General

Modern industrial applications require increasingly high performances from their pneumatic components. For example, the speed and thrust of a pneumatic cylinder, or the torque of a rotary actuator may need to be varied. These parameters often need to be modified dynamically while an operation is running.
Traditional solutions based upon pneumatic valves supplied with different pressures often take up excessive amounts of space. An alternative solution is a regulator that can vary pressure over time. This type of regulator is known as an electronically controlled proportional regulator.
Three sizes have been designed, with flow rates of 7, 1,100 and 4,000 Nl/min.

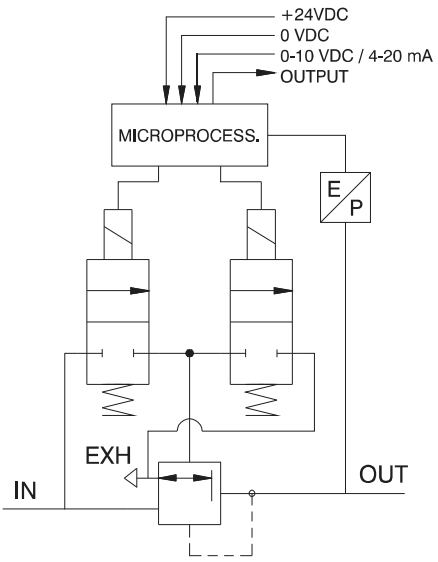
Application fields.

Typical applications will include the necessity to dynamically control the force of an 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

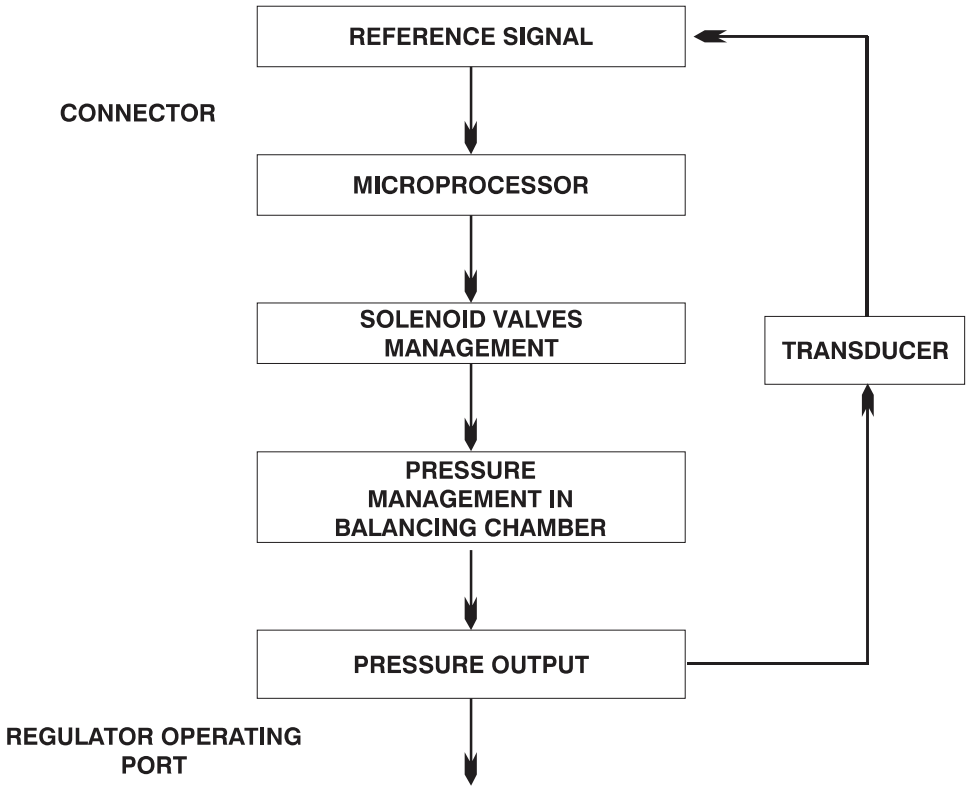
The supply and exhaust connections are on one side of the regulator and the working port is on the opposite side. The two remaining sides carry G1/8" ports that are blanked off with removable plugs, these can be used to connect a pressure gauge or as an outlet port. If you order the version with the 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.
The new proportional regulator range has all the features that were only optional on the previous model. When placing your order it is only necessary to specify the type of control signal, Voltage (T) or current (C), and the pressure range required.

