

## Series 1700 - Electronic proportional regulators

### General

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 NI/min respectively and supporting Analog/Digital, CANopen® or IO-Link communication interfaces.

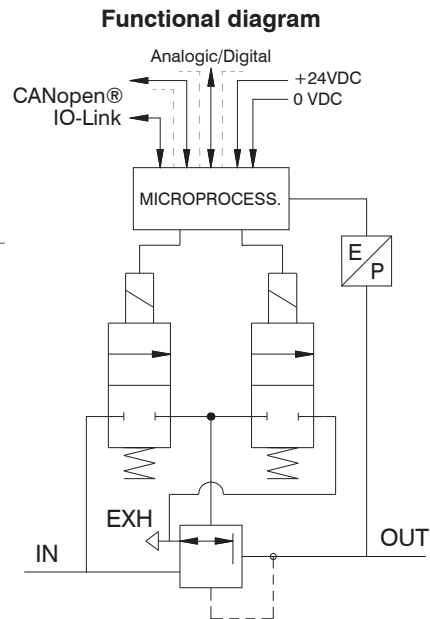
### Application fields

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.

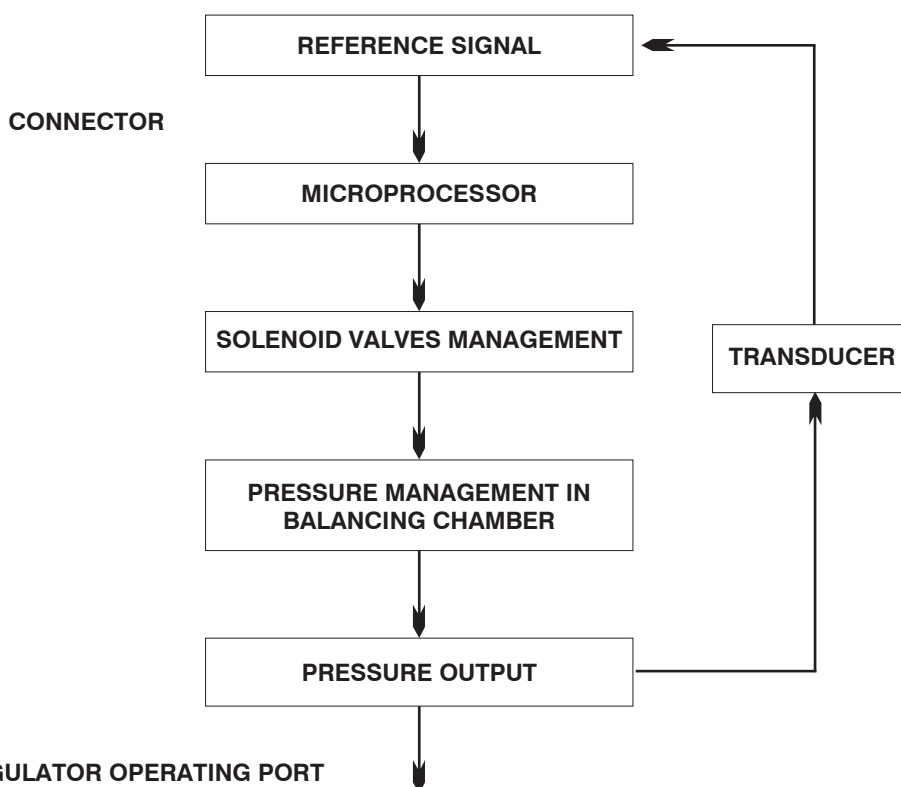
### Product presentation

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 from 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.



### 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.



2 AIR SERVICE UNITS



## 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<br>(6 bar ΔP 1 bar)        | <b>Size 0</b>                             | <b>Size 1</b> | <b>Size 3</b> |
|   | 7 NI/min                                  | 1100 NI/min   | 4000 NI/min   |
| Discharge flowrate<br>(a 6 bar with 1 bar overpressure) | 7 NI/min                                  | 1300 NI/min   | 4500 NI/min   |
| Air consumption   | < 1 NI/min                                | < 1 NI/min    | < 1 NI/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<br>*0 ÷ 5 V<br>*1 ÷ 5 V |
|   | Current                                   | *4 ÷ 20 mA<br>*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° ÷ 50° / 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                    | <b>Size 0</b>             | <b>Size 1</b> | <b>Size 3</b> |
|                           | 168 gr.                   | 360 gr.       | 850 gr.       |

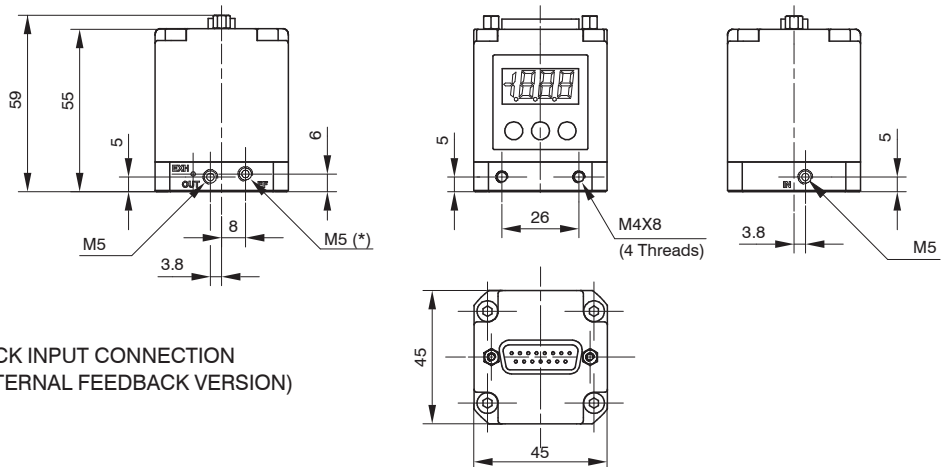
\* Selectable by keyboard or by RS-232

\*\* Valid only for devices with analog input



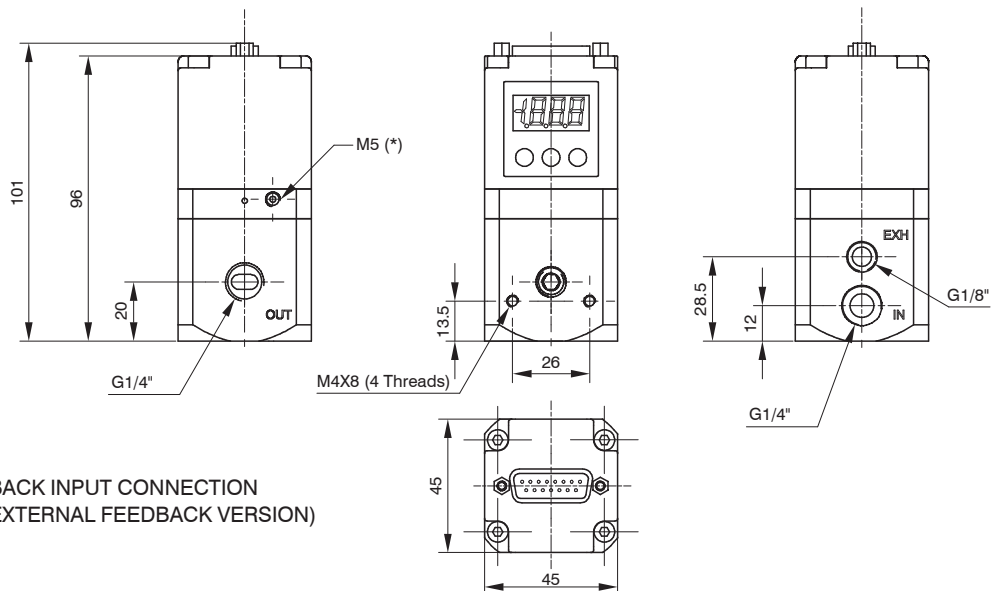
Overall dimensions ("521" standard version and CANopen® version with SUB-D 15 poles)

