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JUMO ZELOS C01 LS

Capacitive level switch

Areas of application

- Food and beverage industry
- Railway applications, according to DIN EN 50155
- Shipbuilding
- Mechanical and plant engineering
- Water and wastewater engineering



Type 408401

Special features

- Suitable for CIP and SIP processes
- High pressure resistance and medium temperature
- Minimization of downtimes due to firmware update profile
- Standard torque wrench SW22 usable



Type 408401

Description

The capacitive level switch measures the point level of solid and liquid media in applications with requirements for overfill and dry run protection and can also be used for media detection, e.g. in separation and cleaning processes.

The device is suitable for installation in pressurized tanks, pipelines, containers, in hygienic areas and as part of overfill protection systems according to WHG and can be used in explosion-proof areas.

IO-Link

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Technical data

Electrical data

Voltage supply	DC 24 V SELV
PNP, NPN, push-pull	DC 9.6 to 36 V
IO-Link	DC 18 to 32 V
Explosion protection Ex i	DC 9.6 to 30 V
Current consumption[a]	
Idle mode	0.45 W
Switch operation with 2 outputs	15 W
IO-Link operation	0.5 W
Protection class	3
Overvoltage category	II
Pollution degree	2
Electrical connection	
Connection elements	M12 plug connector
Connecting cable	
Temperature resistance	≥ 90 °C
Electrical safety	DIN EN 61010-1:2023
Requirements	The device must be equipped with an electrical circuit that meets the requirements with regard to "Limited-energy circuits".

[a] The device labeling indicates a maximum power consumption in switching mode with 2 outputs including self-consumption. The actual power consumption depends on the connected load.

Inputs

Hysteresis	±1 mm
Repeatability	±1 mm
Switch-on delay	< 2 s, during this time the switching outputs are blocked
Switching delay	Adjustable 0.3 to 60 s
When the sensor is covered	0.5 s
When the sensor is uncovered	1 s
Filter time constant	Adjustable 0 to 100 s

Outputs

Number	
For IO-Link operation	1 (output signal according to IO-Link communication standard version 1.1)
For switching operation	2 (SIO mode; SIO = standard IO)
With PNP, NPN, push-pull	2
Configuration options	Hysteresis or window function, switching function, NC contact or NO contact, output p-switching (PNP) or n-switching (NPN), switch-on and switch-off delay, pulse-width modulation (PWM), pollution degree detection, wet test with medium
Pulse-width modulation (PWM)	
Period duration adjustable	50 to 1000 ms
Mark-to-space ratio	0 to 100 %
Switching current	≤ 200 mA per output
Voltage drop at switching transistor	≤ 1 V
Short-circuit resistance	Yes (clocked)
Reverse voltage protection	Yes
Current limiting	Yes

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Interface

IO-Link

Communication	Via end device with IO-Link master and device description file (IODD)
Communication interface	IO-Link device V 1.1
Data transfer rate (baud rate)	COM3 (230.4 kBaud)
Max. cable length	20 m, unshielded
Min. cycle time	0.7 ms
Function	Transfer of process data, configuration data, and device information
Profiles	Common Profile, Smart Sensor Profile, Firmware Update Profile
IO Device Description (IODD)	Depending on the ordered operating temperature range; available on the manufacturer's website https://en.jumo.de or at www.ioddfinder.io-link.com
Menu navigation	According to VDMA 24574-4

Display

Color display	According to NE107, IO-Link, customer-specific
Brightness	4 levels (configurable)
Self-diagnosis/self-monitoring	According to NE107 and VDI/VDE 2650

Environmental influences

Resistance to climatic conditions	
Operation	100 % relative humidity including condensation on the device outer case
Storage	90 % relative humidity without condensation
Ambient temperature	
Cable	-40 to +80 °C (fixed), -25 to +80 °C (movable)
Round plug M12 × 1	-40 to +85 °C
Storage temperature	-40 to +80 °C
Process temperature	
Parts in contact with the medium	-40 to 115 °C (standard), <1 h/d to 135 °C and T_{amb} <50 °C -40 to +200 °C (for versions with sliding connection)
Process pressure	-1 to +60 bar
Protection type	DIN EN 60529
Cable	IP69
M12 plug connector	IP67
Max. site altitude	5300 m above sea level
Electromagnetic compatibility (EMC)	DIN EN 61326-1:2022
Interference emission	
In metallic containers, pipes	Class B[a]
In plastic containers, plastic pipes	Class A[b]
Interference immunity	
In metallic containers, pipes	Industrial requirement
In plastic containers, plastic pipes	Domestic requirement
Vibration resistance	IEC 60068-2-6, DIN EN 61373, DIN EN 50155, category 1 B
Endurance limit	4 g at 25 to 100 Hz
Shock resistance	3 g (vertical) or 5 g (transverse and longitudinal) for 30 ms
Operating location according to UL approval	Indoors