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 with the detected 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	Ordering code	0009	0005	0001
	Pressure value	0 - 9 bar	0 - 5 bar	0 - 1 bar
Nominal flowrate from 1 to 2 (6 bar Δp 1 bar)	**Size 0**	**Size 1**		**Size 3**
	7 Nl /min	1.100 Nl /min		4.000 Nl/min
Discharge flowrate (at 6 bar with 1 bar overpressure)	7 Nl /min	1.300 Nl /min		4.500 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% (stabilised with ripple <1%)	
Standby current consumption	55 mA	
Current consumption with solenoid valves on	145 mA	
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
Voltage analog output	*0 - 10 V *0 - 5 V	
Current analog output	*4 - 20 mA *0 - 20 mA	
Digital inputs	24VDC ± 10%	
Digital outputs	24 VDC PNP (max current 50 mA)	
Connector	D-sub 15 poles	

Functional

Linearity	< ± 0,3 % F.S.
Hysteresis	<0,3 % F.S.
Repeatability	< ± 0,3 % F.S.
Sensitivity	< ± 0,3 % F.S.
Assembly position	Indifferent
Protection grade	IP65 (with casing fitted)
Ambient temperature	-5° - 50°C / 23° - 122°F

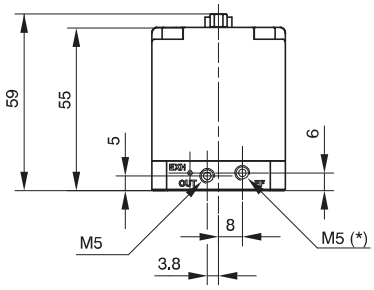
Constructional

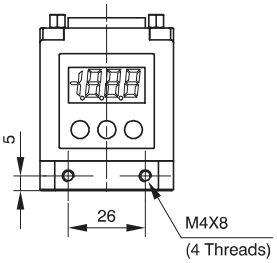
Body	Anodised aluminium		
Shutters	Brass with vulcanised NBR		
Diaphragm	Cloth-covered rubber		
Seals	NBR		
Cover for electrical part	Technopolymer		
Springs	AISI 302		
Weight	**Size 0**	**Size 1**	**Size 3**
	168 gr.	360 gr.	850 gr.

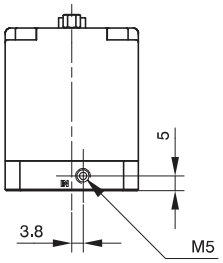
*** Selectable by keyboard or by RS-232**

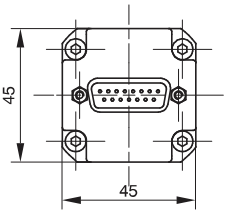
Overall dimensions (Standard version and CANopen version with SUB-D 15 poles)

SIZE 0



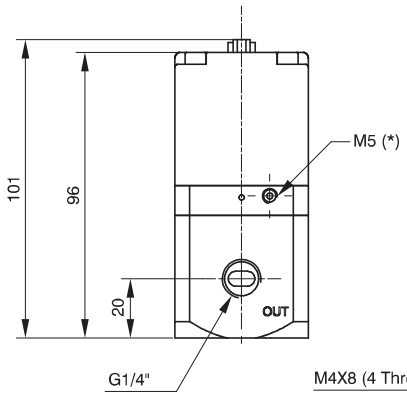


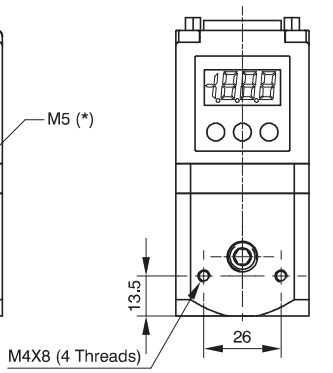


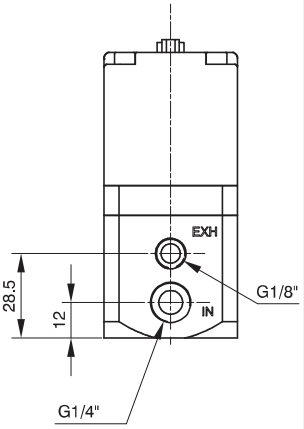


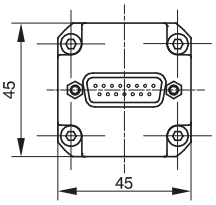
* = EXTERNAL FEEDBACK INPUT CONNECTION
(AVAILABLE ONLY ON THE EXTERNAL FEEDBACK VERSION)