Size 0



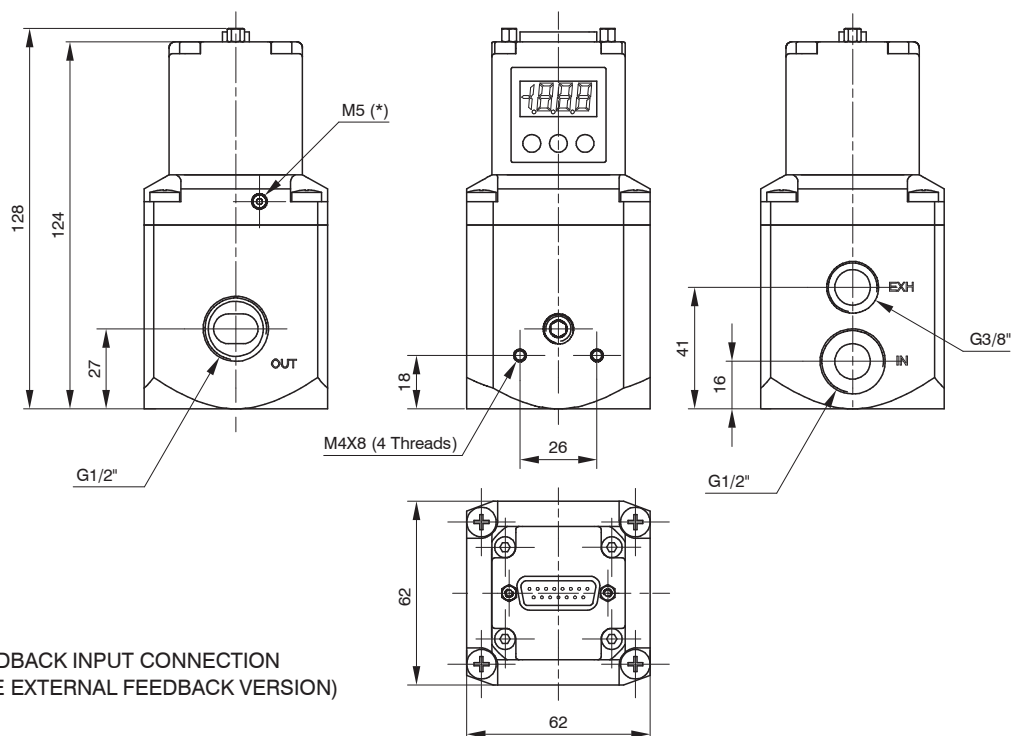
\* = EXTERNAL FEEDBACK INPUT CONNECTION  
(AVAILABLE ONLY ON THE EXTERNAL FEEDBACK VERSION)

Size 1



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

Size 3

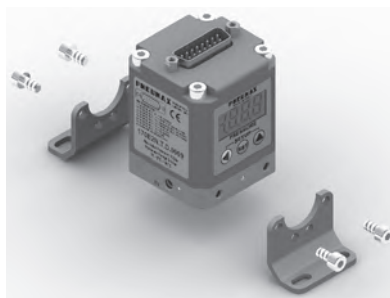
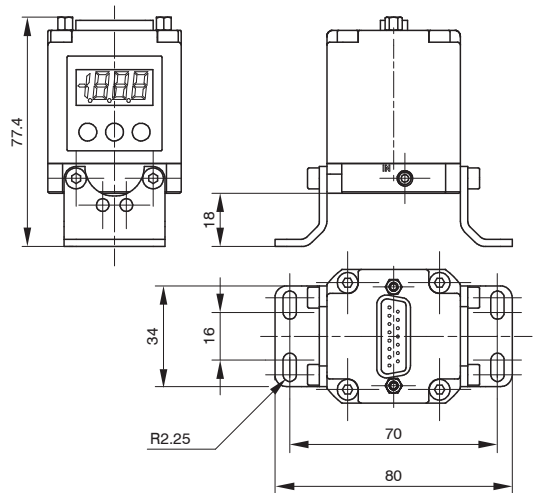


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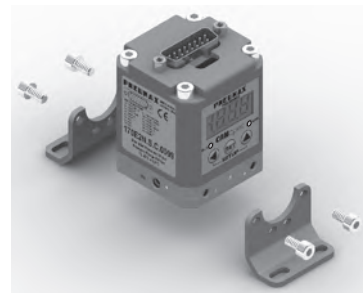
2 AIR SERVICE UNITS

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

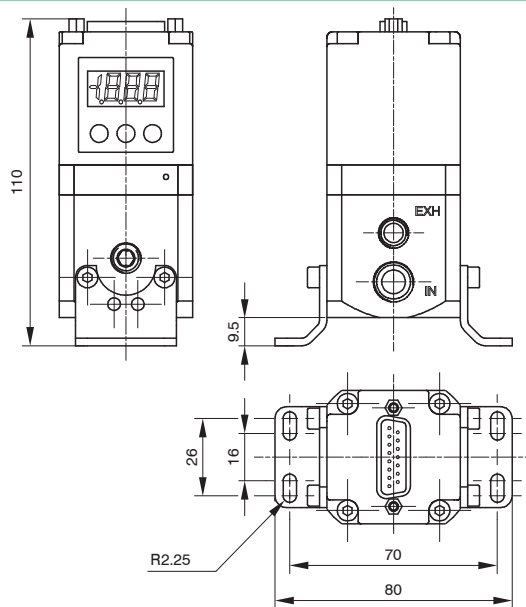
In addition to mounting directly using the M4 tappings on the body, the 170M5 bracket may also be used, as shown below:



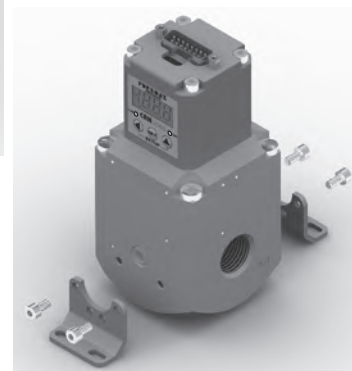
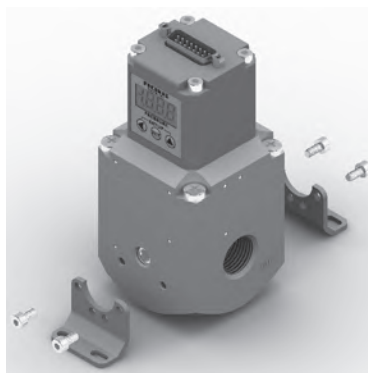
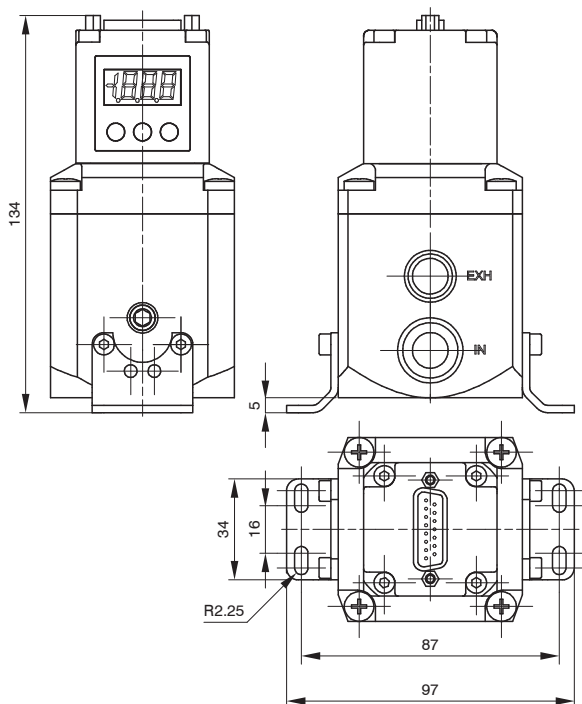
Size 0



