

# SAC-3P-MS-BI-1L-Z180 SCO/.../... - Sensor/actuator cable



1441118

<https://www.phoenixcontact.com/us/products/1441118>

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Sensor/actuator cable, 3-position, Variable cable type, Plug straight M12 SPEEDCON, coding: A, on Valve connector BI (11 mm), with 1 LED, Wiring: Z diode, cable length: Free input (0.2 ... 40.0 m), Pin connector pattern of valve plug rotated 180°

## Your advantages

- Easy and safe: 100 % electrically tested plug-in components
- Save time, thanks to installation with SPEEDCON fast locking system
- Convenient: increased machine availability thanks to quick and easy diagnostics
- Flexible solutions - configurable materials with variable cable types and cable lengths

## Commercial data

Item number	1441118
Packing unit	1 pc
Minimum order quantity	1 pc
Note	Made to order (non-returnable)
Sales key	BF17
Product key	AF1DMA
Customs tariff number	85444290
Country of origin	PL

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1441118

<https://www.phoenixcontact.com/us/products/1441118>

## Technical data

### Product properties

Product type	Sensor/actuator cable with valve connector
Application	Standard
	Robots and drag chains
Number of positions	3
No. of cable outlets	1
Shielded	no
Coding	A

### Insulation characteristics

Overvoltage category	III
Degree of pollution	3

### Connection data

#### Conductor connection

Tightening torque	0.4 Nm (M12 connector)
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### Material specifications

Flammability rating according to UL 94	HB
Seal material	TPU
Material housing valve plug	TPU
Material of grip body	TPU
Contact material	CuSn
Contact surface material	Ni/Au
Contact carrier material	TPU GF
Contact material	CuSn
Valve plug contact insert material	PA 6.6
Contact surface material	Sn
Material for screw connection	Zinc die-cast, nickel-plated

### Electrical properties

Insulation resistance	$\geq 100 \text{ M}\Omega$
Nominal voltage $U_N$	24 V AC
	24 V DC
Nominal current $I_N$	4 A

#### Valve connector characteristics

Fixing screws	M3 x 29
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### Mechanical properties

#### Mechanical data

Insertion/withdrawal cycles	$\geq 100$ (M12 connector)
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# SAC-3P-MS-BI-1L-Z180 SCO/.../... - Sensor/actuator cable



1441118

<https://www.phoenixcontact.com/us/products/1441118>

## Signaling

Status display	1 LED
Status display present	yes

## Connector

### Connection 1

Type	Plug straight M12 SPEEDCON
Locking type	SPEEDCON
Coding type	A

### Connection 2

Type	Valve connector BI (11 mm)
Material	CuSn (Contact)
	Sn (Contact surface)
	PA 6.6 (Contact carrier)
	TPU (Housing)
Protective circuit	Z diode

## Cable/line

Cable length	Free input (0.2 ... 40.0 m)
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### PUR halogen-free black [PUR]

Cable weight	30 kg/km
UL AWM Style	20549
Number of positions	3
Shielded	no
Cable type	PUR halogen-free black [PUR]
	PUR halogen-free black PUR
Conductor structure signal line	28x 0.15 mm
AWG signal line	20
Conductor cross-section	3x 0.5 mm <sup>2</sup>
Wire diameter incl. insulation	1.5 mm ±0.05 mm (Signal line)
External cable diameter	4.50 mm ±0.2 mm
Outer sheath, material	PUR
External sheath, color	black-gray RAL 7021
Conductor material	Bare Cu litz wires
Material wire insulation	PP
Single wire, color	black 1, black 2, green/yellow
Overall twist	3 wires, twisted
Max. conductor resistance	39 Ω/km (at 20 °C)
Insulation resistance	min. 20 MΩ*km
Nominal voltage, cable	≤ 300 V
Test voltage	≥ 1200 V
Minimum bending radius, fixed installation	5 x D

