

Series 1700 - Electronic proportional regulators - Size 0 - 1 - 3

Modern industrial applications require increasingly high performances from their pneumatic components. For example, the speed and thrust of a pneumatic actuator may need to be varied. These parameters often need to be modified dynamically while an operation is running.

This solution can be achieved by means of a regulator that can vary pressure over time.

Pneumax portfolio includes 1700 Series electronic proportional regulator, available in three different sizes with flow rates of 7, 1100, and 4000 Nl/min respectively and supporting Analog/Digital, CANopen® or IO-Link communication interfaces.

Application fields

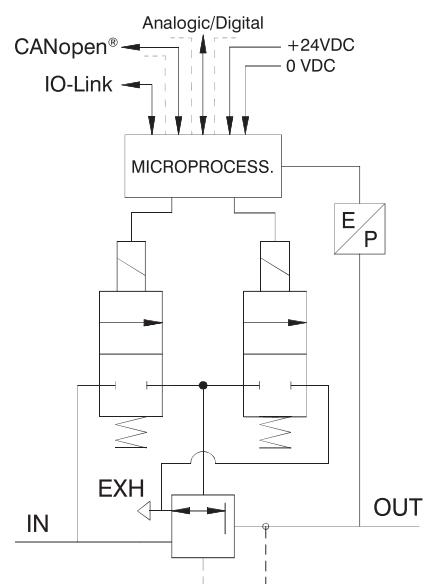
Typical applications will include the necessity to dynamically control the force of the actuator, be it thrust or torque.

Examples include: Closing systems, painting systems, tensioning systems, packaging systems, pneumatic braking systems, force control for welding grippers, thickness compensation systems, balancing systems, laser cutting, pressure transducers for the control of modulating valves, test benches for system testing, force control for buffers on polishers, etc.

Product presentation

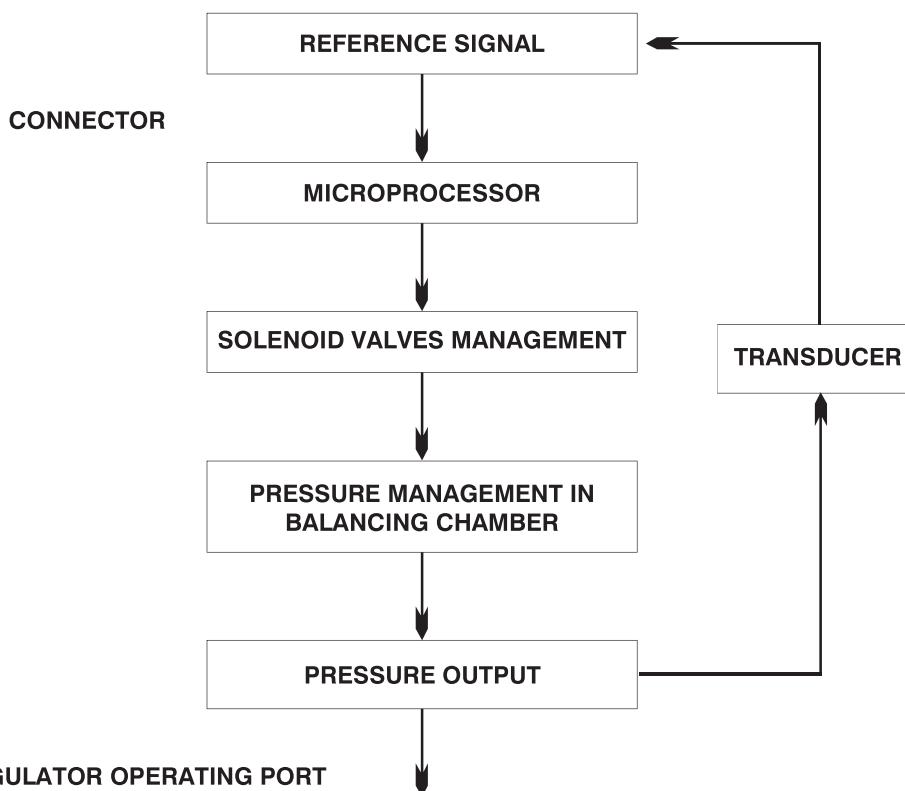
The supply and exhaust connections are on one side of the regulator and the working port is on the opposite side. The two remaining sides carry G 1/8" ports that are blanked off with removable plugs, these can be used to connect a pressure gauge or as an outlet port. If you order the version with the external feedback there is a M5 threaded connection to which connect the feedback pressure (to the pressure transducer). This connection is placed on the outlet connection side. This option allows to take the signal from a remote point instead of directly from the outlet connection; this function is typically used when the regulated pressure is used far away to the regulator. The control solenoid valves, the pressure sensor, and the management electronics are placed in upper part of the regulator. The electronic management system is the same for all the size 0, size 1 and size 3 regulators.

Functional diagram



CLOSED LOOP diagram (internal control circuit)

The proportional regulator is known as a CLOSED LOOP regulator because a pressure transducer in the circuit transmits a continuous analog signal to the microprocessor, which compares the reference value and supplies the control solenoid valves accordingly.



Features

| Pneumatic | | | | | |
|---|---|---|-------------|--|--|
| Fluid | Air filtered at 5 micron and dehumidified | | | | |
| Minimum inlet pressure | Desired outlet pressure + 1 bar | | | | |
| Maximum inlet pressure | 10 bar | | | | |
| Outlet pressure | 0 ... 9 bar | | | | |
| Nominal flowrate from 1 to 2 (6 bar ΔP 1 bar) | Size 0 | Size 1 | Size 3 | | |
| | 7 NL/min | 1100 NL/min | 4000 NL/min | | |
| Discharge flowrate (a 6 bar with 1 bar overpressure) | 7 NL/min | 1300 NL/min | 4500 NL/min | | |
| Air consumption | < 1 NL/min | < 1 NL/min | < 1 NL/min | | |
| Supply connection | M5 | G 1/4" | G 1/2" | | |
| Operating connection | M5 | G 1/4" | G 1/2" | | |
| Exhaust connection | Ø1,8 | G 1/8" | G 3/8" | | |
| Maximum fitting tightening | 3 Nm | 15 Nm | 15 Nm | | |
| Electric | | | | | |
| Supply voltage | 24VDC ± 10% (stabilized with ripple<1%) | | | | |
| Standby current consumption | 70mA | | | | |
| Current consumption with solenoid valves on | 400mA | | | | |
| **Reference Signal | Voltage | *0 ... 10 V *0 ... 5 V *1 ... 5 V | | | |
| | Current | *4 ... 20 mA *0 ... 20 mA | | | |
| **Input Impedance | Voltage | 10 kΩ | | | |
| | Current | 250 Ω | | | |
| **Digital Inputs | 24VDC ± 10% | | | | |
| **Digital Output | 24 VDC PNP (max current 50 mA) | | | | |
| Functional | | | | | |
| Linearity | ± Insensitivity | | | | |
| Hysteresis | ± Insensitivity | | | | |
| Repeatability | ± Insensitivity | | | | |
| Sensitivity | 0,01 bar | | | | |
| Assembly position | Indifferent | | | | |
| Protection grade | IP65 (with casing fitted) | | | | |
| Ambient temperature | -5°C ... 50°C / 23°F ... 122°F | | | | |
| Constructional | | | | | |
| Body | Anodized aluminum | | | | |
| Shutters | Brass with vulcanized NBR | | | | |
| Diaphragm | Cloth-covered rubber | | | | |
| Seals | NBR | | | | |
| Cover for electrical part | Technopolymer | | | | |
| Springs | AISI 302 | | | | |
| Weight | Size 0 | Size 1 | Size 3 | | |
| | 168 g | 360 g | 850 g | | |