[a] The product is suitable for industrial use as well as for households and small businesses.

[b] The product is only suitable for industrial use.

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Mechanical features

Materials	
Parts in contact with the medium	
Process connection	PEEK (depending on sealing concept stainless steel 316 L)
Sliding connection 360, 361	PEEK, FKM/FPM, stainless steel 316 L
Parts not in contact with the medium	
Housing	Stainless steel 316 L
Connection cable	PUR
Surface roughness	$R_a \leq 0.8$ µm
Cable bending radius	
Fixed	r ≥ 21 mm
Movable	r ≥ 42 mm
Installation position	Any
Weight	60 g for G1/2" with M12 plug connector

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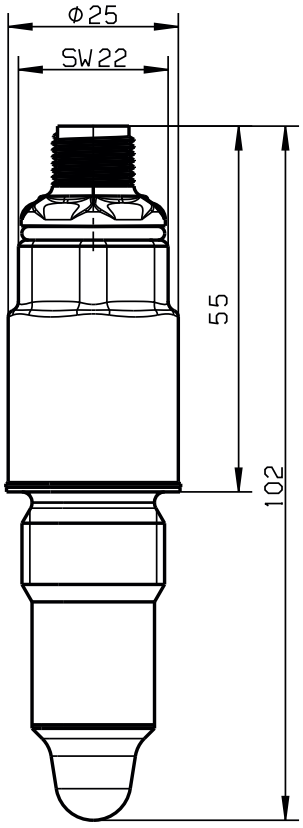
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Dimensions

Device

Electrical connection 036
with M12 plug connector



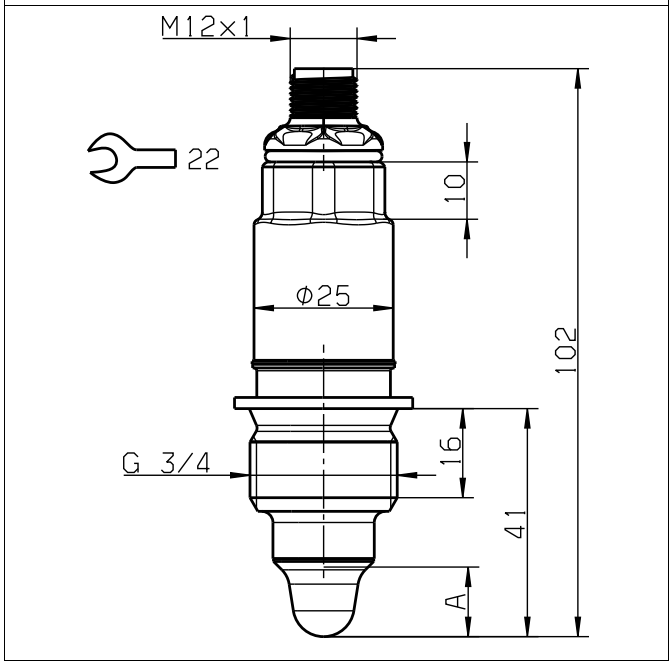
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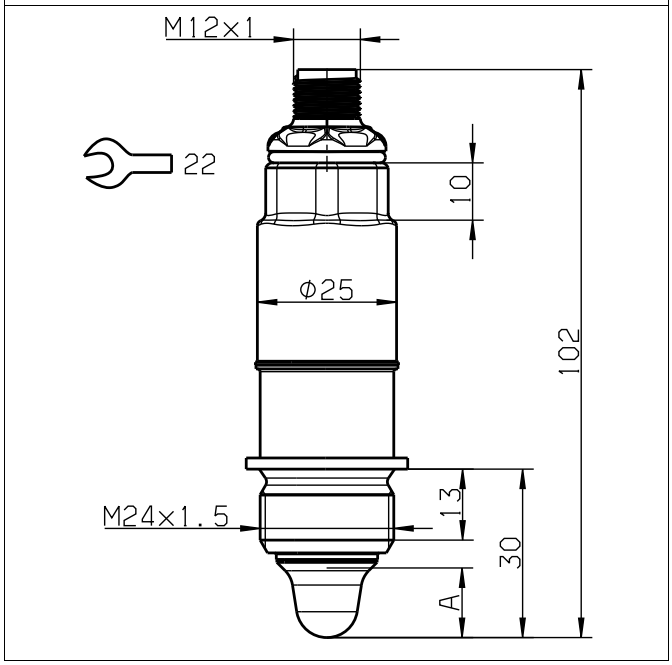
Process connections

