

OPEN FRAME PROPORTIONAL CONTROLLER

SERIES OF

Modular system for proportional control of pressure, flow and position.



- Closed loop flow control
- Compatible to be used with oxygen
- Composed of two base modules:
 - Head
 - Expansion
- Customised, turnkey solutions
- Analog, CANopen or IO-Link interface

The Open Frame Controller can be easily configured to meet specific application needs, to provide the most efficient, turnkey solutions, this reducing assembly times and system complexity. The different Head and Expansion modules can be combined and driven through simple serial communications, making the control of complex applications easier. Typical applications could include the mixing of different gases, piloting different pressures in different parts of the machine.

The new "Open Frame Controller" system is a platform for providing closed loop control of flow, pressure and position and is suitable for Industry 4.0 applications. The system is composed of two base modules: Head and Expansion.

GENERAL DATA

| | |
|---|---|
| Construction | modular, compact, directly operated |
| Number of ways | 2/2-way 3/3-way Parallel |
| Flow | max. 90 NI/min |
| Fluid | compressed air, inert gases and oxygen. Filtering according to ISO 8573-1 class 7.4.4 |
| Supply pressure | -1 ÷ 10 bar |
| Operating pressure | -1 ÷ 10 bar |
| Ports | G1/8 |
| Materials | seals: FKM |
| Mounting position | any position |
| Analogical input | 0-10 V or 4-20 mA |
| Analogical output | 0-10 V |
| Supply voltage, Current absorbed | 24 VDC 0,3A or 12 VDC 0,6A (Head or Expansion Module) |
| BUS interface | CANopen CiA 301 IO-Link (connection type portclass B) |
| Protection class | IP20 |
| Hysteresis | Pressure control version <= 3%FS; Flow control version <= 2%FS |
| Repeatability | Pressure control version <= 1%FS for pressures less than 1 Bar <=2%FS; Flow control version <= 2%FS |
| Resolution | Flow control version <= 2%FS |
| Linearity | Pressure control version <= 2%FS; Flow control version <= 5%FS |
| Environmental temperature (min and max °C) | 0 ÷ 60°C For low temperature on request. |
| Weight | 300 g Single module |

OPEN FRAME PROPORTIONAL CONTROLLER

SERIES OF - CODING EXAMPLE

CODING EXAMPLE

OF - 0 P 1 1 - L L W 2 - D - A - 04 - OX1

| | |
|------------|---|
| OF | SERIES: Open Frame |
| 0 | ELECTRICAL INTERFACE 0 = 0 + 10V analog, 24V power supply 1 = CANopen, 24V power supply 2 = IO-Link -> CAN, 24V power supply 8 = 4 + 20 mA analog, 24V power supply 9 = No tested/24V 4 = 0 + 10V analog, 12V power supply 5 = CANopen, 12V power supply 7 = 4 + 20 mA analog, power supply 12V A = No tested/12V |
| P | CONTROL FUNCTION: A = Open Loop (flow 2-way) Head B = Open loop (flow 3-way) Head & Expansion Q = Flow 2- way closed loop Head C = Flow 3 way closed loop Head & Expansion H = high flow pressure control, 2 ways (parallel) Head & Expansion N = Pressure control, closed loop 2 ways, Head P = Pressure control, closed loop 3 ways, Head & Expansion J = high flow 2 way flow control with booster (parallel) Head & Expansion W = Single ended position control (Head & Expansion) x1 Z = Double ended position control (Head & Expansion) x2 |
| 1 | SIZE: 1 = size 37 mm |
| 1 | PNEUMATIC PORT: 1 = G1/8 |
| L | HEAD VALVE SIZE: F = Ø 1 mm H = Ø 1,2 mm L = Ø 1,6 mm N = Ø 2 mm Q = Ø 2,4 mm |
| L | EXPANSION VALVE SIZE: F = Ø 1 mm H = Ø 1,2 mm L = Ø 1,6 mm N = Ø 2 mm Q = Ø 2,4 mm |
| W | SEALS MATERIAL: W = FKM |
| 2 | BODY MATERIAL: 2 = brass/aluminum |
| D | FULL SCALE OF THE RELATIVE SENSOR - ONLY FOR HEAD: B = 0,2 bar D = 2 bar E = 7bar F = 10 bar G = +/- 1 bar |
| A | MAX. PRESSURE (DIFFERENTIAL SENSOR) ONLY FOR HEAD: 0 = no dp sensor B = 200 mbar C = 1 bar |
| 04 | NOZZLE SIZE FOR HEAD ONLY: 00 = no nozzle 12 = 1,2mm 14 = 1,4mm 16 = 1,6mm 18 = 1,8mm 20 = 2,0mm 23 = 2,3mm 28 = 2,8mm |
| OX1 | CERTIFICATION: OX1 |