# SAC-3P-MS-BI-1L-Z180 SCO/.../... - Sensor/actuator cable



1441118

<https://www.phoenixcontact.com/us/products/1441118>

Minimum bending radius, flexible installation	10 x D
Smallest bending radius, fixed installation	22.5 mm
Smallest bending radius, movable installation	45 mm
Dynamic load capacity (bending)	Max. bending cycles: 15000000, Bending radius: 50 mm, Traversing path: 0.9 m, Traversing rate: 5 m/s, Acceleration: 30 m/s <sup>2</sup>
Halogen-free	in accordance with DIN VDE 0472 part 815
Flame resistance	according to DIN VDE 0482 According to DIN EN 50265-2-1
Resistance to oil	in accordance with DIN EN 60811-2-1
Other resistance	largely oil-resistant partly UV-resistant (in accordance with DIN EN ISO 4892-2-A)
Ambient temperature (operation)	-40 °C ... 80 °C (cable, fixed installation) -20 °C ... 80 °C (Cable, flexible installation)

PUR/PVC, 0.75 mm<sup>2</sup>, black [116]

Cable weight	53.4 kg/km
UL AWM Style	20549
Number of positions	3
Shielded	no
Cable type	PUR/PVC, 0.75 mm <sup>2</sup> , black [116] PUR/PVC, 0.75 mm <sup>2</sup> , black 116
Conductor structure signal line	24x 0.20 mm
AWG signal line	18
Conductor cross-section	3x 0.75 mm <sup>2</sup>
Wire diameter incl. insulation	1.7 mm ±0.05 mm
External cable diameter	5.80 mm ±0.2 mm
Outer sheath, material	PUR
External sheath, color	black RAL 9005
Conductor material	Bare Cu litz wires
Material wire insulation	PVC
Single wire, color	black 1, black 2, green/yellow
Overall twist	3 wires, twisted
Max. conductor resistance	26 Ω/km (at 20 °C)
Insulation resistance	≥ 20 MΩ*km
Nominal voltage, cable	300 V
Test voltage	1200 V
Minimum bending radius, fixed installation	5 x D
Minimum bending radius, flexible installation	10 x D
Smallest bending radius, fixed installation	29 mm
Smallest bending radius, movable installation	58 mm
Dynamic load capacity (bending)	Max. bending cycles: 1000000, Traversing path: 10 m, Traversing rate: 2 m/s, Acceleration: 2.5 m/s <sup>2</sup>
Flame resistance	DIN VDE 0482 DIN EN 50265-2-1

# SAC-3P-MS-BI-1L-Z180 SCO/.../... - Sensor/actuator cable



1441118

<https://www.phoenixcontact.com/us/products/1441118>

	in acc. with UL FT-2
Resistance to oil	in accordance with DIN EN 60811-2-1
Other resistance	Low adhesion
Special properties	flexible
Ambient temperature (operation)	-40 °C ... 80 °C (cable, fixed installation)
	-5 °C ... 80 °C (Cable, flexible installation)

## PUR/PVC 0.75 mm<sup>2</sup> gray [117]

Cable weight	58.5 kg/km
UL AWM Style	20549
Number of positions	3
Shielded	no
Cable type	PUR/PVC 0.75 mm <sup>2</sup> gray [117]
	PUR/PVC 0.75 mm <sup>2</sup> gray 117
Conductor structure signal line	24x 0.20 mm
AWG signal line	18
Conductor cross-section	3x 0.75 mm <sup>2</sup> (Signal line)
Wire diameter incl. insulation	1.7 mm ±0.05 mm (Signal line)
External cable diameter	5.80 mm ±0.2 mm
Outer sheath, material	PUR
External sheath, color	gray RAL 7001
Conductor material	Bare Cu litz wires
Material wire insulation	PVC
Single wire, color	black 1, black 2, green/yellow
Overall twist	Wires twisted in layers
Max. conductor resistance	26 Ω/km (at 20 °C)
Insulation resistance	≥ 20 MΩ*km
Nominal voltage, cable	300 V
Test voltage	1200 V
Minimum bending radius, fixed installation	5 x D
Minimum bending radius, flexible installation	10 x D
Smallest bending radius, fixed installation	29 mm
Smallest bending radius, movable installation	58 mm
Dynamic load capacity (bending)	Max. bending cycles: 1000000, Traversing rate: 2 m/s, Acceleration: 2.5 m/s <sup>2</sup>
Flame resistance	according to DIN VDE 0482
	According to DIN EN 50265-2-1
	in acc. with UL FT-2
Ambient temperature (operation)	-40 °C ... 80 °C (cable, fixed installation)
	-5 °C ... 80 °C (Cable, flexible installation)