105
Screw connection G 3/4"



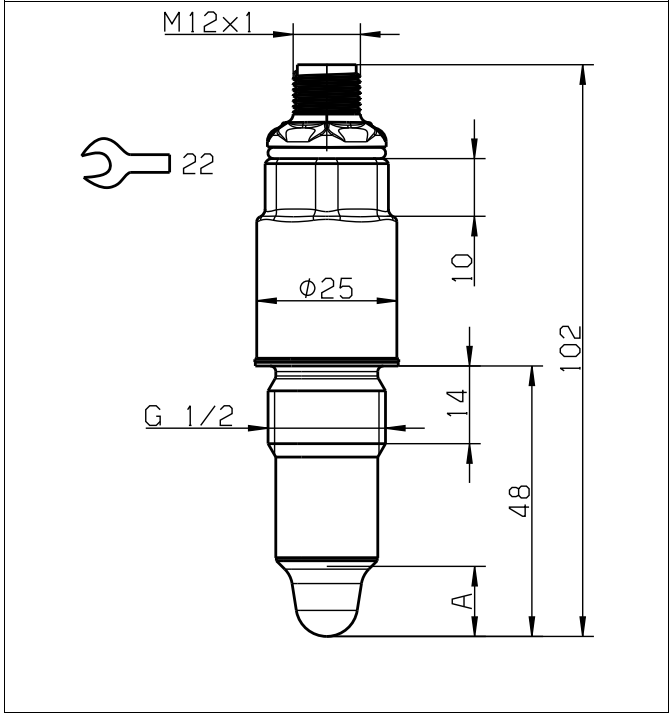
A Immersion depth, PEEK tip 12.5 mm

133
Screw connection M24 × 1.5



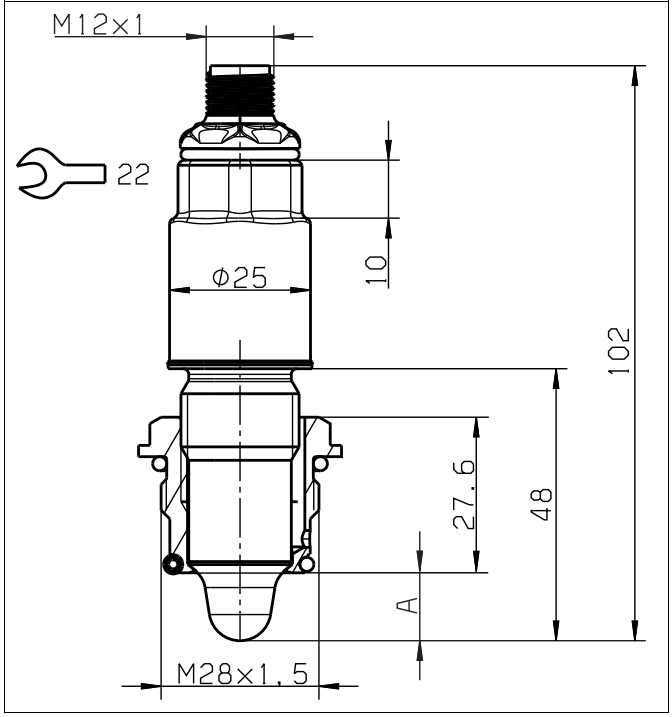
A Immersion depth, PEEK tip 12.5 mm

387
Screw connection G 1/2"



A Immersion depth, PEEK tip 12.5 mm

997
