



Series 2300 - ENOVA®

General

Technical innovation, rational design, high performance and extremely compact size: these are the main features the ENOVA® series bring to the market.

Each valve comprises all the necessary pneumatic and electrical functions needed to produce a solenoid valve assembly.

There are no limits to the configuration of the solenoid valve island, as full priority has been given to the end user's needs; the addition or removal of modules is a simple operation that can be swiftly and easily achieved.

The management of the electrical signals through the valves is optimized through a patented dedicated connector in each valve.

Electrical connections are made via a twenty-five pin connector, which is capable of controlling up to twenty-two solenoids.

Electrical and pneumatic connections are located on the same module at one end of the assembly.

Serial bus nodes compatible with most common protocols are easily integrated.

Most widely used and known communication protocols, such as PROFIBUS DP, CANopen®, DeviceNet, AS-Interface can be directly integrated with the valve manifold by simply plugging the necessary module onto the electrical connection, maintaining IP65 environmental protection.

The management of inputs has also been foreseen, and can be achieved by adding one or more expansion modules directly to the serial module.

“Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001, Pneumatic fluid power-Directional control valves-Measurement of shifting time”

Main characteristics

- Clean profile prevents accumulation of dirt
- Compact size: modules of 12.5 mm
- Connections available: 4 , 6 , 8 mm
- IP65 protection grade
- Optimized electrical connection system
- Electrical and pneumatic line connections on one side
- Quick coupling connection system with visual indicator: locked/unlocked
- Freedom of configuration

Functions

- 5/2 monostable
- 5/2 bistable
- 5/3 closed centres
- 2x3/2 NC/NC (5/3 open centres)
- 2x3/2 NO/NO (5/3 pressured centres)
- 2x3/2 NC/NO
- 2x2/2 NC/NC
- 2x2/2 NO/NO
- 2x2/2 NC/NO

Construction characteristics

Central body	Reinforced Technopolymer
External casing	Reinforced Technopolymer
Operators	Reinforced Technopolymer
Spool seals	PUR
Spools	Aluminium 2011
Springs	Spring steel with protective coating
Piston seals	Oil resistant nitrile rubber - NBR

Technical characteristics

Voltage	24 VDC ± 10% PNP (NPN on request)
Pilot consumption	0,9 Watt
Valve working pressure (1-11)	from vacuum to 10 bar max.
Pilot working pressure (12-14)	from 2,5 to 7 bar max.
Operating temperature	-5°C +50°C
Protection degree	IP65
Fluid	Filtered air. No lubrication needed, if applied it shall be continuous

Attention: dry air must be used for applications below 0°C"

1 AIR DISTRIBUTION

Solenoid - Differential (Monostable)

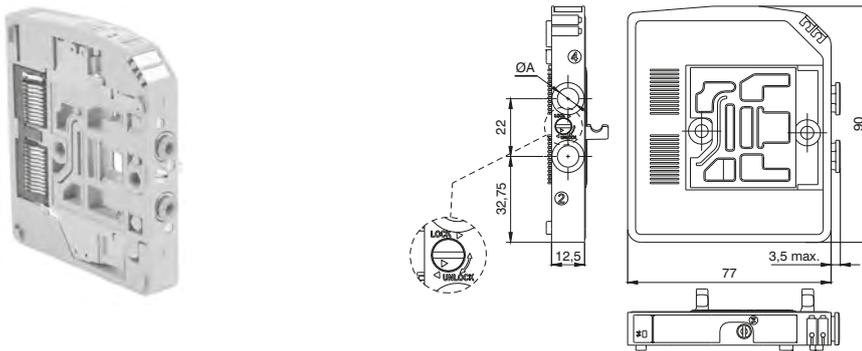
Coding: 23E052.00.36.V

Operational characteristics	
Fluid	Filtered air. No lubrication needed, if applied it shall be continuous
Working pressure (bar)	From vacuum to 10
Pressure range (bar)	2,5 ÷ 7
Temperature °C	-5 ÷ +50
Flow rate at 6 bar with Δp=1 (NI/min)	700
Response time according to ISO 12238, activation time (ms)	12
Response time according to ISO 12238, deactivation time (ms)	15

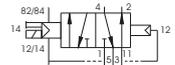
Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

ELECTRICAL CONTACTS	
0	= STANDARD-only one electric signal
1	= CEB (Bistable Electrical contacts)-(two electrical signals)
ELECTRICAL CONTACTS	
4	= Quick connection for tube Ø4
6	= Quick connection for tube Ø6
8	= Quick connection for tube Ø8
VOLTAGE	
02	= 24 VDC PNP
12	= 24 VDC NPN

SHORT CODE B4
SHORT CODE B6
SHORT CODE B8
SHORT CODE R4 (CEB)
SHORT CODE R6 (CEB)
SHORT CODE R8 (CEB)



Weight 115 g



Solenoid - Spring (Monostable)

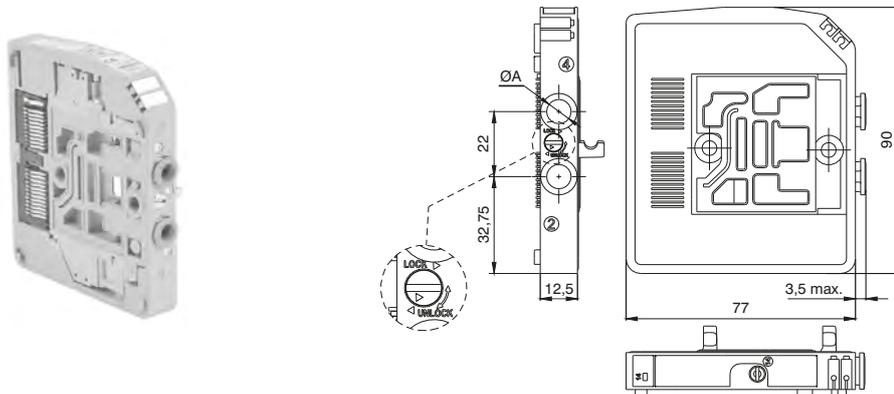
Coding: 23E052.00.39.V

Operational characteristics	
Fluid	Filtered air. No lubrication needed, if applied it shall be continuous
Working pressure (bar)	From vacuum to 10
Pressure range (bar)	2,5 ÷ 7
Temperature °C	-5 ÷ +50
Flow rate at 6 bar with Δp=1 (NI/min)	700
Response time according to ISO 12238, activation time (ms)	9
Response time according to ISO 12238, deactivation time (ms)	30

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

ELECTRICAL CONTACTS	
0	= STANDARD-only one electric signal
1	= CEB (Bistable Electrical contacts)-(two electrical signals)
ELECTRICAL CONTACTS	
4	= Quick connection for tube Ø4
6	= Quick connection for tube Ø6
8	= Quick connection for tube Ø8
VOLTAGE	
02	= 24 VDC PNP
12	= 24 VDC NPN

SHORT CODE A4
SHORT CODE A6
SHORT CODE A8
SHORT CODE P4 (CEB)
SHORT CODE P6 (CEB)
SHORT CODE P8 (CEB)



Weight 115 g



1
AIR DISTRIBUTION

Solenoid - Solenoid (Bistable)

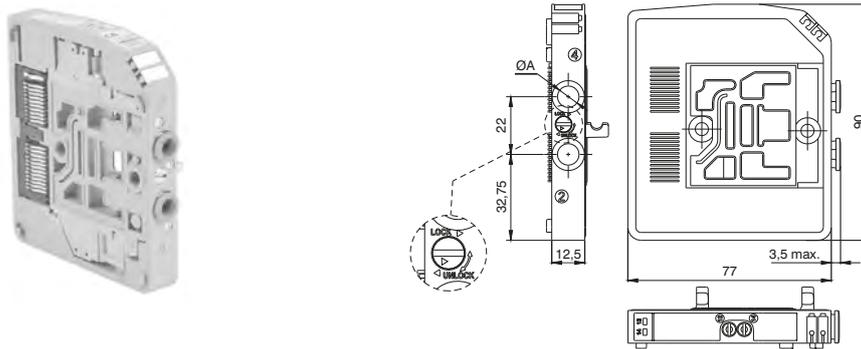
Coding: 230●.52.00.35.▼

Operational characteristics	
Fluid	Filtered air. No lubrication needed, if applied it shall be continuous
Working pressure (bar)	From vacuum to 10
Pressure range (bar)	2,5 ÷ 7
Temperature °C	-5 ÷ +50
Flow rate at 6 bar with Δp=1 (NI/min)	700
Response time according to ISO 12238, activation time (ms)	7
Response time according to ISO 12238, deactivation time (ms)	7