SIZE 1



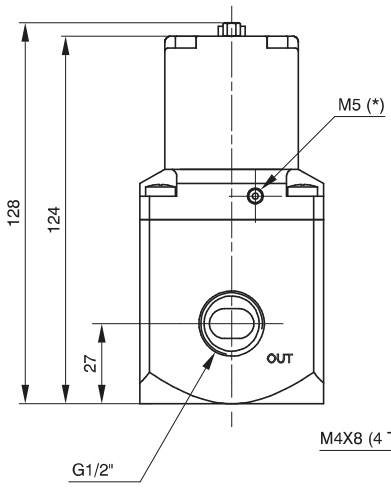


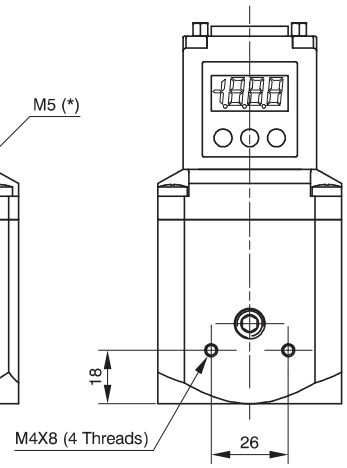


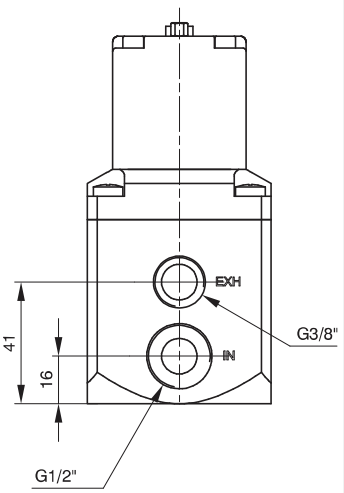


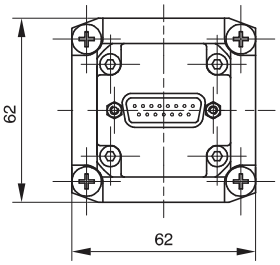
* = EXTERNAL FEEDBACK INPUT CONNECTION
(AVAILABLE ONLY ON THE EXTERNAL FEEDBACK VERSION)

SIZE 3





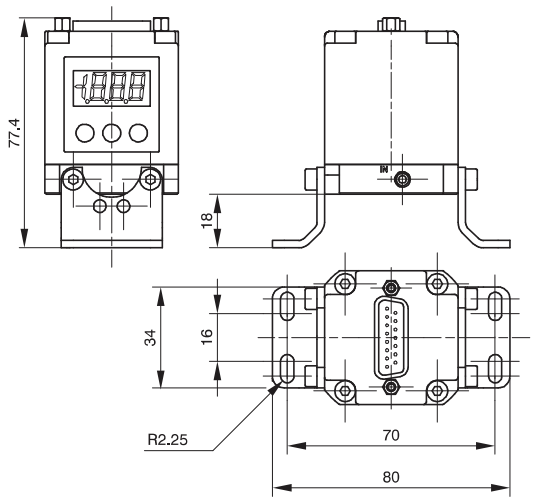




* = EXTERNAL FEEDBACK INPUT CONNECTION
(AVAILABLE ONLY ON THE EXTERNAL FEEDBACK VERSION)

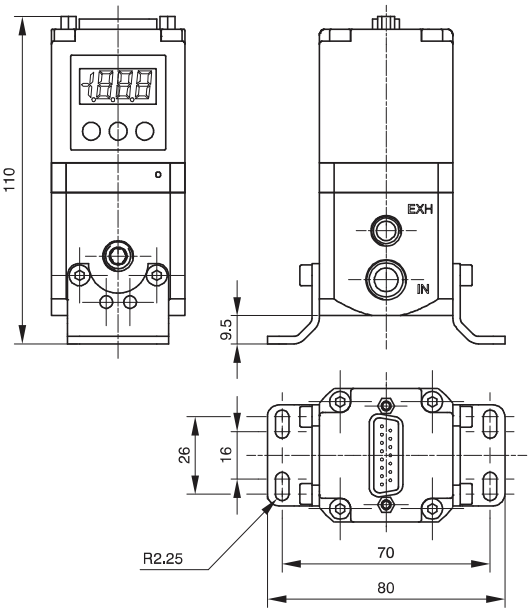
Mounting options (Standard version and CANopen version with SUB-D 15 poles)

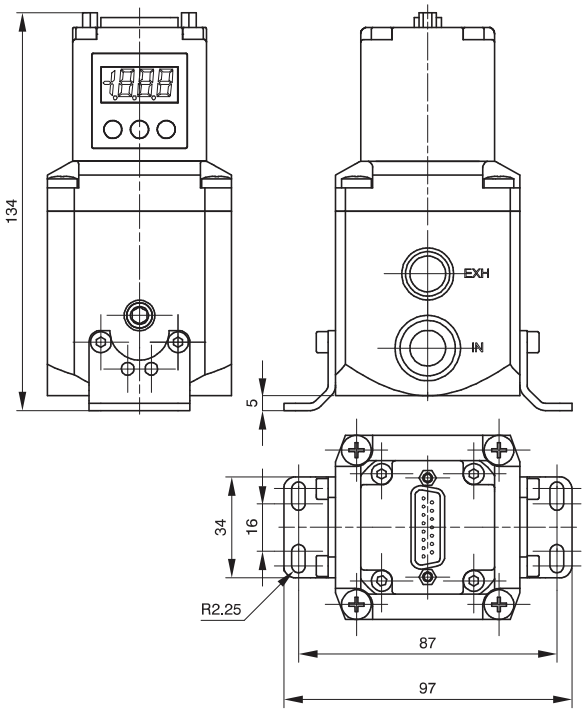
In addition to mounting directly using the M4 tappings on the body, the 170M5 bracket may also be used, as shown below:



SIZE 0

SIZE 1

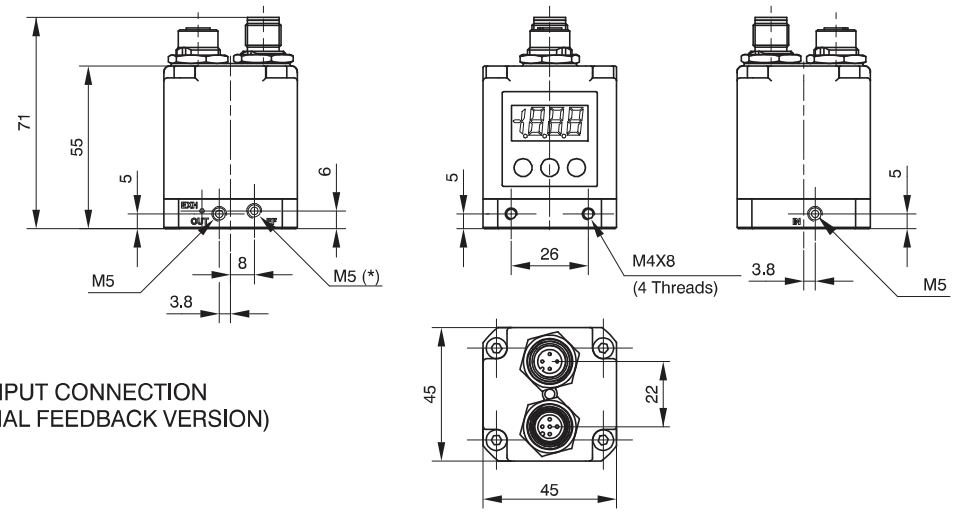




SIZE 3

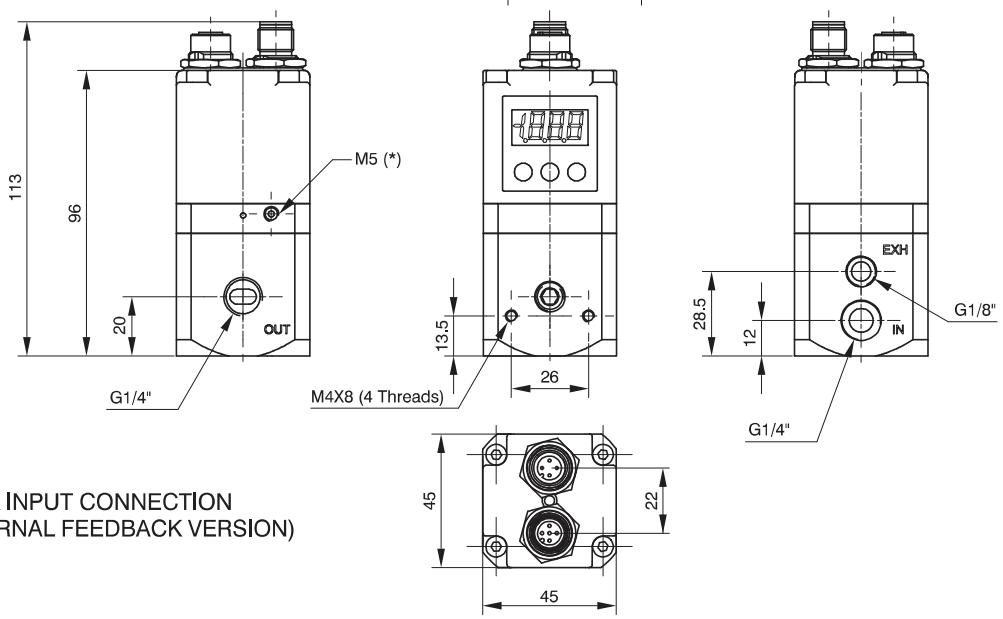
Overall dimensions (CANopen version with M12 connector)