* Selectable by keyboard or by RS-232

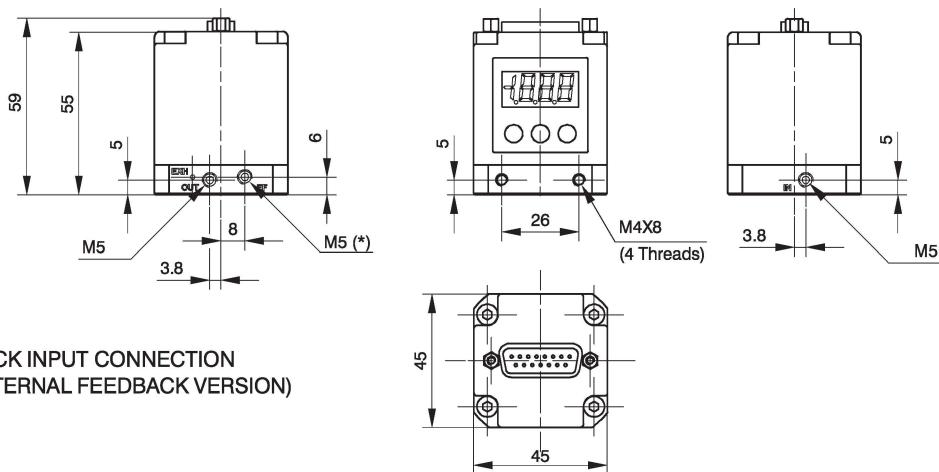
** Valid only for devices with analog input

Overall dimensions ("521" standard version and CANopen® version with SUB-D 15 poles)

2

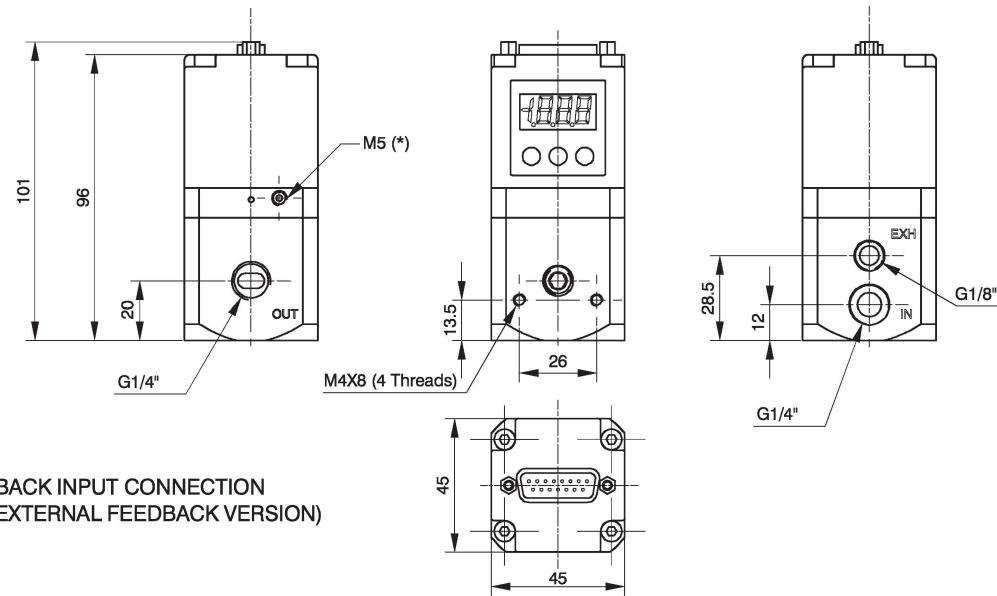
AIR TREATMENT

► **Size 0**



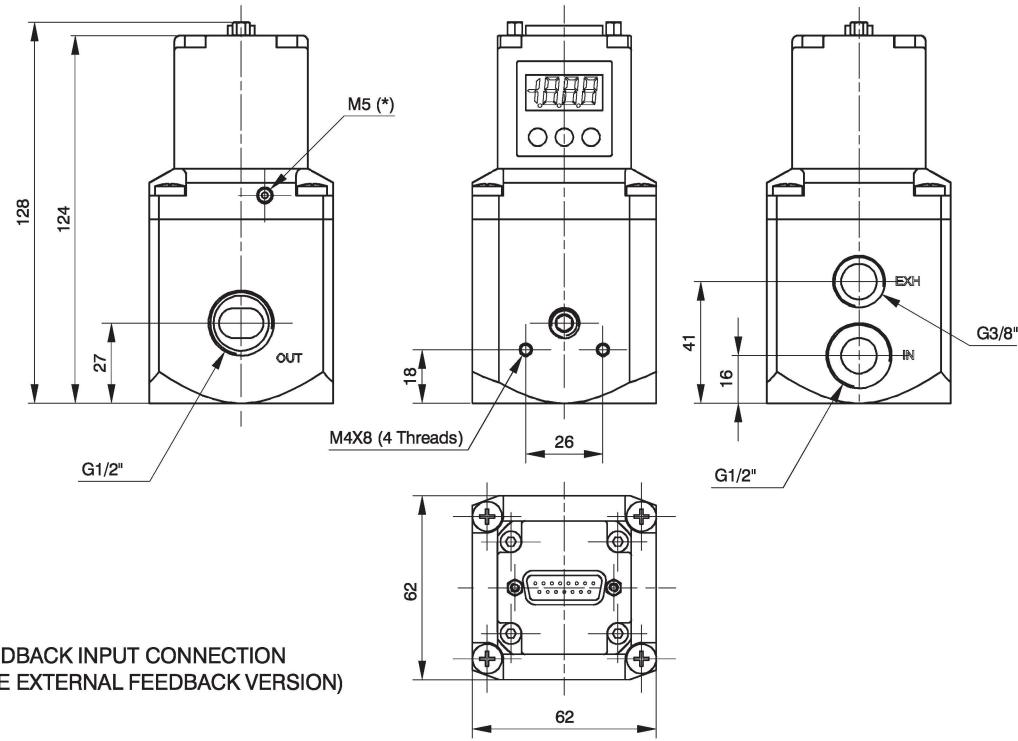
* = EXTERNAL FEEDBACK INPUT CONNECTION
(AVAILABLE ONLY ON THE EXTERNAL FEEDBACK VERSION)

► **Size 1**



* = EXTERNAL FEEDBACK INPUT CONNECTION
(AVAILABLE ONLY ON THE EXTERNAL FEEDBACK VERSION)

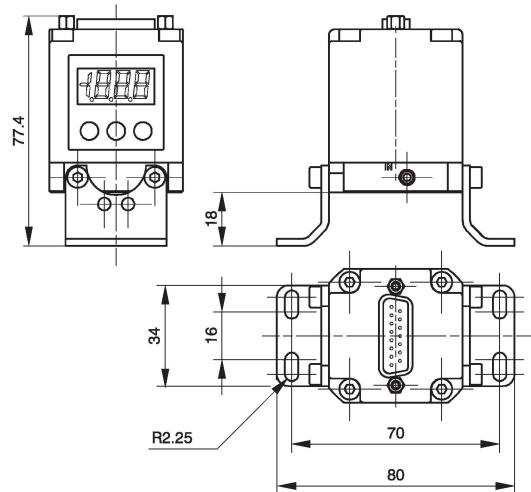
► **Size 3**



* = EXTERNAL FEEDBACK INPUT CONNECTION
(AVAILABLE ONLY ON THE EXTERNAL FEEDBACK VERSION)

Mounting options ("521" standard version and CANopen® version with SUB-D 15 poles)

