



North America

# Valve Catalog

## Manual, Mechanical & Air-Pilot

Edition 8.5







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# WELCOME TO THE WORLD OF CAMOZZI.

Welcome to the world of Camozzi and our new **Valve Catalog** that includes Manual, Mechanical and Air-Pilot valves. As part of our total commitment to our customers, Camozzi is launching this new, improved and updated catalog designed with an easy-to-use and practical format, which offers comprehensive and innovative range of valve components.

The catalog includes technical images, drawings, dimension tables, technical specifications and additional tools that will provide you with a better understanding of our Manual, Mechanical, Air-Pilot and Accessories product line.

You will see a new layout and design over how valves have been categorized in the past including the notation of specific flow rates (Cv) at the top of each page. Valves are combined by flow rate range and similar operation. Each major chapter is organized by general function, and sorted by increasing flow rates within the different series of valve families (Manual, Mechanical, or Air-Pilot).

We have also included our Flow Control Valves & Accessories. This chapter is the same section reprinted in our Fittings & Flow Control Valves Catalog (Edition 8.5).

We have also added a Valve Selector Guide at the beginning of this catalog to help you decide which valve family is right for your application. Additionally, please see the Seal Kit Guide in chapter 5 for Camozzi's entire family of valves.

We hope you will find the new catalog helpful to you and your customers.

UNI EN ISO 9001 (ISO 9001)



UNI EN  
**ISO 9001**

Day by day we try to improve ourselves,  
to extend our competence and our  
professionalism in a constant way.

UNI EN ISO 14001 (ISO 14001)



UNI EN  
**ISO 14001**

Minimize the consumption of  
energy, water, raw material and  
the production of waste,  
and focus on recycling  
wherever possible.





Everybody talks about quality. We prefer to talk about the many components that work together to create a quality system that ensures excellence, not only in the final product but throughout the entire business process. Research, technological innovation, training, respect for personnel, employee and environmental safety, and total customer care are all factors that Camozzi considers strategic in the achievement of quality reflecting an unyielding commitment to the pursuit of excellence.

In 2009 Camozzi renewed from Det Norske Veritas the certifications for the Quality Management Systems regarding UNI EN ISO 9001 :2008 and for the Environmental Management Systems as UNI EN ISO 14001:2004. One of Camozzi's main goals, equal to quality and safety, is the protection of the environment and compatibility of our activities with the territorial context in which they are performed.









VALVE CATALOG : MANUAL, MECHANICAL & AIR-PILOT





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# Chapter 1

## Manual Valves

### MANUAL VALVES

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# Manual Valves Product Guide

Cv = .06 - 1.32

This range of valves includes operating devices suitable for most applications according to the space available. They are offered in a range of different dimensions: M5 (10-32 UNF), 1/8" NPTF and 1/4".

Functions include: 3-way/2-position, 5-way/2-position, 5-way/3-position with closed center and exhaust center

Page 4

Cv = .06

## Manually Operated Console Minivalves Series 2



3-way/2-position and 5-way/3-position  
Ports M5, Cartridge  $\varnothing$ 4 mm (5/32" O.D.)

Page 10

Cv = .06

## Mini Handle Valve Series 2



Handle with incorporated micro valve 3-way/2-position Normally Closed  
Mod. 234-885

Handle with incorporated micro switch Mod. 234-88E

Page 12

Cv = .52 - 1.3

## Manually Operated Valves - 1/8" & 1/4" Series 1, 3, and 4



3-way/2-position, 5-way/2-position and  
5-way/3-position  
Ports 1/8", 1/4" NPTF

Page 22

Cv = .06 - .91

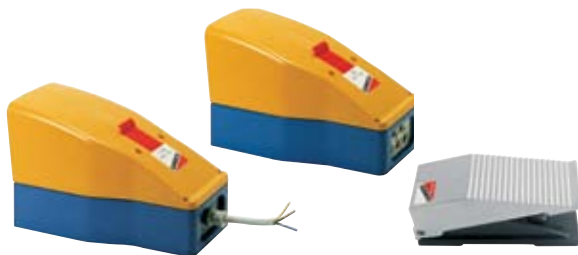
## Pneumatic - Foot Operated Pedal Series 3 1/4", 5/2 Way NPTF

Cv = .9

Electrical - Foot Operated Pedal Series 3  
with Normally Closed/Normally Open contacts

## Foot Pedal Series 2

Cv = .06



Page 24

Cv = .73 - 4.10

## Slide Valve Series VMS



3-way/2-position  
Ports 1/8", 1/4", 3/8",  
1/2" NPTF

Page 26

Cv = 5.0 - 6.26

## Ball Valves Series 2930, 2930N, 2940, 2960



Ports 1/4", 3/8", 1/2", 3/4", 1",  
1 1/4", 1 1/2", 2", 2 1/2", 3",  
4", NPTF

# Series 2

## Manually Operated Console Minivalves

Cv = .06

3/2 and 5/3-way  
Ports M5 (10-32 UNF)  
Cartridge  $\varnothing$  4 mm (5/32" O.D.)

The manually operated console valves come standard with a 22 mm diameter mounting aperture which consists of our own valves combined with manual devices. This feature means that all the manual devices, 22 in diameter, can be used. This series of miniature valves has been specially designed to satisfy all the application requirements of the controls industry, with particular attention being paid to the operating characteristics which are required from these components:

- Low actuating force=6N (1.35 lbs.)
- Short operational stroke
- Small dimensions
- Speed and accuracy of signal
- Reduced air consumption

The versatility of the manual range is expandable. It is possible to mount an electrical switch next to the miniature valve. In this case, the base piece Mod. 220-000 is required.

Note: Several additional push buttons, switches, lighted operators and electrical controls are available which integrate into this product line. Contact factory for details, lead time and part number codes.



### TECHNICAL SPECIFICATIONS

Valve group	3-way/2-position, 5-way/3-position
Construction	Poppet type
Mounting	On consoles, control panels or cabinets: bulkhead design
Materials	Anodized body, Brass poppet gate, Buna-N seals
Threaded port sizes	M5 (10-32 UNF) thread, or 4 mm OD cartridge (5/32" OD tube connect)
Installation	Bulkhead, or single panel mount
Operating temperature	32°F - 175°F, (dry air necessary down to -4°F)
Fluid	Filtered air (25 micron or less recommended)
Lubricant	Not required. Otherwise, only oil compatible with Buna-N, (3° - 10° E) (approximate 32 centistokes viscosity), ISOVG32 grade

**PNEUMATIC DATA**

Operating pressure	2 - 10 bar, (30 - 145 psi)
Nominal pressure	6 bar, (87 psi)
Nominal flow	*Qn = 60 NL/min. (2.12 SCFM)
Nominal diameter	2.5 mm
Cv Rating	0.06

\*Qn flowrate (SCFM) determined with a supply pressure of 6 bar, (87 psi), and with a pressure drop of 1 bar, (14.5 psi).