Size 1

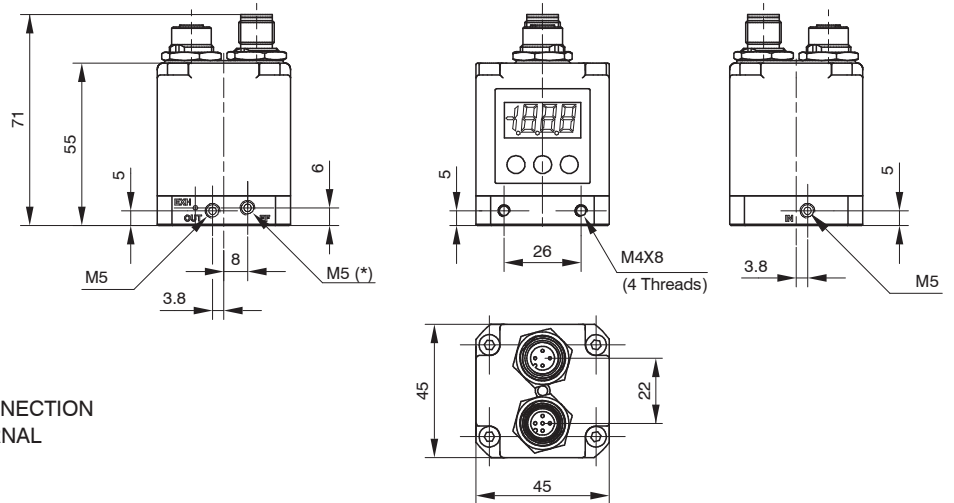


Size 3



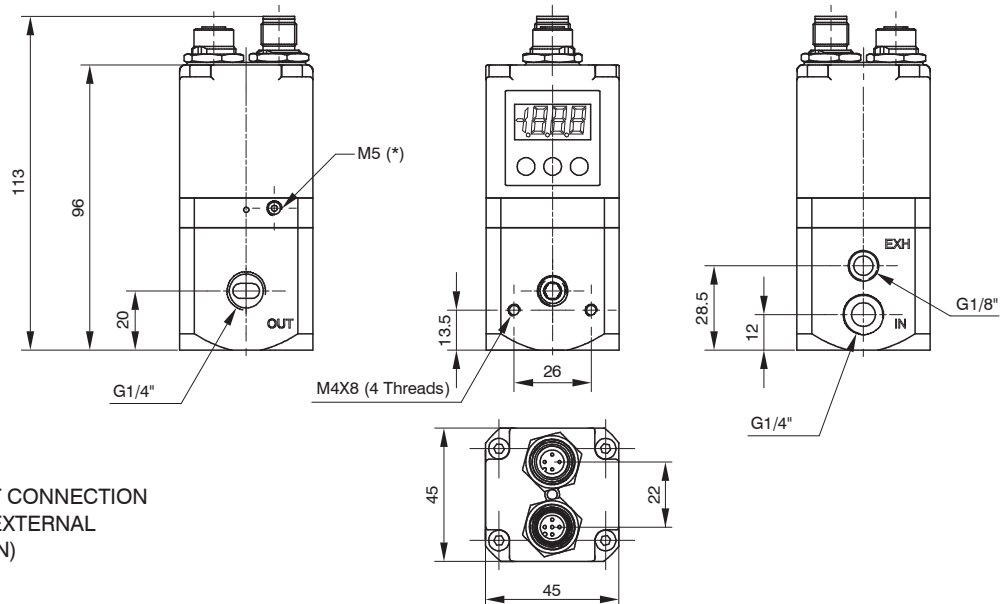
Overall dimensions ("521 M12 version" - CANopen® version)

Size 0



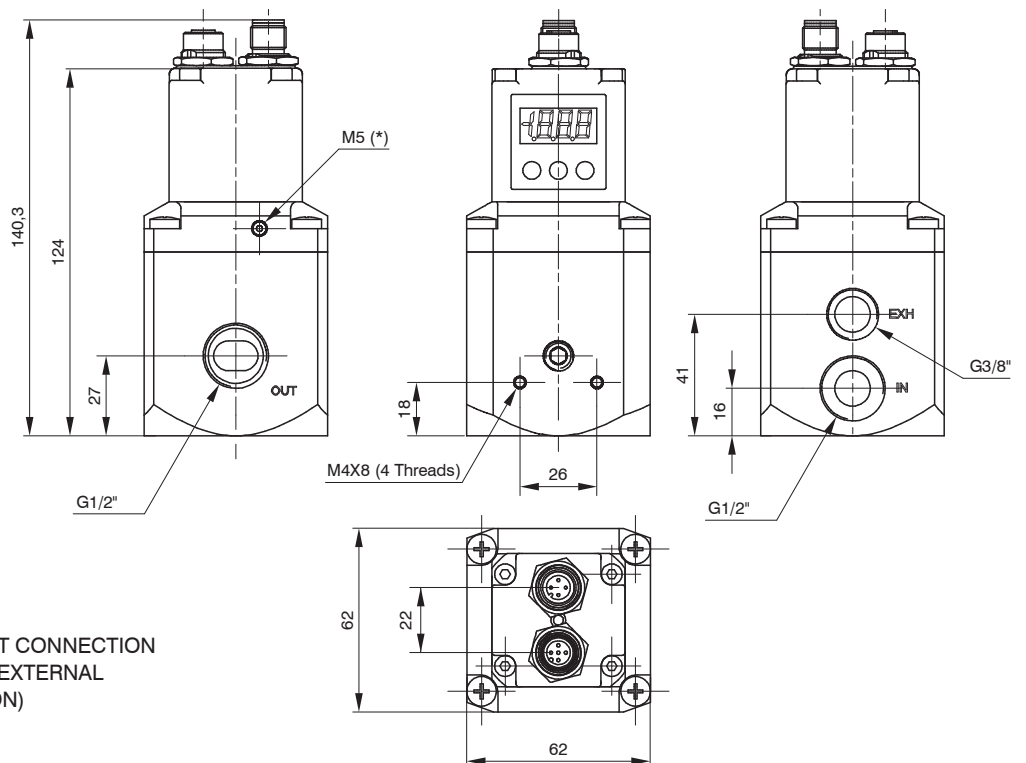
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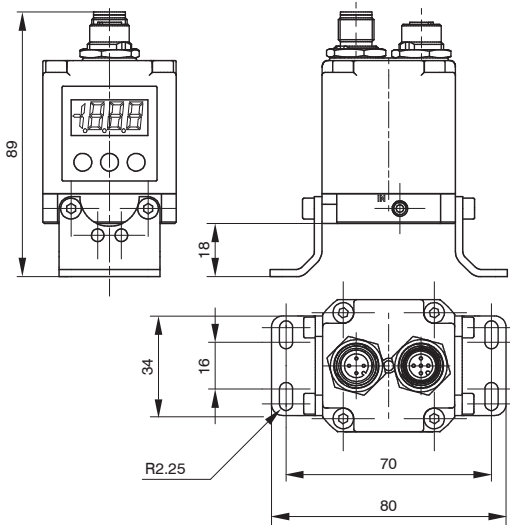
Size 3



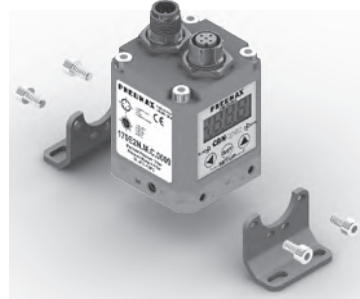
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**Mounting options ("521 M12 version" - CANopen® version)**