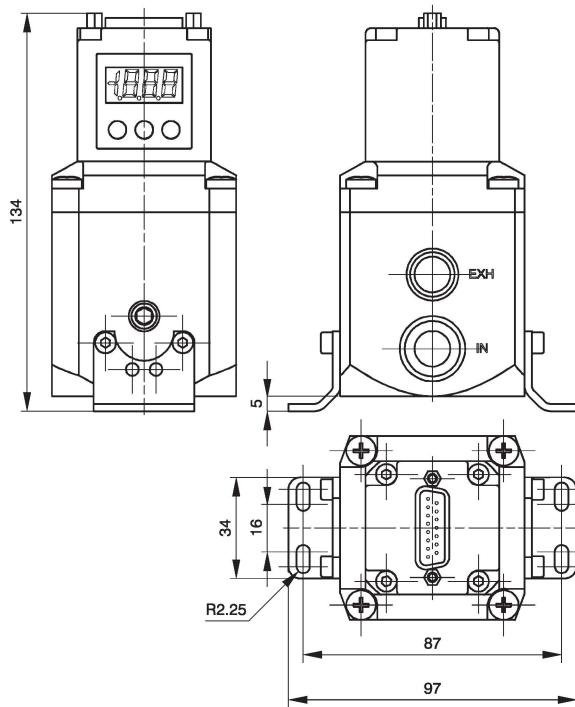
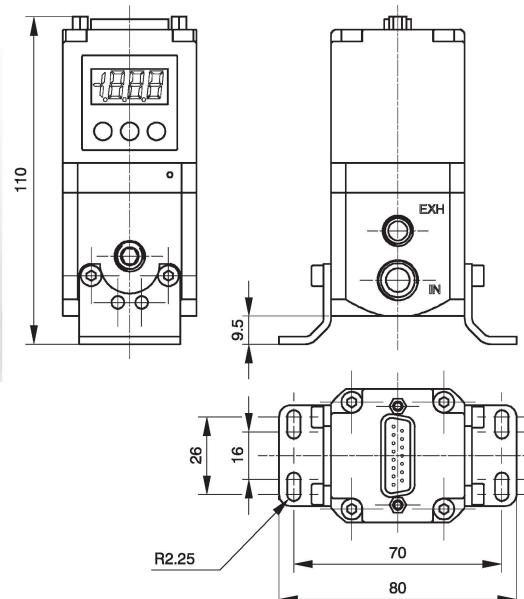
In addition to mounting directly using the M4 tappings on the body, the 170M5 bracket may also be used, as shown below:



Size 0



Size 1



Size 3



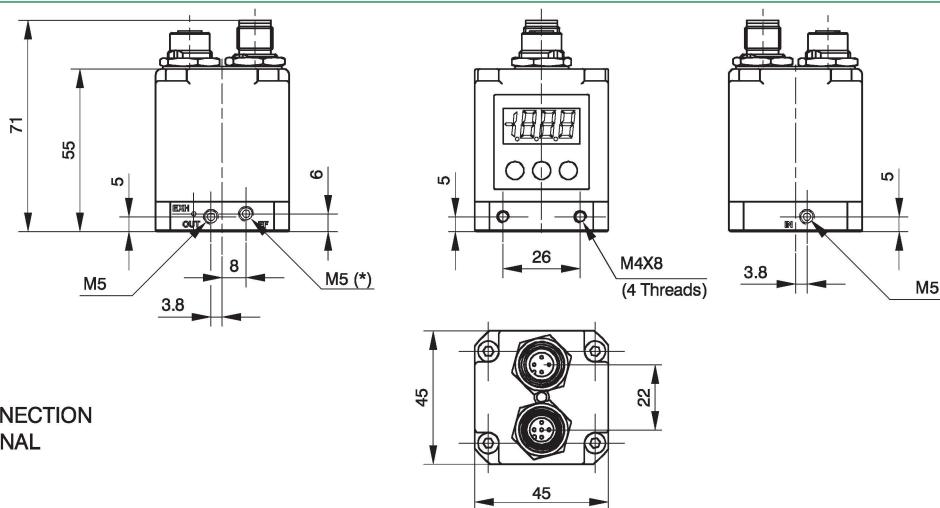


Overall dimensions ("521 M12 version" - CANopen® version)

2

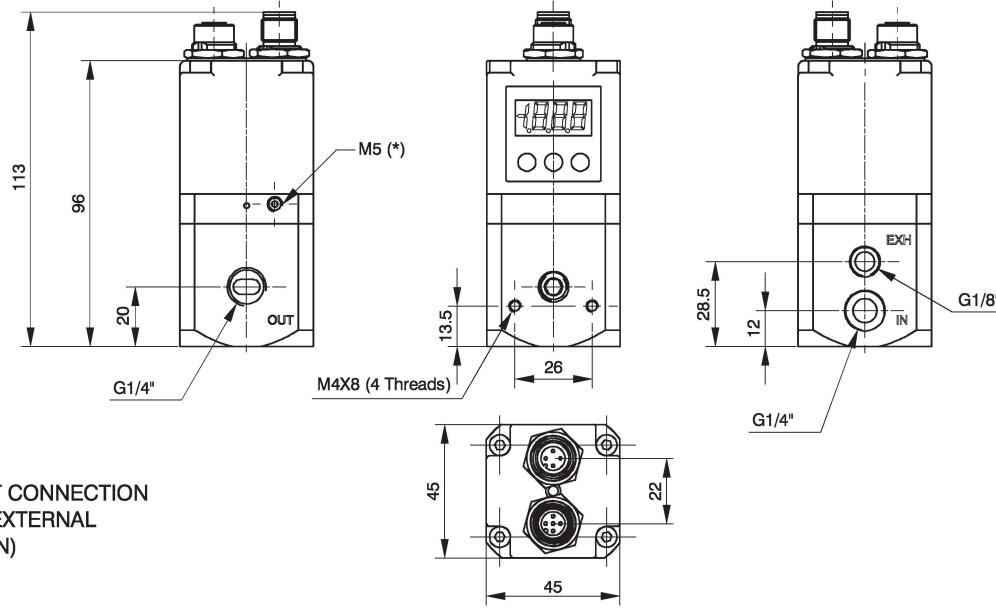
AIR TREATMENT

► **Size 0**



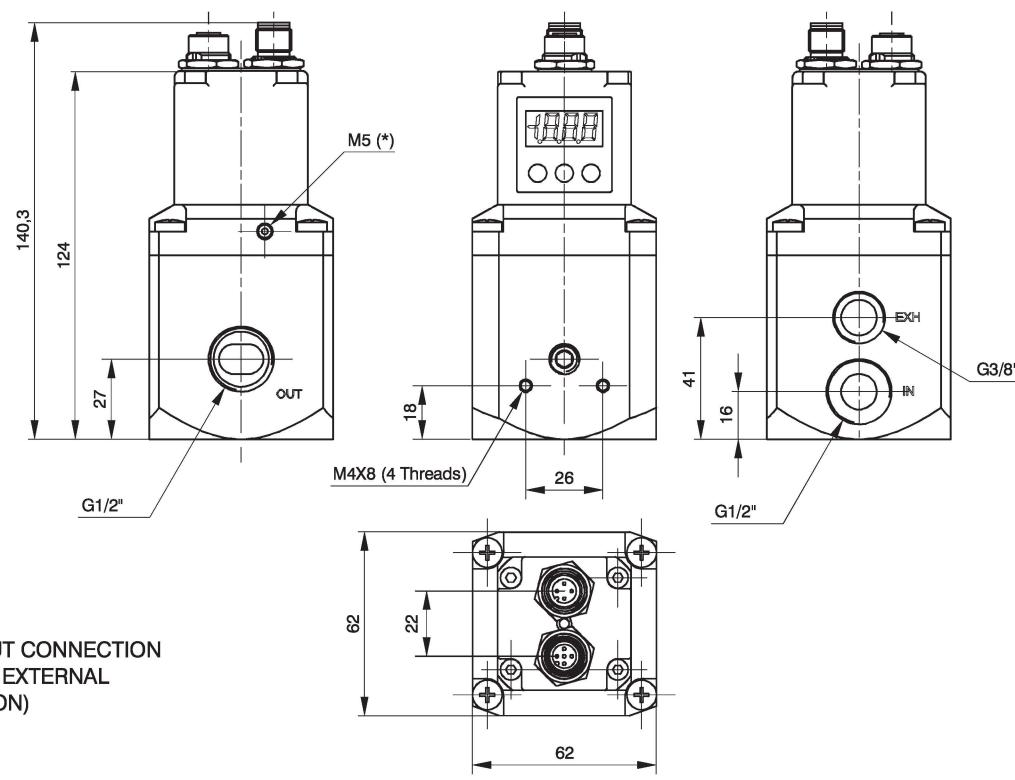
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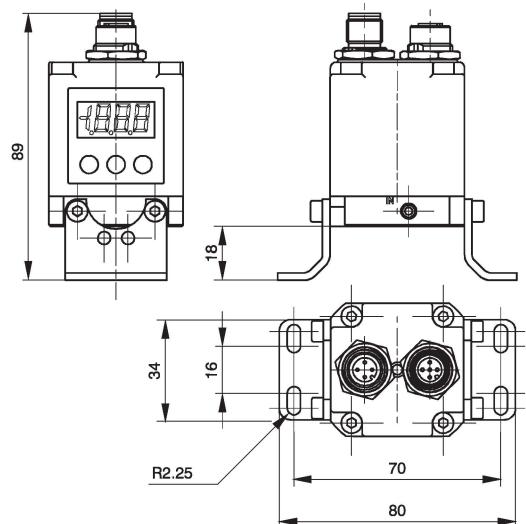
► **Size 3**



