

# SAC-4P-M12MR SH/.../... - Sensor/actuator cable



1697470

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Sensor/actuator cable, 4-position, Variable cable type, shielded (Advanced Shielding Technology), Plug angled M12, coding: A, on free cable end, cable length: Free input (0.2 ... 40.0 m)

## Your advantages

- Easy and safe: 100 % electrically tested plug-in components
- Reliable signal transmission – 360° shielding in environments with electromagnetic interference

## Commercial data

|                        |                                |
|------------------------|--------------------------------|
| Item number            | 1697470                        |
| Packing unit           | 1 pc                           |
| Minimum order quantity | 1 pc                           |
| Note                   | Made to order (non-returnable) |
| Sales key              | BF17                           |
| Product key            | AF1CJA                         |
| Customs tariff number  | 85444290                       |
| Country of origin      | PL                             |

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## Technical data

### Product properties

|                      |                       |
|----------------------|-----------------------|
| Product type         | Sensor/actuator cable |
| Application          | Standard              |
| Number of positions  | 4                     |
| No. of cable outlets | 1                     |
| Shielded             | yes                   |
| Coding               | A                     |

### Insulation characteristics

|                      |    |
|----------------------|----|
| Overvoltage category | II |
| Degree of pollution  | 3  |

### Material specifications

|  |   |
|--|---|
| Flammability rating according to UL 94 | HB  |
| Material of grip body                  | TPU, hardly inflammable, self-extinguishing |
| Contact material                       | CuSn  |
| Contact surface material               | Ni/Au                                       |
| Contact carrier material               | TPU GF                                      |
| Material for screw connection          | Zinc die-cast, nickel-plated                |

### Electrical properties

|                       |                            |
|-----------------------|----------------------------|
| Insulation resistance | $\geq 100 \text{ M}\Omega$ |
| Nominal voltage $U_N$ | 48 V AC                    |
|                       | 60 V DC                    |
| Nominal current $I_N$ | 4 A                        |

### Mechanical properties

#### Mechanical data

|                             |            |
|-----------------------------|------------|
| Insertion/withdrawal cycles | $\geq 100$ |
|-----------------------------|------------|

### Signaling

|                        |    |
|------------------------|----|
| Status display         | no |
| Status display present | no |

### Connection data

#### Conductor connection

|                   |                        |
|-------------------|------------------------|
| Tightening torque | 0.4 Nm (M12 connector) |
|-------------------|------------------------|

### Connector

#### Connection 1

|      |                 |
|------|-----------------|
| Type | Plug angled M12 |
|------|-----------------|

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|                     |   |
|---------------------|---|
| Number of positions | 4 |
| Coding type         | A |

## Connection 2

|      |                |
|------|----------------|
| Type | free cable end |
|------|----------------|

## Cable/line

|              |                             |
|--------------|-----------------------------|
| Cable length | Free input (0.2 ... 40.0 m) |
|--------------|-----------------------------|

### PUR halogen-free black [PUR]

|   |  |
|---|--|
| Cable weight                                  | 36 kg/km   |
| UL AWM Style                                  | 20549 / 10493 (80°C/300 V)   |
| Number of positions                           | 4  |
| Shielded                                      | yes  |
| Cable type                                    | PUR halogen-free black [PUR]<br>PUR halogen-free black PUR   |
| Conductor structure signal line               | 42x 0.10 mm  |
| AWG signal line                               | 22   |
| Conductor cross-section                       | 4x 0.34 mm <sup>2</sup> (Signal line)  |
| Wire diameter incl. insulation                | 1.27 mm ±0.02 mm (Signal line)   |
| External cable diameter                       | 4.95 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                            | brown, white, blue, black  |
| Thickness, insulation                         | ≥ 0.21 mm  |
| Thickness, outer sheath                       | approx. 0.50 mm  |
| Overall twist                                 | 4 wires, twisted   |
| Shielding                                     | Tinned copper braided shield   |
| Optical shield covering                       | 80 %   |
| Max. conductor resistance                     | max. 58 Ω/km (at 20 °C)  |
| Insulation resistance                         | ≥ 100 GΩ*km (at 20 °C)   |
| Wave impedance                                | ≥ 62 Ω (f = 10 MHz)  |
| Cable capacity                                | ≤ 80 pF/m (Conductor-Conductor)<br>≤ 135 pF/m (Wire/shield)  |
| 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   | 25 mm  |
| Smallest bending radius, movable installation | 50 mm  |
| Dynamic load capacity (bending)               | Max. bending cycles: 10000000, Bending radius: 10 x D,<br>Traversing path: 10 m, Traversing rate: 3 m/s, Acceleration: 10 m/s <sup>2</sup> |