## PUR irradiated halogen-free orange [150]

Cable weight	31 kg/km
Number of positions	3
Shielded	no

# SAC-3P-MS-BI-1L-Z180 SCO/.../... - Sensor/actuator cable



1441118

<https://www.phoenixcontact.com/us/products/1441118>

Cable type	PUR irradiated halogen-free orange [150]
	PUR irradiated halogen-free orange 150
Conductor structure signal line	28x 0.15 mm
AWG signal line	20
Conductor cross-section	3x 0.5 mm <sup>2</sup> (Signal line)
Wire diameter incl. insulation	1.46 mm ±0.02 mm (Signal line)
External cable diameter	4.50 mm ±0.15 mm
Outer sheath, material	PUR
External sheath, color	orange RAL 2003
Conductor material	Bare Cu litz wires
Material wire insulation	TPE-E
Single wire, color	black 1, black 2, green/yellow
Thickness, insulation	≥ 0.21 mm (Core insulation)
	approx. 0.60 mm (Outer cable sheath)
Overall twist	3 wires, twisted
Max. conductor resistance	max. 39 Ω/km (at 20 °C)
Insulation resistance	≥ 100 MΩ*km (at 20 °C)
Nominal voltage, cable	≤ 300 V
Test voltage	≥ 3000 V
Minimum bending radius, fixed installation	5 x D
Minimum bending radius, flexible installation	10 x D
Smallest bending radius, fixed installation	23 mm
Smallest bending radius, movable installation	45 mm
Dynamic load capacity (bending)	Max. bending cycles: 5000000, Bending radius: 45 mm, Traversing path: 10 m, Traversing rate: 3 m/s
Halogen-free	in accordance with DIN VDE 0472 part 815
Flame resistance	in accordance with DIN UL-Style 20549
Resistance to oil	in accordance with DIN EN 60811-2-1
Special properties	Silicone-free
	Irradiated
Ambient temperature (operation)	-25 °C ... 80 °C (cable, fixed installation)
	-5 °C ... 80 °C (Cable, flexible installation)

## PUR halogen-free yellow [240]

Cable weight	30 kg/km
UL AWM Style	20549 (80°C/300 V)
Number of positions	3
Shielded	no
Cable type	PUR halogen-free yellow [240]
	PUR halogen-free yellow 240
Conductor structure signal line	28x 0.15 mm
AWG signal line	20
Conductor cross-section	3x 0.5 mm <sup>2</sup>
Wire diameter incl. insulation	1.46 mm ±0.02 mm

# SAC-3P-MS-BI-1L-Z180 SCO/.../... - Sensor/actuator cable



1441118

<https://www.phoenixcontact.com/us/products/1441118>

External cable diameter	4.50 mm ±0.15 mm
Outer sheath, material	PUR
External sheath, color	yellow
Conductor material	Bare Cu litz wires
Material wire insulation	PP
Single wire, color	black 1, black 2, green/yellow
Thickness, insulation	≥ 0.21 mm
Thickness, outer sheath	approx. 0.60 mm
Overall twist	3 wires, twisted
Max. conductor resistance	≤ 39 Ω/km
Insulation resistance	≥ 10 GΩ*km
Nominal voltage, cable	≤ 300 V
Test voltage	≥ 3000 V
Minimum bending radius, fixed installation	5 x D
Minimum bending radius, flexible installation	10 x D
Smallest bending radius, fixed installation	23 mm
Smallest bending radius, movable installation	45 mm
Halogen-free	in accordance with DIN VDE 0472 part 815
Flame resistance	in accordance with DIN UL-Style 20549
Resistance to oil	in accordance with DIN EN 60811-2-1
Ambient temperature (operation)	-15 °C ... 80 °C (cable, fixed installation)