SIZE 0



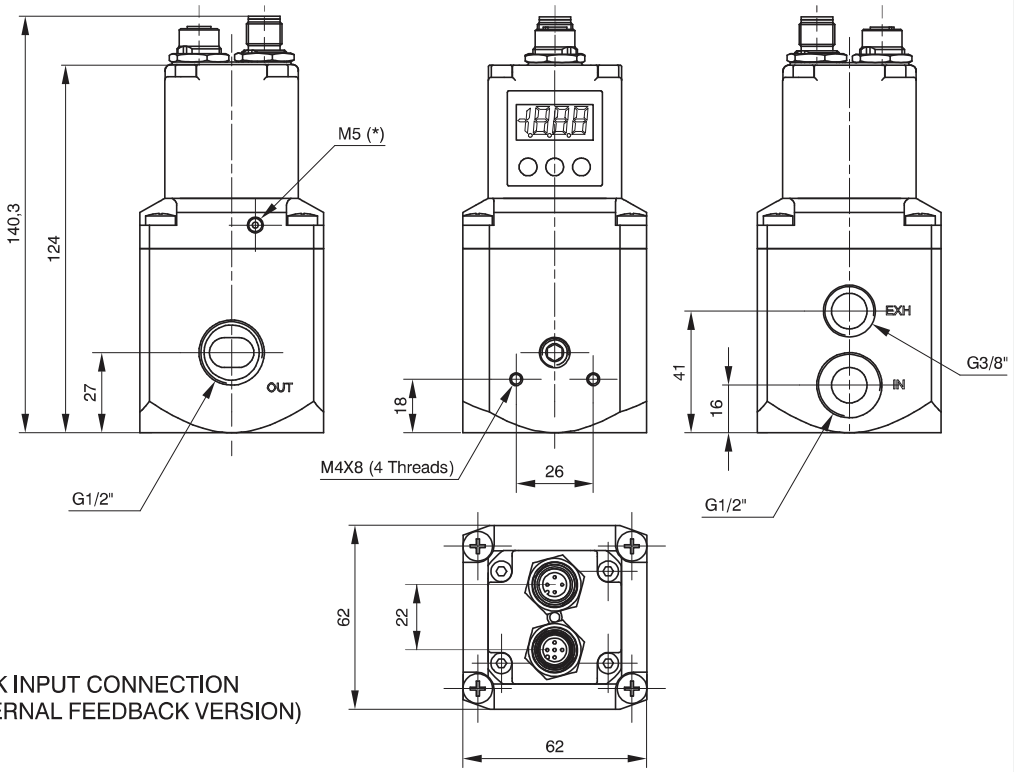
* = EXTERNAL FEEDBACK INPUT CONNECTION
(AVAILABLE ONLY ON THE EXTERNAL FEEDBACK VERSION)

SIZE 1



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

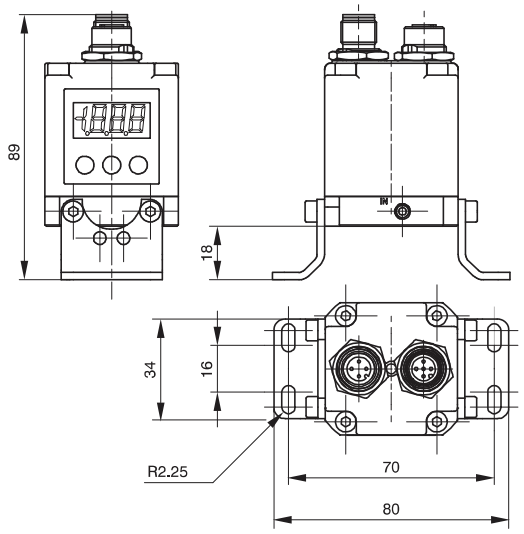
SIZE 3



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

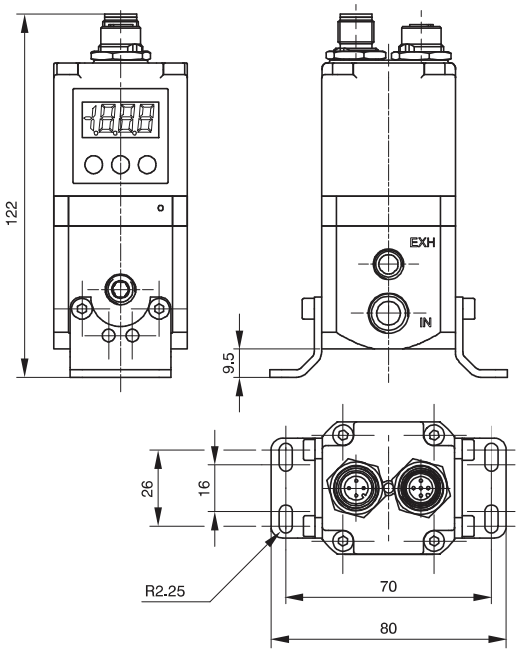
Mounting options (CANopen version with M12 connector)