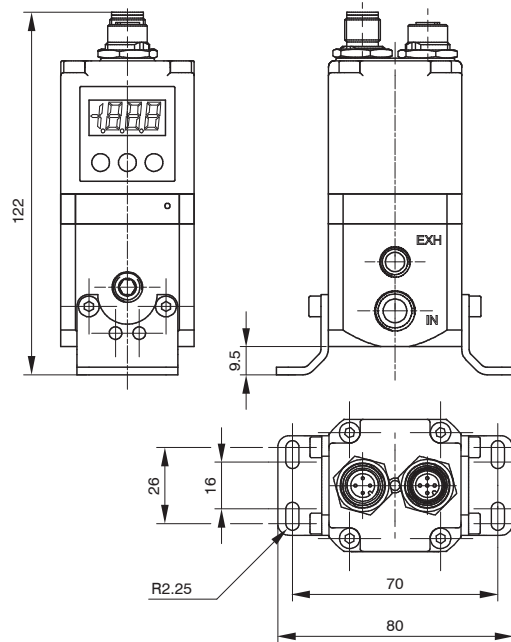
In addition to mounting directly using the M4 tapping on the body, the 170M5 bracket may also be used, as shown below:



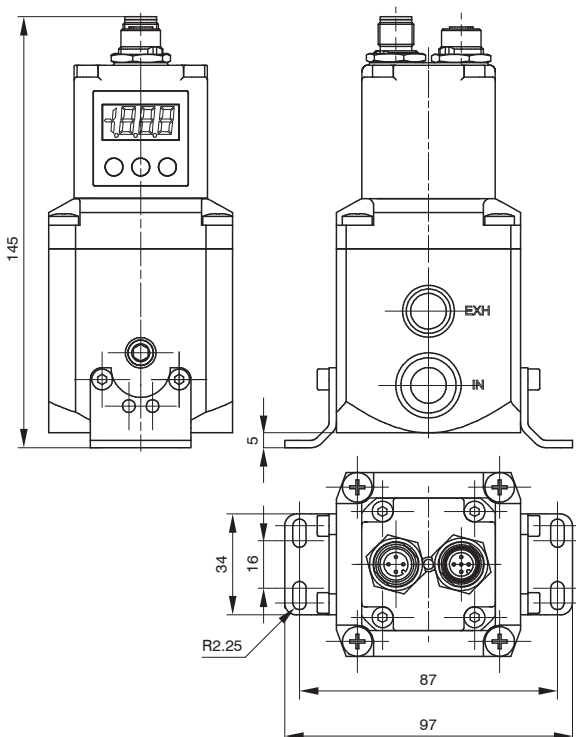
Size 0



Size 1



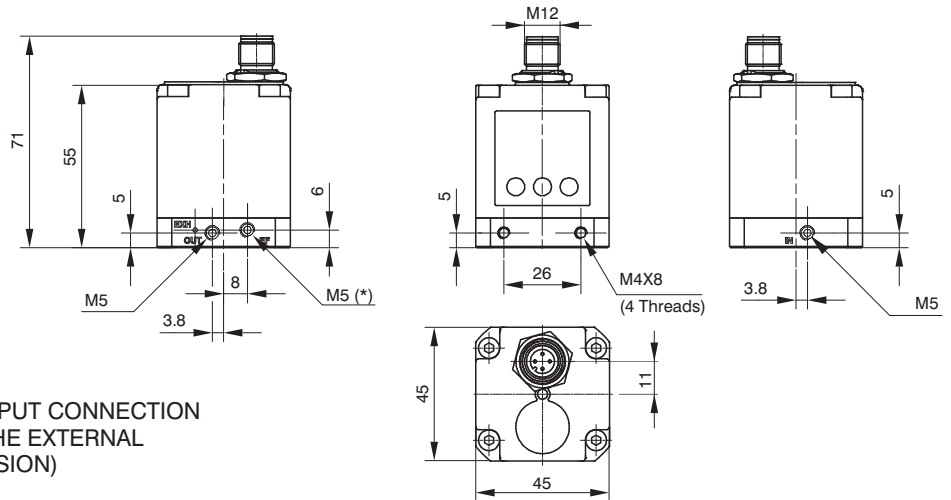
Size 3





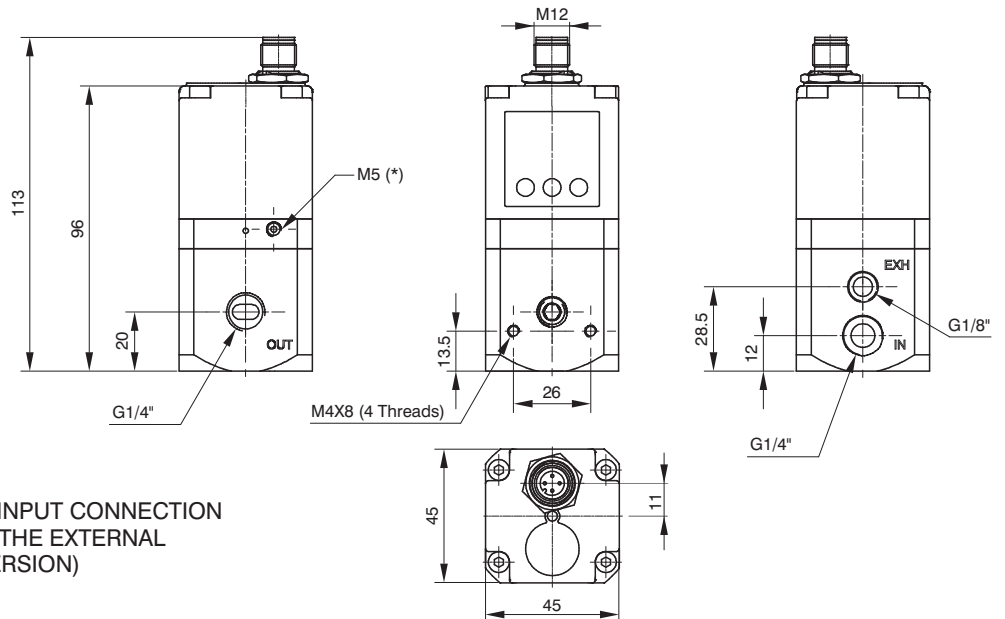
Overall dimensions ("521 M12 BASIC version")

Size 0



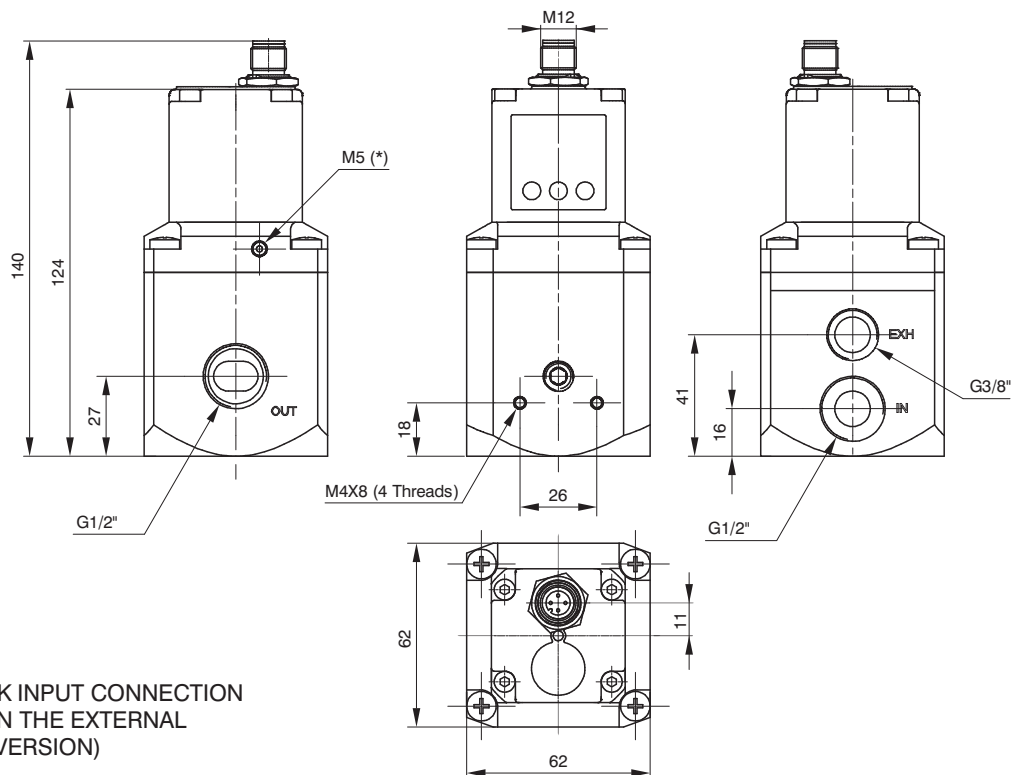
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Size 1