ELECTRICAL CONTACTS	
●	4 = Quick connection for tube Ø4
	6 = Quick connection for tube Ø6
	8 = Quick connection for tube Ø8
VOLTAGE	
▼	02 = 24 VDC PNP
	12 = 24 VDC NPN

SHORT CODE C4
SHORT CODE C6
SHORT CODE C8

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001



Weight 115 g

Solenoid - Solenoid (Bistable-Closed centres)

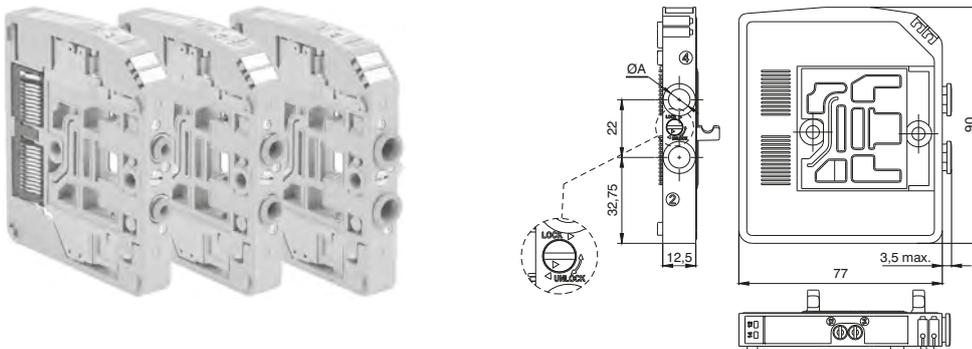
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Operational characteristics	
Fluid	Filtered air. No lubrication needed, if applied it shall be continuous
Working pressure (bar)	From vacuum to 10
Pressure range (bar)	2,5 ÷ 7
Temperature °C	-5 ÷ +50
Flow rate at 6 bar with Δp=1 (NI/min)	550
Response time according to ISO 12238, activation time (ms)	15
Response time according to ISO 12238, deactivation time (ms)	15

ELECTRICAL CONTACTS	
●	4 = Quick connection for tube Ø4
	6 = Quick connection for tube Ø6
	8 = Quick connection for tube Ø8
VOLTAGE	
▼	02 = 24 VDC PNP
	12 = 24 VDC NPN

SHORT CODE E4
SHORT CODE E6
SHORT CODE E8

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001



Weight 130 g

Solenoid - Solenoid 2x3/2 Bistable-N.C.-N.C. (=5/3 Open centres)

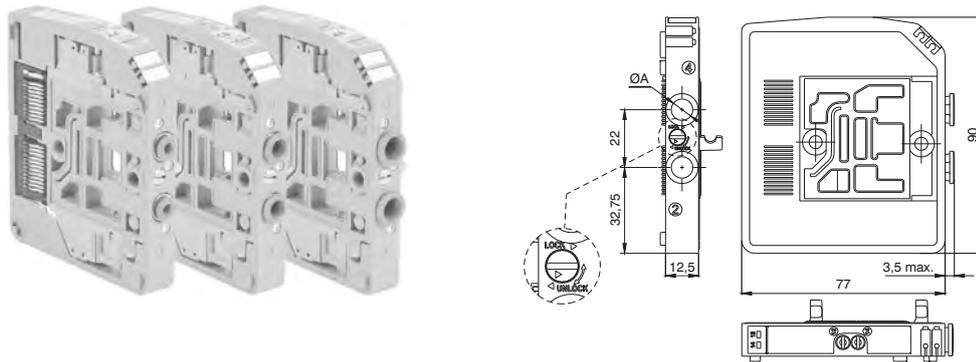
Coding: 230 62.44.35. V

Operational characteristics	
Fluid	Filtered air. No lubrication needed, if applied it shall be continuous
Working pressure (bar)	From vacuum to 10
Pressure range (bar)	2,5 ÷ 7
Temperature °C	-5 ÷ +50
Flow rate at 6 bar with Δp=1 (NI/min)	700
Response time according to ISO 12238, activation time (ms)	9
Response time according to ISO 12238, deactivation time (ms)	30

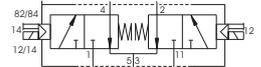
ELECTRICAL CONTACTS	
4	= Quick connection for tube Ø4
6	= Quick connection for tube Ø6
8	= Quick connection for tube Ø8
VOLTAGE	
02	= 24 VDC PNP
12	= 24 VDC NPN

SHORT CODE F4
SHORT CODE F6
SHORT CODE F8

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001



Weight 130 g
5/3 Open Centres: Use the Solenoid valves with 2x3/2 N.C.-N.C. function
5/3 Pressured Centres: Use the Solenoid valves with 2x3/2 N.O.-N.O. function



Solenoid - Solenoid 2x3/2 Bistable-N.C.-N.O.

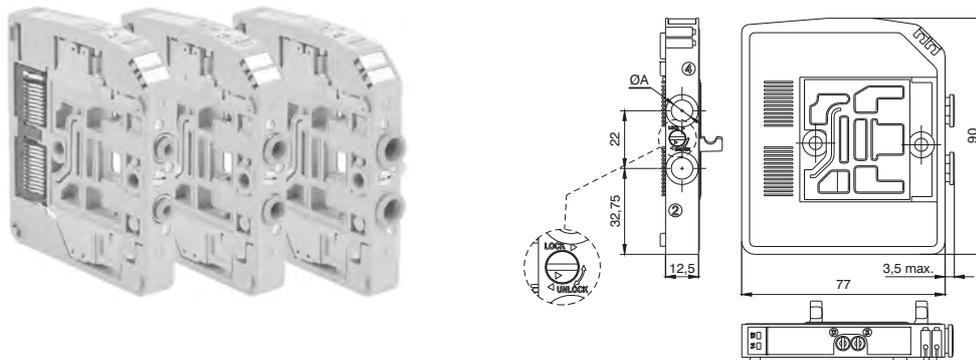
Coding: 230 62.45.35. V

Operational characteristics	
Fluid	Filtered air. No lubrication needed, if applied it shall be continuous
Working pressure (bar)	From vacuum to 10
Pressure range (bar)	2,5 ÷ 7
Temperature °C	-5 ÷ +50
Flow rate at 6 bar with Δp=1 (NI/min)	700
Response time according to ISO 12238, activation time (ms)	9
Response time according to ISO 12238, deactivation time (ms)	30

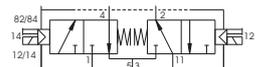
ELECTRICAL CONTACTS	
4	= Quick connection for tube Ø4
6	= Quick connection for tube Ø6
8	= Quick connection for tube Ø8
VOLTAGE	
02	= 24 VDC PNP
12	= 24 VDC NPN

SHORT CODE H4
SHORT CODE H6
SHORT CODE H8

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001



Weight 130 g
5/3 Open Centres: Use the Solenoid valves with 2x3/2 N.C.-N.C. function
5/3 Pressured Centres: Use the Solenoid valves with 2x3/2 N.O.-N.O. function





Solenoid - Solenoid 2x3/2 Bistable-N.O.-N.O. (=5/3 Pressured centres)