Operating pressure

The maximum operating pressure of the open frame depends on the following:

- Maximum pressure of the pilot valve;
- Full scale of the relative sensor.

Head valve size

| | Ø Nozzle [mm] | Pmax [bar] |
|---|---------------|------------|
| F | 1 | 10 |
| H | 1,2 | 8 |
| L | 1,6 | 6 |
| N | 2 | 5 |
| Q | 2,4 | 4 |

Full scale of the relative sensor - Only for head

| | Full scale [bar] |
|---|------------------|
| B | 0,2 |
| D | 2 |
| E | 7 |
| F | 10 |
| G | ±1 |

The maximum operating pressure of the device corresponds to the minimum value of the identified pressures.
For example:

OF-OP11-LHW2-E-A-04

- Valve size "L", Ø 1,6 mm, Pmax = 6 bar;
- Valve size "H", Ø 1,2 mm, Pmax = 8 bar;
- Full scale of the relative pressure sensor "E", Pmax 7 bar;
- The maximum operating pressure is the lowest of the three; 6 bar.

Maximum flow

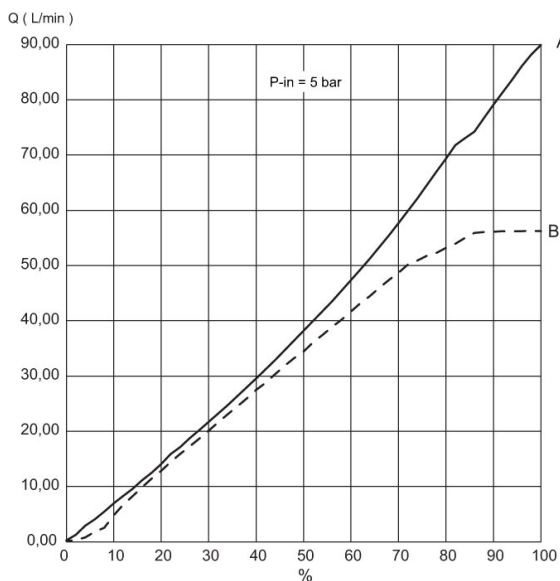
In case of versions with closed loop flow control (control functions Q, C and J) the maximum flow depends on the combination of Differential pressure sensor and Calibrated nozzle.

| DIFFERENTIAL PRESSURE SENSOR | Maximum flow [NL/min] | |
|------------------------------|-----------------------|----|
| | Calibrated nozzle | |
| B | Ø 1,4 | 10 |
| B | Ø 1,6 | 13 |
| B | Ø 1,8 | 16 |
| B | Ø 2,0 | 20 |
| C | Ø 1,6 | 29 |
| C | Ø 2,0 | 45 |
| C | Ø 2,3 | 60 |
| C | Ø 2,8 | 90 |