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

Size 3

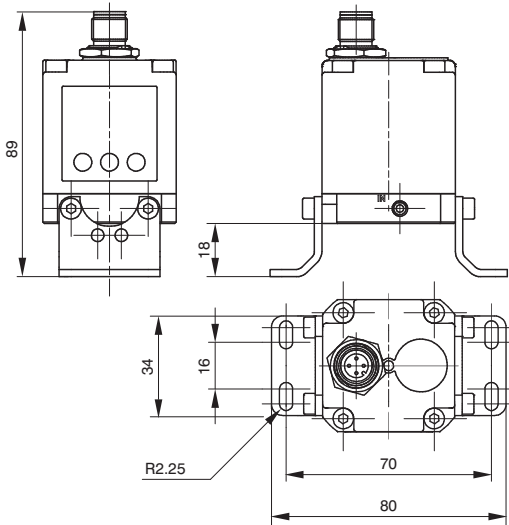


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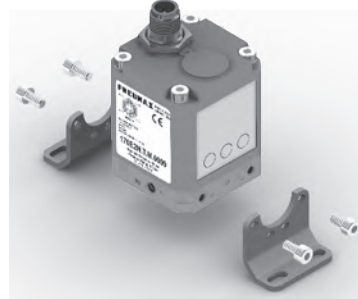
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**Mounting options ("521 M12 BASIC version")**

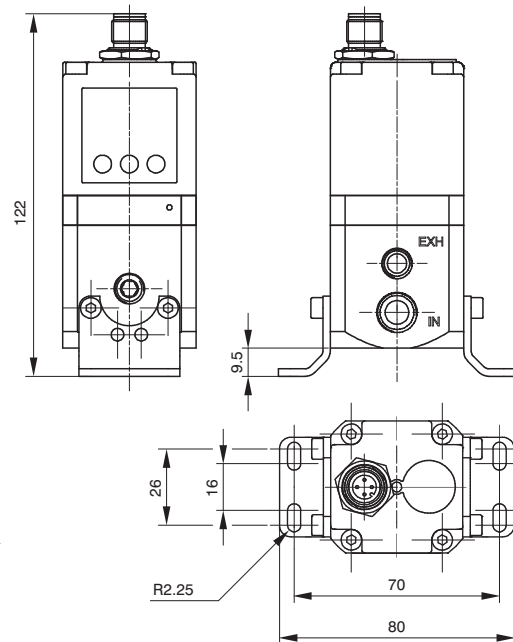
In addition to mounting directly using the M4 tapping on the body, the 170M5 bracket may also be used, as shown below:



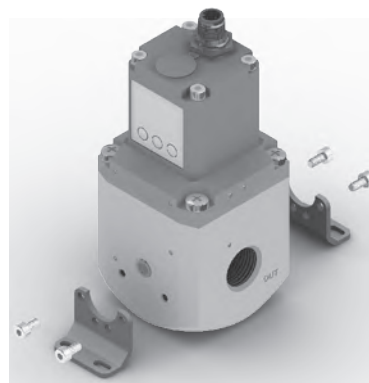
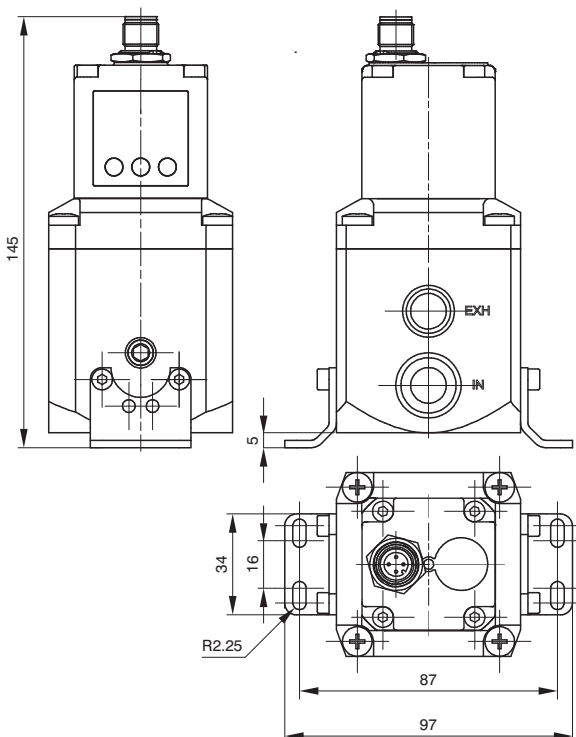
Size 0



Size 1



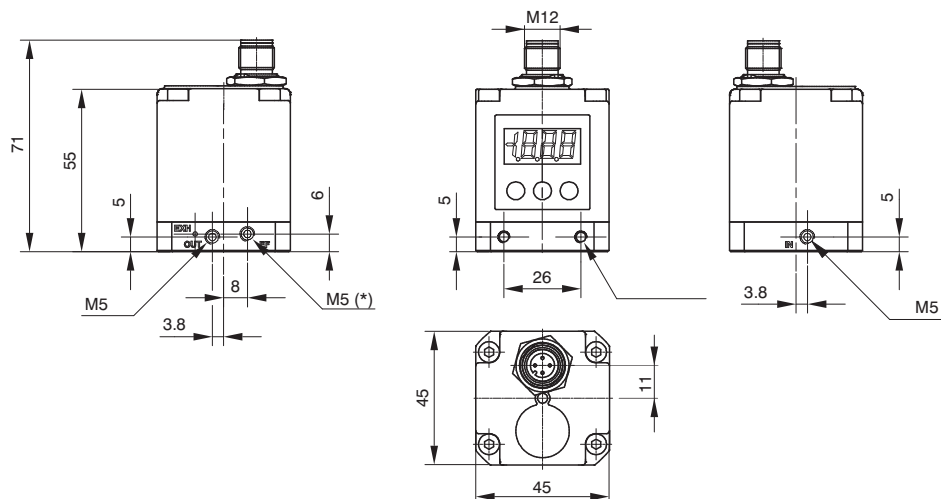
Size 3



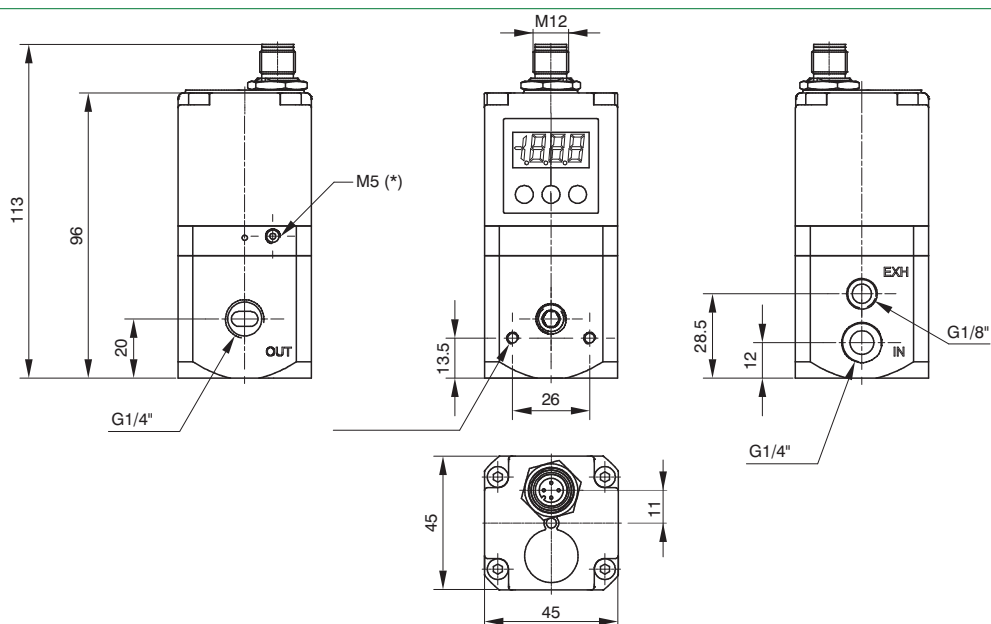


Overall dimensions ("521 M12 version" - Standard version)