Coding: 230 62.55.35

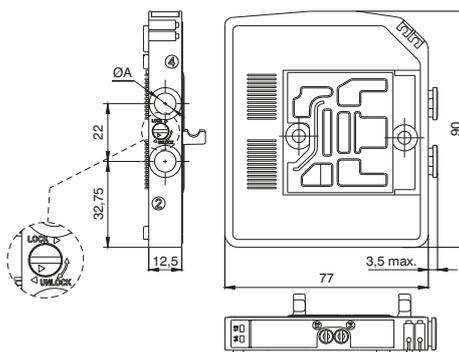
Operational characteristics	
Fluid	Filtered air. No lubrication needed, if applied it shall be continuous
Working pressure (bar)	From vacuum to 10
Pressure range (bar)	2,5 ÷ 7
Temperature °C	-5 ÷ +50
Flow rate at 6 bar with Δp=1 (NI/min)	700
Response time according to ISO 12238, activation time (ms)	9
Response time according to ISO 12238, deactivation time (ms)	30

ELECTRICAL CONTACTS	
4	= Quick connection for tube Ø4
6	= Quick connection for tube Ø6
8	= Quick connection for tube Ø8
VOLTAGE	
02	= 24 VDC PNP
12	= 24 VDC NPN

SHORT CODE G4
SHORT CODE G6
SHORT CODE G8

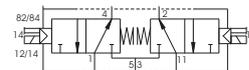
Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001

1 AIR DISTRIBUTION



Weight 130 g

5/3 Open Centres: Use the Solenoid valves with 2x3/2 N.C.-N.C. function
5/3 Pressured Centres: Use the Solenoid valves with 2x3/2 N.O.-N.O. function



Solenoid - Solenoid 2x2/2 Bistable-N.C.-N.C.

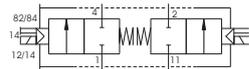
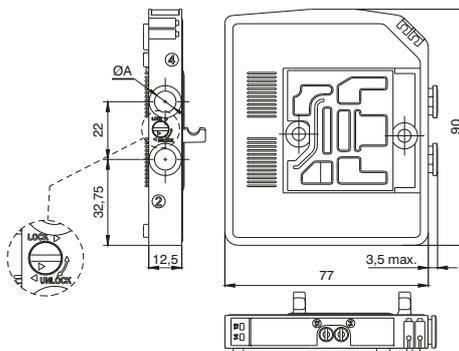
Coding: 230 42.44.35

Operational characteristics	
Fluid	Filtered air. No lubrication needed, if applied it shall be continuous
Working pressure (bar)	From vacuum to 10
Pressure range (bar)	2,5 ÷ 7
Temperature °C	-5 ÷ +50
Flow rate at 6 bar with Δp=1 (NI/min)	700
Response time according to ISO 12238, activation time (ms)	9
Response time according to ISO 12238, deactivation time (ms)	30

ELECTRICAL CONTACTS	
4	= Quick connection for tube Ø4
6	= Quick connection for tube Ø6
8	= Quick connection for tube Ø8
VOLTAGE	
02	= 24 VDC PNP
12	= 24 VDC NPN

SHORT CODE L4
SHORT CODE L6
SHORT CODE L8

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001



Weight 130 g

Solenoid - Solenoid 2x2/2 Bistable-N.C.-N.O.

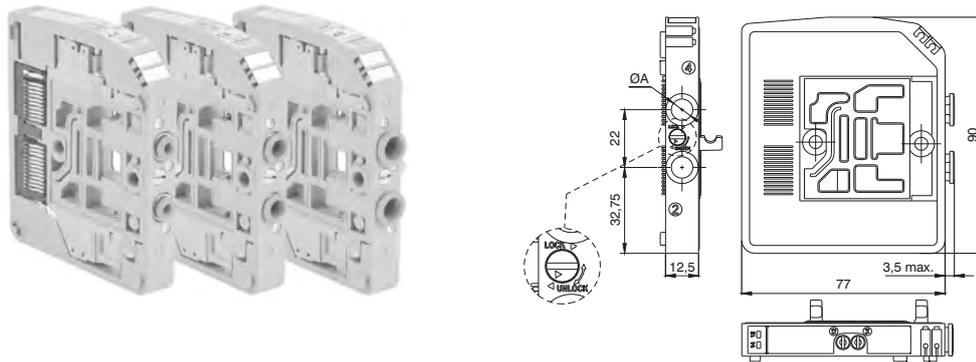
Coding: 230 42.45.35. V

Operational characteristics	
Fluid	Filtered air. No lubrication needed, if applied it shall be continuous
Working pressure (bar)	From vacuum to 10
Pressure range (bar)	2,5 ÷ 7
Temperature °C	-5 ÷ +50
Flow rate at 6 bar with Δp=1 (NI/min)	700
Response time according to ISO 12238, activation time (ms)	9
Response time according to ISO 12238, deactivation time (ms)	30

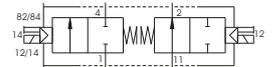
ELECTRICAL CONTACTS	
4	= Quick connection for tube Ø4
6	= Quick connection for tube Ø6
8	= Quick connection for tube Ø8
VOLTAGE	
02	= 24 VDC PNP
12	= 24 VDC NPN

SHORT CODE N4
SHORT CODE N6
SHORT CODE N8

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001



Weight 130 g



Solenoid - Solenoid 2x2/2 Bistable-N.O.-N.O.

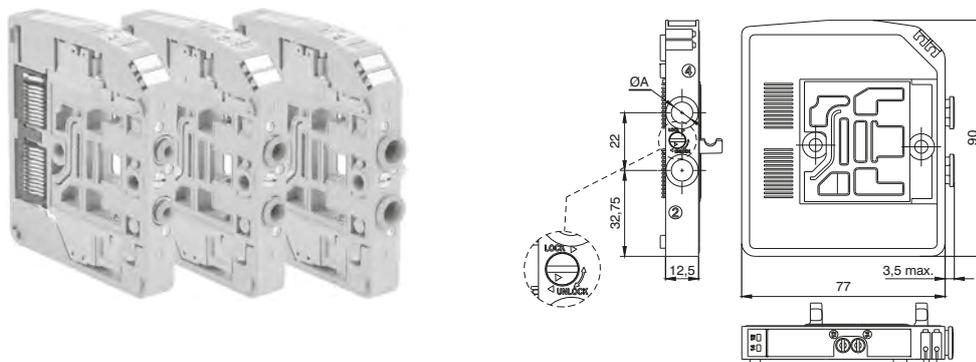
Coding: 230 42.55.35. V

Operational characteristics	
Fluid	Filtered air. No lubrication needed, if applied it shall be continuous
Working pressure (bar)	From vacuum to 10
Pressure range (bar)	2,5 ÷ 7
Temperature °C	-5 ÷ +50
Flow rate at 6 bar with Δp=1 (NI/min)	700
Response time according to ISO 12238, activation time (ms)	9
Response time according to ISO 12238, deactivation time (ms)	30

ELECTRICAL CONTACTS	
4	= Quick connection for tube Ø4
6	= Quick connection for tube Ø6
8	= Quick connection for tube Ø8
VOLTAGE	
02	= 24 VDC PNP
12	= 24 VDC NPN

SHORT CODE M4
SHORT CODE M6
SHORT CODE M8

Shifting time of pneumatic directional control valves or moving parts, logic devices were measured in accordance to ISO 12238:2001



Weight 130 g



1
AIR DISTRIBUTION

Left Endplates

Coding: 2311.05

Operational characteristics

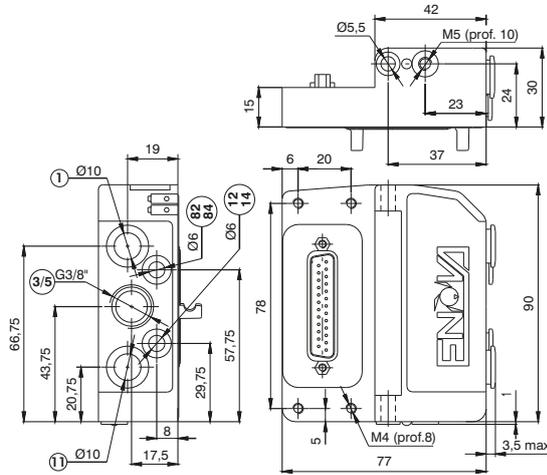
Fluid	Filtered air. No lubrication needed, if applied it shall be continuous
Working pressure (bar)	From vacuum to 10
Pressure range (bar)	2,5 ÷ 7
Temperature °C	-5 ÷ +50