\*\*Dimensions are in millimeters.

**CODING OF MINIVALVES**

<b>2</b>	<b>3</b>	<b>4</b>	<b>-</b>	<b>97</b>	<b>5</b>
<b>2</b>	SERIES				
<b>3</b>	FUNCTION: 3 = 3/2-way NC 4 = 3/2-way NO 8 = 5/3-way CO				
<b>4</b>	PORTS: 4 = cartridge ø 4 (5/32" OD) 5 = M5 (10-32 UNF)				
<b>97</b>	MODE OF OPERATION: 87 = 3 position selector 89 = push button 97 = palm switch 90 = joystick 99 = 2 position selector 92 = pedal 904 = key				
<b>5</b>	RESETTING: 5 = spring return 0 = stable 2 = latching-twist to release 54 = joystick				

Manually operated console minivalves (operators shown below as spare parts, see code key for complete assemblies) Cv = .06



Mod. **200-895** (ø 22 mm)  
red - black - green



Mod. **200-975** (ø 22 mm)  
red



Mod. **200-972** (ø 22 mm)  
red



Mod. **200-905** (ø 22 mm)  
Mod. **200-905** (ø 30 mm)  
red



Mod. **200-990** (ø 22 mm)  
black



Mod. **200-870** (ø 22 mm)  
black



Mod. **200-904** (ø 22 mm)



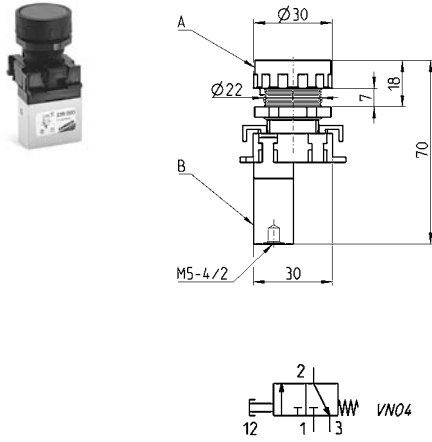
Mod. **234-9054**



Mod. **200-925**

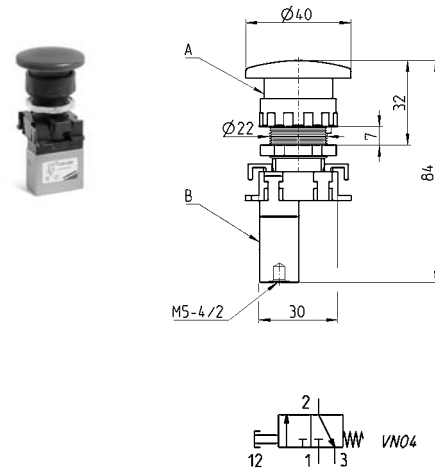
Minivalves Mod. 235-895 and Mod 234-895 Cv = .06

(235-895 and 234-895).  
Actuation force at 6 bar = 7 in (1.5 lbs)



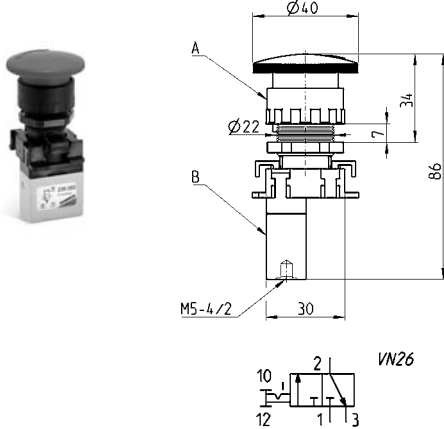
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Actuation force at 6 bar = 7 in (1.5 lbs)



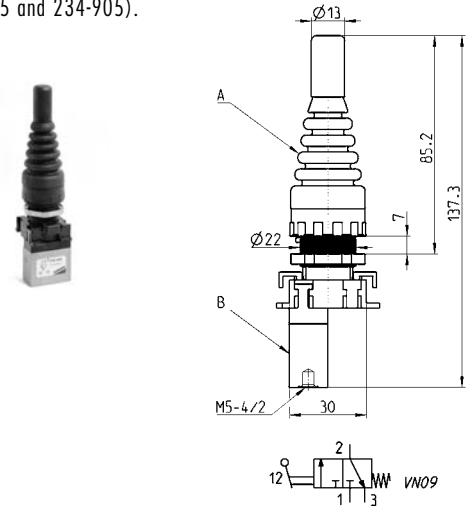
Minivalves Mod. 235-972 and Mod 234-972 Cv = .06

(235-972 and 234-972).  
Actuation force at 6 bar = 7 in (1.5 lbs)



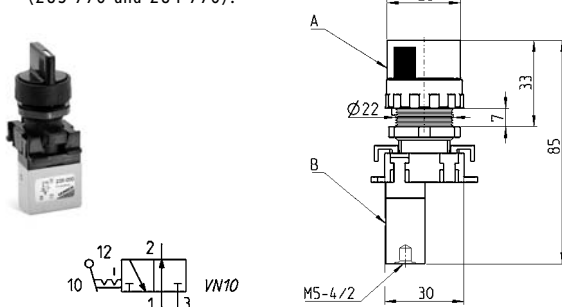
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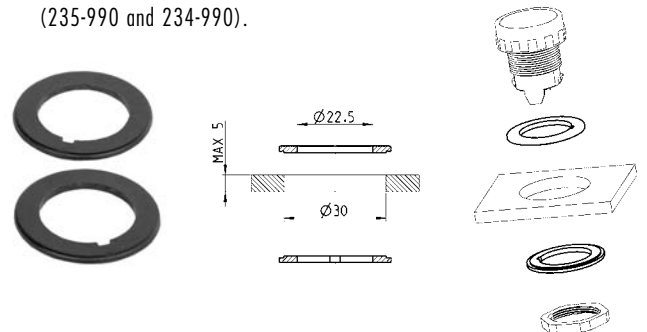
Minivalves Mod. 235-990 and Mod 234-990 Cv = .06

(235-990 and 234-990).