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|                                 |  |
|---------------------------------|--|
| Dynamic load capacity (torsion) | Torsion: $\pm 180$ °/m, Torsion cycles: $\geq 5000000$ , Torsional frequency: 35 cycles/min. |
| Halogen-free                    | in accordance with DIN VDE 0472 part 815   |
|                                 | in accordance with DIN EN 50267-2-1  |
| Flame resistance                | in accordance with UL 758/1581 FT2   |
|                                 | DIN EN 60332-2-2 (20 s)  |
| Resistance to oil               | in accordance with DIN EN 60811-2-1  |
| Other resistance                | Highly resistant to acids, alkaline solutions and solvents                                   |
|                                 | hydrolysis and microbe resistant   |
|                                 | Resistant to salt water  |
|                                 | partly UV-resistant (in accordance with DIN EN ISO 4892-2-A)                                 |
|                                 | abrasion-resistant   |
| Special properties              | Flexible cable conduit capable   |
|                                 | Silicone-free  |
|                                 | Free of substances which would hinder coating with paint or varnish                          |
|                                 | Low adhesion surface   |
| Ambient temperature (operation) | -40 °C ... 80 °C (cable, fixed installation)   |
|                                 | -25 °C ... 80 °C (Cable, flexible installation)  |

## PUR halogen-free gray [280]

|                                 |                                       |
|---------------------------------|---------------------------------------|
| Cable weight                    | 36 kg/km                              |
| UL AWM Style                    | 20549 / 10493 (80°C/300 V)            |
| Number of positions             | 4                                     |
| Shielded                        | yes                                   |
| Cable type                      | PUR halogen-free gray [280]           |
|                                 | PUR halogen-free gray 280             |
| Conductor structure signal line | 42x 0.10 mm                           |
| AWG signal line                 | 22                                    |
| Conductor cross-section         | 4x 0.34 mm <sup>2</sup> (Signal line) |
| Wire diameter incl. insulation  | 1.27 mm $\pm$ 0.02 mm (Signal line)   |
| External cable diameter         | 4.95 mm $\pm$ 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              | brown, white, blue, black             |
| Thickness, insulation           | $\geq 0.21$ mm                        |
| Thickness, outer sheath         | approx. 0.50 mm                       |
| Overall twist                   | 4 wires, twisted                      |
| Shielding                       | Tinned copper braided shield          |
| Optical shield covering         | 80 %                                  |
| Max. conductor resistance       | max. 58 $\Omega$ /km (at 20 °C)       |
| Insulation resistance           | $\geq 100$ G $\Omega$ *km (at 20 °C)  |
| Wave impedance                  | $\geq 62$ $\Omega$ (f = 10 MHz)       |

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|   |   |
|---|---|
| Cable capacity                                | ≤ 80 pF/m (Conductor-Conductor)   |
|   | ≤ 135 pF/m (Wire/shield)  |
| 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   | 25 mm   |
| Smallest bending radius, movable installation | 50 mm   |
| Dynamic load capacity (bending)               | Max. bending cycles: 10000000, Bending radius: 10 x D, Traversing path: 10 m, Traversing rate: 3 m/s, Acceleration: 10 m/s <sup>2</sup> |
| Dynamic load capacity (torsion)               | Torsion: ±180 °/m, Torsion cycles: ≥5000000   |
| Halogen-free                                  | in accordance with DIN VDE 0472 part 815  |
|   | in accordance with DIN EN 50267-2-1   |
| Flame resistance                              | in accordance with UL 758/1581 FT2  |
|   | DIN EN 60332-2-2 (20 s)   |
| Resistance to oil                             | in accordance with DIN EN 60811-2-1   |
| Other resistance                              | Highly resistant to acids, alkaline solutions and solvents  |
|   | hydrolysis and microbe resistant  |
|   | Resistant to salt water   |
|   | partly UV-resistant (in accordance with DIN EN ISO 4892-2-A)  |
|   | abrasion-resistant  |
| Special properties                            | Flexible cable conduit capable  |
|   | Silicone-free   |
|   | Free of substances which would hinder coating with paint or varnish   |
|   | Low adhesion surface  |
| Ambient temperature (operation)               | -40 °C ... 80 °C (cable, fixed installation)  |
|   | -25 °C ... 80 °C (Cable, flexible installation)   |