## PUR halogen-free gray [280]

Cable weight	33.2 kg/km
UL AWM Style	20549
Number of positions	3
Shielded	no
Cable type	PUR halogen-free gray [280] PUR halogen-free gray 280
Conductor structure signal line	28x 0.15 mm
AWG signal line	20
Conductor cross-section	3x 0.5 mm <sup>2</sup> (Signal line)
Wire diameter incl. insulation	1.5 mm ±0.05 mm (Signal line)
External cable diameter	4.50 mm ±0.2 mm
Outer sheath, material	PUR
External sheath, color	gray RAL 7001
Conductor material	Bare Cu litz wires
Material wire insulation	PP
Single wire, color	black 1, black 2, green/yellow
Overall twist	Wires twisted in layers
Max. conductor resistance	39 Ω/km (at 20 °C)
Insulation resistance	≥ 20 MΩ*km
Nominal voltage, cable	300 V
Test voltage	1200 V

# SAC-3P-MS-BI-1L-Z180 SCO/.../... - Sensor/actuator cable



1441118

<https://www.phoenixcontact.com/us/products/1441118>

Minimum bending radius, fixed installation	5 x D
Minimum bending radius, flexible installation	10 x D
Smallest bending radius, fixed installation	22.5 mm
Dynamic load capacity (bending)	Max. bending cycles: 15000000, Bending radius: 50 mm, Traversing path: 0.9 m, Traversing rate: 5 m/s, Acceleration: 30 m/s <sup>2</sup>
Halogen-free	in accordance with DIN VDE 0472 part 815
Flame resistance	according to DIN VDE 0482 According to DIN EN 50265-2-1
Resistance to oil	in accordance with DIN EN 60811-2-1
Ambient temperature (operation)	-40 °C ... 80 °C (cable, fixed installation) -20 °C ... 80 °C (Cable, flexible installation)

## PVC black [PVC]

Cable weight	38.6 kg/km
UL AWM Style	2464
Number of positions	3
Shielded	no
Cable type	PVC black [PVC] PVC black PVC
Conductor structure signal line	16x 0.20 mm
AWG signal line	20
Conductor cross-section	3x 0.5 mm <sup>2</sup>
Wire diameter incl. insulation	1.5 mm ±0.05 mm
External cable diameter	4.80 mm ±0.2 mm
Outer sheath, material	PVC
External sheath, color	black RAL 9005
Conductor material	Bare Cu litz wires
Material wire insulation	PVC
Single wire, color	black 1, black 2, green/yellow
Overall twist	3 wires, twisted
Max. conductor resistance	39 Ω/km (at 20 °C)
Insulation resistance	≥ 20 MΩ*km
Nominal voltage, cable	300 V
Test voltage	1200 V
Minimum bending radius, fixed installation	5 x D
Smallest bending radius, fixed installation	24 mm
Flame resistance	DIN VDE 0482 DIN EN 50265-2-1
Resistance to oil	in accordance with DIN EN 60811-2-1
Ambient temperature (operation)	-40 °C ... 80 °C (cable, fixed installation) -5 °C ... 80 °C (Cable, flexible installation)

## PVC gray [500]

Cable weight	39.2 kg/km
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# SAC-3P-MS-BI-1L-Z180 SCO/.../... - Sensor/actuator cable