JUMO PEKA – Hygienic process connection



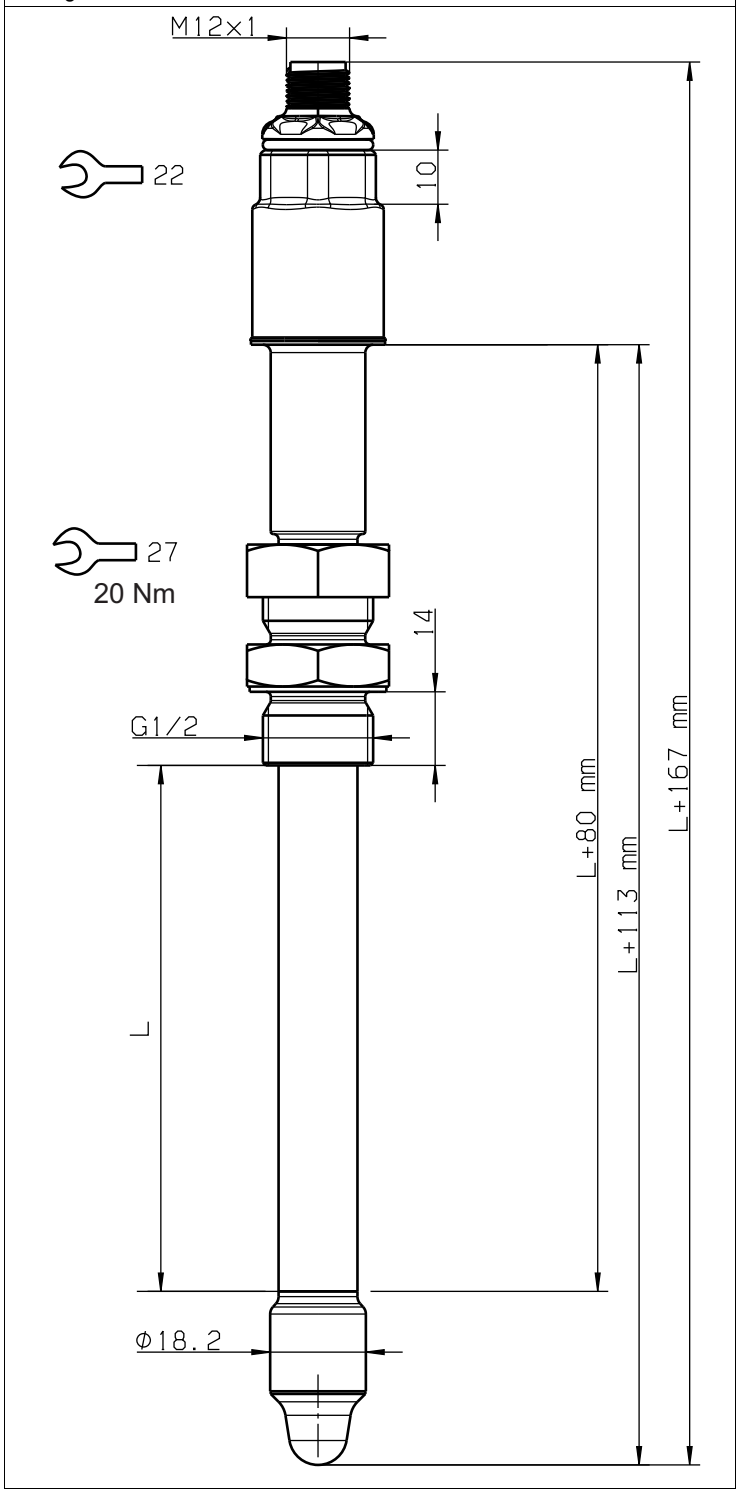
A Immersion depth, PEEK tip 12.5 mm

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360, 361
Sliding connection



L Length 100 mm or 250 mm

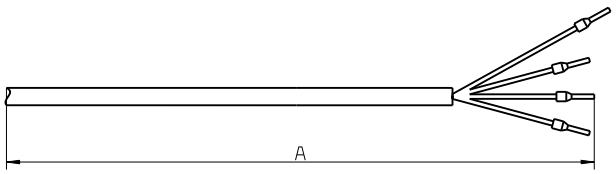
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Cable