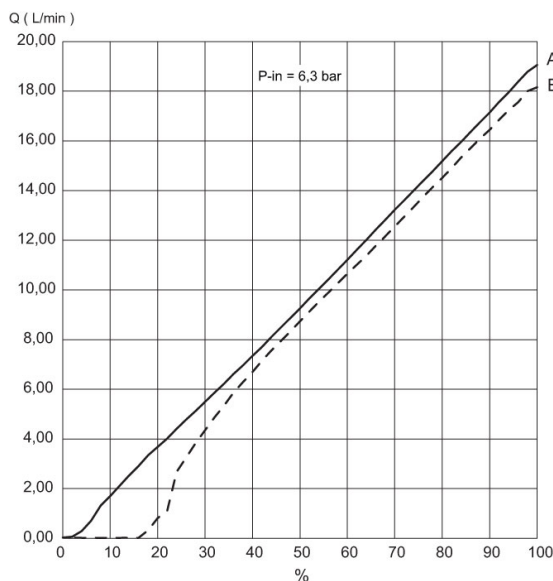
Flow diagrams Open Frame - Closed loop flow control valve version

PROPORTIONAL TECHNOLOGY

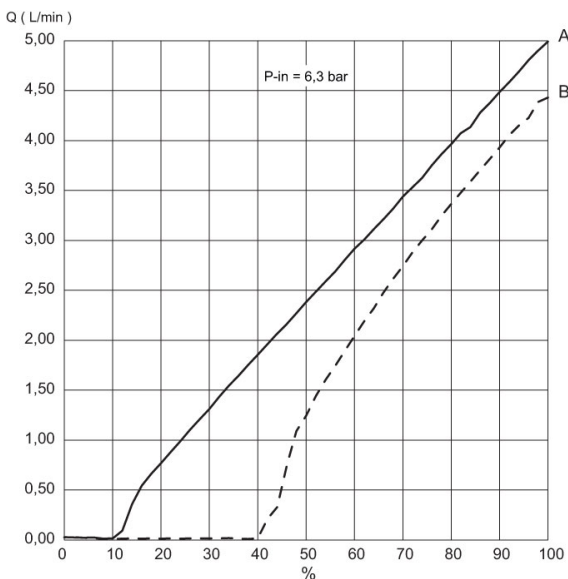
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Q = Flow (L/min)
 % = Percentage of the command signal
 A = P out flow = P atmosphere
 B = Delta flow P 1 bar



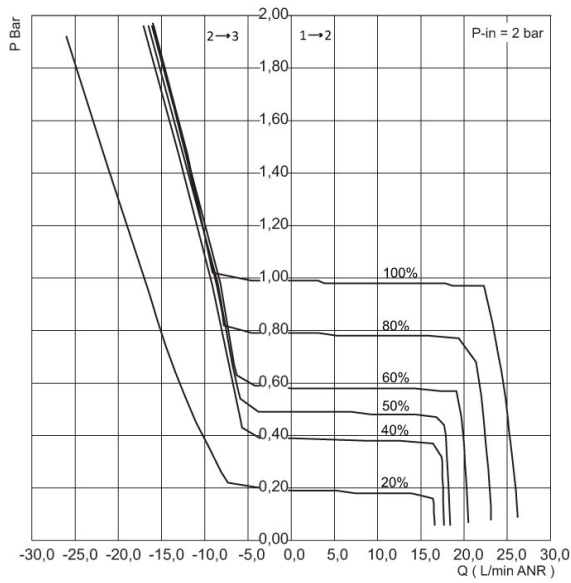
Q = Flow (L/min)
 % = Percentage of the command signal
 A = P out flow = P atmosphere
 B = Delta flow P 1 bar



