Open Frame proportional controller Series OF

New

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 and 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 Nl/min
Media	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

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 supply 1 = CANopen / 24 V supply 2 = IOLink -> CAN / 24V supply Portclass B compatible 8 = 4 ÷ 20mA analog / 24V supply 9 = no header / 24V 4 = 0 ÷ 10V analog / 12V supply 5 = CANopen / 12V supply 7 = 4 ÷ 20mA analog / 12V supply A = no header/ 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

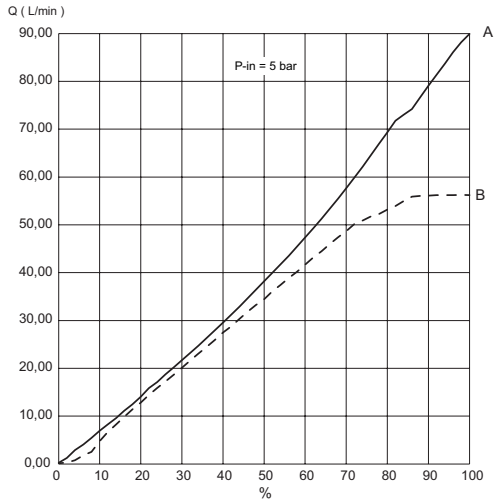
The maximum operating pressure of the device corresponds to the minimum value of the identified pressures. For example:
OF-OP11-LHW2-E-A-04
Valve size "L", ø 1.6 mm, Pmax = 6 bar
Valve size "H", ø 1.2 mm, Pmax = 8 bar
Full scale of the relative pressure sensor "E", Pmax 7 bar
The maximum operating pressure is the lowest of the three; 6 bar

Maximum flow

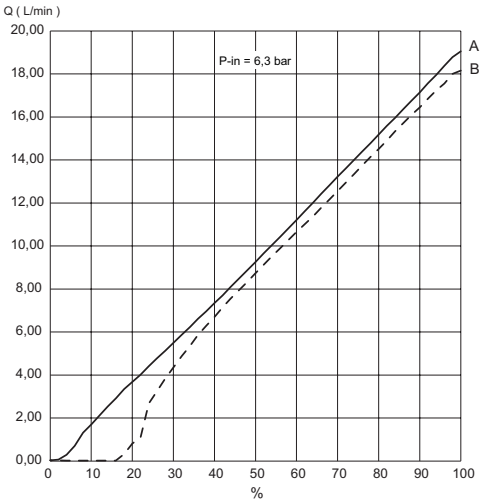
In case of versions with closed loop flow control (control functions Q, C and J) the maximum flow depends on the combination of Differential pressure sensor and Calibrated nozzle.

DIFFERENTIAL PRESSURE SENSOR		
	Calibrated nozzle	Maximum flow [Nl/min]
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



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



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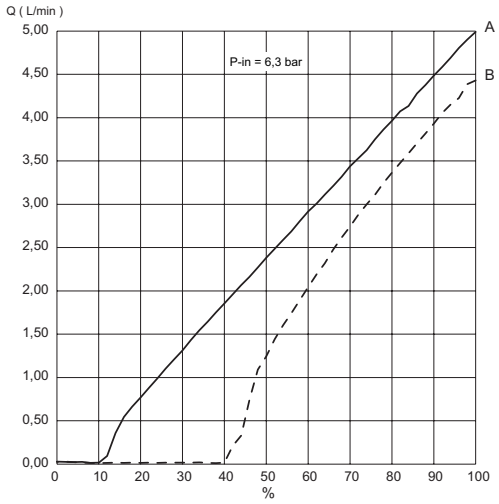
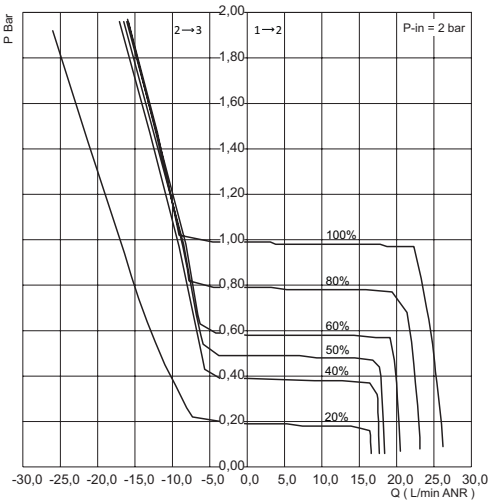