PORTS	
B	05 = 5 ports
	03 = 3 ports
CONNECTIONS	
C	P = Electrical connection PNP
	N = Electrical connection NPN



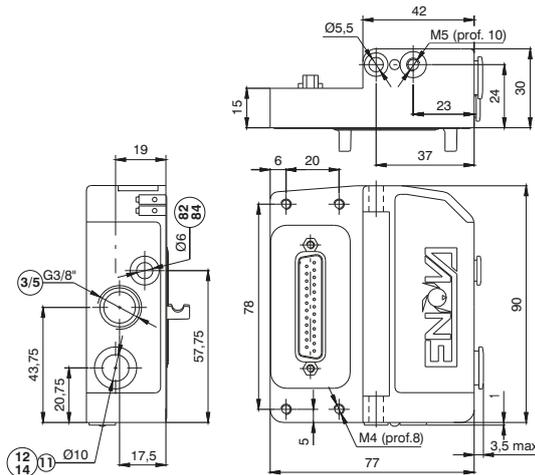
Weight 190 g
 1/11 Conduit (tube $\varnothing 10$): Main Solenoid valve feeding (pressure from vacuum to 10 bar maximum)
 3/5 Conduit (G 3/8"): Main Solenoid valve exhaust

2311.05



Weight 185 g
 1/11-12/14 Conduit (tube $\varnothing 10$): Main Solenoid valve and pilot feeding (pressure from 2,5bar to 7 bar)
 3/5 Conduit (G 3/8"): Main Solenoid valve exhaust
 82/84 Conduit (tube $\varnothing 6$): Pilot exhaust

2311.03

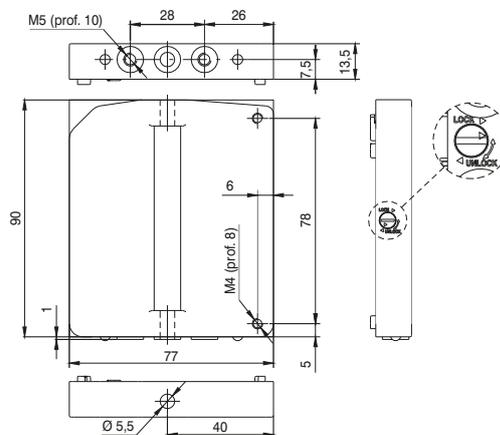


Right Endplates closed

Coding: 2312.00

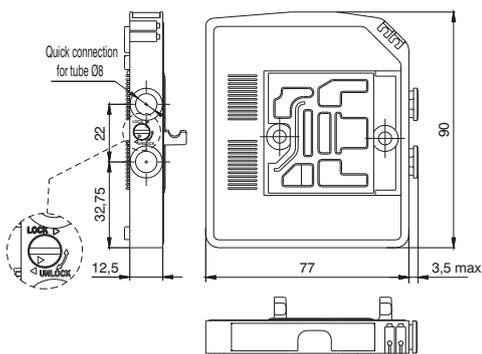


Weight 100 g



AIR DISTRIBUTION

► Intermediate Inlet/Exhaust module



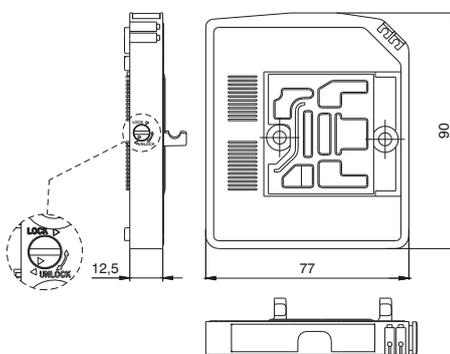
Weight 5 g

Coding: 2308.F

FUNCTION	
F	08 = Exhaust module
	12 = Inlet module
	20 = Inlet-Exhaust module

SHORT CODE J
SHORT CODE K
SHORT CODE W

► Through module



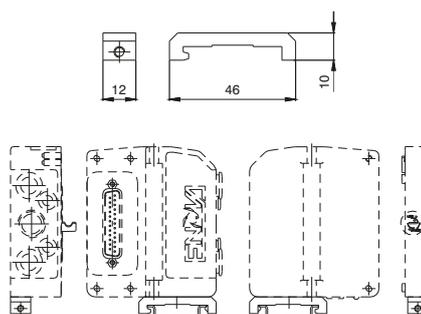
Weight 90 g

Coding: 2300.F

FUNCTION	
F	01 = 1 electric signal module
	02 = 2 electric signals module

SHORT CODE T1
SHORT CODE T2

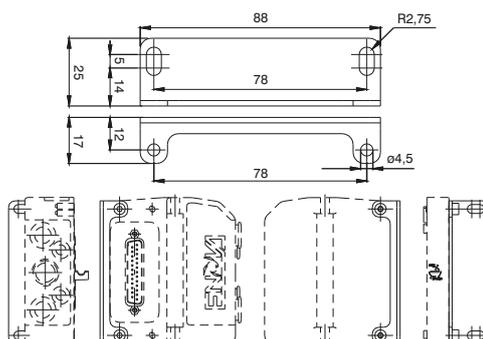
► DIN rail adapter



Weight 12 g

Coding: 2300.16

► Fixing brackets



Weight 45 g
for fixing dimensions see the Left endplates 3 and 5 ports

Coding: 2300.50



▶ Exhaust Diaphragm

Coding: 2317.08



Weight 5 g
SHORT CODE Y

▶ Inlet/Exhaust Diaphragm

Coding: 2317.20



Weight 5 g
SHORT CODE Z

▶ Inlet Diaphragm

Coding: 2317.12



Weight 5 g
SHORT CODE X

▶ Cable complete with connector, 25 Poles IP65

Coding: 2300.25.**L**.**C**



	CABLE LENGTH
L	03 = 3 meters
	05 = 5 meters
	10 = 10 meters
	CONNECTOR
C	10 = In line
	90 = 90° Angle

1
AIR DISTRIBUTION



The electrical connection is achieved via a 25 pin connector and can manage up to 22 solenoid pilots.

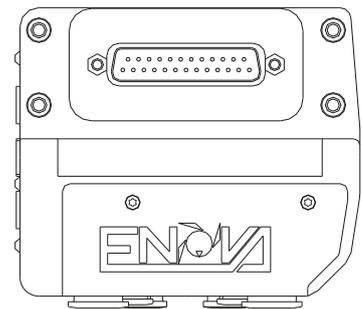
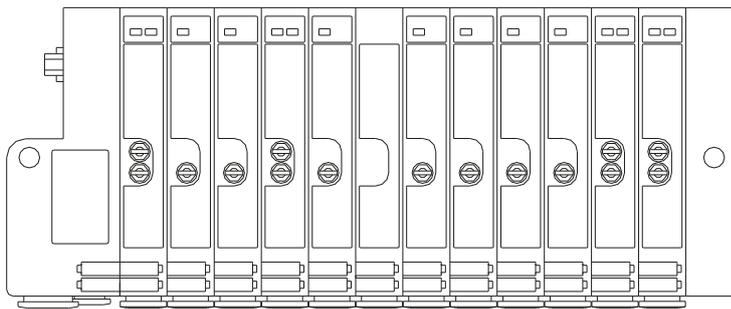
The management and distribution of the electrical signals between each valve is obtained thanks to a patented electrical connector which receives the signals from the previous module, uses one, two or none depending on the type, and carries forward to the next module the remaining. Bistable valves, 5/3 ; 2X3/2 e 2X2/2 valves which have two solenoid pilots built in, use two signals; the first is directed to the pilot side 14 the second to the pilot side 12.