1441118

<https://www.phoenixcontact.com/us/products/1441118>

Number of positions	3
Shielded	no
Cable type	PVC gray [500]
	PVC gray 500
Conductor type	Round cable
Conductor structure signal line	16x 0.20 mm
AWG signal line	20
Conductor cross-section	3x 0.5 mm <sup>2</sup> (Signal line)
Wire diameter incl. insulation	1.5 mm ±0.05 mm (Signal line)
External cable diameter	4.80 mm ±0.2 mm
Outer sheath, material	PVC
External sheath, color	gray RAL 7001
Conductor material	Bare Cu litz wires
Material wire insulation	PVC
Single wire, color	black 1, black 2, green/yellow
Overall twist	Wires twisted in layers
Max. conductor resistance	39 Ω/km (at 20 °C)
Insulation resistance	min. 20 MΩ*km
Nominal voltage, cable	300 V
Test voltage	1200 V
Minimum bending radius, fixed installation	5 x D
Smallest bending radius, fixed installation	24 mm
Flame resistance	DIN EN 50265-2-1
Resistance to oil	in accordance with DIN EN 60811-2-1
Ambient temperature (operation)	-40 °C ... 80 °C (cable, fixed installation)
	-5 °C ... 80 °C (Cable, flexible installation)

PVC, 0.75 mm<sup>2</sup>, black [534]

Cable weight	49.1 kg/km
Number of positions	3
Shielded	no
Cable type	PVC, 0.75 mm <sup>2</sup> , black [534]
	PVC, 0.75 mm <sup>2</sup> , black 534
Conductor structure signal line	24x 0.20 mm
AWG signal line	18
Conductor cross-section	3x 0.75 mm <sup>2</sup>
Wire diameter incl. insulation	1.7 mm ±0.1 mm
External cable diameter	5.30 mm ±0.2 mm
Outer sheath, material	PVC
External sheath, color	black
Conductor material	Bare Cu litz wires
Material wire insulation	PVC
Single wire, color	black 1, black 2, green/yellow
Overall twist	3 wires, twisted

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1441118

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Max. conductor resistance	26 Ω/km (at 20 °C)
Insulation resistance	min. 20 MΩ*km (at 20 °C)
Nominal voltage, cable	300 V
Test voltage	1200 V
Minimum bending radius, fixed installation	5 x D
Smallest bending radius, fixed installation	27 mm
Flame resistance	DIN VDE 0482
	DIN EN 50265-2-1
	in acc. to UL VW1
Resistance to oil	in accordance with DIN EN 60811-2-1
Ambient temperature (operation)	-40 °C ... 80 °C (cable, fixed installation)
	-5 °C ... 80 °C (Cable, flexible installation)

PUR, halogen-free, highly stranded, resistant to welding sparks, gray [800]

Note	Due to the extremely robust outer sheath, this cable should only be stripped in 5 cm increments.
Cable weight	31 kg/km
UL AWM Style	20549
Number of positions	3
Shielded	no
Cable type	PUR, halogen-free, highly stranded, resistant to welding sparks, gray [800]
	PUR, halogen-free, highly stranded, resistant to welding sparks, gray 800
Conductor structure signal line	28x 0.15 mm
AWG signal line	20
Conductor cross-section	3x 0.5 mm <sup>2</sup> (Signal line)
Wire diameter incl. insulation	1.5 mm ±0.05 mm (Signal line)
External cable diameter	4.50 mm ±0.2 mm
Outer sheath, material	PUR
External sheath, color	gray RAL 7001
Conductor material	Bare Cu litz wires
Material wire insulation	PP
Single wire, color	black 1, black 2, green/yellow
Overall twist	Wires twisted in layers
Max. conductor resistance	39 Ω/km (at 20 °C)
Insulation resistance	≥ 20 MΩ*km
Nominal voltage, cable	300 V
Test voltage	1200 V
Minimum bending radius, fixed installation	5 x D
Minimum bending radius, flexible installation	10 x D
Smallest bending radius, fixed installation	23 mm
Smallest bending radius, movable installation	45 mm
Dynamic load capacity (bending)	Max. bending cycles: 15000000, Bending radius: 50 mm, Traversing path: 0.9 m, Traversing rate: 5 m/s, Acceleration: 30 m/s <sup>2</sup>