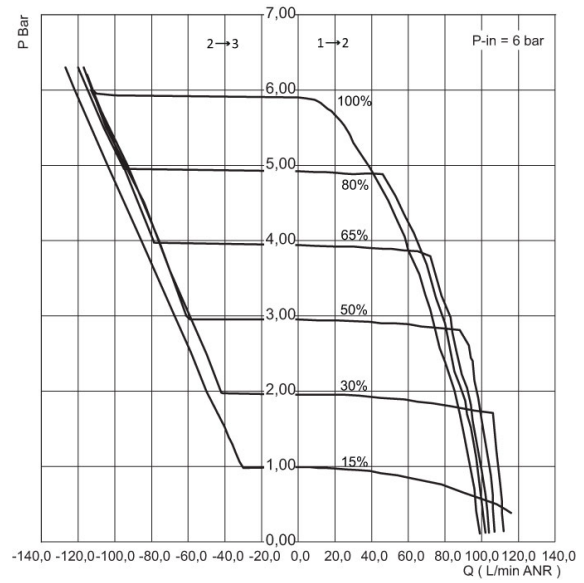
Q = Flow (L/min)
 % = Percentage of the command signal
 A = P out flow = P atmosphere
 B = Delta flow P 1 bar

Nota 1: The graphs shown above are for reference only. Thanks to the high flexibility of the Open Frame, the different modules will be calibrated accurately according to the specifications of each application, exploiting the product in the best way possible.

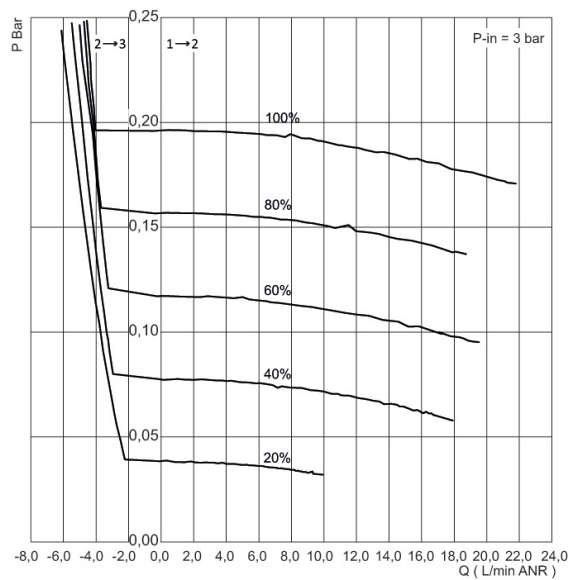
Flow diagrams Open Frame – 3-way and 2-way Pressure regulator version



Operating pressure 1 bar



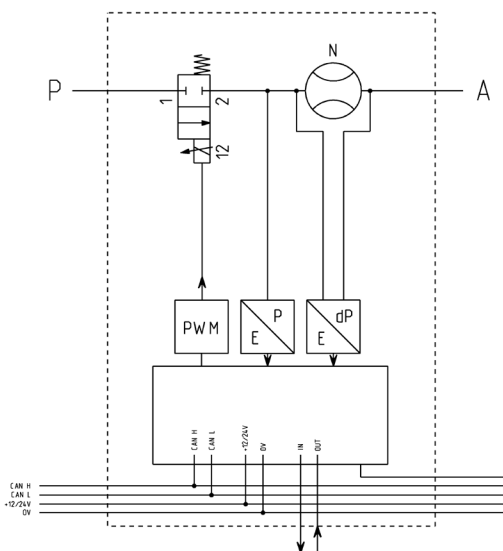
Operating pressure 6 bar



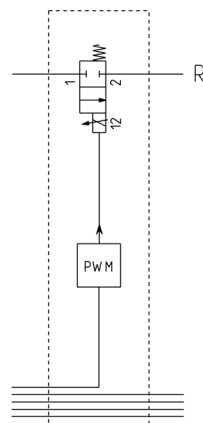
Operating pressure 0,2 bar

Note 1: Regarding the pressure regulation graphs shown above, please do not consider the negative values when you refer to the 2-way regulator, as these values relate to the exhaust flow which is absent in the 2-way version.

