1	% of EW
Accuracy at +20°C ^b	0.35	0.3	0.25	0.25	0.25	0.25	% of EW
Accuracy at -20...+75°C ^c	0.7	0.6	0.5	0.5	0.5	0.5	% of EW
Nominal measuring range							
Nominal measuring range	-0.4...0.4	-1...11	-1...3	-1...9	-1...24		bar
Linearity ^a	0.15	0.15	0.1	0.1	0.1		% of EW
Accuracy at +20°C ^b	0.35	0.3	0.25	0.25	0.25		% of EW
Accuracy at -20...+75°C ^c	0.7	0.6	0.5	0.5	0.5		% of EW
Absolute pressure							
Nominal measuring range	0.4	1	4	10	25	60	bar
Linearity ^a	0.15	0.15	0.1	0.1	0.1	0.1	% of EW
Accuracy at +20°C ^b	0.35	0.3	0.25	0.25	0.25	0.25	% of EW
Accuracy at -20...+75°C ^c	0.7	0.6	0.5	0.5	0.5	0.5	% of EW
Switching output							
Accuracy	≤ 0.5%						
Non-repeatability	≤ 0.2%						
Long-term stability	0.2% with reference conditions as per EN 61298-1						

^a Linearity after limit point setting

^b includes: linearity, hysteresis, repeatability, deviation from measuring range start and measuring range end

^c includes: linearity, hysteresis, repeatability, deviation from measuring range start and measuring range end, thermal influence to measuring range start and measuring range

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Auxiliary energy

Supply voltage UB	12...30 V DC (nominal voltage supply 24V DC) Ripple: ensure that the voltage peaks do not exceed or go below the specified values
Minimum supply voltage not reached	Display: Err 5
Maximum supply voltage exceeded	> 34 V DC; The specified characteristics are no longer met.
Reverse polarity protection	YES
Power consumption	≤ 45 mA without load, ≤ 545 mA with load 2 x PNP
Electrical connection	Round pin plug M 12 x 1, 4-pin, A-coded (for the assignment, see "Electrical connection")
Circuit	SELV

Approval/approval marks

Approval marks	Inspection authority	Certificate/ Inspection number	Inspection basics	valid for
EHEDG	TUM MAK	No 03/2006	Document No 8	Process connection 997 JUMO PEKA

Connection diagram

Output 470		Output 471		Output 475 - 477	
1 PNP switching output		2 PNP switching outputs		1 PNP switching output + 1 analog output	
Voltage supply		Voltage supply		Voltage supply	
1 L+	(12...30 V DC)	1 L+	(12...30 V DC)	1 I+	(12...30 V DC)
3 L-	(GND)	3 L-	(GND)	3 L-	(GND)
Output		Output		Output	
4 K1	Highside open collector max. 0.25 A	2 K2	Highside open collector max. 0.25 A	2 analog	0(4)...20 mA / 0...10 V
2	nc	4 K1		4 K1	Highside open collector max. 0.25 A
5	Interface	5	Interface	5	Interface

Color coding: M 12x1 round pin plug	1 bn	Brown	4 bk	Black	Color coding is only valid for A-coded standard cables.
	2 wh	White	5 gy	Gray	
	3 bu	Blue			

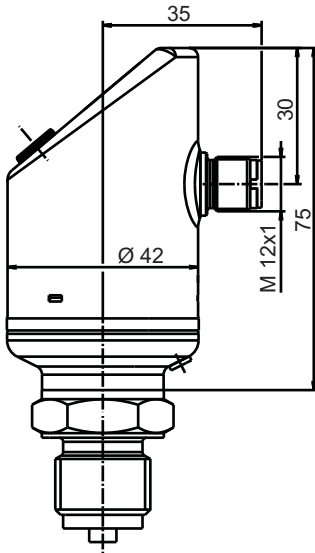
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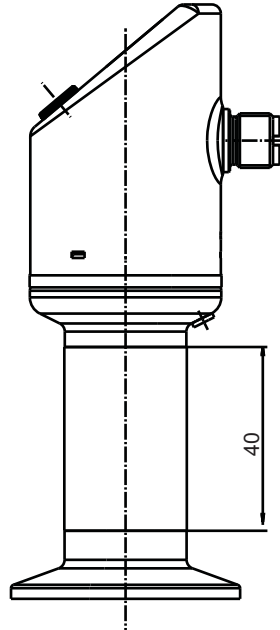
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Dimensions



Type 405052/000-...