Mono-stable valves can be fitted with two type of electrical connector: one that uses only one signal (connected to the pilot side 14) and carries forward the remaining and one called CEB (Electrical contact for bistable) which uses two signals, one is needed for the valve the other is not used.

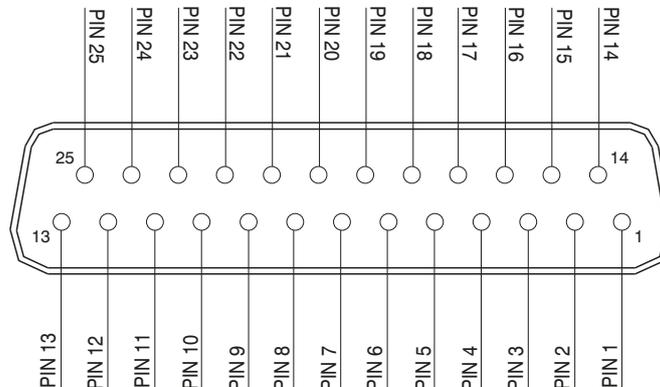
This second solution (CEB) allows the modification of the manifold (replacement of monostable valves with bistable for example) without the need of reconfiguring the PLC outputs layout. On the other hand this solution limits the maximum number of valves to 11 (two signals for each position).

Intermediate supply / exhaust modules are fitted with a dedicated electrical connector which carries forward all electric signals without using any. This allows the use of intermediate modules in any position of the manifold.

Example of manifold samples with the corresponding pin layout.

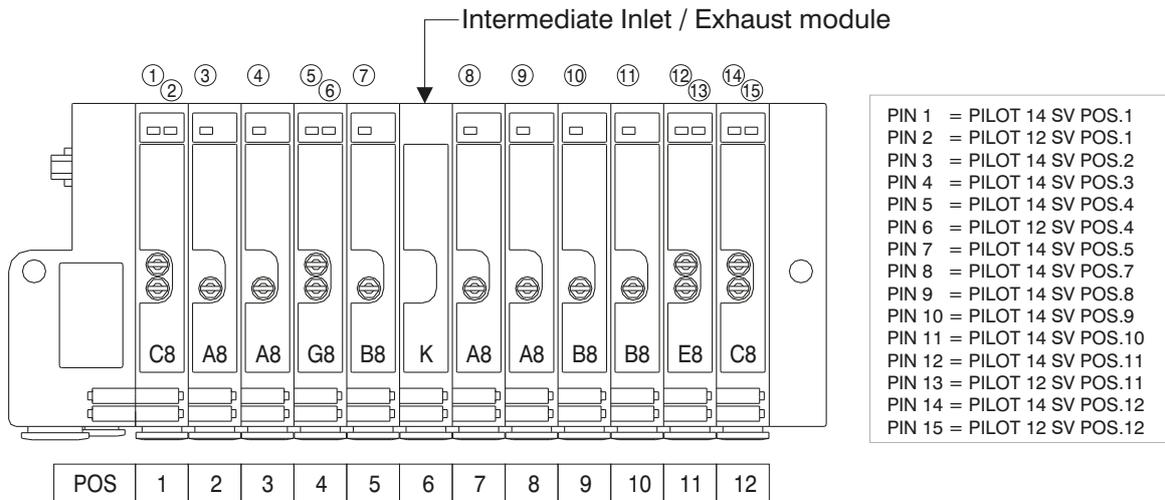


**ELECTRIC CONNECTOR
SUB-D TYPE - 25 POLES**

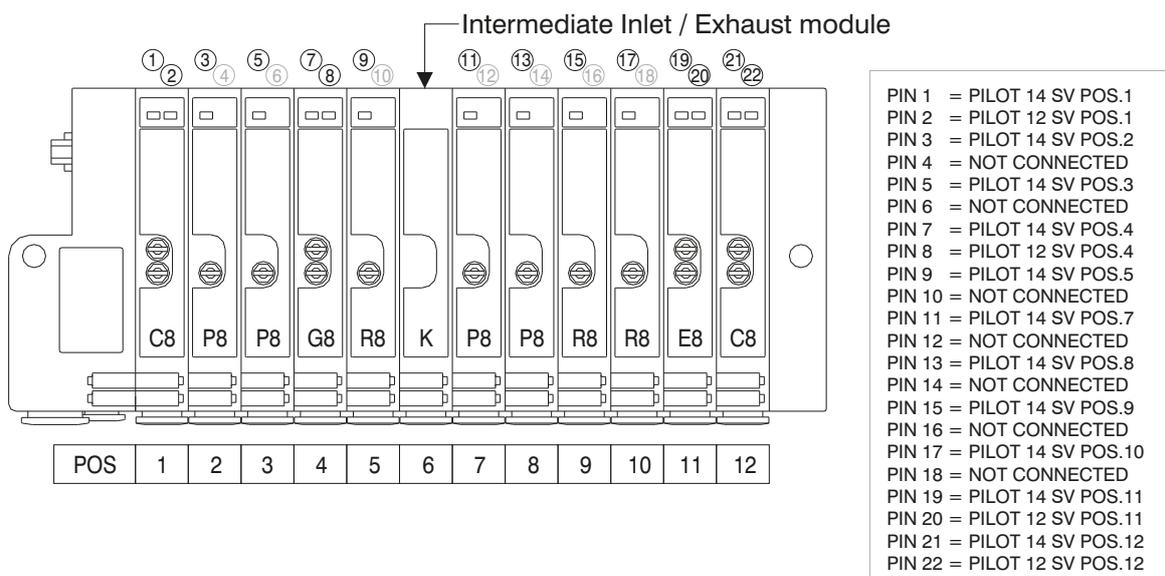


1 - 22 = Solenoid valves signals
23 - 24 - 25 = Common

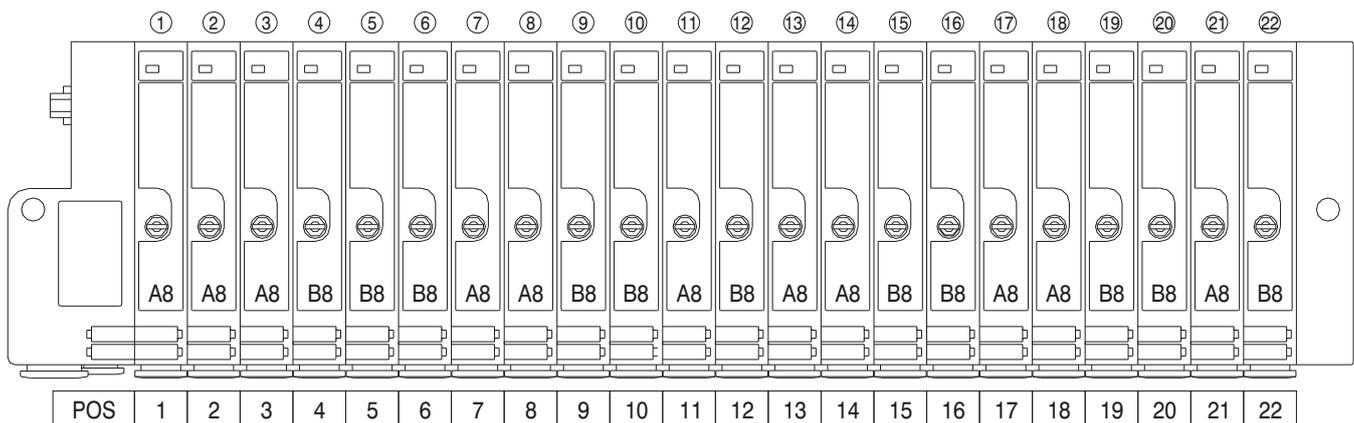
25 PIN Connector correspondence for bistable, 2x3/2, 5/3 and standard monostable valves manifold



25 PIN Connector correspondence for bistable, 2x3/2, 5/3 manifold and CEB monostable valves (electrical contact for bistable)