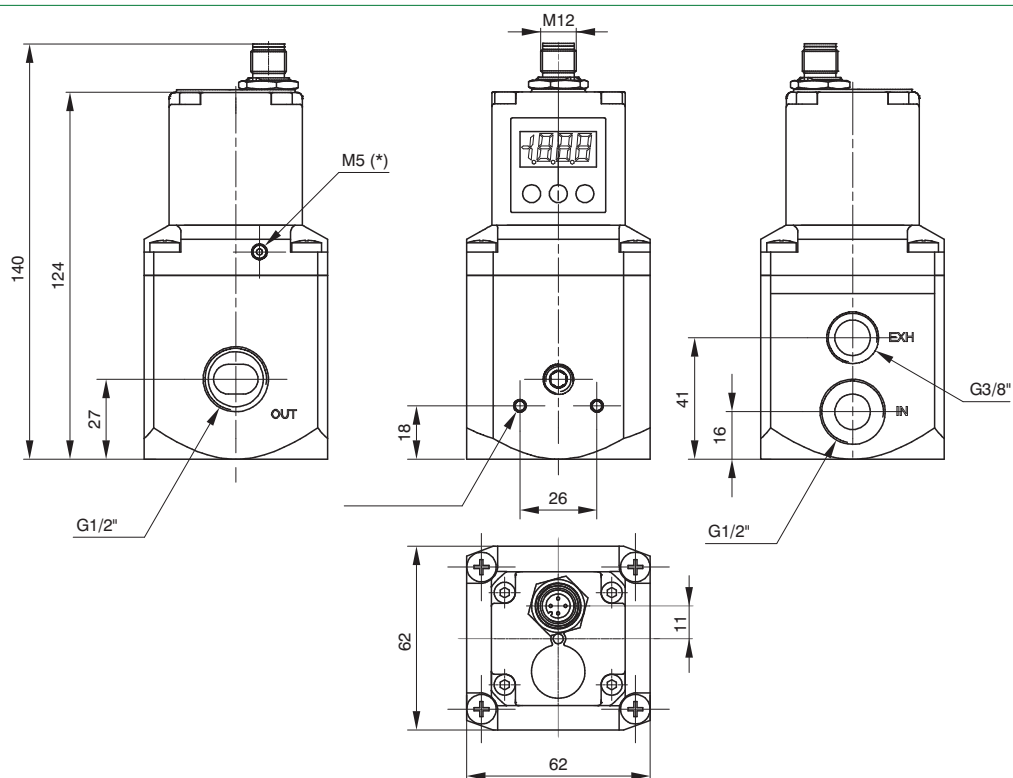
Size 0



Size 1



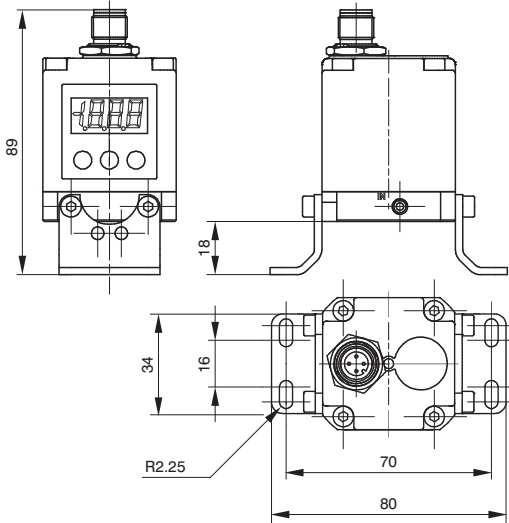
Size 3



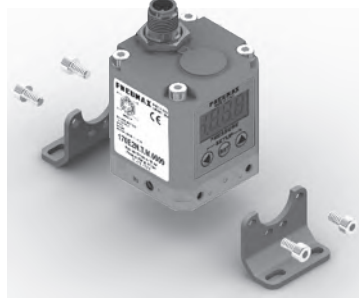
2 AIR SERVICE UNITS

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

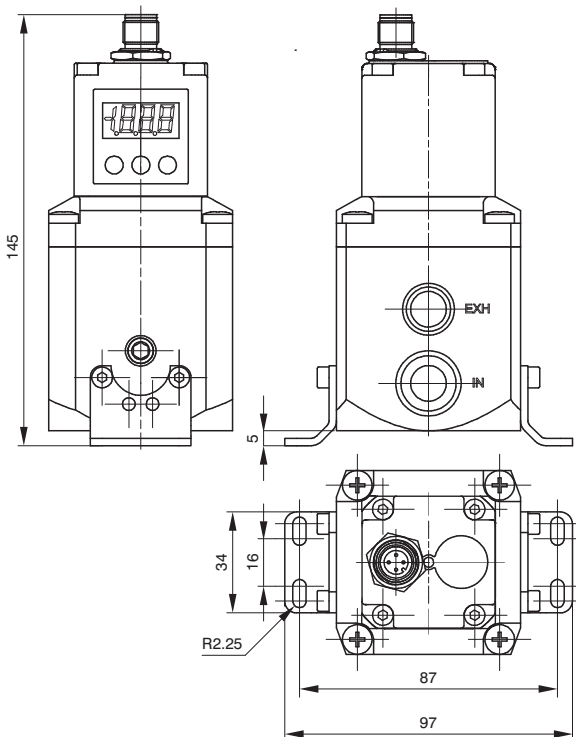
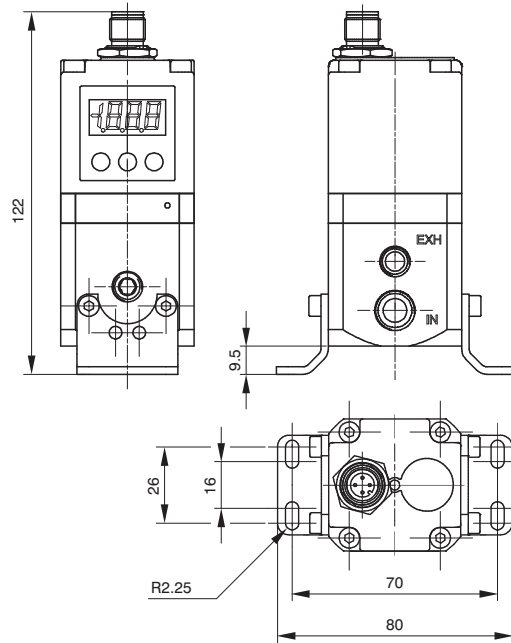
In addition to mounting directly using the M4 tapping on the body, the 170M5 bracket may also be used, as shown below:



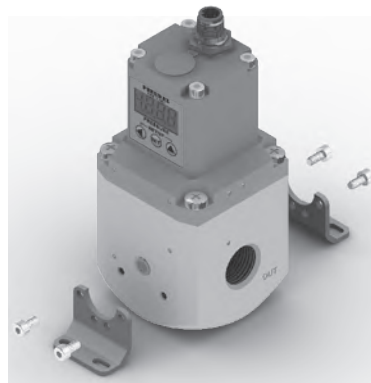
Size 0



Size 1

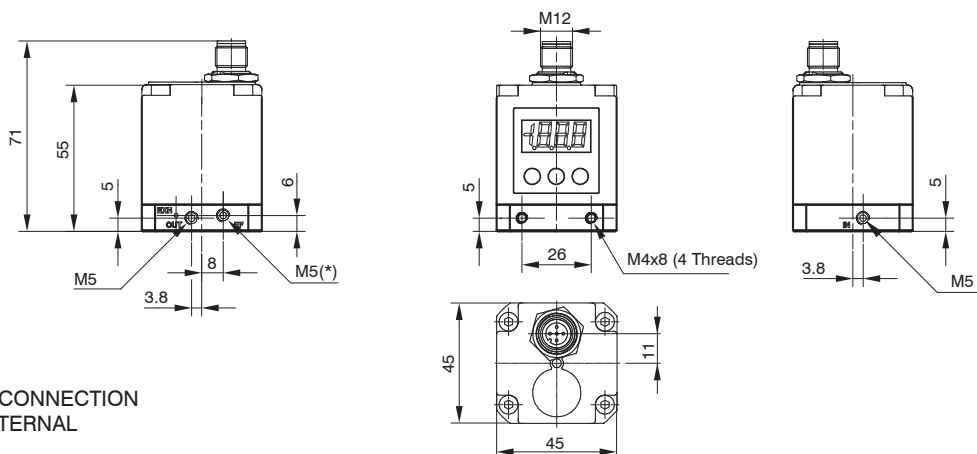


Size 3



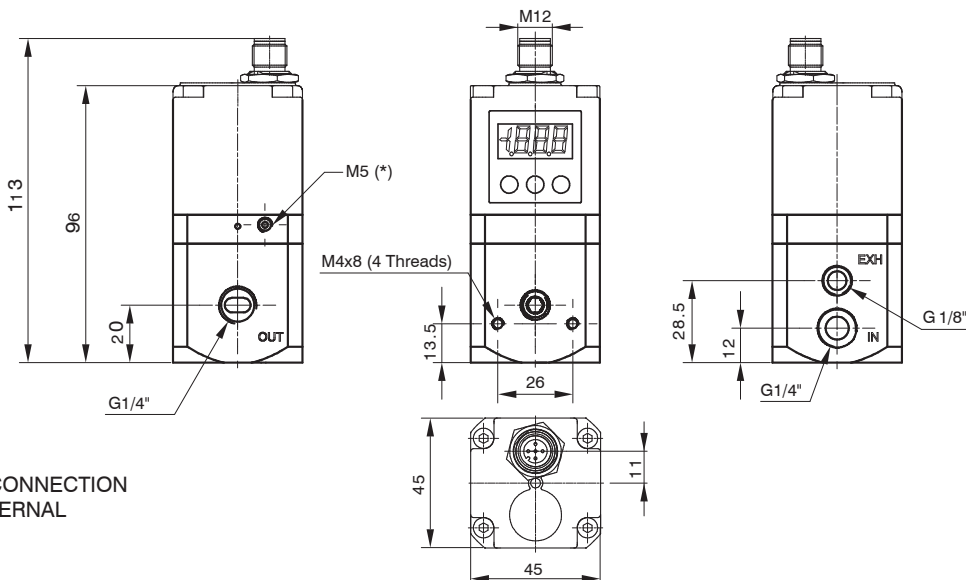
Overall dimensions ("521 IO-Link version")

Size 0



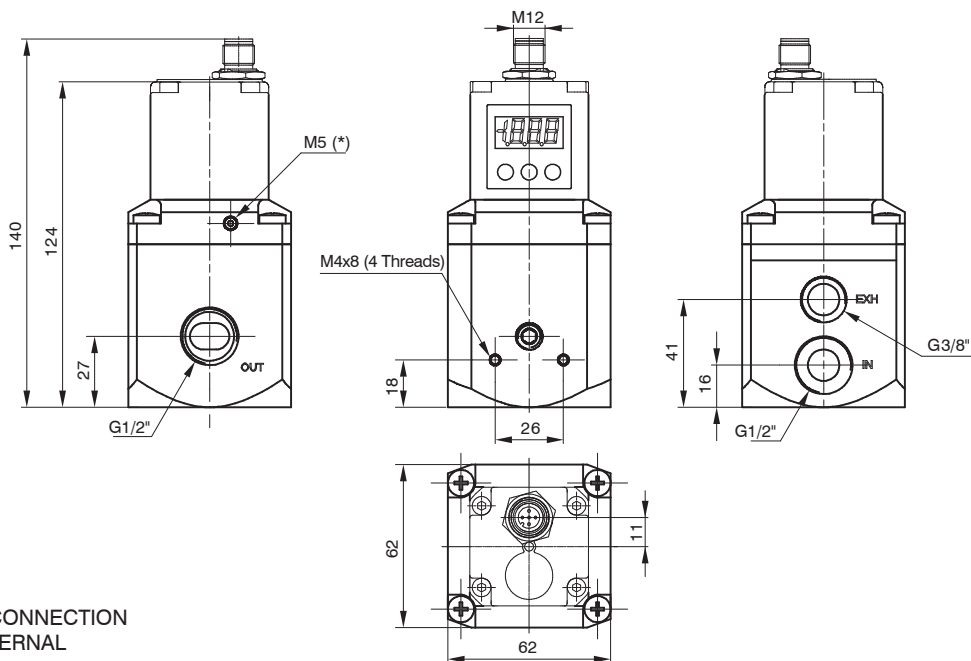
\* = EXTERNAL FEEDBACK INPUT CONNECTION  
(AVAILABLE ONLY ON THE EXTERNAL  
FEEDBACK VERSION)

Size 1



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

Size 3

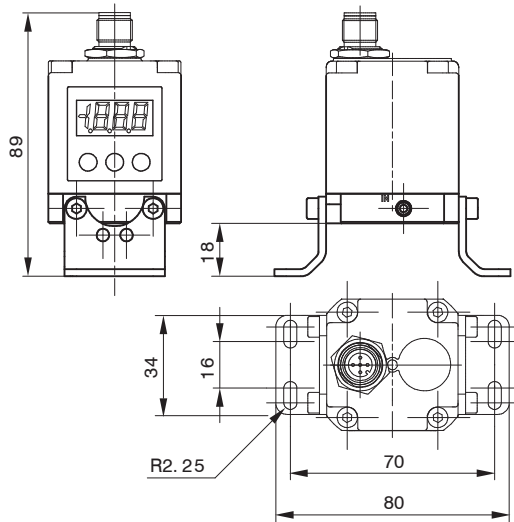


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FEEDBACK VERSION)