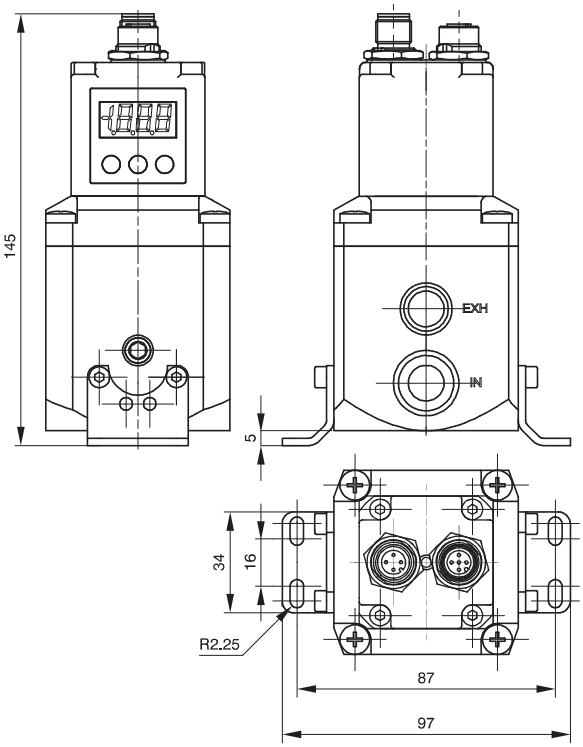
In addition to mounting directly using the M4 tappings on the body, the 170M5 bracket may also be used, as shown below:



SIZE 0

SIZE 1



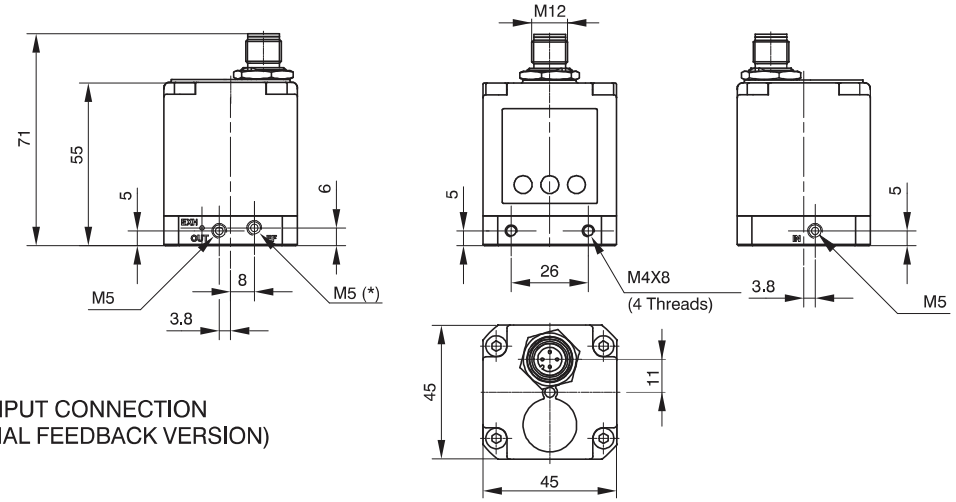


SIZE 3

3

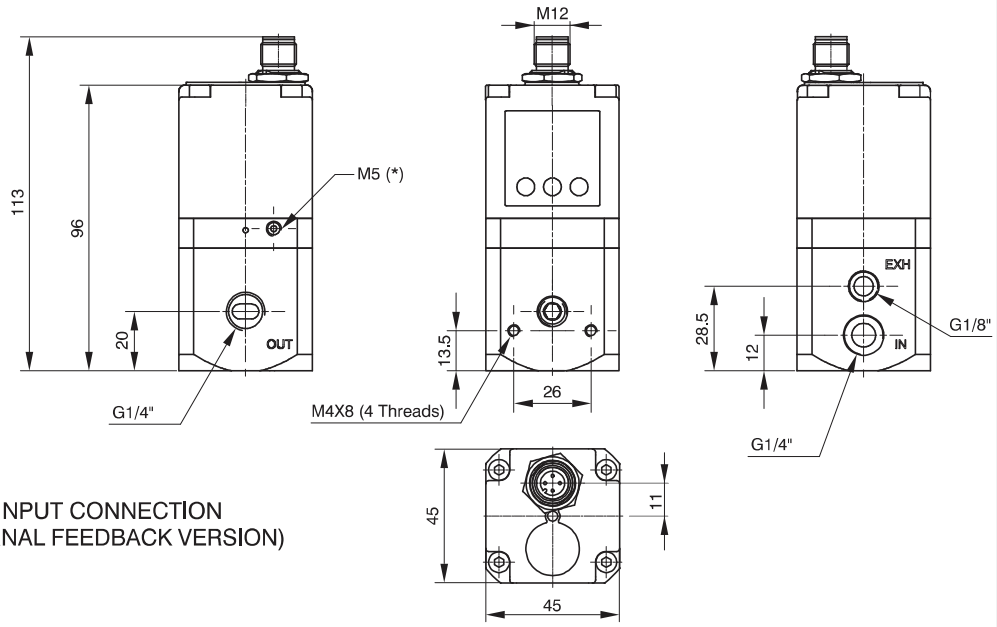
Overall dimensions (ECONOMIC version)