Note 2: The graphs shown above are for reference only. Thanks to the high flexibility of the Open Frame, the different modules will be calibrated accurately according to the specifications of each application, exploiting the product in the best way possible.

SERIES OPEN FRAME - PNEUMATIC SCHEME

HEAD MODULE SCHEME

P= pressure inlet head
A= use of head
N= calibrated nozzle


EXPANSION MODULE SCHEME

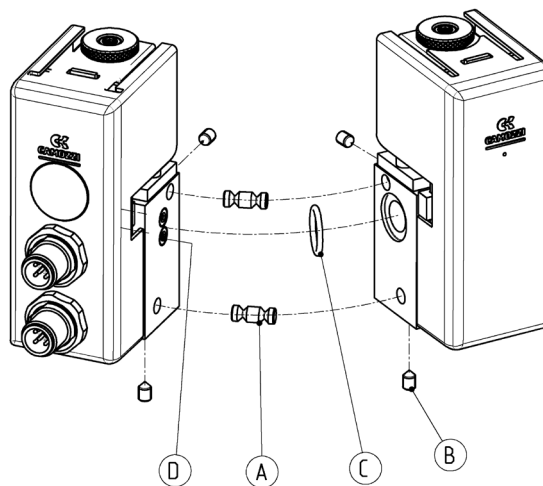
R= expansion exhaust

MOUNTING EXAMPLE

To correctly mount the modular HEAD and EXPANSION components, insert the fixing elements (A) in the special seats between the two bodies and the O-Ring (C) in the seat on the EXPANSION body.

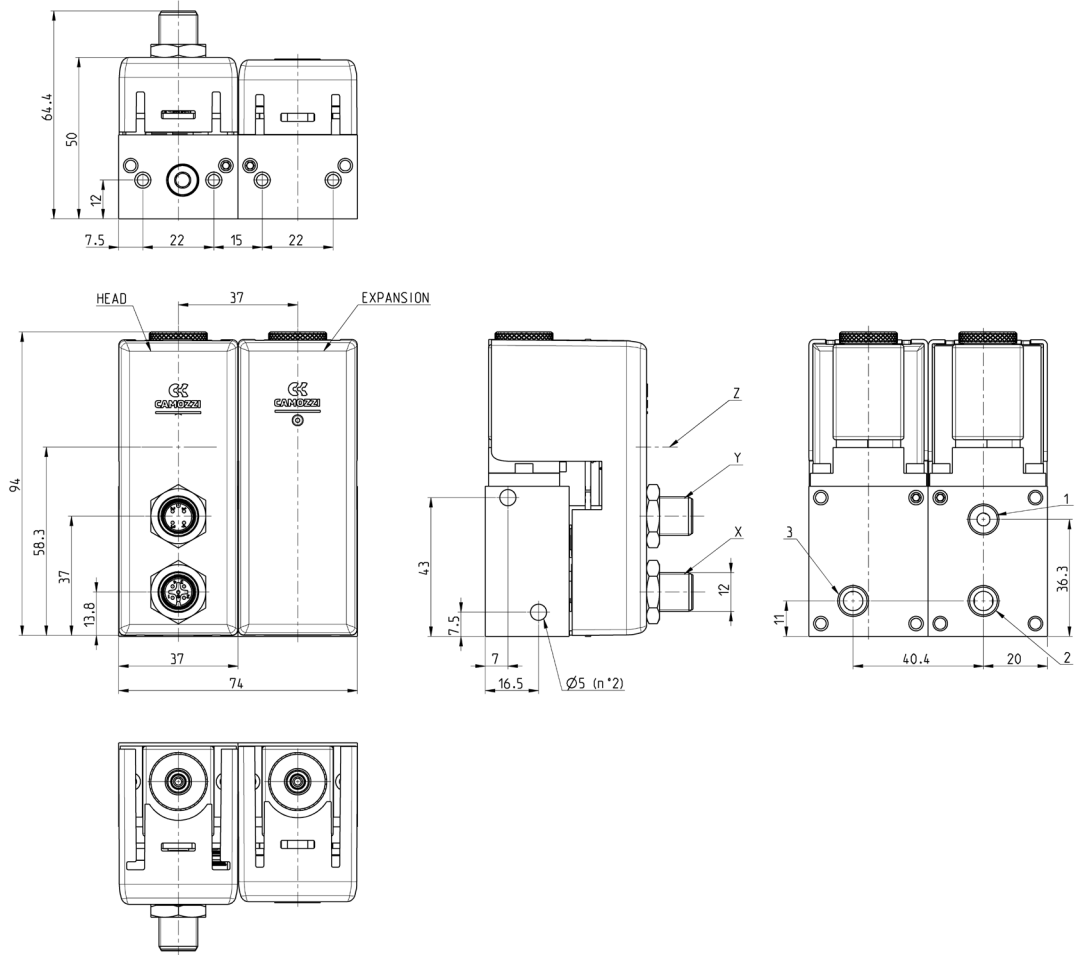
Join the two bodies and fix them into position with the fixing nuts (B), close to the side in contact.