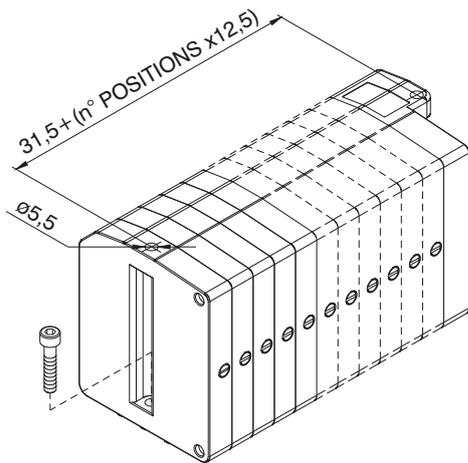


25 PIN Connector correspondence for manifold for 22 position manifold with standard monostable valves

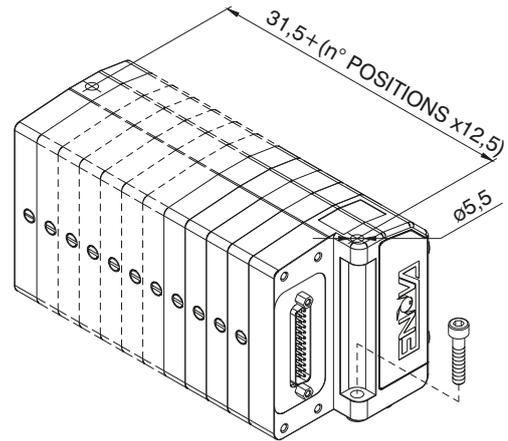


1 AIR DISTRIBUTION

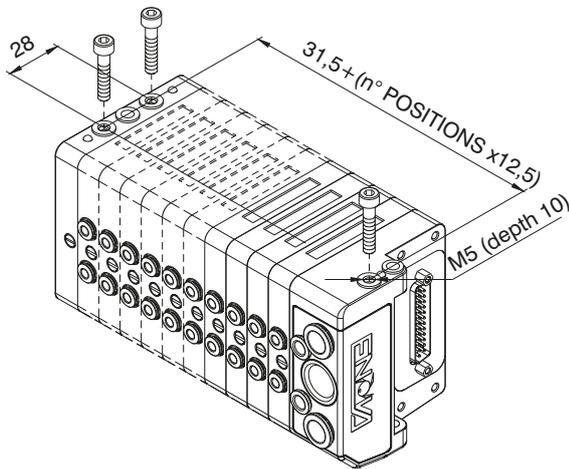
Mounting



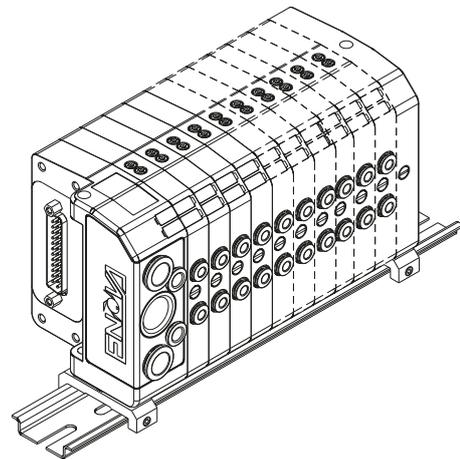
From the top



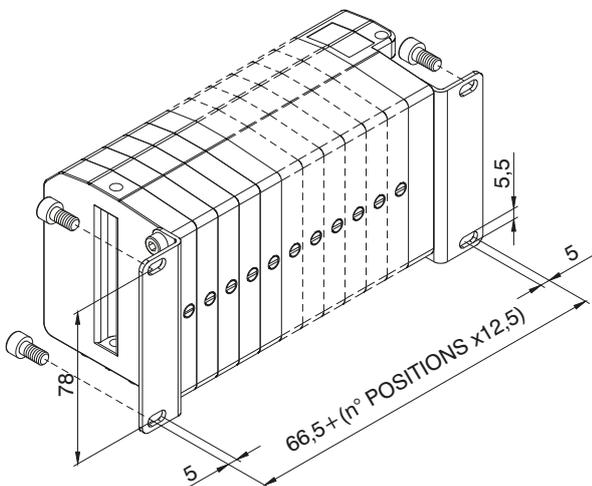
From the bottom