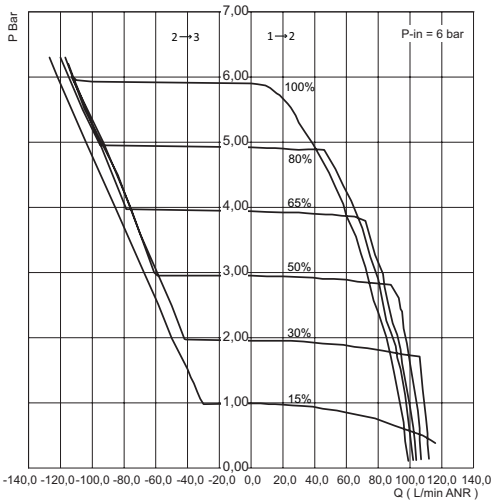
Q = Flow (l/min)
% = Percentage of the command signal
A = P out flow = P atmosphere
B = Delta flow P 1 bar

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.

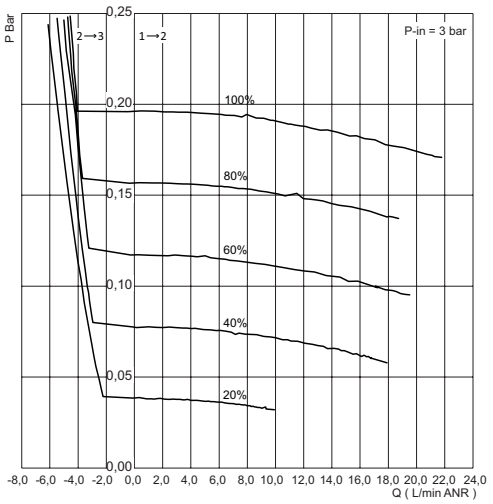
Flow diagrams Open Frame – 3-way and 2-way Pressure regulator version



Operating pressure 1 bar



Operating pressure 6 bar

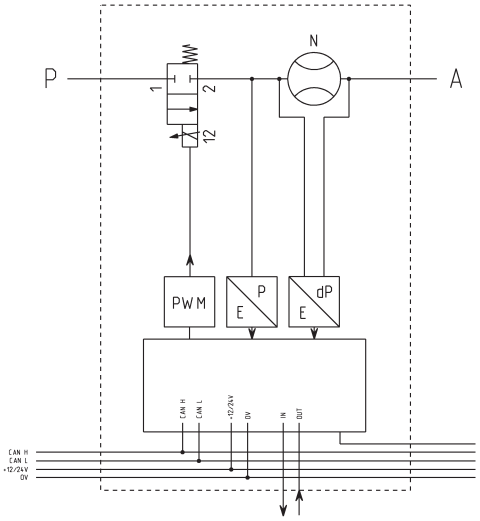


Operating pressure 0.2 bar

Nota 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.

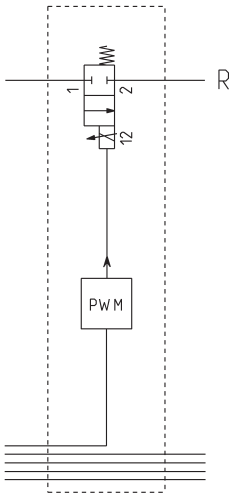
Nota 2: The graphs shown above are for reference only. Thanks to the high flexibility of the Open Frame, the different modules will be calibrated accurately according to the specifications of each application, exploiting the product in the best way possible.