The positions of the covers (D), prepared at the factory, cannot be changed.



OPEN FRAME PROPORTIONAL CONTROLLER
SERIES OF - DIMENSIONAL CHARACTERISTICS

Open Frame proportional controller - dimensions



PROPORTIONAL TECHNOLOGY

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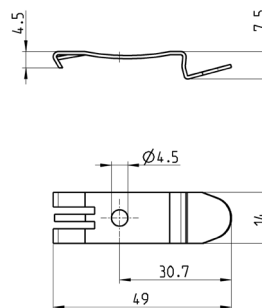
| Mod. | X | Y | Z | A | B | C | M4 |
|------|------------------|------------------|-----------|------|------|------|------------------------|
| OF-2 | M12 5 PIN (Male) | M12 5 PIN (Male) | Micro USB | G1/8 | G1/8 | G1/8 | M4 thread for mounting |

OPEN FRAME PROPORTIONAL CONTROLLER
SERIES OF - ACCESSORIES
Mounting bracket for DIN rail Open Frame

DIN EN 50022 (7,5mm x 35mm - width 1)

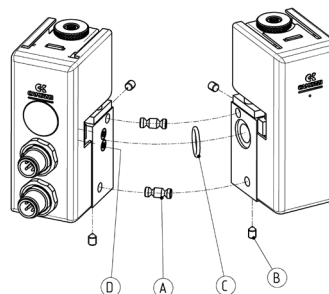
 Supplied with:
 1x mounting bracket
 1x screw M4x6 UNI 5931

This accessory cannot be used with the Light sub-base.



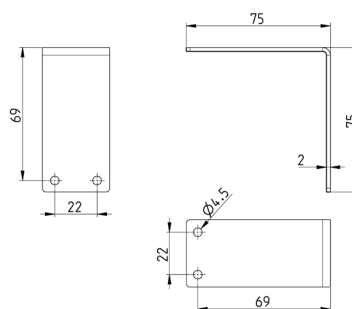
| |
|-------------|
| Mod. |
| PCF-K8P |

Fixing kit for manifold version: Open Frame

The kit includes:
 2x shaped steel pins
 4x steel grub screws
 1x electrical connection


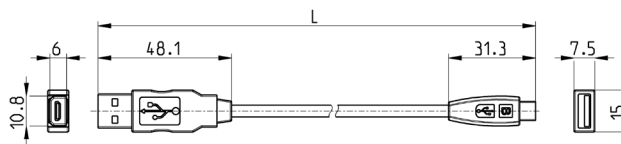
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| Mod. |
| OF-M-PIN |