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1441118

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Dynamic load capacity (torsion)	Torsion: $\pm 360$ °/m
Halogen-free	The cable is halogen-free
Flame resistance	in accordance with UL 758/1581 FT2
Resistance to oil	in accordance with DIN EN 60811-2-1
Other resistance	Highly resistant to acids, alkaline solutions and solvents
Special properties	Cable jacket is welding spark-resistant, recyclable, matt, low-adhesion, abrasion-resistant, flame-retardant, and self-extinguishing
	Free from silicone and cadmium
	Free of substances which would hinder coating with paint or varnish
Ambient temperature (operation)	-40 °C ... 80 °C (cable, fixed installation)
	-25 °C ... 80 °C (Cable, flexible installation)

## Environmental and real-life conditions

### Ambient conditions

Degree of protection	IP65
	IP67
	IP68
Ambient temperature (operation) (male connector/female connector)	-25 °C ... 90 °C (Plug / socket)
Ambient temperature (operation) (Valve connector)	-20 °C ... 85 °C (Valve connector)

## Standards and regulations

### M12

Standard designation	M12 connector
Standards/specifications	IEC 61076-2-101

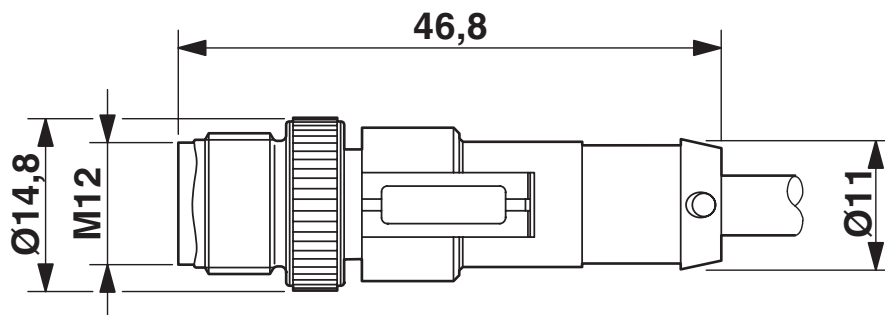
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1441118

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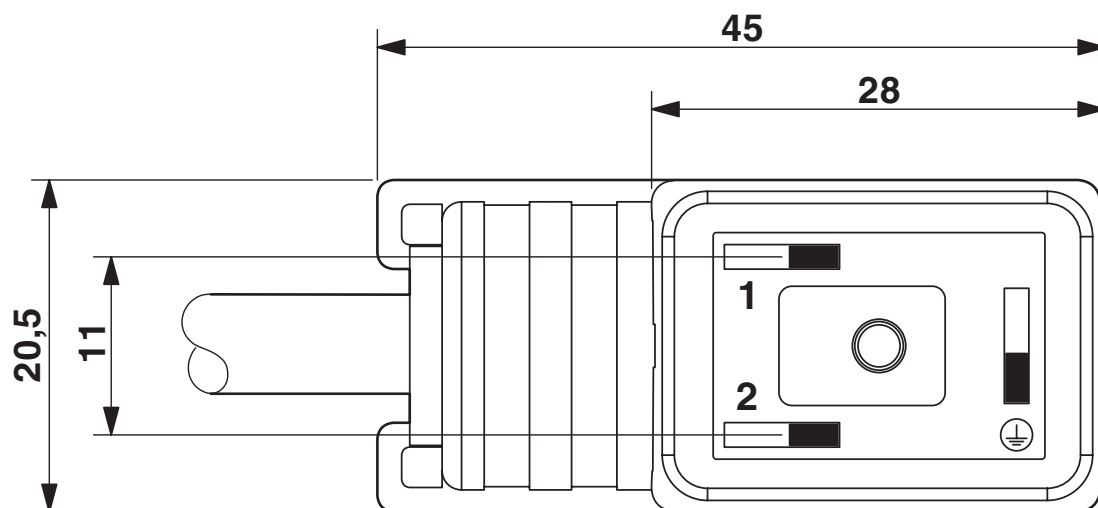
## Drawings