Adaptor Mod. 200-2230

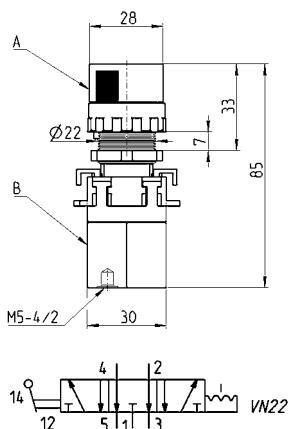
(235-990 and 234-990).





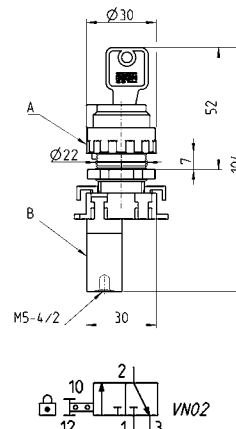
Minivalves Mod. 285-870 and Mod 284-870 Cv = .06

(285-870 and 284-870).



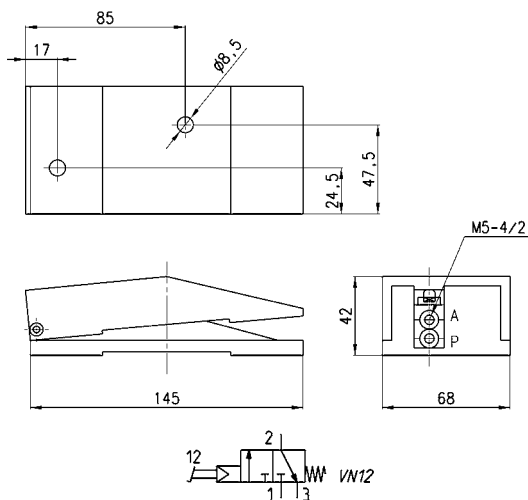
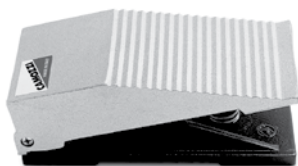
Minivalves Mod. 235-904 and Mod 234-904 Cv = .06

(235-904 and 234-904).



Pedal Mod. 235-925 and Mod 234-925

Cv = .06

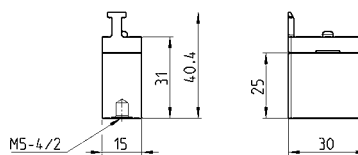


Mod.

<b>235-925</b>	10-32 UNF
<b>234-925</b>	5/32" OD

Minivalves Mod. 235-000 and Mod 234-000 (Spare Parts)

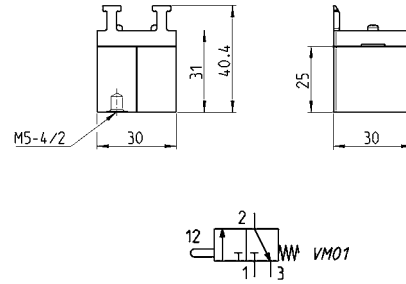
Cv = .06



Mod.

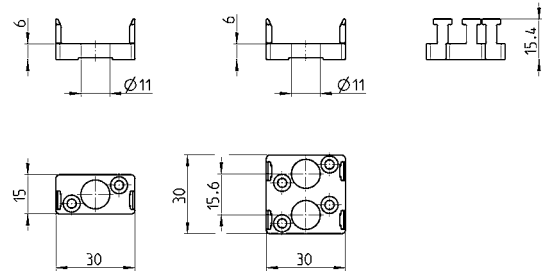
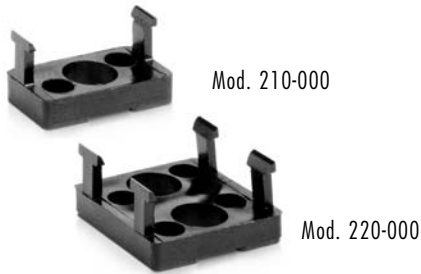
<b>235-000</b>	10-32 UNF
<b>234-000</b>	5/32" OD

Minivalve Mod. 284-000 and Mod 285-000 (Spare Parts)



Mod.
284-000
285-000

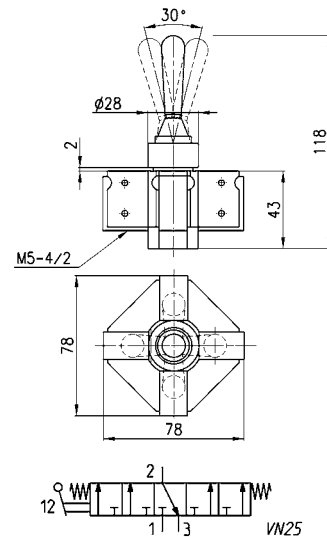
Adaptors Mod. 210-000 and Mod 220-000 (Spare Parts)



Joystick Mod. 234-9054

Cv = .06

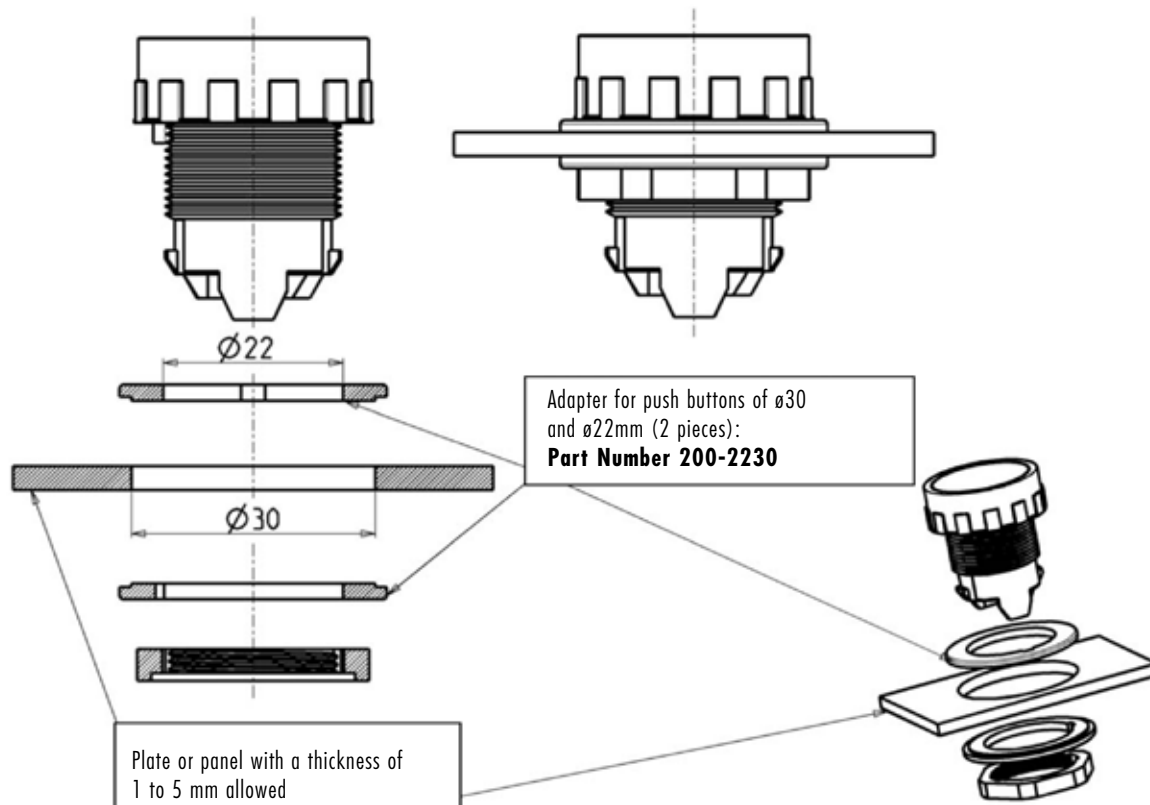
Minimum pressure = 2 bar (30 psi)  
 Note: Valve is composed of 4 pieces of Mod. 234-000,  
 each actuated by 1 direction of joystick