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Mounting options ("521 M12 version" - CANopen® version)

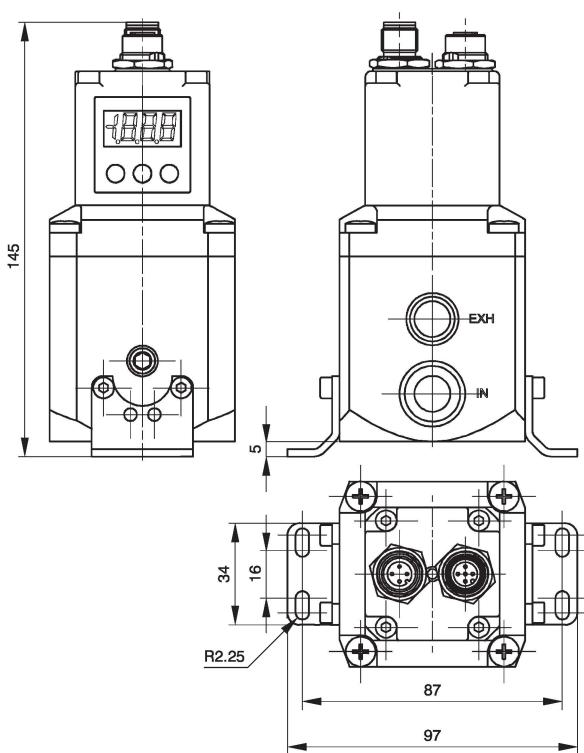
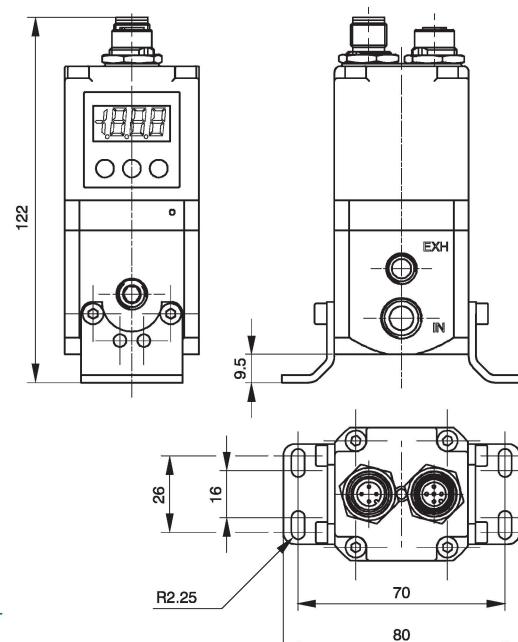
In addition to mounting directly using the M4 tappings on the body, the 170M5 bracket may also be used, as shown below:



Size 0



Size 1



Size 3

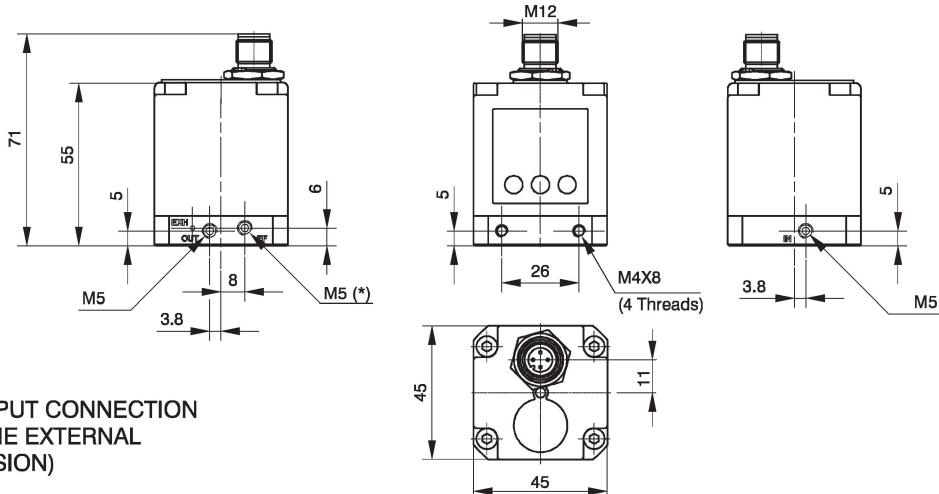


Overall dimensions ("521 M12 BASIC version")