SERIES OPEN FRAME - PNEUMATIC SCHEME



HEAD MODULE SCHEME

P= pressure inlet head
A= output head module
N= calibrated nozzle



EXPANSION MODULE SCHEME

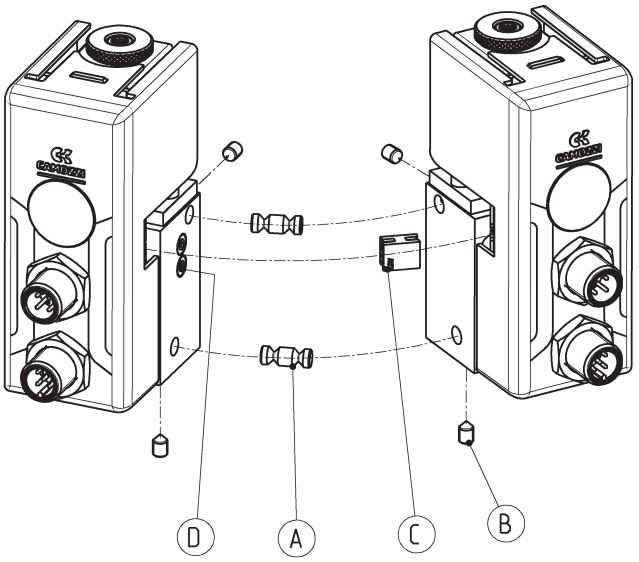
R= expansion exhaust

MOUNTING EXAMPLE

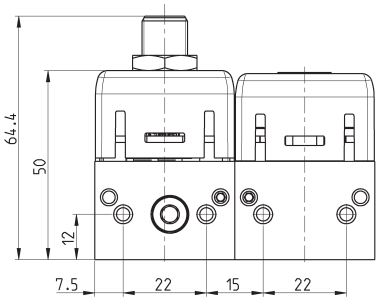
To correctly mount the modular HEAD and EXPANSION components, insert the fixing elements (A) in the special seats between the two bodies and the O-Ring (C) in the seat on the EXPANSION body.

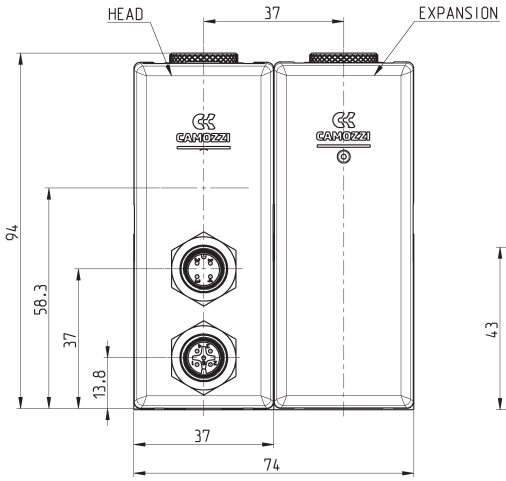
Join the two bodies and fix them into position with the fixing nuts (B), close to the side in contact.

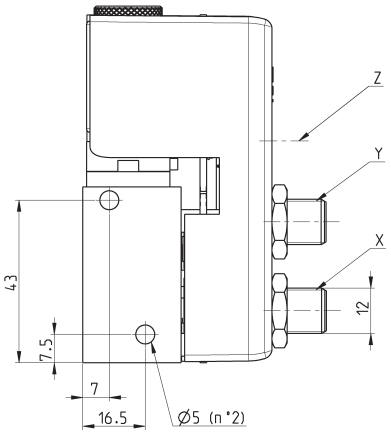
The positions of the covers (D), prepared at the factory, cannot be changed.

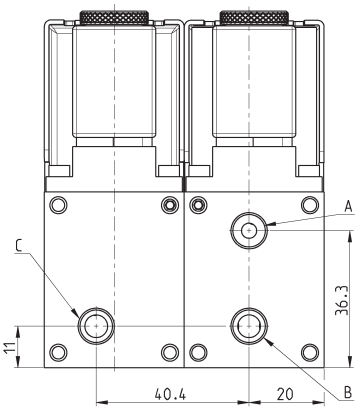


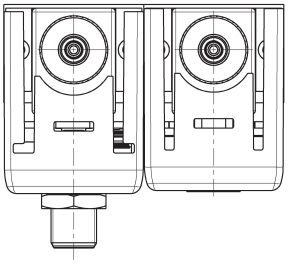
Open Frame proportional controller - dimensions











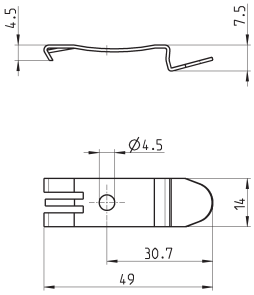
Mod.	X	Y	Z	A	B	C	M4
OF-2	M12 5 PIN (Male)	M12 5 PIN (Male)	Micro USB	G1/8	G1/8	G1/8	M4 thread for mounting

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

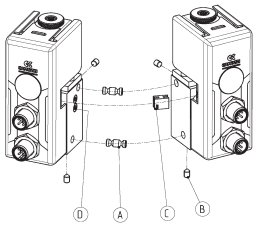
This accessory cannot be used with the Light sub-base.