SIZE 0



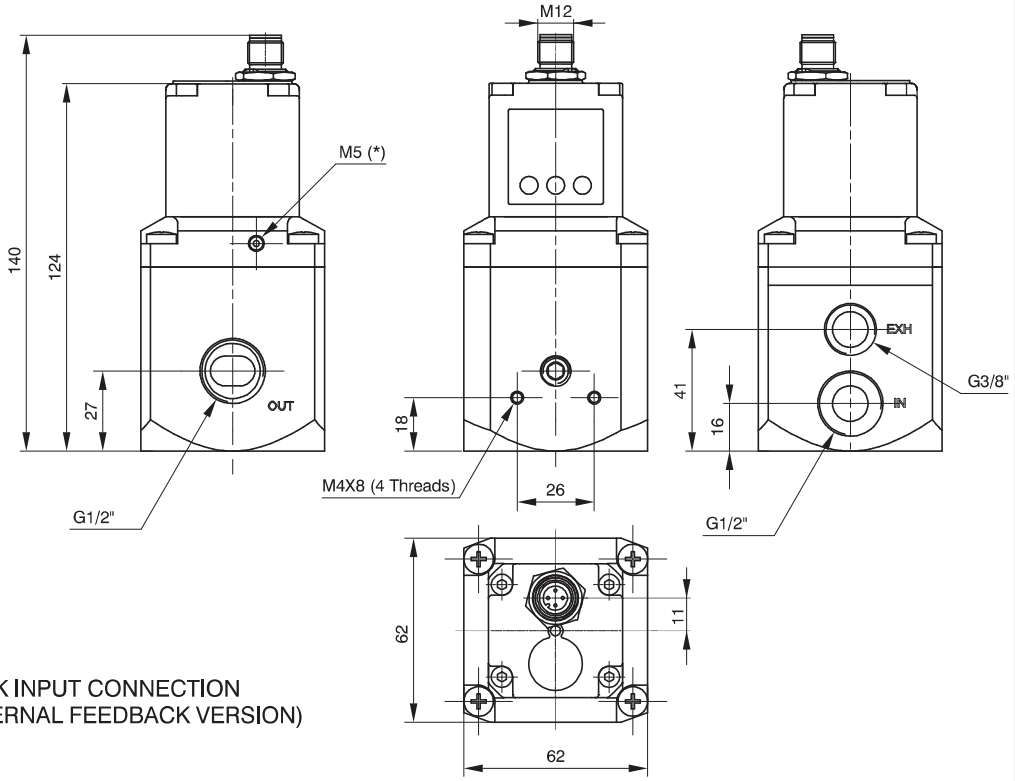
* = EXTERNAL FEEDBACK INPUT CONNECTION
(AVAILABLE ONLY ON THE EXTERNAL FEEDBACK VERSION)