2

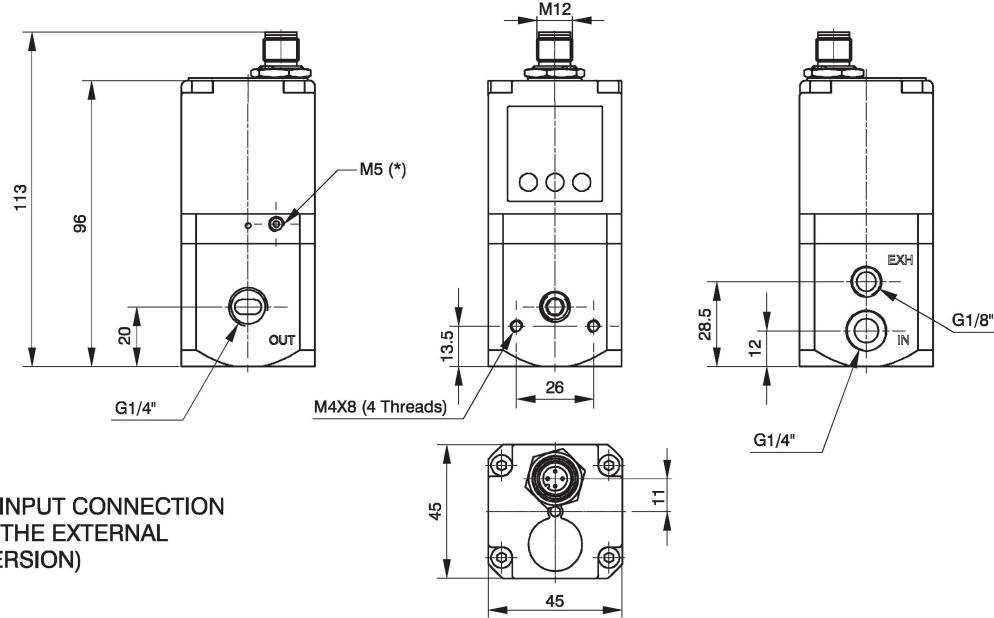
AIR TREATMENT

► **Size 0**



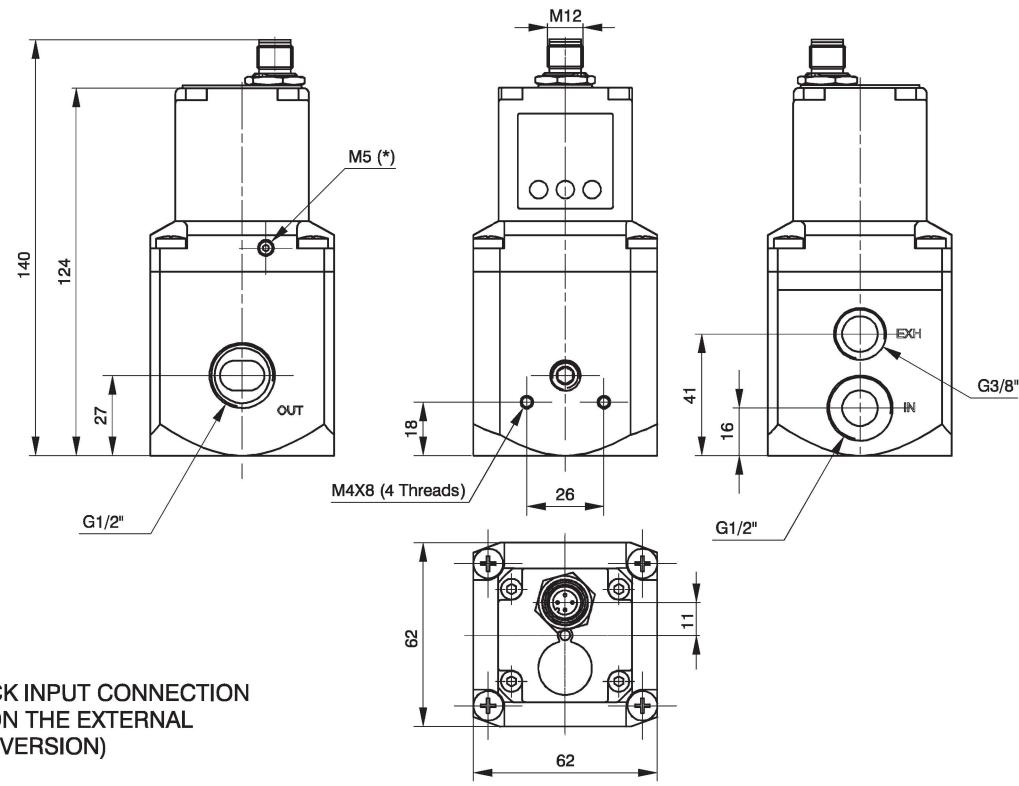
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* = EXTERNAL FEEDBACK INPUT CONNECTION
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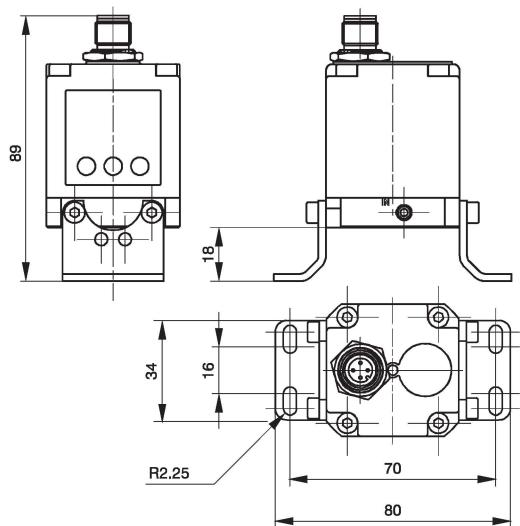
► **Size 3**



* = EXTERNAL FEEDBACK INPUT CONNECTION
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FEEDBACK VERSION)

Mounting options ("521 M12 BASIC version")

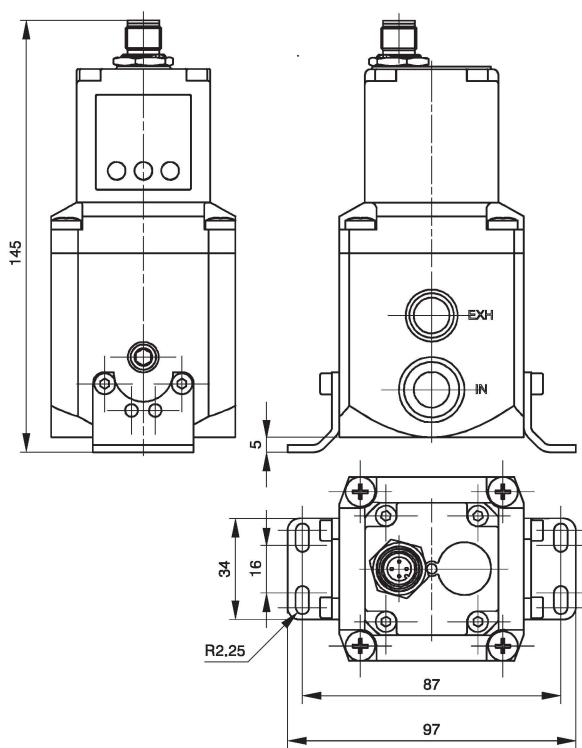
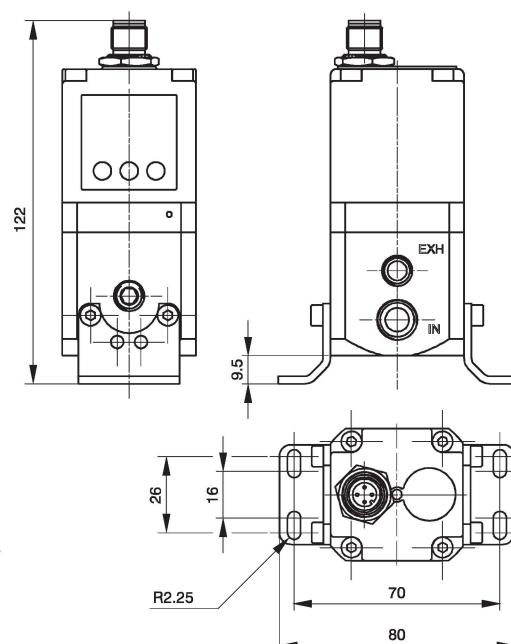
In addition to mounting directly using the M4 tappings on the body, the 170M5 bracket may also be used, as shown below:



Size 0



Size 1



Size 3

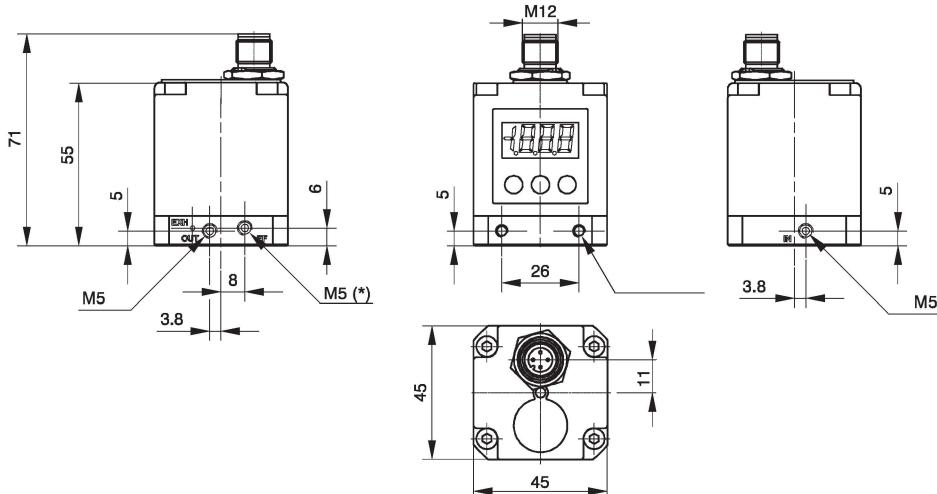


Overall dimensions ("521 M12 version" - Standard version)