2 AIR SERVICE UNITS

**Mounting options ("521 IO-Link version")**

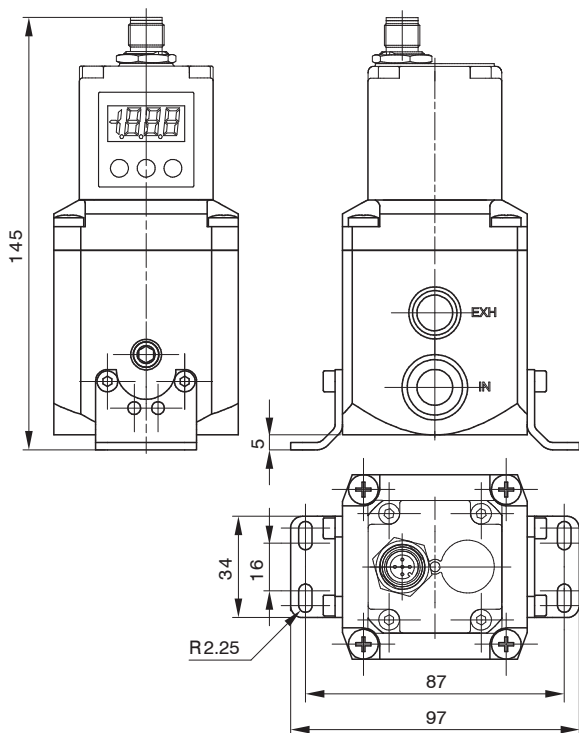
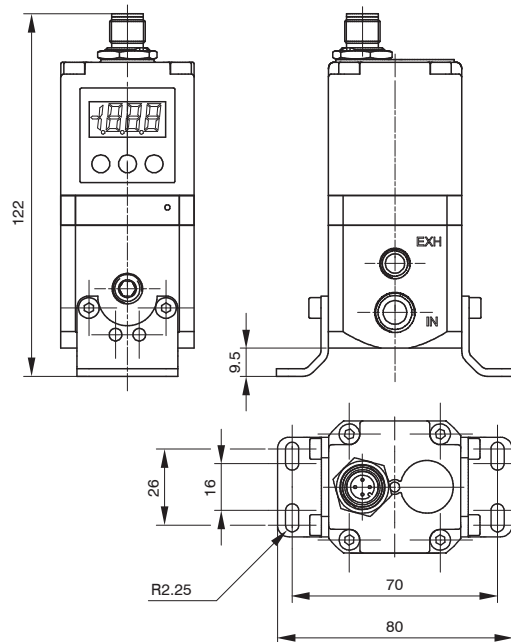
In addition to mounting directly using the M4 tappings on the body, the 170M5 bracket may also be used, as shown below.



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**

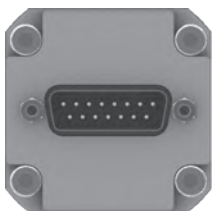
**NOTES ON OPERATION**



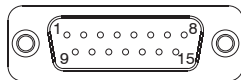
If the electric supply is interrupted, the outlet pressure is maintained at the set value. However, maintaining the exact value cannot be ensured as it is impossible to operate the solenoid valves.  
 In order to discharge the circuit downstream, zero the reference, make sure that the display shows a 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.

2 AIR SERVICE UNITS

**"521" Standard version with D-SUB connector**

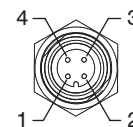


TOP VIEW OF THE REGULATOR CONNECTOR



- 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

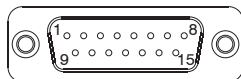
- M12 BASIC version**  
 CONNECTOR PINOUT:
- 1 = POWER SUPPLY (24 VDC)
  - 2 = NC
  - 3 = GND
  - 4 = ANALOG INPUT

- 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**

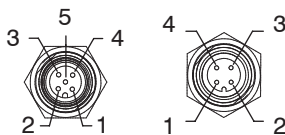
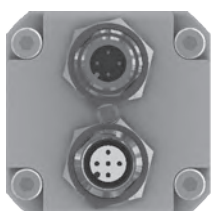


TOP VIEW OF THE REGULATOR CONNECTOR



- 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)
  - 10 = CAN\_SHIELD
  - 11 = CAN\_V+
  - 12 = CAN\_GND
  - 13 = CAN\_H
  - 14 = CAN\_L
  - 15 = GND

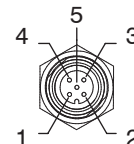
**"521" CANopen® version with M12 connector**



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

**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

**SIZE :**

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

**Accessories**

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

\* Whitout cable

| Fixing bracket |
|----------------|
| <b>170M5</b>   |
|                |

**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

**Accessories**

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

|   |
|---|
| Model with M12 connector  |
| <b>NETWORK connector</b>  |
| Male straight connector M12A 5P   |
| 5312A.M05.00  |
|  |

|   |
|---|
| 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 display 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.

**Accessories**

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

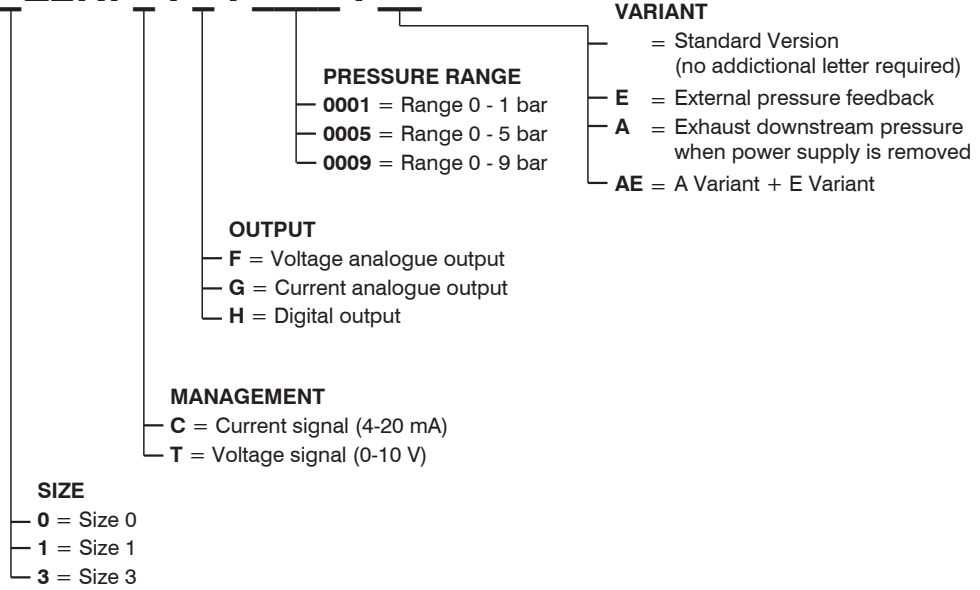
|   |
|---|
| Fixing bracket  |
| 170M5   |
|  |

**ORDERING CODES**

"521 M12 version" - Standard version



**17 E2N.**



**Accessories**

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

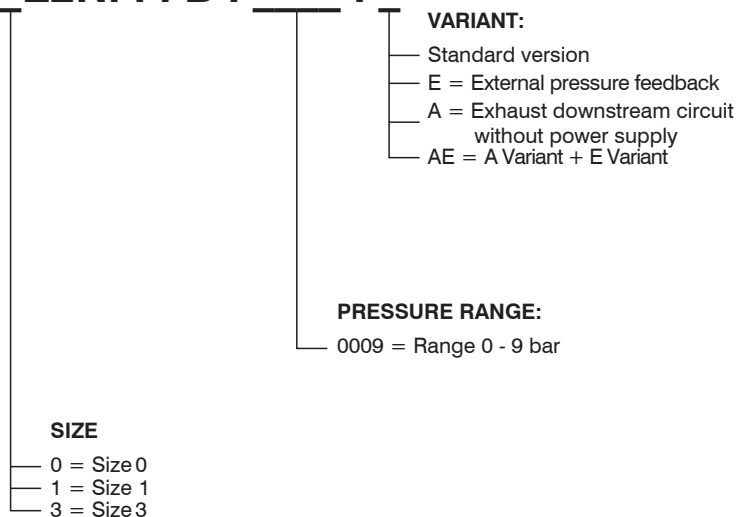
|                       |
|-----------------------|
| <b>Fixing bracket</b> |
| <b>170M5</b>          |
|                       |

**ORDERING CODES**

"521 IO-Link version"



**17 E2N. I . B.**



**Accessories**

|                                   |
|-----------------------------------|
| Model with M12 connector          |
| <b>POWER SUPPLY connector</b>     |
| Female straight connector M12A 5P |
| <b>5312A.F05.00</b>               |
|                                   |

|                       |
|-----------------------|
| <b>Fixing bracket</b> |
| <b>170M5</b>          |
|                       |