Rear bracket OPEN FRAME

The kit includes
 1x zinc-plated bracket
 2x M4x8 white zinc-plated screws


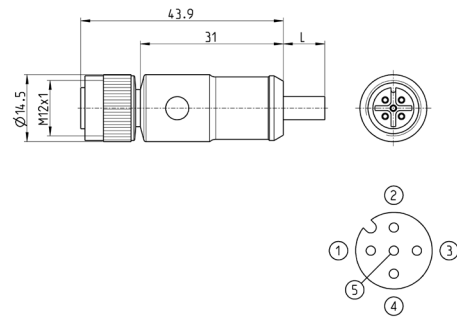
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| Mod. |
| OF-ST |

USB to Micro USB cable Mod. G11W-G12W-2

For the hardware configuration of the Camozzi products


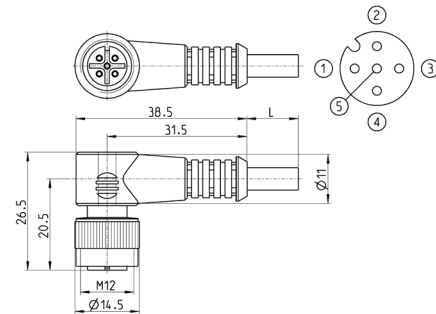
| Mod. | Description | Connections | Material for outer sheath | Cable length "L" (m) |
|-------------|-----------------------------|---------------------------|---------------------------|----------------------|
| G11W-G12W-2 | black shielded cable 28 AWG | standard USB to Micro USB | PVC | 2 |

Cable with M12, 5 pin, connector, female, straight, shielded



| Mod. | Cable length (m) | Shielding | N° wires |
|----------------|------------------|------------|----------|
| CS-LF05HB-C200 | 2 | Unshielded | 5 |
| CS-LF05HB-C500 | 5 | Unshielded | 5 |
| CS-LF05HB-D200 | 2 | Shielded | 5 |
| CS-LF05HB-D500 | 5 | Shielded | 5 |

Cable with M12 5 pin connector, 90°, female



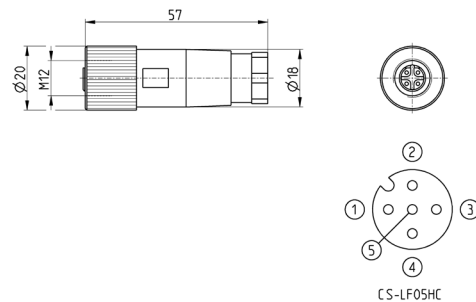
| Mod. | Cable length (m) | Shielding | N° wires |
|----------------|------------------|------------|----------|
| CS-LR05HB-C200 | 2 | Unshielded | 5 |
| CS-LR05HB-C500 | 5 | Unshielded | 5 |
| CS-LR05HB-D200 | 2 | Shielded | 5 |
| CS-LR05HB-D500 | 5 | Shielded | 5 |

PROPORTIONAL TECHNOLOGY

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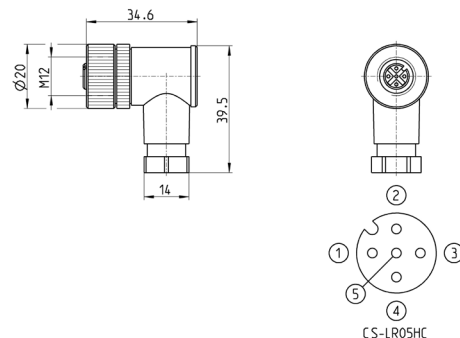
Connector M12, 5 pin, female, straight

CANopen bus IN



| Mod. | Description | Type of connector | Connection |
|-----------|-------------|-------------------|--------------------|
| CS-LF05HC | for wiring | straight | M12 A 5 pin female |

Connector M12, 5 pin, female, angular



| Mod. | Description | Type of connector | Connection |
|-----------|-------------|-------------------|--------------------|
| CS-LR05HC | for wiring | 90° | M12 A 5 pin female |