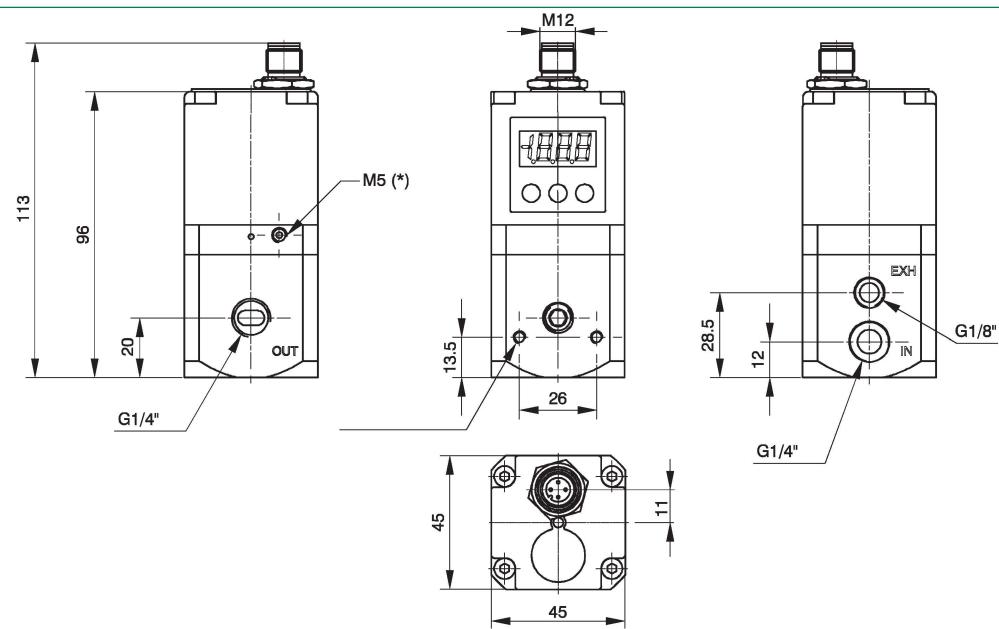
2

AIR TREATMENT

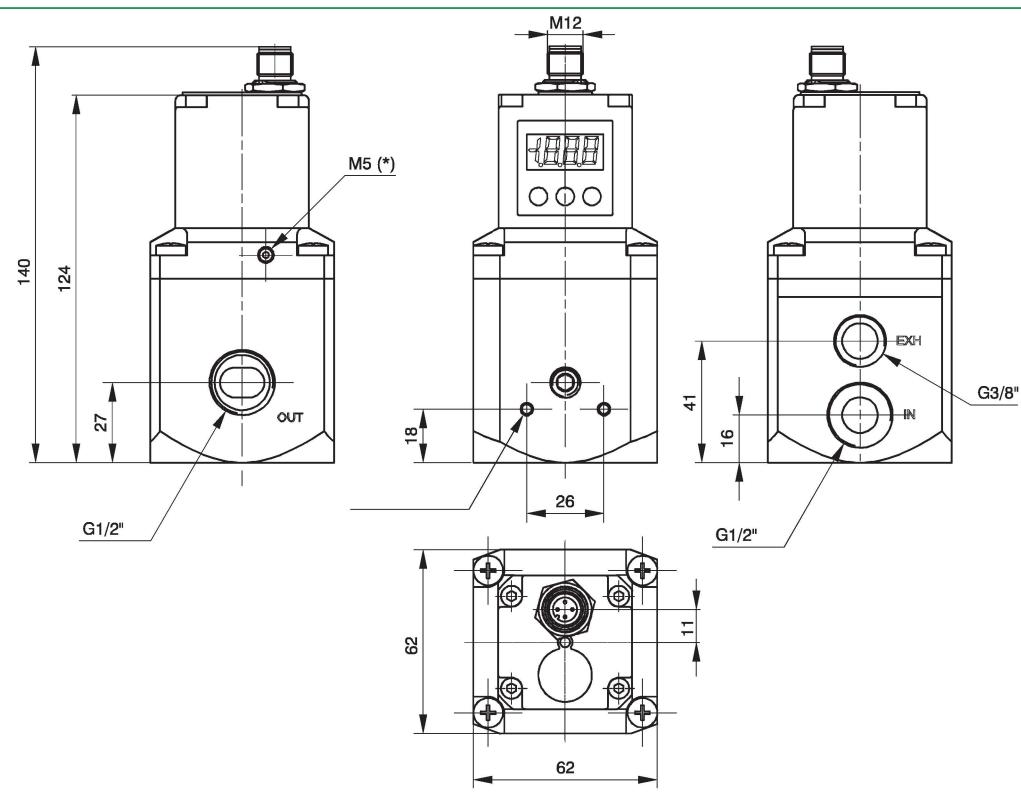
Size 0



Size 1

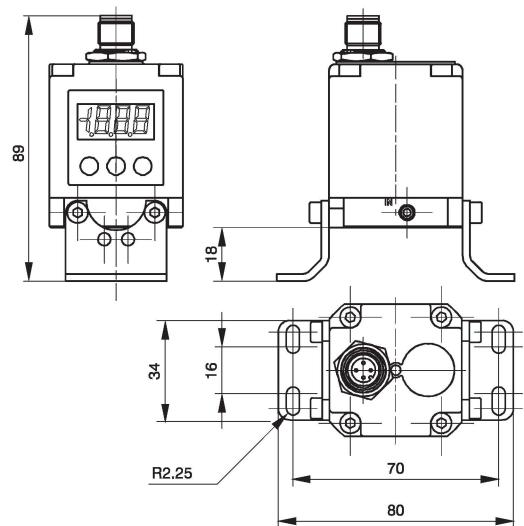


► Size 3



Mounting options ("521 M12 version" - Standard version)

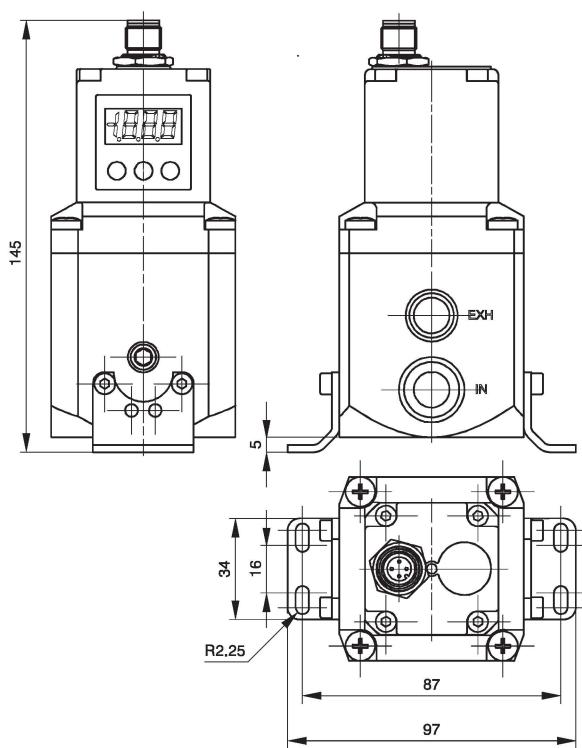
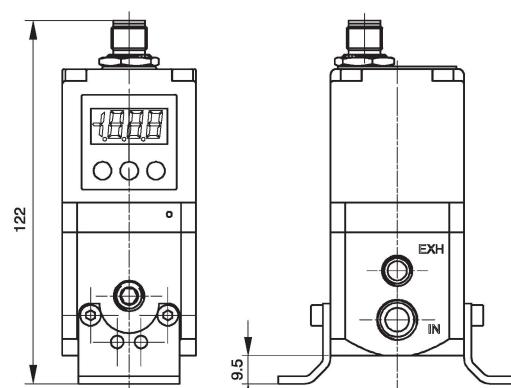
In addition to mounting directly using the M4 tappings on the body, the 170M5 bracket may also be used, as shown below:



Size 0



Size 1

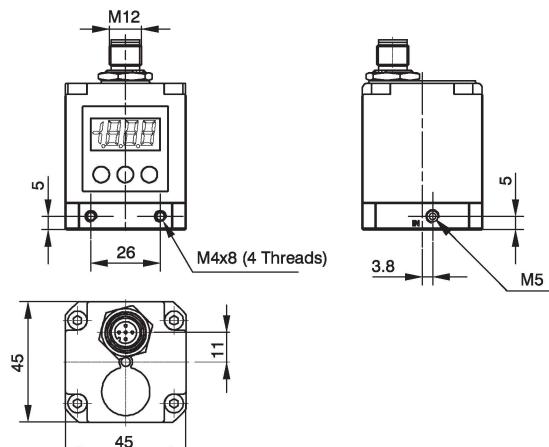
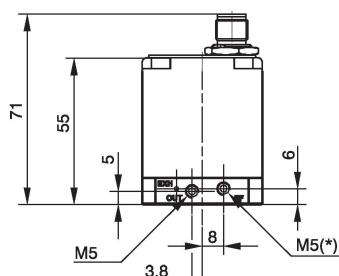