Mod.
PCF-K8P

Fixing kit for manifold version: Open Frame

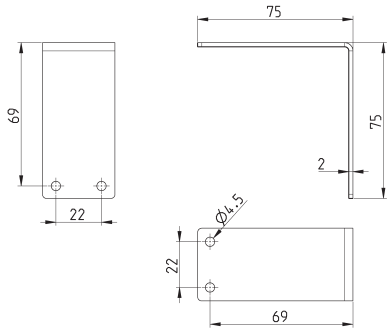
The kit includes:
2x shaped steel pins
4x steel grub screws
1x electrical connection



Mod.
OF-M-PIN

Rear bracket OPEN FRAME

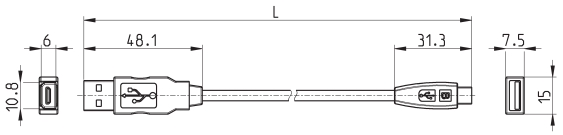
The kit includes
1x zinc-plated bracket
2x M4x8 white zinc-plated screws



Mod.
OF-ST

USB to Micro USB cable

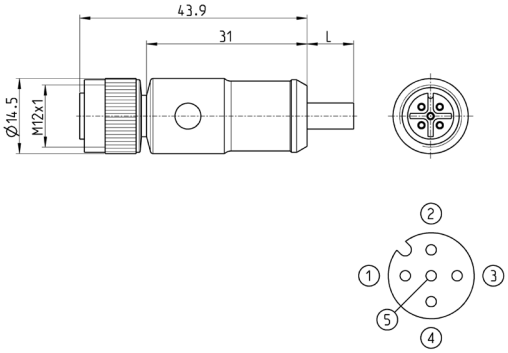
For the hardware configuration of the Camozzi products



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, straight, female

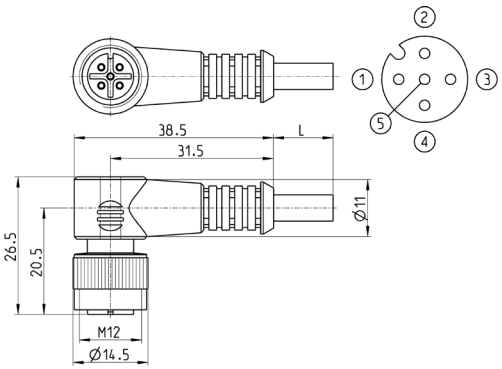
For power supply and
IO-Link command signal



Mod.	Cable length (m)	Shielding	No. wires
CS-LF05HB-C200	2	UNSHIELEDED	3
CS-LF05HB-C500	5	UNSHIELEDED	3
CS-LF05HB-D200	2	SHIELDED	3
CS-LF05HB-D500	5	SHIELDED	3

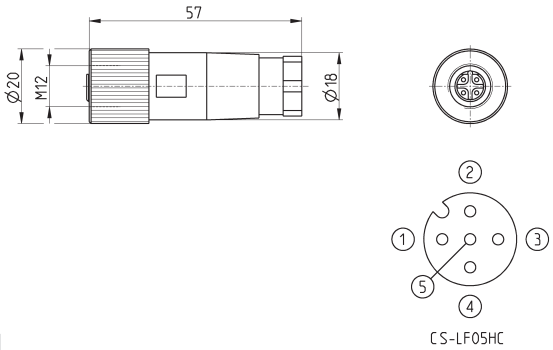
Cable with M12 5 pin connector, 90°, female

For power supply and
IO-Link command signal



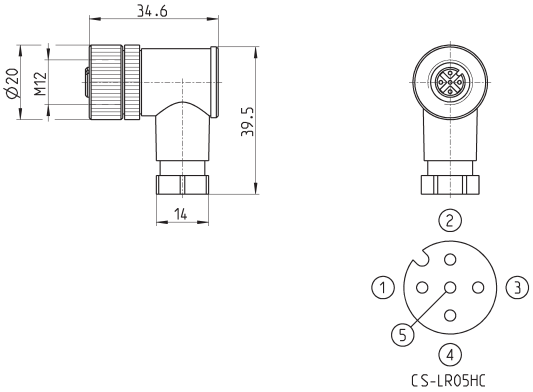
Mod.	Cable length (m)	Shielding	No. wires
CS-LR05HB-C200	2	UNSHIELEDED	5
CS-LR05HB-C500	5	UNSHIELEDED	5
CS-LR05HB-D200	2	SHIELDED	5
CS-LR05HB-D500	5	SHIELDED	5

Straight, female, M12 5 pin connector



Mod.	description	type of connector	connections
CS-LF05HC	for wiring	straight	M12 A 5 pin female

Female connector M12 5 pin , 90°



Mod.	description	type of connector	connections
CS-LR05HC	for wiring	90°	M12 A 5 pin female