Mod.
234-9054

# Panel Assembly Guide

Adapter for standard 22mm operators to fit 30mm diam. panel openings



Optional electrical assembly with Normally Open/Closed contacts, lighted button, etc.



Contact factory for details, part number, and availability.

## Mini-handle valve Series 2

Cv = .06

Handle with incorporated micro valve 3-way/2-position Normally Closed

Mod. 234-885

Handle with incorporated micro switch Mod. 234-88E

Manual handle with integrated pneumatic micro valve 3/2 or with an electrical micro switch with single pole changeover contacts. Rugged construction particularly suited to be incorporated in to other equipment, such as manual lifting systems, manual vacuum systems, locking and clamping systems.

Note: Handles can support a load of 330 lbf combined total when assembled with 2, M5 x 0.8 bolts x 10mm long. (Maximum bolt torque is 7 ft-lbs).



### GENERAL and PNEUMATIC CHARACTERISTICS MOD. 234-885

Construction	poppet-type (closed centers)
Valve function	3-way/2-position Normally Closed
Nominal diameter	2.5 mm orifice
Fixing	N°2 M5 x 0.8 female bolts
Ports	push in cartridge Ø4mm (5/32" OD)
Installation	in any position
Operating temperature	
Operating pressure	2 - 10 bar (30-145 psi)
Nominal flow	Qn 60 NI/min. (6 bar Δ p1) (2.12 SCFM)
Fluid	Filtered air, without lubricant*
Actuating force	at 6 bar 13N (3 lbs)

\* If lubricated air is used, it is recommended to use oil ISOVG32 grade. Once applied the lubrication should never be interrupted.

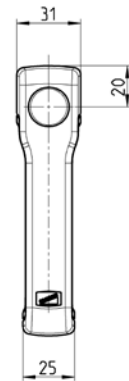
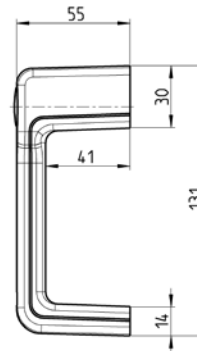
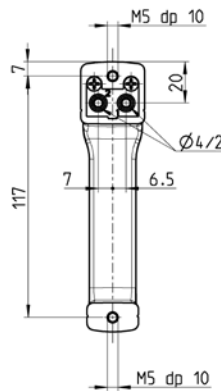
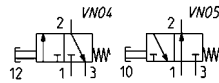
32°F - 175°F (dry air required down to -4°F)

### GENERAL and ELECTRICAL CHARACTERISTICS MOD. 234-88E

Construction	switch device
Electrical connections	3 wires Ø external 2,2 mm
	internal section 0,5 length 30 cm
	NC = black wire
	NO = blue wire
Fixing	N° 2 M5 x 0.8 female bolt holes, 10 mm deep
Mounting	in any position
Operating temperature	32°F - 175°F
Protection class	IP40
Activation stroke	2 mm
Actuating force	5 N (1 lbf)

Mod. 234-885

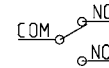
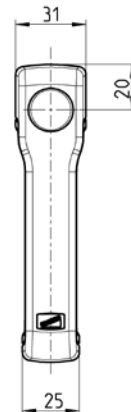
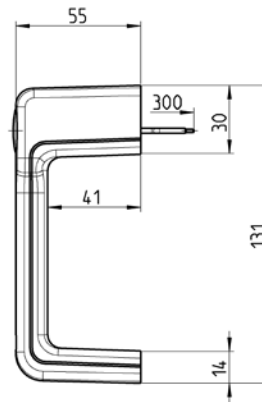
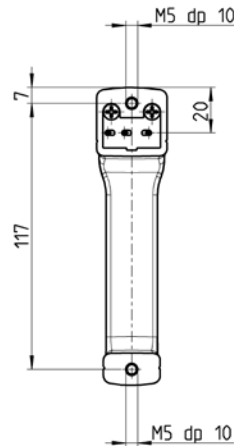
Cv = .06



Mod.	Symbol
234-885	VN04
244-885	VN05

Mod. 234-88E

Cv = .06



## Electrical characteristics

Mod.	Voltage	Non-inductive load Resist. NC / NO	Non-inductive load Lamp NC / NO	Inductive load NC / NO	Inductive load Motor NC/NO
<b>234-88E</b>	125VAC	5A	1,5 A / 0,7 A	3 A	2,5 A / 1,3 A
	250 VAC	3A	1 A / 0,5 A	2 A	1,5 A / 0,8 A
	8 VDC	5A	2 A	5 A / 4 A	3 A
	14 VDC	5A	2 A	4 A	3 A
	30 VDC	4A	2 A	3 A	3 A
	125 VDC	0,4A	0,05 A	0,4 A	0,05 A
	250 VDC	0,2A	0,03 A	0,2 A	0,03 A
<b>234-88E</b>	The above-mentioned values refer to steady-state-current	If the switch is used in a DC circuit and is subjected to a surge connect a surge suppressor across the switch.	Lamp load has an inrush current of 10 times the steady-state current.	The inductive load refers to power factor = 0,4 in AC. and a time constant of 7 msec max. in DC.	Motor load has an inrush current of 6 times the steady-state current.