Size 3



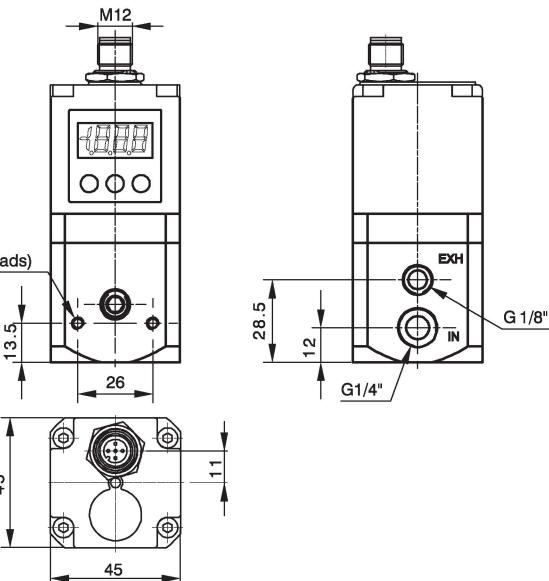
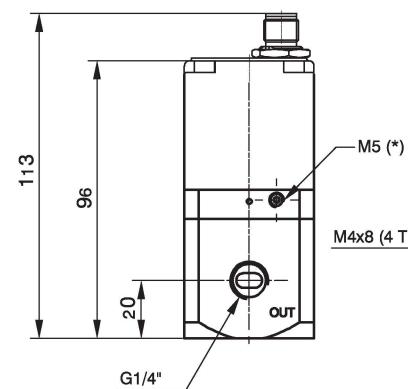
Overall dimensions ("521 IO-Link version")

Size 0



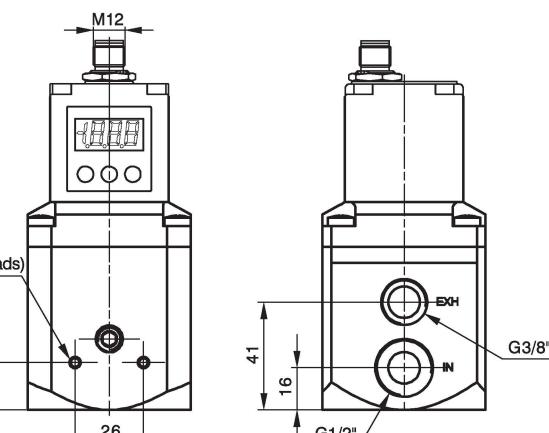
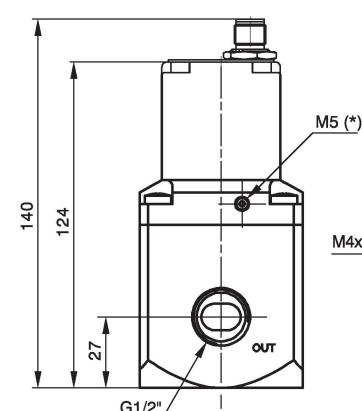
* = EXTERNAL FEEDBACK INPUT CONNECTION
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Size 1



* = EXTERNAL FEEDBACK INPUT CONNECTION
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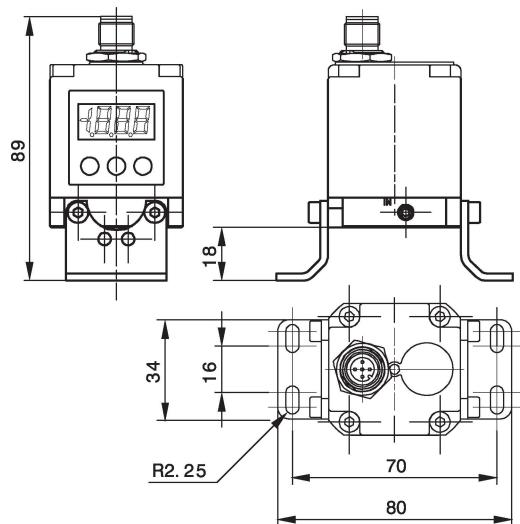
► Size 3



* = EXTERNAL FEEDBACK INPUT CONNECTION
(AVAILABLE ONLY ON THE EXTERNAL
FEEDBACK VERSION)

Mounting options ("521 IO-Link version")

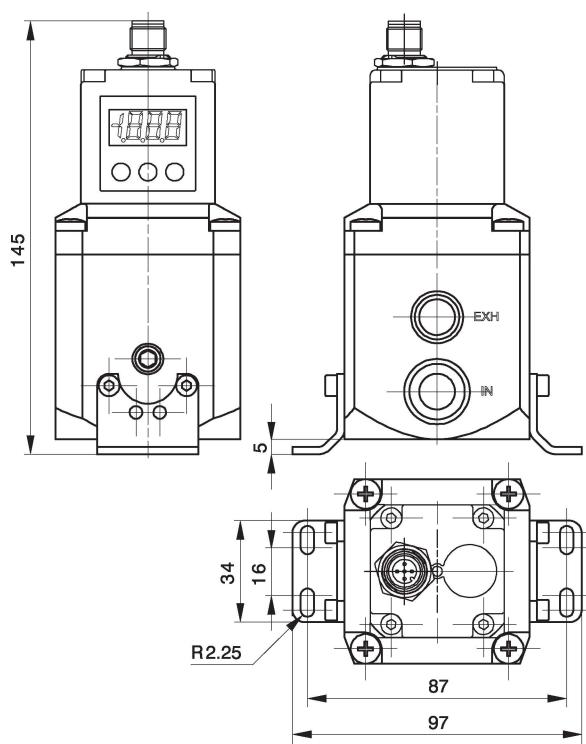
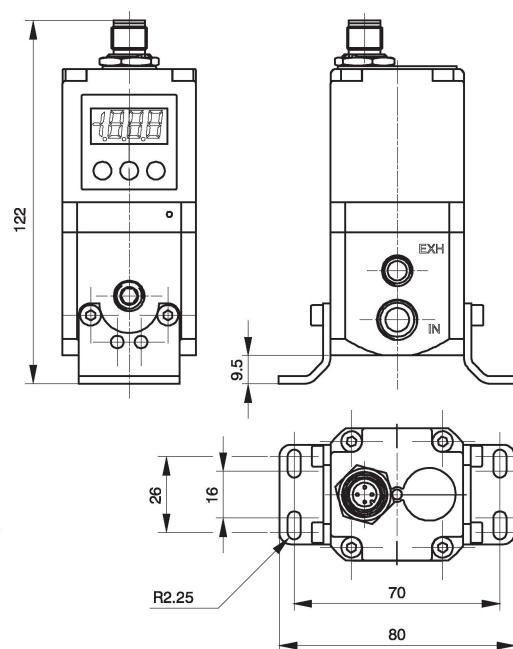
In addition to mounting directly using the M4 tappings on the body, the 170M5 bracket may also be used, as shown below.



Size 0



Size 1



Size 3





Installation/Operation

PNEUMATIC CONNECTION

The compressed air is connected by means of M5 threaded holes (for size 0 regulators), G 1/4" threaded holes (for size 1 regulators) and G 1/2" threaded holes (for size 3 regulators) on the body.



Before making the connections, eliminate any impurities in the connecting pipes to prevent chippings or dust entering the unit. Do not supply the circuit with more than 10 bar pressure and make sure that the compressed air is dried (excessive condensate could cause the appliance to malfunction) and filtered at 5 micron. The supply pressure to the regulator must always be at least 1 bar greater than the desired outlet pressure.

If a silencer is applied to the discharge path the unit response time may change; periodically check that the silencer is not blocked and replace it if necessary.

ELECTRICAL CONNECTION



For the electrical connection a SUB-D 15-pole female or a M12 connector is used (accordingly to the model, to be ordered separately). Wire in accordance with the wiring diagram shown below.

Warning: INCORRECT CONNECTIONS MAY DAMAGE THE DEVICE

NOTES ON OPERATION



If the electric supply is interrupted, the outlet pressure is maintained at the set value. However, maintaining the exact value cannot be ensured as it is impossible to operate the solenoid valves.

In order to discharge the circuit downstream, zero the reference, make sure that the display shows a pressure value equal to zero and then disconnect the electric power supply.

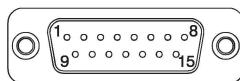
A version of the device is available that exhausts the downstream circuit when the power supply is removed. (Option "A" at the end of the ordering code).

If the compressed-air supply is suspended and the electric power supply is maintained a whirring will be heard that is due to the solenoid valves; an operating parameter can be activated (P18) that triggers the regulator protection whenever the requested pressure is not reached within 4 seconds of the reference signal being sent. In this case the system will intervene to interrupt the control of the solenoid valves. Every twenty seconds, the unit will start the reset procedure until standard operating conditions have been restored.