SIZE 1



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

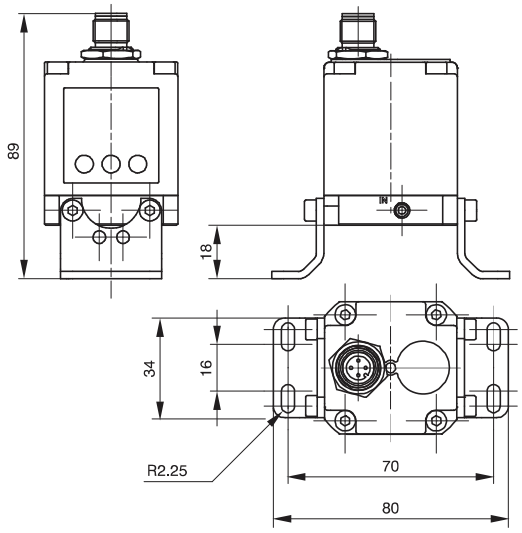
SIZE 3



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

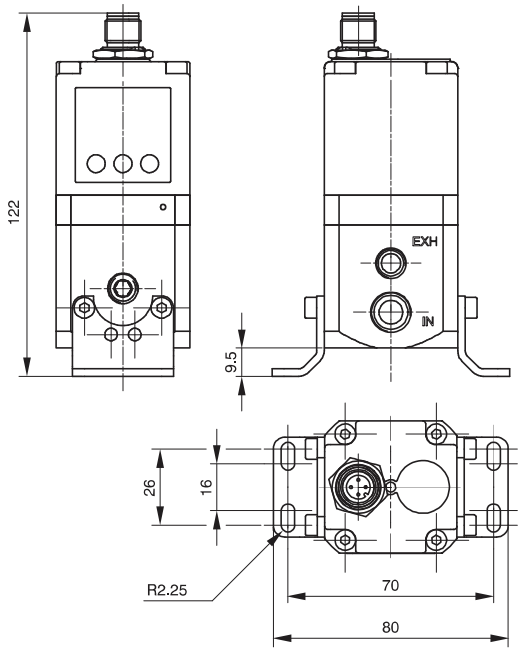
Mounting options (ECONOMIC version)

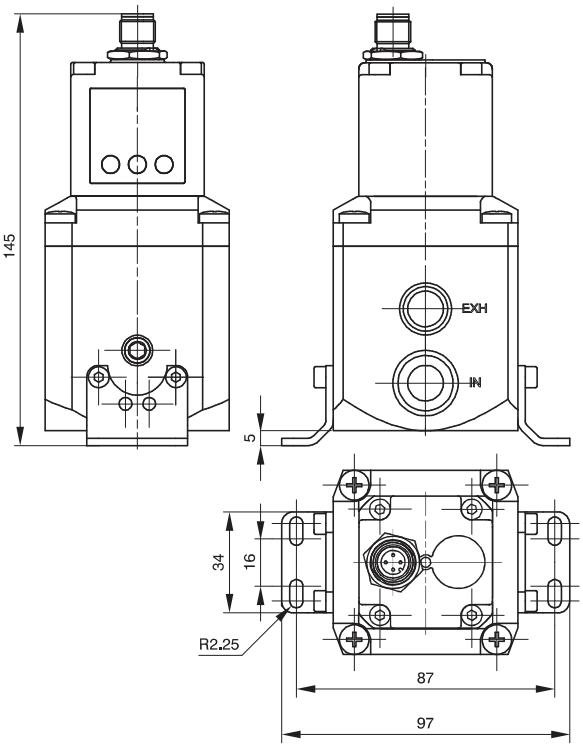
In addition to mounting directly using the M4 tappings on the body, the 170M5 bracket may also be used, as shown below:



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.

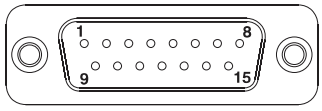
ELECTRICAL CONNECTION

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.

TOP VIEW OF THE REGULATOR CONNECTOR

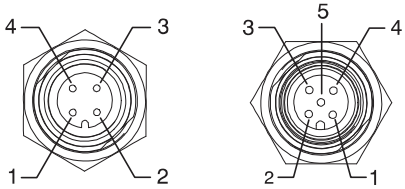


Standard version

CONNECTOR PIN:
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

CANopen version with SUB-D 15 poles

CONNECTOR PIN :
1 = CAN_SHLD
2 = CAN_V+
3 = CAN_GND
4 = CAN_H
5 = CAN_L
6 = NC
7 = NC
8 = NC
9 = SUPPLY (24 VDC)
10 = CAN_SHLD
11 = CAN_V+
12 = CAN_GND
13 = CAN_H
14 = CAN_L
15 = GND



M12 4P MALE — M12 5P FEMALE

ECONOMIC version

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

CANopen version with M12 connector

MALE CONNECTOR PIN :
1 = +24 VDC
2 = NC
3 = GND
4 = NC

FEMALE CONNECTOR PIN :
1 = CAN_SHLD
2 = CAN_V+
3 = CAN_GND
4 = CAN_H
5 = CAN_L

ORDERING CODES
Standard version

17_E2N._._D._____._

VARIANT :
- = Standard Version (no addictional 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
ECONOMIC Version

17_E2N._._M._____._

VARIANT :
- = Standard Version (no addictional 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)

SIZE :
- **0** = Size 0
- **1** = Size 1
- **3** = Size 3

Note:
This model doesn't include display and 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 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

Fixing bracket
170M5


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


*** Without cable**

ORDERING CODES
Version with CANopen protocol



17_E2N. S . C . ____ . __

SIZE :
- **0** = Size 0
- **1** = Size 1
- **3** = Size 3

VARIANT :
- = Standard Version (no addictional 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

3

ORDERING CODES
Version with CANopen protocol M12 connector



17_E2N. M . C . ____ . __

SIZE :
- **0** = Size 0
- **1** = Size 1
- **3** = Size 3

VARIANT :
- = Standard Version (no addictional 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 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


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
5312A.M05.00