## Series 1, 3 and 4

Cv = .52 — 1.3

## 1/8" and 1/4" Ported Manually Operated Valves

3-way/2-position, 5-way/2-position and 5-way/3-position  
Ports 1/8" and 1/4" NPTF

The Series 1 manual valves (1/8" & 1/4", 3-way/2-position and 5-way/2-position) and the Series 3 & 4 manual valves (1/8" & 1/4", 3-way/2-position, 5-way/2-position and 5-way/3-position) are available with actuators designed to satisfy different needs. For series 3 & 4, the 3-way/2-position valves are normally closed when P is the inlet; they can also be normally open when R is the inlet. They can be operated with vacuum down to -.9 bar (28" Hg). Additionally, the series 3 & 4 valves can be supplied with 2 different pressures into ports 3 and 5 if a cylinder requires different extend and retract forces. The series 1 valves offer a more rugged, compact design with steel operator interfaces.



## TECHNICAL SPECIFICATIONS

Valve group	3-way/2-position, 5-way/2-position, 5-way/3position
Construction	Spool type Series 3 and 4, Poppet type Series 1
Mounting	Mounting holes in valve body
Materials	Anodized aluminum body, Stainless steel spool, Buna-N seals, Brass Poppet (Series 1)
Threaded port sizes	1/8" and 1/4" NPTF
Installation	Manifold, or single panel mount
Operating temperature	32°F - 175°F, (dry air necessary down to -4° F)
Fluid	Filtered air (25 micron or less recommended)
Lubricant	Not required; otherwise, only oil compatible with Buna-N, (3° - 10° E) (ISOVG32 grade; 32 centistokes)

## PNEUMATIC DATA

Operating pressure	0 - 10 bar, (0 - 145 psi) (down to -.9 bar vacuum; 28" Hg with series 3)
Nominal pressure	6 bar, (87 psi)
Nominal flow	*Qn Series 3: 1/8" = 700 NL/min. (24.7 SCFM) Series 1: 1/8" = 500 NL/min. (17.65 SCFM), 1/4"=1250 NL/min. (44.14 SCFM)
	*Qn Series 4: 1/4"=1250 NL/min. (44.14 SCFM)
Nominal diameter	1/8" = 5 mm, 1/4" = 7.5 mm
Cv Rating	Series 3: 1/8" = 0.73, Series 4: 1/4" = 1.3 Series 1: 1/8" = 0.52, 1/4" = 1.3

\*Qn flowrate (SCFM) determined with a supply pressure of 6 bar (87 psi), and with a pressure drop of 1 bar (14.5 psi).

\*\* Soft-seal repair kits are available on request.

\*\*\*Dimensions are in millimeters

## CODING OF MINIVALVES

3	3	8	-	900	TF
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<b>3</b>	SERIES: 1 3 4
<b>5</b>	FUNCTION: 3 = 3/2-way NC 5 = 5/2-way 6 = 5/3-way CC 7 = 5/3-way CO
<b>8</b>	PORTS: 8 = 1/8 4 = 1/4
<b>900</b>	RESETTING: 895 = pushbutton, monostable, black 896 = pushbutton, monostable, green 897 = pushbutton, monostable, red 900 = lever, bistable 905 = lever, monostable 910 = knob, bistable 915 = knob, monostable 935 = digital monostable 975 = palm-switch, monostable, black 976 = palm-switch, monostable, green 977 = palm-switch, monostable, red 990 = switch, bistable
<b>TF</b>	TF = NPTF ports blank = BSP ports

## Manually operated valves



Mod. 138-935TF

Mod. 138-900TF

Mod. 158-900TF

Mod. 338-990TF

Mod. 358-990TF

Mod. 338-895TF  
Mod. 338-896TF  
Mod. 338-897TFMod. 358-895TF  
Mod. 358-896TF  
Mod. 358-897TFMod. 338-975TF  
Mod. 338-976TF  
Mod. 338-977TFMod. 358-975TF  
Mod. 358-976TF  
Mod. 358-977TFMod. 338-910TF  
Mod. 338-915TFMod. 358-910 TF  
Mod. 358-915 TFMod. 338-900TF  
Mod. 338-905TFMod. 358-900TF  
Mod. 358-905TFMod. 368-900TF  
Mod. 368-905TFMod. 378-900TF  
Mod. 378-905TF

Mod. 134-935TF



Mod. 134-900TF

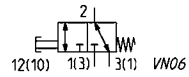
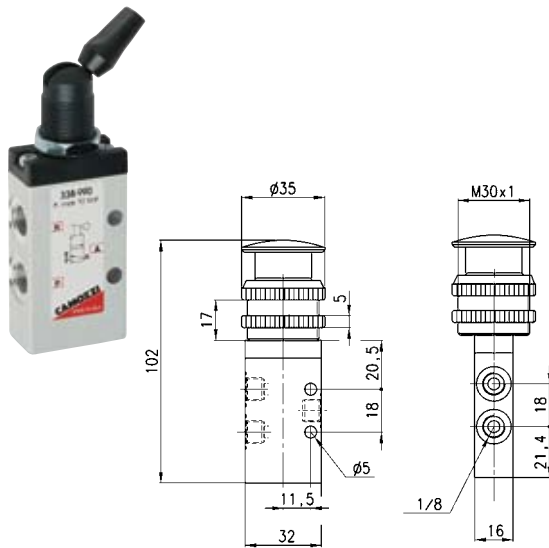
Mod. 154-900TF

Mod. 434-910TF  
Mod. 434-915TFMod. 454-910TF  
Mod. 454-915TFMod. 434-900TF  
Mod. 434-905TFMod. 454-900TF  
Mod. 454-905TFMod. 464-900TF  
Mod. 464-905TFMod. 474-900TF  
Mod. 474-905TF

Valves Mod. 338-990TF

Cv = .73

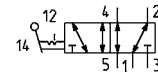
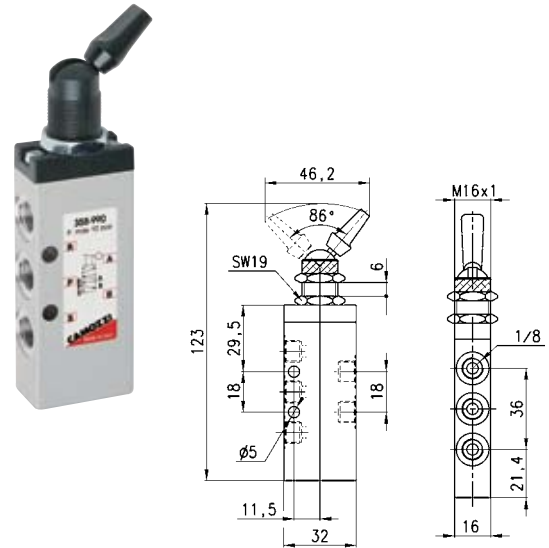
Actuation Force at 87 psi = 4.04 lbf