Type 405052/004-...

Process connections, not flush-mounted

504	511	521	523

A = Profiled seal DN G 1/4
 B = Profiled seal DN G 1/2
 E = SW 27

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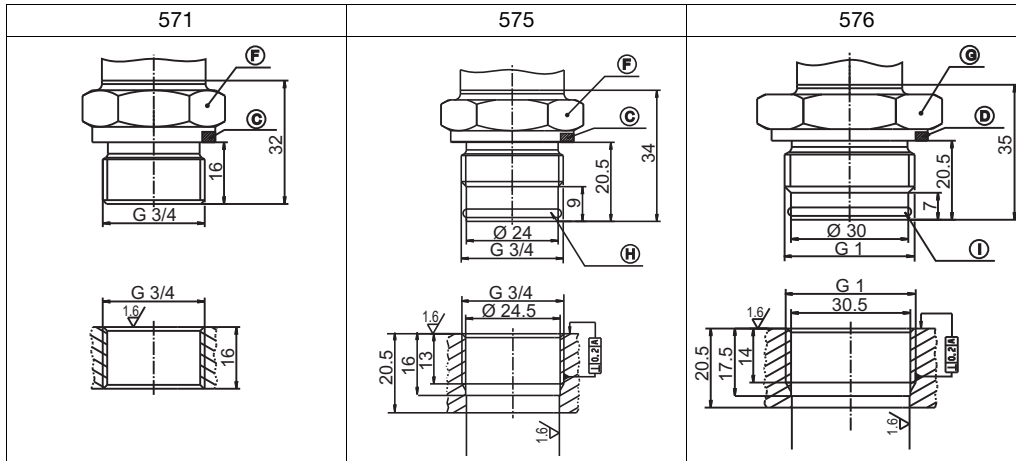
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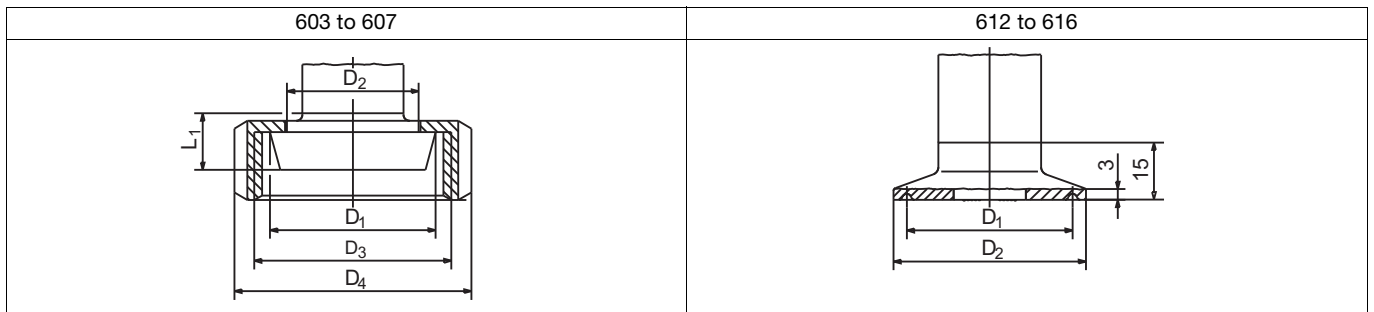


Dimensions

Process connections, flush-mounted

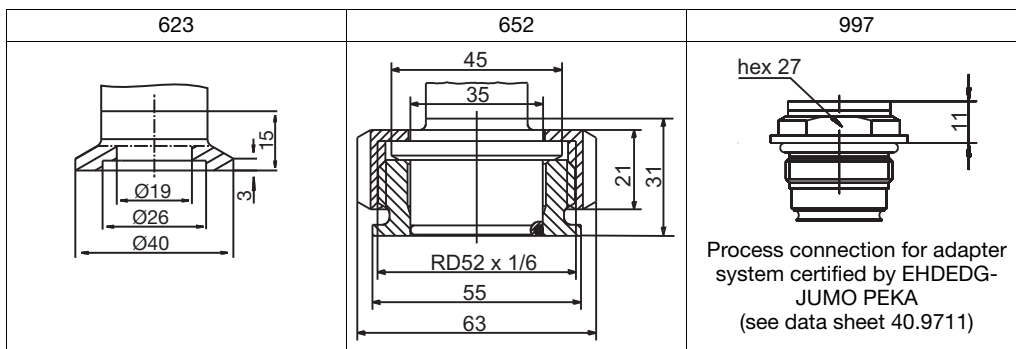


C = Profiled seal DN G 3/4
 D = Profiled seal DN G 1
 F = SW 32
 G = SW 41
 H = O ring 20.35 x 1.78
 I = O ring 26.7 x 1.78