"521" Standard version with D-SUB connector



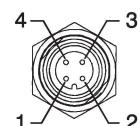
TOP VIEW OF THE REGULATOR CONNECTOR



CONNECTOR PINOUT:
1 = DIGITAL INPUT 1
2 = DIGITAL INPUT 2
3 = DIGITAL INPUT 3
4 = DIGITAL INPUT 4
5 = DIGITAL INPUT 5
6 = DIGITAL INPUT 6
7 = DIGITAL INPUT 7

8 = ANALOG INPUT /
DIGITAL INPUT 8
9 = SUPPLY (24 VDC)
10 = DIGITAL OUTPUT (24 VDC PNP)
11 = ANALOG OUTPUT (CURRENT)
12 = ANALOG OUTPUT (VOLTAGE)
13 = Rx RS-232
14 = Tx RS-232
15 = GND

"521" M12 BASIC and Standard versions



M12 4P
MALE

M12 BASIC version

CONNECTOR PINOUT:
1 = POWER SUPPLY (24 VDC)
2 = NC
3 = GND
4 = ANALOG INPUT

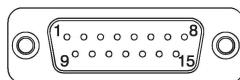
M12 Standard version

CONNECTOR PINOUT:
1 = POWER SUPPLY (24 VDC)
2 = ANALOG OUTPUT
(depending on the model)
3 = GND
4 = ANALOG INPUT

"521" CANopen® version with D-SUB connector

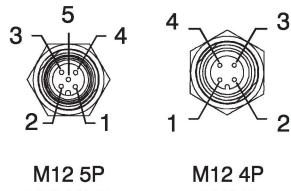


TOP VIEW OF THE REGULATOR CONNECTOR



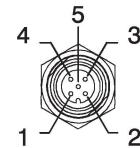
CONNECTOR PINOUT:
1 = CAN_SHIELD
2 = CAN_V+
3 = CAN_GND
4 = CAN_H
5 = CAN_L
6 = NC
7 = NC
8 = NC
9 = SUPPLY
(+24 VDC)

"521" CANopen® version with M12 connector



M12 5P
FEMALE M12 4P
MALE

"521" IO-Link version"



M12 5P
MALE

CONNECTOR PINOUT:
1 = L+
2 = +24 VDC (P24)
3 = L-
4 = C/Q
5 = GND (N24)

ORDERING CODES

"521" standard version with SUB-D 15 poles



17 E2N. . D .

VARIANT

- = Standard Version
(no additional letter required)
- E = External pressure feedback
- A = Exhaust downstream pressure
when power supply is removed
- AE = A Variant + E Variant

PRESSURE RANGE :

- 0001 = Range 0 - 1 bar
- 0005 = Range 0 - 5 bar
- 0009 = Range 0 - 9 bar

MANAGEMENT :

- C = Current signal (4-20 mA / 0-20 mA)
- T = Voltage signal (0-10 V / 0-5 V / 1-5 V)

SIZE :

- 0 = Size 0
- 1 = Size 1
- 3 = Size 3

WARNING: Pressure from 0 to 0.1 bar cannot be adjusted.

ORDERING CODES

"521" CANopen® version with SUB-D 15 poles



17 E2N. S . C .

VARIANT

- = Standard Version
(no additional letter required)
- E = External pressure feedback
- A = Exhaust downstream pressure
when power supply is removed
- AE = A Variant + E Variant

PRESSURE RANGE :

- 0001 = Range 0 - 1 bar
- 0005 = Range 0 - 5 bar
- 0009 = Range 0 - 9 bar

WARNING: Pressure from 0 to 0.1 bar cannot be adjusted.

Accessories

| Model with SUB-D 15 poles connector | |
|---|--|
|  | 5300.F15.00.00 : Straight connector + Casing IP65 |
| | 5300.F15.00.03 : Straight connector + Cable 3 meters |
| | 5300.F15.00.05 : Straight connector + Cable 5 meters |
| | 5300.F15.90.00 : 90° connector + Casing IP65 |
| | 5300.F15.90.03 : 90° connector + Cable 3 meters |
| | 5300.F15.90.05 : 90° connector + Cable 5 meters |

* Without cable

| Fixing bracket |
|--|
| 170M5 |
|  |

ORDERING CODES

"521 M12 version" - CANopen® version



17 E2N. M. C.

SIZE :

- **0** = Size 0
- **1** = Size 1
- **3** = Size 3

VARIANT

- = Standard Version
(no additional letter required)
- **E** = External pressure feedback
- **A** = Exhaust downstream pressure
when power supply is removed
- **AE** = A Variant + E Variant

PRESSURE RANGE :

- **0001** = Range 0 - 1 bar
- **0005** = Range 0 - 5 bar
- **0009** = Range 0 - 9 bar

NOTE: This model doesn't include the terminating resistor.

WARNING: Pressure from 0 to 0.1 bar cannot be adjusted.

Accessories

| |
|-----------------------------------|
| Model with M12 connector |
| POWER SUPPLY connector |
| Female straight connector M12A 4P |
| 5312A.F04.00 |

| |
|---------------------------------|
| Model with M12 connector |
| NETWORK connector |
| Male straight connector M12A 5P |

| |
|-----------------------|
| Fixing bracket |
| 170M5 |

ORDERING CODES

"521 M12 BASIC version"



17 E2N. . M.

SIZE :

- **0** = Size 0
- **1** = Size 1
- **3** = Size 3

VARIANT

- = Standard Version
(no additional letter required)
- **E** = External pressure feedback
- **A** = Exhaust downstream pressure
when power supply is removed
- **AE** = A Variant + E Variant

PRESSURE RANGE :

- **0001** = Range 0 - 1 bar
- **0005** = Range 0 - 5 bar
- **0009** = Range 0 - 9 bar

MANAGEMENT :

- **C** = Current signal (4-20 mA)
- **T** = Voltage signal (0-10 V)

NOTE:

This model doesn't include a keyboard.
Therefore it is not possible to set the parameters.
Unless specifically requested it is provided with
all parameters set with default values.
Personalisations are available.

WARNING: Pressure from 0 to 0.1 bar cannot be adjusted.

Accessories

| |
|-----------------------------------|
| Model with M12 connector |
| POWER SUPPLY connector |
| Female straight connector M12A 4P |
| 5312A.F04.00 |

| |
|-----------------------|
| Fixing bracket |
| 170M5 |

ORDERING CODES

"521 M12 version" - Standard version



17 E2N.

PRESSURE RANGE
— 0001 = Range 0 - 1 bar
— 0005 = Range 0 - 5 bar
— 0009 = Range 0 - 9 bar

VARIANT

- = Standard Version (no additional letter required)
- E = External pressure feedback
- A = Exhaust downstream pressure when power supply is removed
- AE = A Variant + E Variant

OUTPUT

- F = Voltage analogue output
- G = Current analogue output
- H = Digital output

MANAGEMENT

- C = Current signal (4-20 mA)
- T = Voltage signal (0-10 V)

SIZE

- 0 = Size 0
- 1 = Size 1
- 3 = Size 3

WARNING: Pressure from 0 to 0.1 bar cannot be adjusted.

Accessories

| |
|---|
| Model with M12 connector |
| POWER SUPPLY connector |
| Female straight connector M12A 4P |
| 5312A.F04.00 |
|  |

| |
|---|
| Fixing bracket |
| 170M5 |
|  |

ORDERING CODES

"521 IO-Link version"



17 E2N. I . B .

VARIANT:

- Standard version
- E = External pressure feedback
- A = Exhaust downstream circuit without power supply
- AE = A Variant + E Variant

PRESSURE RANGE:

- 0009 = Range 0 - 9 bar

SIZE

- 0 = Size 0
- 1 = Size 1
- 3 = Size 3

WARNING: Pressure from 0 to 0.1 bar cannot be adjusted.

Accessories

| |
|---|
| Model with M12 connector |
| POWER SUPPLY connector |
| Female straight connector M12A 5P |
| 5312A.F05.00 |
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|---|
| Fixing bracket |
| 170M5 |
|  |