Valves Mod. 358-990TF

Cv = .73

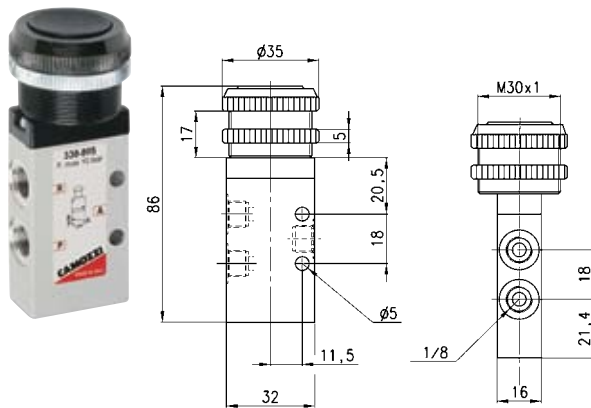
Actuation Force at 87 psi = 4.04 lbf



Valves Mod. 338-895TF

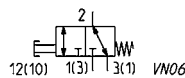
Cv = .73

Actuation Force at 87 psi = 7.9 lbf



Mod.	Button Color
<b>338-895TF</b>	Black
<b>338-896TF</b>	Green
<b>338-897TF</b>	Red

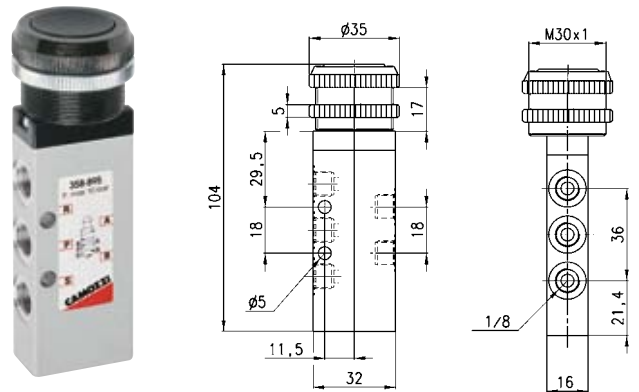
\*buttons are anodized aluminum



Valves Mod. 358-895TF

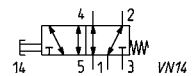
Cv = .73

Actuation Force at 87 psi = 7.9 lbf



Mod.	Button Color
<b>358-895TF</b>	Black
<b>358-896TF</b>	Green
<b>358-897TF</b>	Red

\*buttons are anodized aluminum

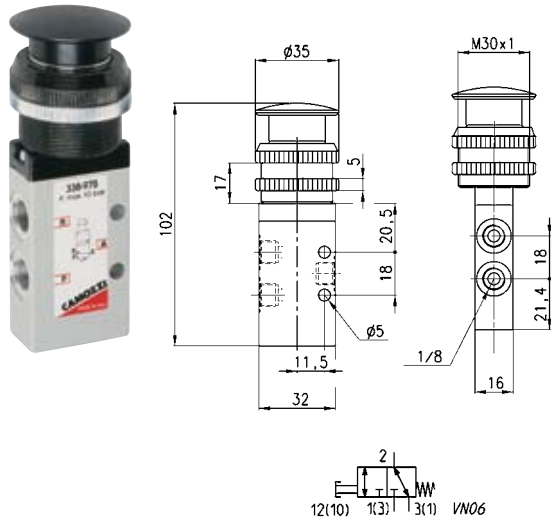




Valves Mod. 338-975TF

Cv = .73

Actuation Force at 87 psi = 7.9 lbf



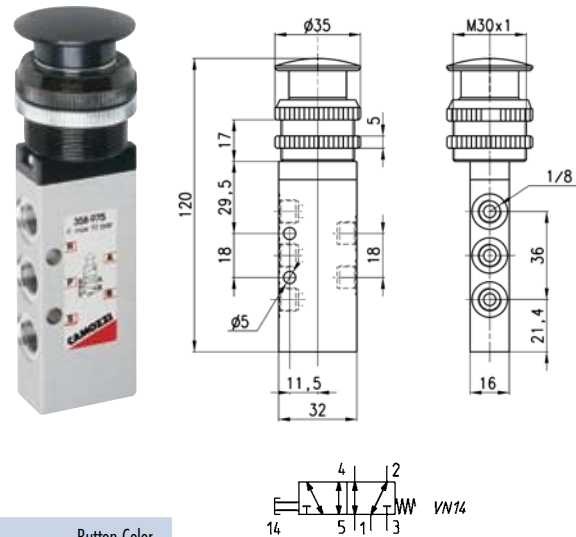
Mod.	Button Color
<b>338-975TF</b>	Black
<b>338-976TF</b>	Green
<b>338-977TF</b>	Red

\*buttons are anodized aluminum

Valves Mod. 358-975TF

Cv = .73

Actuation Force at 87 psi = 7.9 lbf



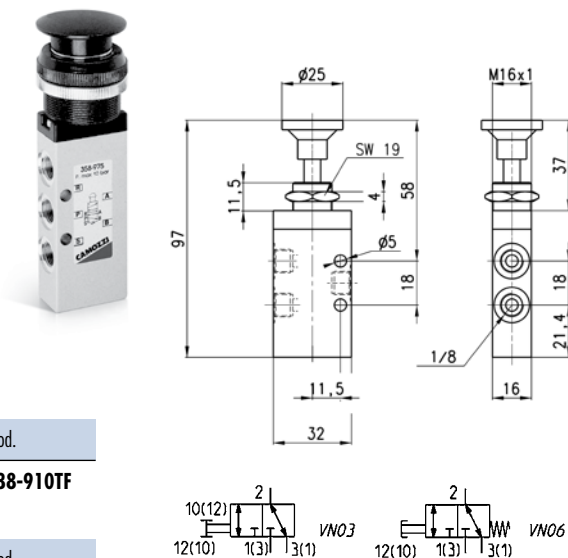
Mod.	Button Color
<b>358-975TF</b>	Black
<b>358-976TF</b>	Green
<b>358-977TF</b>	Red

\*buttons are anodized aluminum

Valves Mod. 338-910TF and Mod. 338-915TF

Cv = .73

338-910TF Actuation Force at 87 psi = 1.35 lbf  
338-915TF Actuation Force at 87 psi = 7.9 lbf