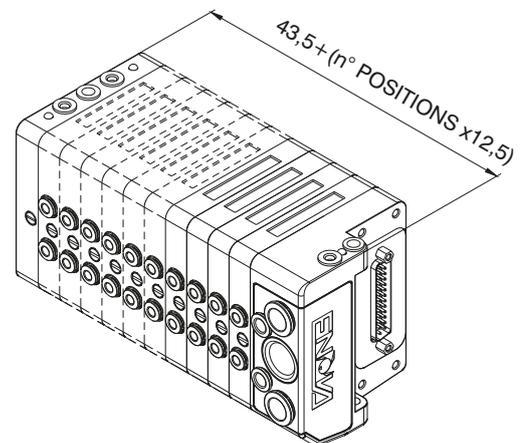
On DIN rail

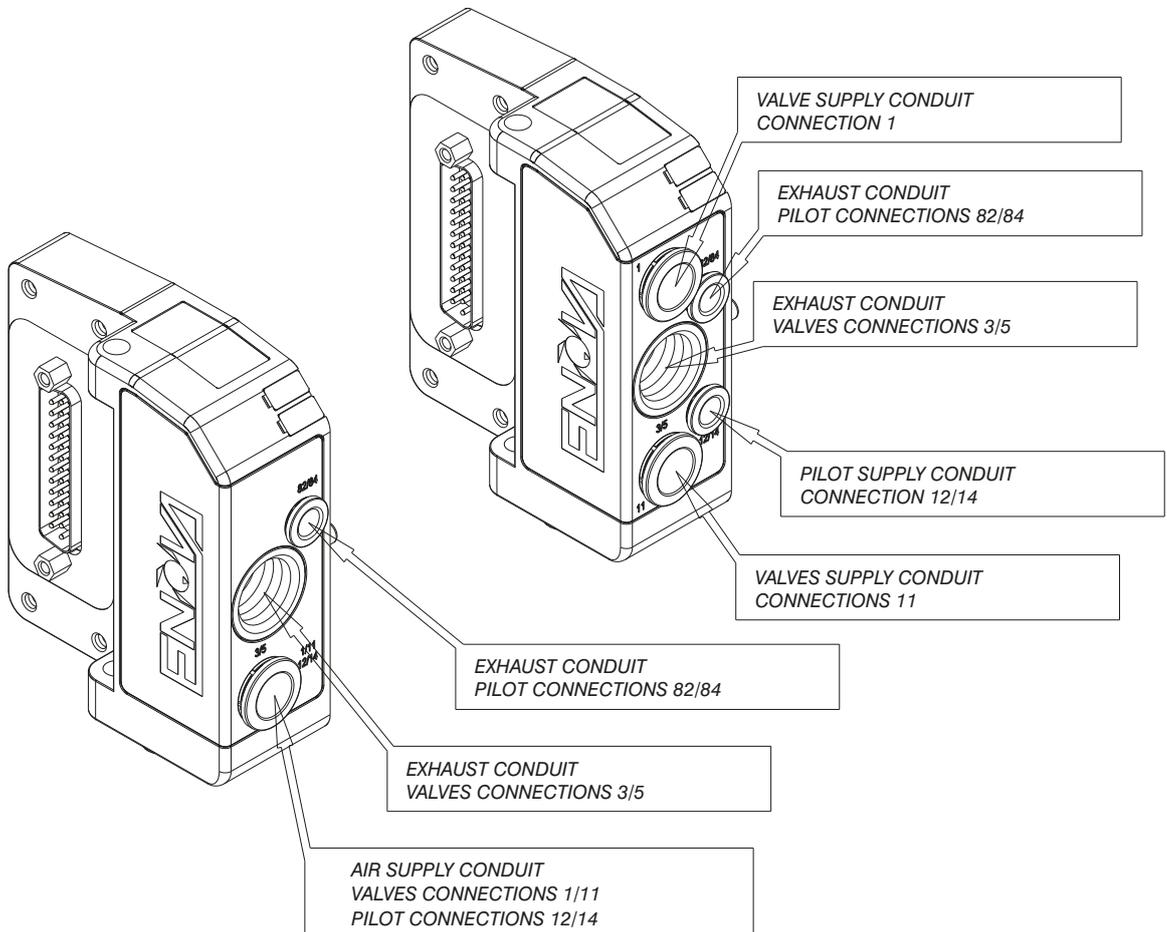
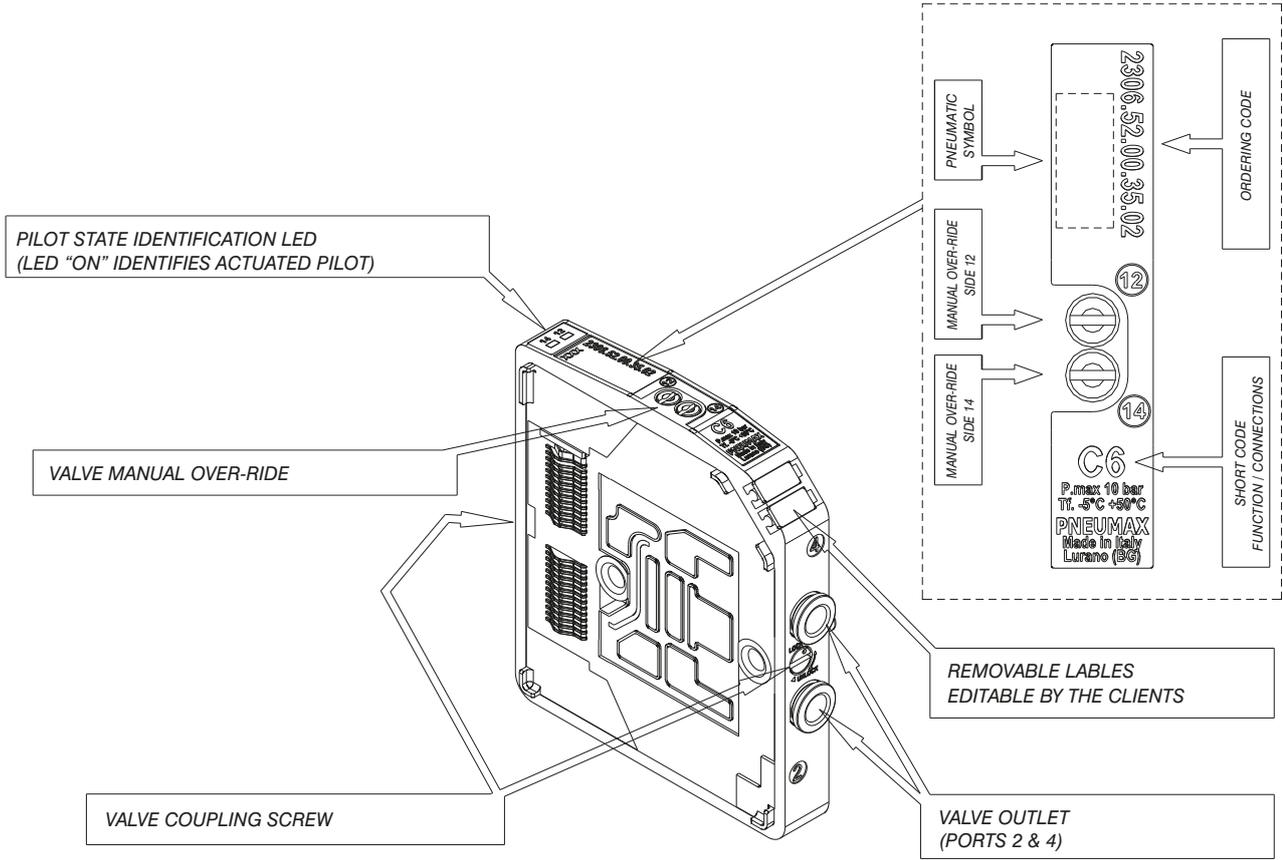


90° Bracket



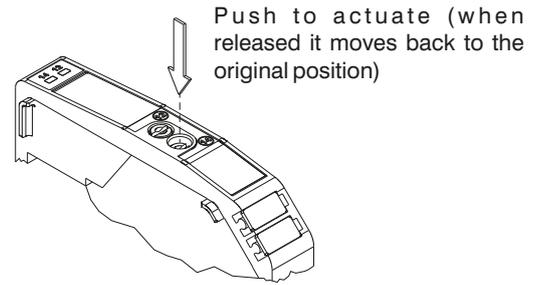
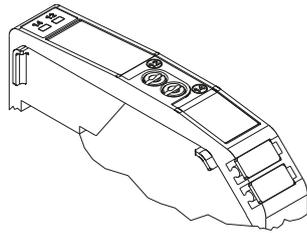
Maximum envelop size based on the number of positions



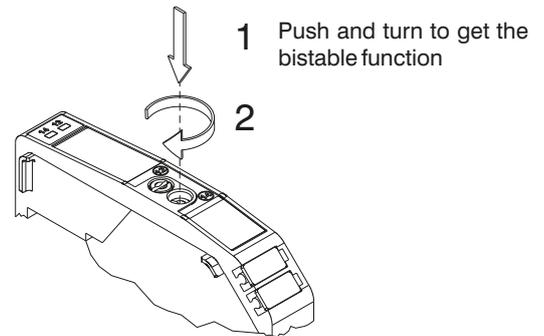
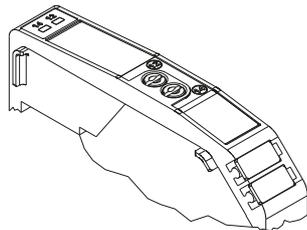