## PVC black [PVC]

|                                 |                                       |
|---------------------------------|---------------------------------------|
| Cable weight                    | 52 kg/km                              |
| Number of positions             | 4                                     |
| Shielded                        | yes                                   |
| Cable type                      | PVC black [PVC]                       |
|                                 | PVC black PVC                         |
| Conductor structure signal line | 42x 0.10 mm                           |
| AWG signal line                 | 22                                    |
| Conductor cross-section         | 4x 0.34 mm <sup>2</sup> (Signal line) |
| Wire diameter incl. insulation  | 1.4 mm ±0.02 mm                       |
| External cable diameter         | 5.90 mm ±0.2 mm                       |
| Outer sheath, material          | PVC                                   |
| External sheath, color          | black RAL 9005                        |
| Conductor material              | Bare Cu litz wires                    |
| Material wire insulation        | PVC                                   |

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|   |   |
|---|---|
| Single wire, color                            | brown, white, blue, black   |
| Thickness, insulation                         | ≥ 0.23 mm (Core insulation)   |
|   | ≥ 0.76 mm (Outer cable sheath)                                      |
| Overall twist                                 | 4 wires, twisted  |
| Shielding                                     | Tinned copper braided shield  |
| Optical shield covering                       | 85 %  |
| Max. conductor resistance                     | max. 58 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   | 30 mm   |
| Smallest bending radius, movable installation | 59 mm   |
| Flame resistance                              | As per UL-Style 2464  |
| Resistance to oil                             | in accordance with DIN EN 60811-2-1                                 |
| Special properties                            | Free of substances which would hinder coating with paint or varnish |
|   | Silicone-free   |
| Ambient temperature (operation)               | -25 °C ... 80 °C (cable, fixed installation)                        |
|   | -5 °C ... 80 °C (Cable, flexible installation)                      |

## PVC gray [500]

|                                 |                                |
|---------------------------------|--------------------------------|
| Cable weight                    | 57 kg/km                       |
| Number of positions             | 4                              |
| Shielded                        | yes                            |
| Cable type                      | PVC gray [500]                 |
|                                 | PVC gray 500                   |
| Conductor structure signal line | 42x 0.10 mm                    |
| AWG signal line                 | 22                             |
| Conductor cross-section         | 0.34 mm <sup>2</sup>           |
| Wire diameter incl. insulation  | 1.4 mm ±0.02 mm                |
| External cable diameter         | 5.9 mm                         |
|                                 | 5.90 mm                        |
| Outer sheath, material          | PVC                            |
| External sheath, color          | gray RAL 7001                  |
| Conductor material              | Bare Cu litz wires             |
| Material wire insulation        | PVC                            |
| Single wire, color              | brown, white, blue, black      |
| Thickness, insulation           | ≥ 0.23 mm (Core insulation)    |
|                                 | ≥ 0.76 mm (Outer cable sheath) |
| Overall twist                   | 4 wires, twisted               |
| Shielding                       | Tinned copper braided shield   |
| Optical shield covering         | 85 %                           |

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|   |  |
|---|--|
| Max. conductor resistance                     | max. 58 Ω/km   |
| Insulation resistance                         | ≥ 1 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   |
| Resistance to oil                             | in accordance with DIN EN 60811-2-1  |
| Special properties                            | Free of substances which would hinder coating with paint or varnish<br>Silicone-free           |
| Ambient temperature (operation)               | -25 °C ... 80 °C (cable, fixed installation)<br>-5 °C ... 80 °C (Cable, flexible installation) |

## Environmental and real-life conditions

### Ambient conditions

|   |                                  |
|---|----------------------------------|
| Degree of protection  | IP65<br>IP67                     |
| Ambient temperature (operation) (male connector/female connector) | -25 °C ... 90 °C (Plug / socket) |