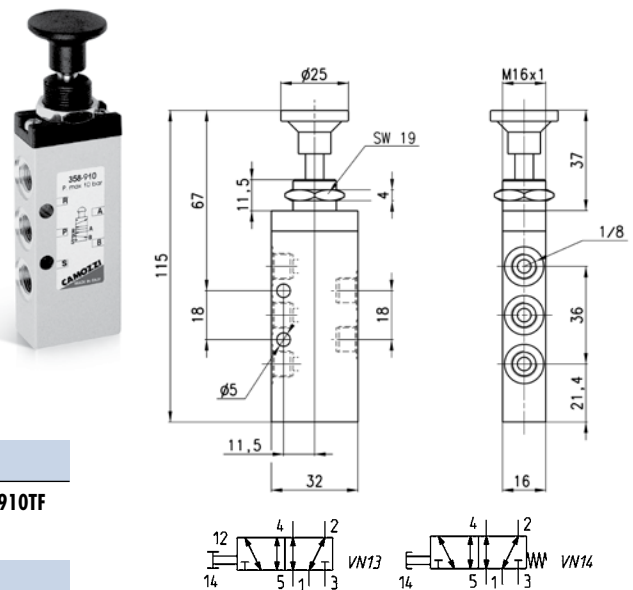
Mod.
<b>338-910TF</b>

Mod.
<b>338-915TF</b>

Valves Mod. 358-910TF and Mod. 358-915TF

Cv = .73

358-910TF Actuation Force at 87 psi = 1.35 lbf  
358-915TF Actuation Force at 87 psi = 7.9 lbf

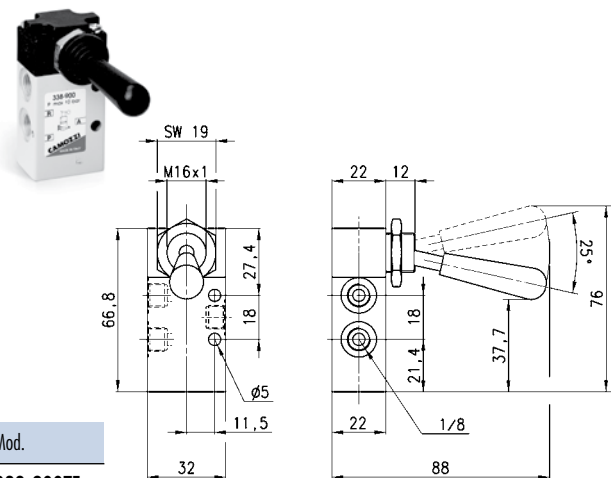


Mod.
<b>358-910TF</b>

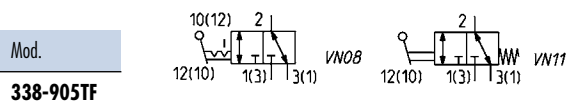
Mod.
<b>358-915TF</b>

Valves Mod. 338-900TF and Mod. 338-905TF Cv = .73

338-900TF Actuation Force at 87 psi = 1.35 lbf  
 338-905TF Actuation Force at 87 psi = 7.9 lbf  
 \*Detent force can be adjusted by means of 5 spring-loaded screws on the side of handle interface



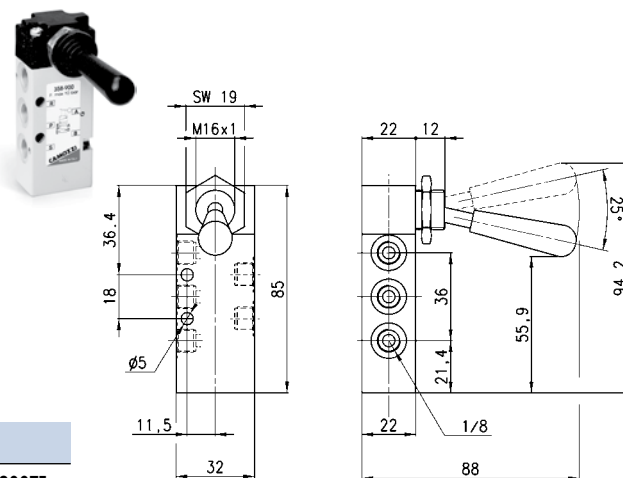
Mod.  
**338-900TF**



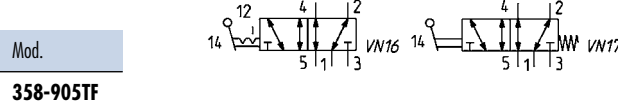
Mod.  
**338-905TF**

Valves Mod. 358-900TF and Mod. 358-905TF Cv = .73

358-900TF Actuation Force at 87 psi = 1.35 lbf  
 358-905TF Actuation Force at 87 psi = 7.9 lbf  
 \*Detent force can be adjusted by means of 5 spring-loaded screws on the side of handle interface



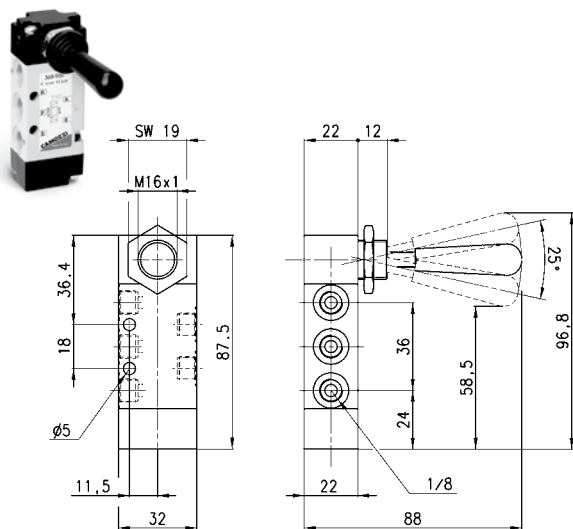
Mod.  
**358-900TF**



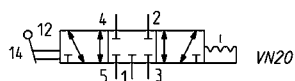
Mod.  
**358-905TF**

Valves Mod. 368-900TF Cv = .73

Actuation Force at 87 psi = 1.35 lbf  
 \*Detent force can be adjusted by means of 5 spring-loaded screws on the side of handle interface