Manual over-ride function

Unstable function



Bistable function



NOTE: It is strongly suggested to replace the original position after using

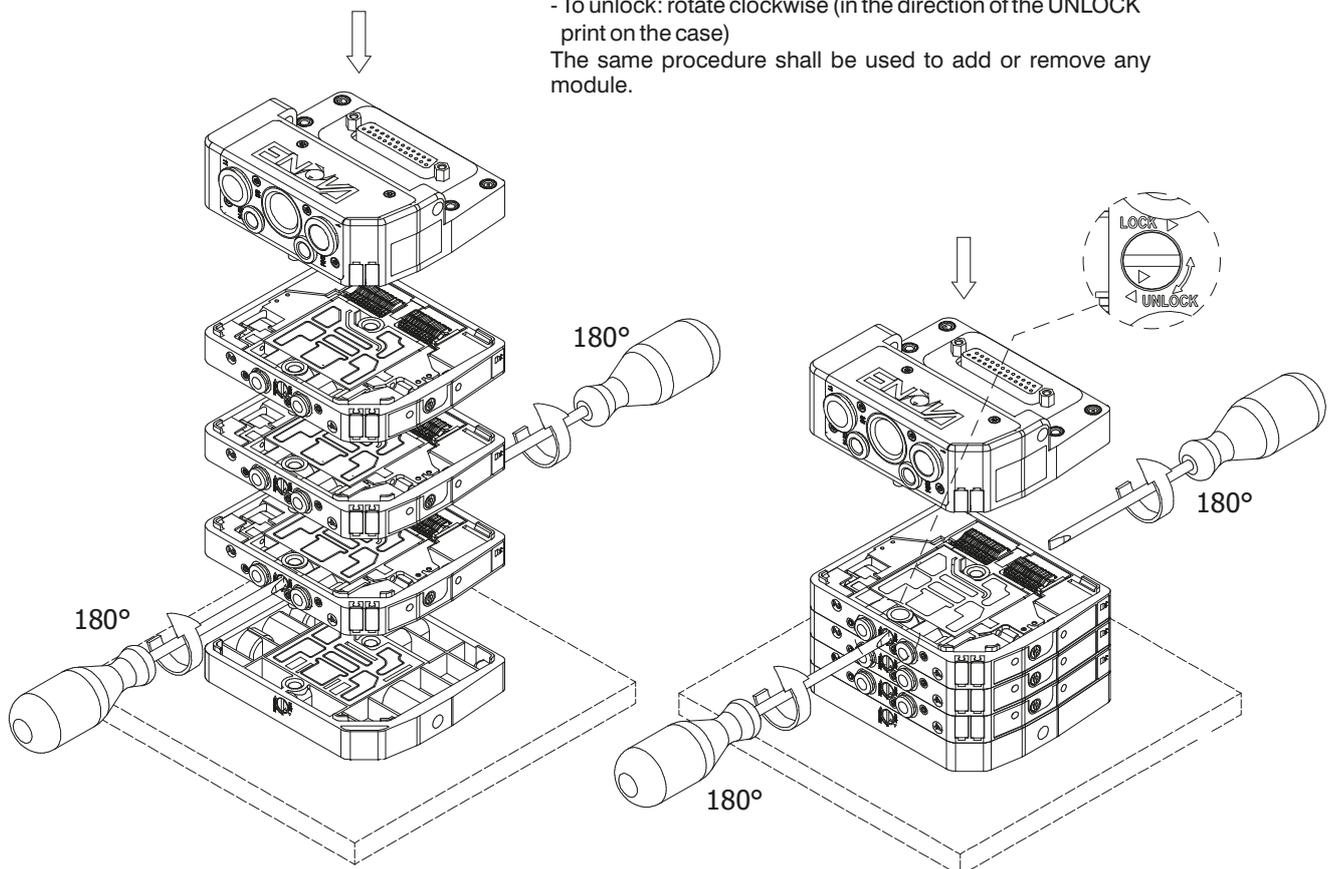
Manifold assembly

The assembly procedure should start from the end-plate which should be positioned on a flat surface. Add the requested modules by simply rotating by 180° the fastening pins by means of a 1x5.5 flat screw driver. The last module to be assembled shall be the inlet module

Fastening pins rotation direction:

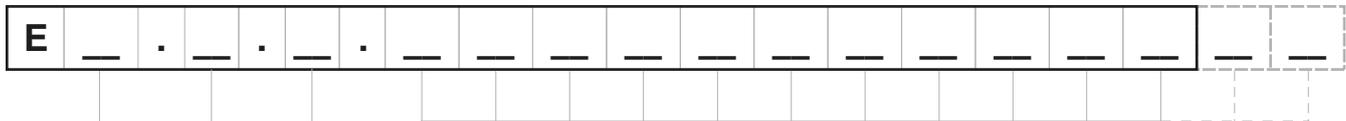
- To lock: rotate anticlockwise (in the direction of the LOCK print on the case)
- To unlock: rotate clockwise (in the direction of the UNLOCK print on the case)

The same procedure shall be used to add or remove any module.



Manifold Lay-Out configuration

1
AIR DISTRIBUTION



ACCESSORIES :
 0= none
 D= DIN bar adapter
 S= 90° Fixing bracket

ENDPLATES SELECTION :
 A= 5 ports endplated left side plus right side endplated
 B= 3 ports endplated left side plus right side endplated

ELECTRICAL CONNECTION:
 MP= MULTIPOLAR PNP (standard)
 MN= MULTIPOLAR NPN
 CA= CANopen® 22 OUT
 CB= CANopen® 22 OUT + 8 IN
 CC= CANopen® 22 OUT + 16 IN
 CD= CANopen® 22 OUT + 24 IN
 DA= DeviceNet 22 OUT
 DB= DeviceNet OUT + 8 IN
 DC= DeviceNet 22 OUT + 16 IN
 DD= DeviceNet OUT + 24 IN
 PA= PROFIBUS 22 OUT
 PB= PROFIBUS 22 OUT + 8 IN
 PC= PROFIBUS 16 OUT + 16 IN

SHORT CODE
FUNCTION / CONNECTION:
 A4= SV 5/2 MONOST. SOL.-SPRING Ø4
 A6= SV 5/2 MONOST. SOL.-SPRING Ø6
 A8= SV 5/2 MONOST. SOL.-SPRING Ø8
 B4= SV 5/2 MONOST. SOL.-DIFFERENTIAL Ø4
 B6= SV 5/2 MONOST. SOL.-DIFFERENTIAL Ø6
 B8= SV 5/2 MONOST. SOL.-DIFFERENTIAL Ø8
 C4= SV 5/2 BISTABLE SOL.-SOL. Ø4
 C6= SV 5/2 BISTABLE SOL.-SOL. Ø6
 C8= SV 5/2 BISTABLE SOL.-SOL. Ø8
 E4= SV 5/3 CC SOL.-SOL. Ø4
 E6= SV 5/3 CC SOL.-SOL. Ø6
 E8= SV 5/3 CC SOL.-SOL. Ø8
 F4= SV 2x3/2 NC-NC (= 5/3 CA) SOL.-SOL. Ø4
 F6= SV 2x3/2 NC-NC (= 5/3 CA) SOL.-SOL. Ø6
 F8= SV 2x3/2 NC-NC (= 5/3 CA) SOL.-SOL. Ø8
 G4= SV 2x3/2 NO-NO (= 5/3 CP) SOL.-SOL. Ø4
 G6= SV 2x3/2 NO-NO (= 5/3 CP) SOL.-SOL. Ø6
 G8= SV 2x3/2 NO-NO (= 5/3 CP) SOL.-SOL. Ø8
 H4= SV 2x3/2 NC-NO SOL.-SOL. Ø4
 H6= SV 2x3/2 NC-NO SOL.-SOL. Ø6
 H8= SV 2x3/2 NC-NO SOL.-SOL. Ø8
 L4= SV 2x2/2 NC-NC SOL.-SOL. Ø4
 L6= SV 2x2/2 NC-NC SOL.-SOL. Ø6
 L8= SV 2x2/2 NC-NC SOL.-SOL. Ø8
 M4= SV 2x2/2 NO-NO SOL.-SOL. Ø4
 M6= SV 2x2/2 NO-NO SOL.-SOL. Ø6
 M8= SV 2x2/2 NO-NO SOL.-SOL. Ø8
 N4= SV 2x2/2 NC-NO SOL.-SOL. Ø4
 N6= SV 2x2/2 NC-NO SOL.-SOL. Ø6
 N8= SV 2x2/2 NC-NO SOL.-SOL. Ø8
 P4= SV 5/2 MONOST. SOL.-SPRING CEB Ø4
 P6= SV 5/2 MONOST. SOL.-SPRING CEB Ø6
 P8= SV 5/2 MONOST. SOL.-SPRING CEB Ø8
 R4= SV 5/2 MONOST. SOL.-DIFF. CEB Ø4
 R6= SV 5/2 MONOST. SOL.-DIFF. CEB Ø6
 R8= SV 5/2 MONOST. SOL.-DIFF. CEB Ø8
 T1 = 1 ELECTRIC SIGNAL THROUGH MODULE
 T2 = 2 ELECTRIC SIGNALS THROUGH MODULE

J= INTERMEDIATE EXHAUST MODULE Ø8
 K= INTERMEDIATE INLET MODULE Ø8
 W = INLET-EXHAUST MODULE Ø8

X= INLET DIAPHRAGM
 Y= EXHAUST DIAPHRAGM
 Z= INLET -EXHAUST DIAPHRAGM

NOTE:

While configuring the manifold always bear in mind that the maximum number of electrical signals available is 22.

N.B. CEB = Electrical connector for bistable valves (uses two electric signals)

Intermediate supply / exhaust modules require the same space as a valve but do not use any electric signals (as the electric connector carries forward all signals received from the module immediately before).

The separation diaphragms are positioned between two modules and replace the standard seal therefore do not increase the dimension of the assembly. When using a separation diaphragm of any type, it is necessary to add, in any position between diaphragm and the manifold and plate, an extra air supply / exhaust module depending on the type of diaphragm used.