## Standards and regulations

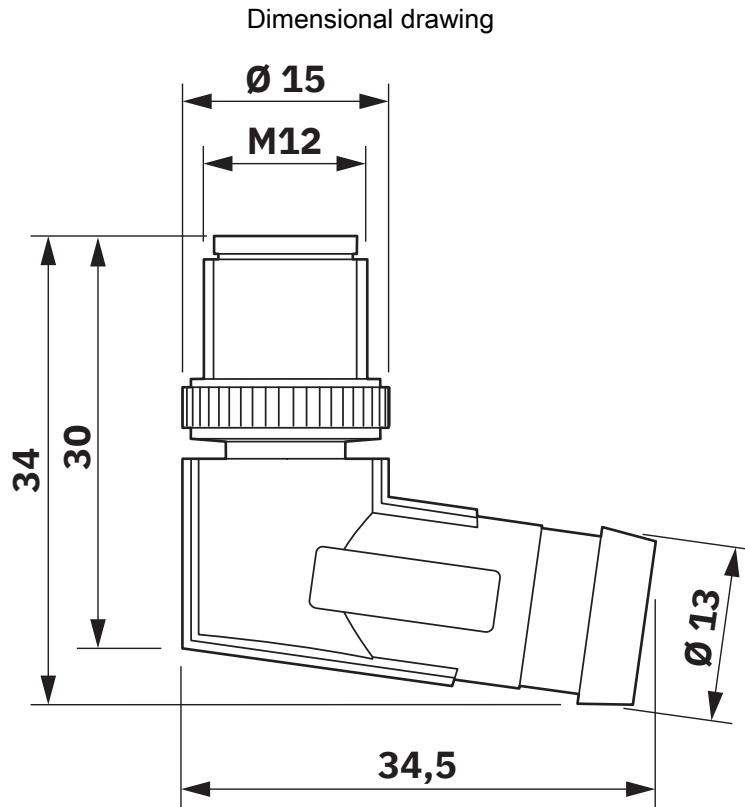
|                          |                 |
|--------------------------|-----------------|
| Standard designation     | M12 connector   |
| Standards/specifications | IEC 61076-2-101 |