Electrical connection 170
with cable PUR



A Cable length, see order details

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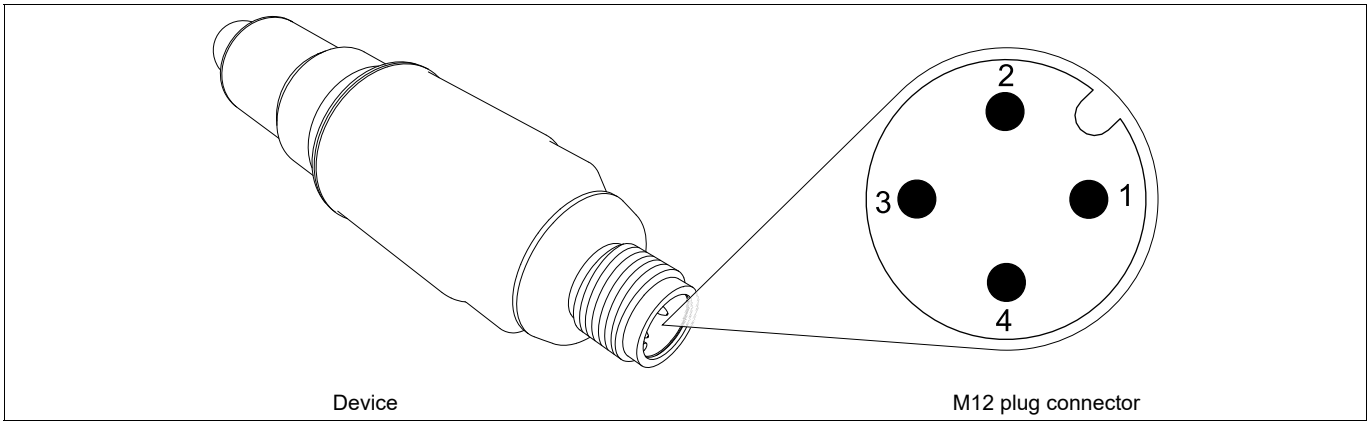
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Connection elements

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

M12 plug connector



Designation	Description	Assignment[a]
IO-Link	L+	1 BN (brown)
	L-	3 BU (blue)
	I/Q = OUT2	2 WH (white)
	C/Q = IO-Link	4 BK (black)
PNP	L+	1 BN (brown)
	L-	3 BU (blue)
	OUT2	2 WH (white)
	OUT1	4 BK (black)
NPN	L+	1 BN (brown)
	L-	3 BU (blue)
	OUT2	2 WH (white)
	OUT1	4 BK (black)
push-pull	L+	1 BN (brown)
	L-	3 BU (blue)
	OUT2	2 WH (white)
	OUT1	4 BK (black)

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

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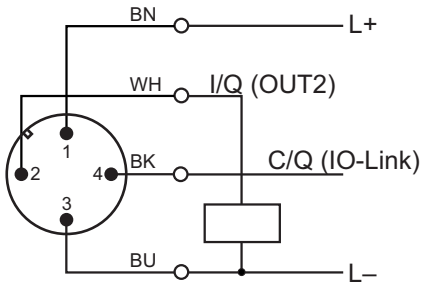
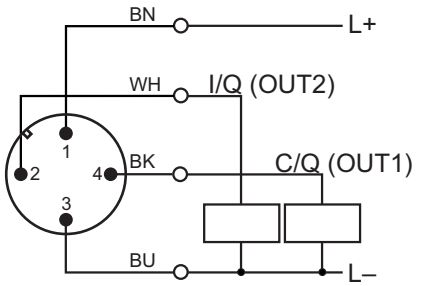
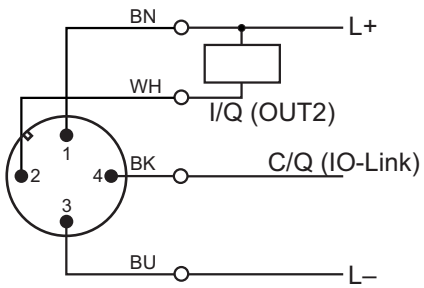
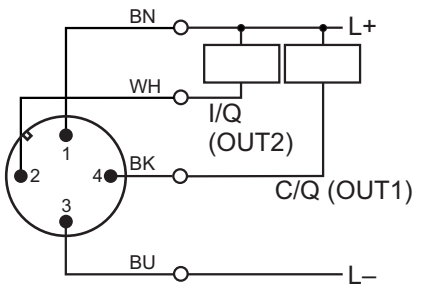
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If connected to a certified intrinsically safe electrical circuit [Ex i], the following values are given.