Process connection	DN	Ø D ₁	Ø D ₂	Ø D ₃	Ø D ₄	L ₁
603	20	36.5	30	RD 44 x 1/6	54	13
604	25	44	35	RD 52 x 1/6	63	15
606	40	56	48	RD 65 x 1/6	78	15
607	50	68.5	61	RD 78 x 1/6	92	16

Process connection	DN DIN 32676	DN (inch)	Nominal size ISO 2852	Ø D ₁	Ø D ₂
612	20		12	27.5	34
	15		12.7		
			17.2		
			21.3		
613	25	1"	25	43.5	50.5
	32	1.5"	33.7		
	40		38		
616	50	2"	40	56.5	64
			51		



Process connection for adapter system certified by EHDEG-JUMO PEKA (see data sheet 40.9711)

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Order details

- (1) **Basic type**
405052 Pressure transducer JUMO DELOS SI
- (2) **Basic type extension**
000 none
004 For temperatures of the material to be measured up to 200°C^a
999 Special design
- (3) **Nominal measuring range.**
Overpressure measuring ranges
452 0 ...400 mbar relative pressure
454 0 ...1 bar relative pressure
457 0...4 bar relative pressure
459 0...10 bar relative pressure
461 0...25 bar relative pressure
463 0...60 bar relative pressure
- Measurement ranges of negative overpressure**
447 -400...400 mbar relative pressure
449 -1...1 bar relative pressure
481 -1...3 bar relative pressure
483 -1...9 bar relative pressure
485 -1...24 bar relative pressure
- Absolute pressure measuring ranges**
486 0...400 mbar absolute pressure
488 0...1 bar absolute pressure
491 0...4 bar absolute pressure
493 0...10 bar absolute pressure
495 0...25 bar absolute pressure
506 0...60 bar absolute pressure
- (4) **Output**
470 1 x PNP switching output
471 2 x PNP switching output
475 1 x PNP switching output + analog output, 4...20 mA, 3-wire^b
476 1 x PNP switching output + analog output, 0...20 mA, 3-wire
477 1 x PNP switching output + analog output, 0...10 V, 3-wire

^a For process connection flush-mounted only

^b Factory setting - the output can be freely configured

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**(5) Process connection
 not flush-mounted**

- 504 G 1/2
- 511 1/4-18 NPT
- 521 G 1/4 as per DIN 3852 T11
- 523 G 1/2 as per DIN 3852 T11
- 998 suitable for connection to diaphragm seal

flush-mounted

- 571 G 3/4
- 575 G 3/4
- 576 G 1
- 603 Taper DN 20
- 604 Taper DN 25
- 606 Taper DN 40
- 607 Taper DN 50
- 612 Clamp DN 15-20
- 613 Clamp DN 25-40
- 616 Clamp DN 50
- 623 Small flange connection
- 652 Tank connection
- 997 JUMO PEKA (certified by EHEDG)^a

(6) Process connection, material

- 20 Stainless steel 316L

(7) Electrical connection

- 36 Round pin plug M 12 x 1

(7) Measuring system, filling medium

- 01 FDA conforming oil
- 99 Special filling medium

(9) Extra codes

- 000 none
- 591 Throttle valve in the pressure channel
- 624 Oil and grease free

^a For suitable process connection adapters, see data sheet 40.9711

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)								
Order code	405052	/		-		-		-		/							
Order example	405052	/	000	-	459	-	471	-	504	-	20	-	36	-	01	/	000

Accessories

Sales article No.	Designation
40/00404585	4-pin cable box (straight) M 12 x 1 with 2 m PVC cable
40/00409334	angled 4-pin box M 12 x1 with 2 m PVC cable
40/00522381	Setup program
40/00507861	Connection cable (required for programming with the set-up program)
40/00456352	PC interface cable including USB/TTL converter and adapter (USB connection cable) ^a

^a Also order the connection cable