Dimensional drawing



Plug, M12 x 1, straight, shielded

Dimensional drawing

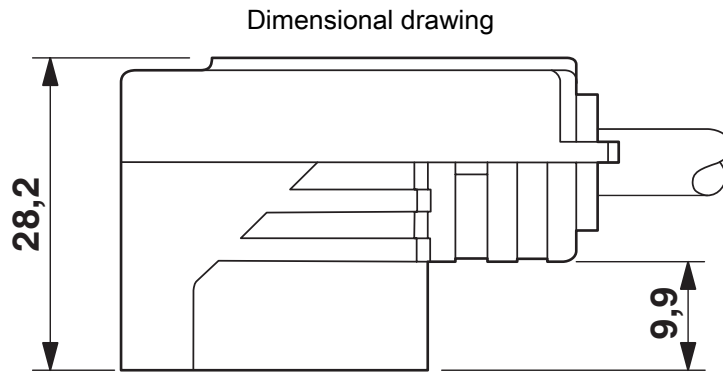


Valve connector, type BI, rotated by 180°

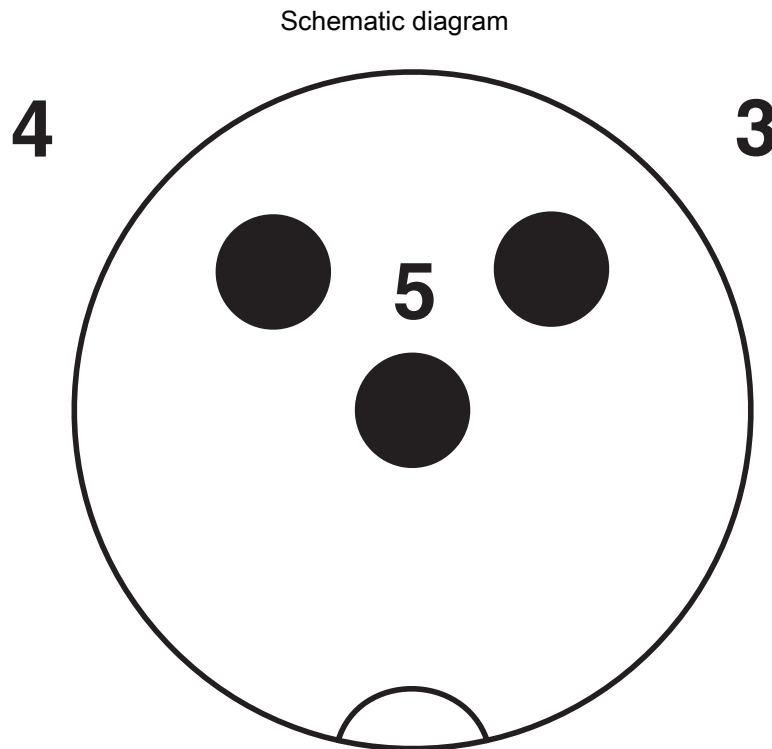
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Valve connector, type BI, side view



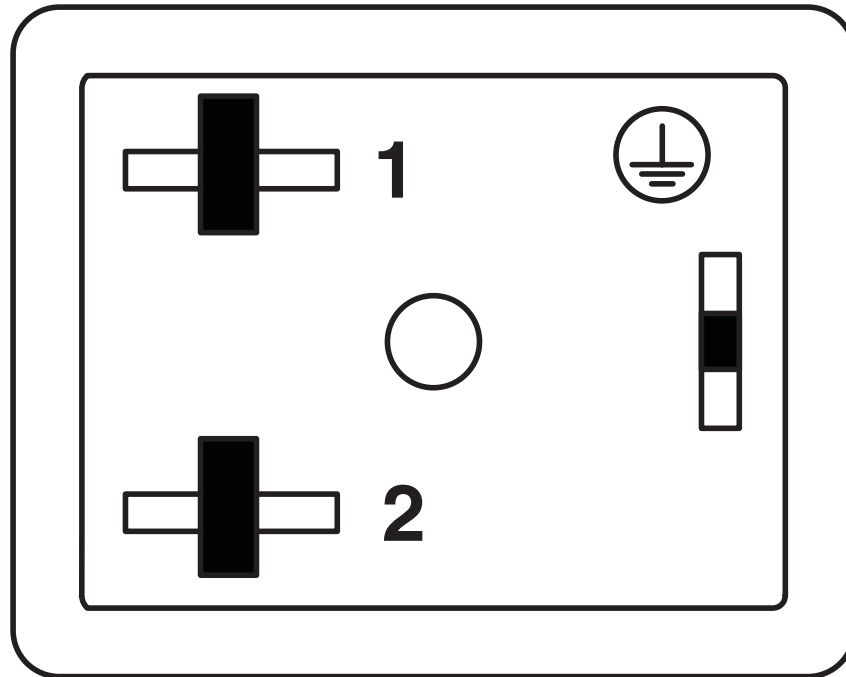
Pin assignment M12 plug, 3-pos., valve connector