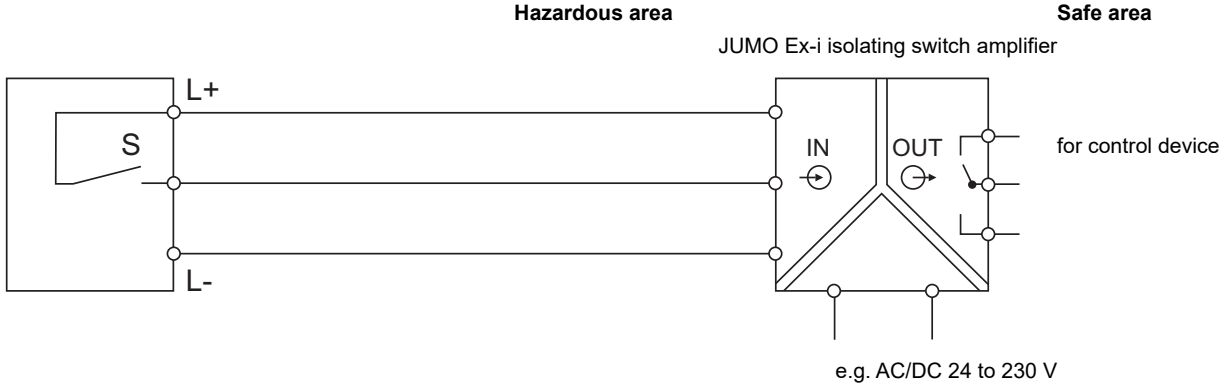
Output signal	Max. voltage U_i in V	Max. current U_i in mA	Max. power P_i in mW	Inner inductance in µH	Inner capacitance in nF
PNP	≤ 30	≤ 100	≤ 750	57	35
NPN				For cable version 1 µH/m add connecting cable	For cable version 0,2 nF/m add connecting cable
push-pull					

Connection examples

Standard

IO-Link operation with 1 switching output	**Switch operation with 2 switching outputs**
p-switching (PNP)	p-switching (PNP)
	
n-switching (NPN)	n-switching (NPN)
	

Ex i



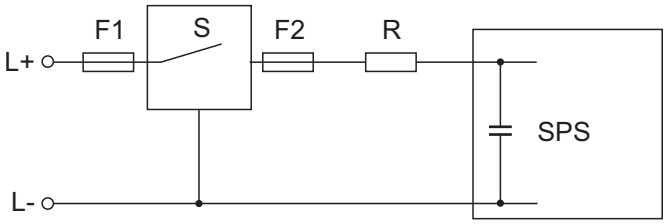
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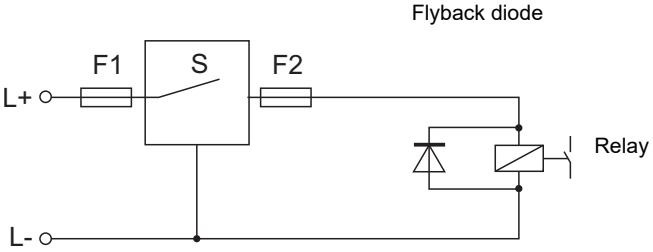
Current limiting for capacitive loads

In the case of capacitive loads, the switching contact (S) must be protected with a resistor.



Protective circuit for inductive loads for capacitive loads

In the case of inductive loads, the switching contact (S) must be protected with a flyback diode.