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## Drawings



M12 x 1 male plug, angled, shielded

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Schematic diagram

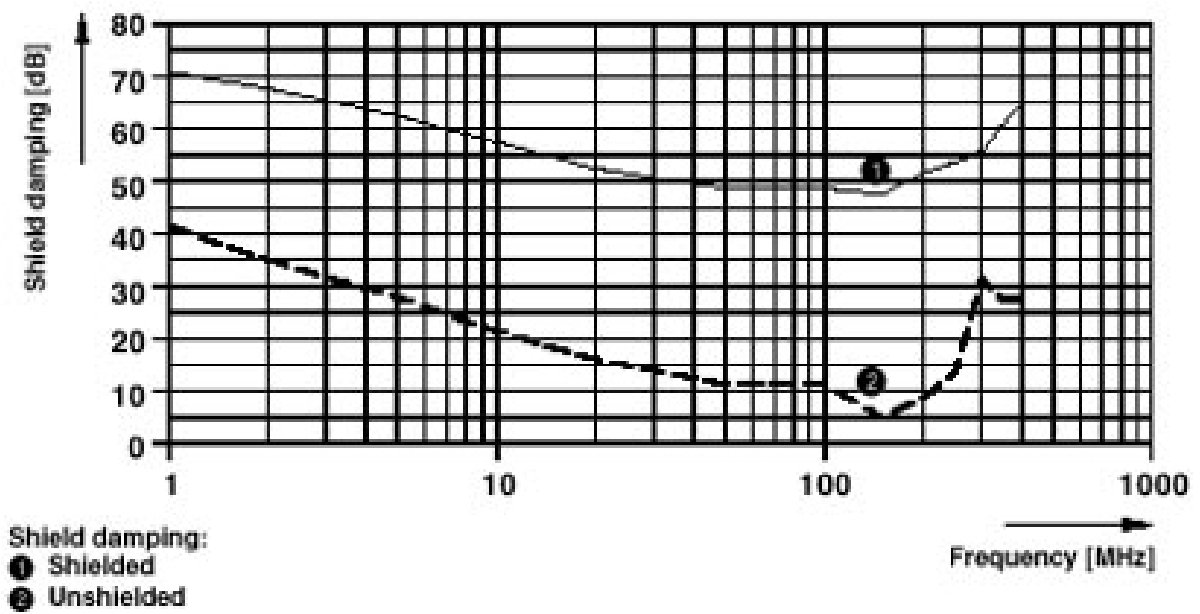


Pin assignment M12 plug, 4-pos., A-coded, view plug side

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Diagram



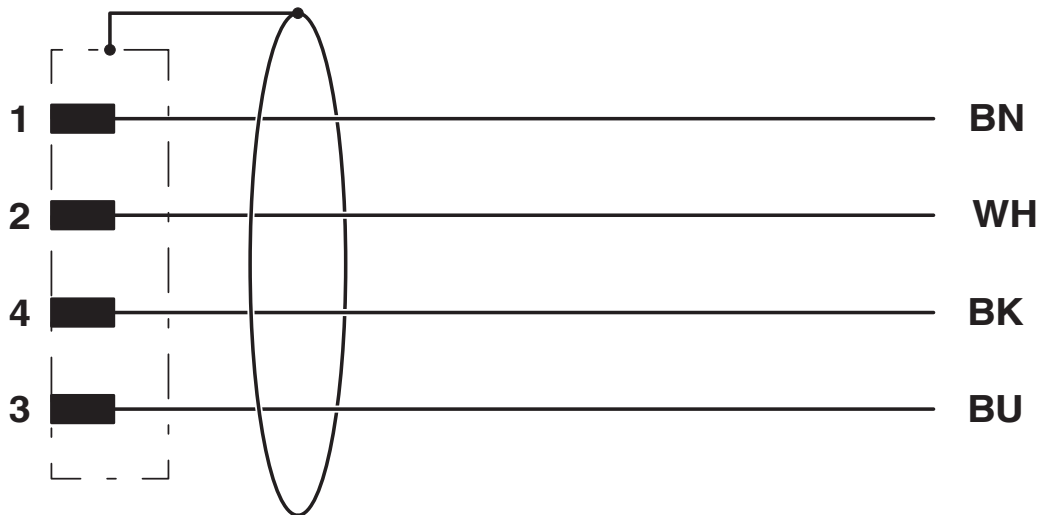
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Circuit diagram



Contact assignment of the M12 plug

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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/1697470>

|  <b>UL Listed</b><br>Approval ID: FILE E 221474 |                       |                       |                   |                             |
|--|-----------------------|-----------------------|-------------------|-----------------------------|
|  | Nominal voltage $U_N$ | Nominal current $I_N$ | Cross section AWG | Cross section $\text{mm}^2$ |
| keine  |                       |                       |                   |                             |
|  | 300 V                 | 4 A                   | -                 | -                           |

|  <b>cUL Listed</b><br>Approval ID: FILE E 221474 |                       |                       |                   |                             |
|---|-----------------------|-----------------------|-------------------|-----------------------------|
|   | Nominal voltage $U_N$ | Nominal current $I_N$ | Cross section AWG | Cross section $\text{mm}^2$ |
| keine   |                       |                       |                   |                             |
|   | 300 V                 | 4 A                   | -                 | -                           |

|  <b>EAC-RoHS</b><br>Approval ID: RU D-DE.HB35.B.00387 |  |
|--|--|
|--|--|

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## Classifications

### ECLASS

|             |          |
|-------------|----------|
| ECLASS-13.0 | 27060311 |
| ECLASS-15.0 | 27060311 |

### ETIM

|           |          |
|-----------|----------|
| ETIM 10.0 | EC001855 |
|-----------|----------|

### UNSPSC

|             |          |
|-------------|----------|
| UNSPSC 21.0 | 26121600 |
|-------------|----------|

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## Environmental product compliance

### EU RoHS

|   |                    |
|---|--------------------|
| Fulfills EU RoHS substance requirements | Yes, No exemptions |
|---|--------------------|

### China RoHS

|  |  |
|--|--|
| Environment friendly use period (EFUP) | EFUP-E                                   |
|  | No hazardous substances above the limits |

### EU REACH SVHC

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

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