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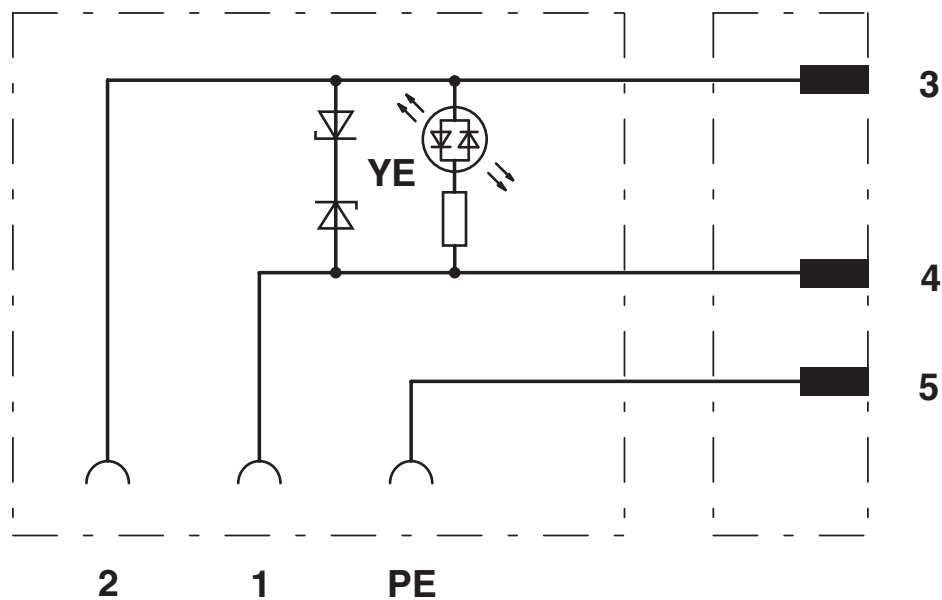
<https://www.phoenixcontact.com/us/products/1441118>

Schematic diagram



Valve connector pin assignment, type BI

Circuit diagram



Contact assignment of M12 plug and valve connector

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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/1441118>



**EAC-RoHS**

Approval ID: RU D-DE.HB35.B.00387



**CSAus**

Approval ID: 13631

	Nominal voltage $U_N$	Nominal current $I_N$	Cross section AWG	Cross section $\text{mm}^2$
keine				
	24 V	4 A	-	-

# SAC-3P-MS-BI-1L-Z180 SCO/.../... - Sensor/actuator cable



1441118

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## Classifications

### ECLASS

ECLASS-13.0	27060312
ECLASS-15.0	27060312

### ETIM

ETIM 10.0	EC001855
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### UNSPSC

UNSPSC 21.0	31251500
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# SAC-3P-MS-BI-1L-Z180 SCO/.../... - Sensor/actuator cable



1441118

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## Environmental product compliance

### EU RoHS

Fulfills EU RoHS substance requirements	Yes
Exemption	7(c)-I

### China RoHS

Environment friendly use period (EFUP)	EFUP-50
	An article-related China RoHS declaration table can be found in the download area for the respective article under "Manufacturer declaration". For all articles with EFUP-E, no China RoHS declaration table issued and required.

### EU REACH SVHC

REACH candidate substance (CAS No.)	No substance above 0.1 wt%
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