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Order details

	(1)	**Basic type**
408401		JUMO ZELOS C01 LS – Capacitive level switch
	(2)	**Basic type extension**
000		None
062		Shipbuilding approval
065		Hygienic design
262		WHG approval
263		WHG approval, explosion protection, intrinsically safe, Ex i
265		WHG approval, explosion protection, intrinsically safe, Ex i, and hygienic design
362		Explosion protection, intrinsically safe, Ex i
365		Explosion protection, intrinsically safe, Ex i, and hygienic design
662		Shipbuilding approval and explosion protection, intrinsically safe, Ex i
	(3)	**Electrical connection**
036		M12 plug connector
170		Cable, PUR
	(4)	**Cable length**
0		None
2000		2,000 mm
5000		5,000 mm
10000		10,000 mm
	(5)	**Process connection**
105		Fitting G 3/4"
133		Fitting M24 × 1.5
360		Sliding connection, G 1/2", 100 mm adjustable
361		Sliding connection, G 1/2", 250 mm adjustable
387		Fitting G 1/2" with PEEK seal
997		JUMO PEKA – Hygienic process connection
	(6)	**Output**
447		Digital (push-pull)
458		IO-Link measured value transmission, including digital output
469		NPN switching output
470		PNP switching output
	(7)	**Medium temperature**
487		-40 to +200 °C
500		-40 to +115 °C
	(8)	**Extra codes**
061		UL approval
374		acceptance test certificate 3.1 Material DIN EN 10204
634		TAG number
950		Railway application

	(1)		**(2)**		**(3)**		**(4)**		**(5)**		**(6)**		**(7)**		**(8)**
Order code		/		-		-		-		-		-		/	
Order example	408401	/	000	-	036	-	0	-	387	-	470	-	500	/	061

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Stock versions

Order code	Part no.
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408401/065-036-0-387-458-500/061	00771693
408401/065-036-0-387-470-500/061	00771694
408401/362-036-0-387-470-500/061	00771696
408401/062-036-0-387-470-500/061	00771699

Accessories

When using a device with UL application, the user has to ensure that the accessories he uses are also approved for a UL application (e.g. cables with UL approval AVLV2/8 suitable for external connection and/or cables with UL approval CYJV/7 or CYJV/8 or PVVA/7 or PVVA2/8, each approved for ambient temperatures > 80 °C).

Designation	Part no.
Connection line M8/voltage supply, length 2 m, IO-Link master, 4 channel, with UL approval	00767913
Connection line M8/Ethernet, length 2 m, IO-Link master, 4 channel, with UL approval	00767923
Connection line M12/voltage supply, length 2 m, IO-Link master, 8 channel, with UL approval	00767914
Connection line M12/Ethernet, length 2 m, IO-Link master, 8 channel, with UL approval	00767927
USB IO-Link master, 1-channel	00694070
IO-Link master, 4 channel, with UL approval	00759867
IO-Link master, 8 channel, with UL approval	00759875
Magnetic pen for teach function	00736330
Welding socket G 1/2" for process connection 387	00378264
Adapter G 1/2" VARIVENT Type N DN 50/40	30054461
T-piece with PEKA connection DN 100	00643582
T-piece with PEKA connection DN 80	00643581
T-piece with PEKA connection DN 65	00643580
T-piece with PEKA connection DN 50	00643579
T-piece with PEKA connection DN 40	00643576
T-piece with PEKA connection DN 32	00643574
T-piece with PEKA connection DN 25	00643555
T-piece with screw connection G 1/2" DN 100	00772334
T-piece with screw connection G 1/2" DN 80	00772333
T-piece with screw connection G 1/2" DN 65	00772332
T-piece with screw connection G 1/2" DN 50	00772331
T-piece with screw connection G 1/2" DN 40	00772330
T-piece with screw connection G 1/2" DN 32	00772321
T-piece with screw connection G 1/2" DN 25	00772316
Configuration cable for Ex devices	30048990
Connection line M12, M12, black, PUR, length 2 m (straight coupling/straight connector; 5 pole; A-coded)	00777804
Cable PUR, 4 × 0.34, black, length 2 m, with UL approval	00776248
Cable PUR, 4 × 0.34, black, length 5 m, with UL approval	00776250
Cable PUR, 4 × 0.34, black, length 10 m, with UL approval	00776252
Line socket, 4-pole, M12 × 1, straight, length 2 m	00404585
Line socket, 4-pole, M12 × 1, angled, length 2 m	00409334
Sealing ring A24 × 2 - Vf for process connection 133	00704485
Sealing ring A26 × 2 - Vf for process connection 105	30049315
Service deployment	00427970
Preconfiguration (Service)	00427968