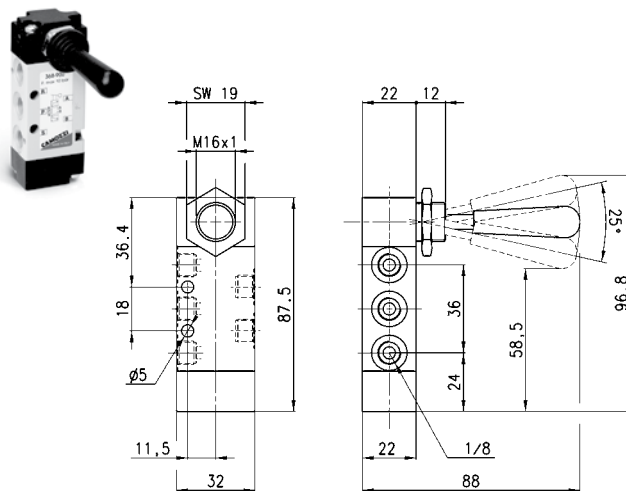


Mod.  
**368-900TF**

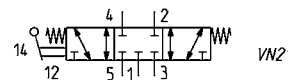


Valves Mod. 368-905TF Cv = .73

Actuation Force at 87 psi = 4.5 lbf  
 \*Detent force can be adjusted by means of 5 spring-loaded screws on the side of handle interface



Mod.  
**368-905TF**

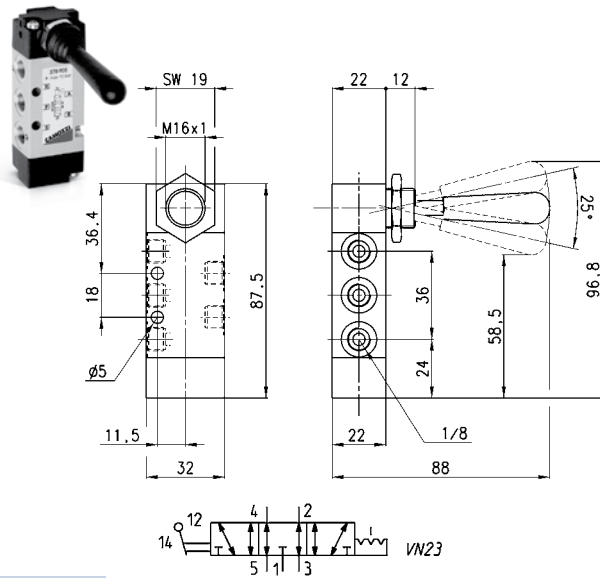


## Valves Mod. 378-900TF

Cv = .73

Actuation Force at 87 psi = 1.35 lbf

\*Detent force can be adjusted by means of 5 spring-loaded screws on the side of handle interface



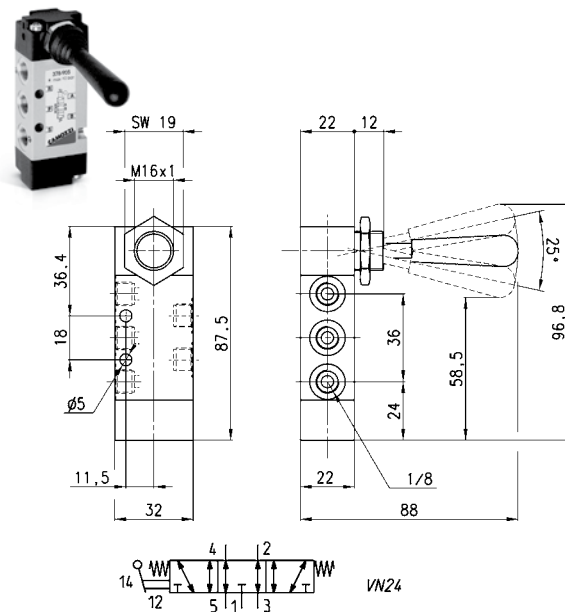
Mod.

**378-900TF**

## Valves Mod. 378-905TF

Cv = .73

Actuation Force at 87 psi = 4.5 lbf



Mod.

**378-905TF**

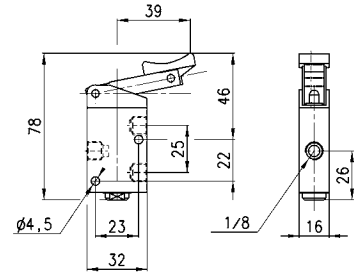
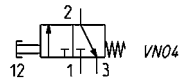
Valve Mod. 138-935TF

Cv = .52

Actuating force at 6 bar = 38N (8.5 lbf)  
 Operating pressure = 0 - 10 bar (0 - 145psi)  
 Flow rate = 500 NI/min. (17.6 SCFM)

Mod.

138-935TF



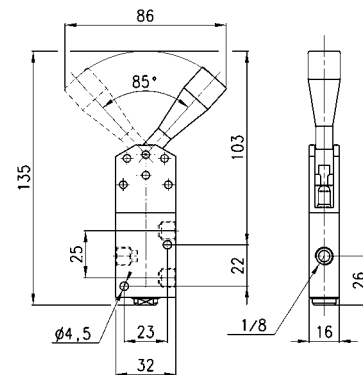
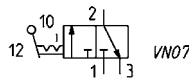
Valve Mod. 138-900TF

Cv = .52

Actuating force at 6 bar = 25N (5.6 lbf)  
 Operating pressure = 0 - 10 bar (0-145 psi)  
 Flow rate = 500 NI/min. (17.6 SCFM)

Mod.

138-900TF



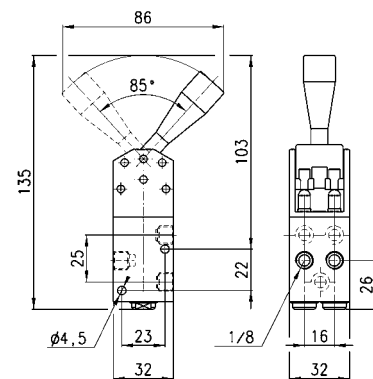
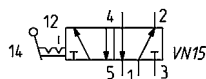
Valve Mod. 158-900TF

Cv = .52

Actuating force at 6 bar = 45N (10.1 lbf)  
 Operating pressure = 0 - 10 bar (0-145 psi)  
 Flow rate = 500 NI/min. (17.6 SCFM)

Mod.

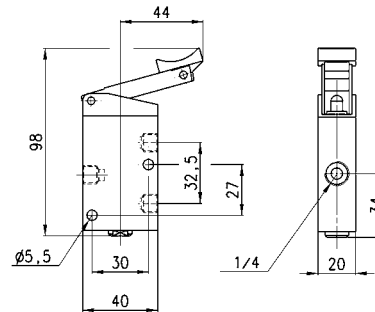
158-900TF



## Valve Mod. 134-195TF

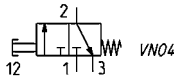
Cv = 1.3

Actuating force at 6 bar = 40N (9 lbf)  
 Operating pressure = 0 - 10 bar (0-145 psi)  
 Flow rate = 1250 NI/min. (44.1 SCFM)



Mod.

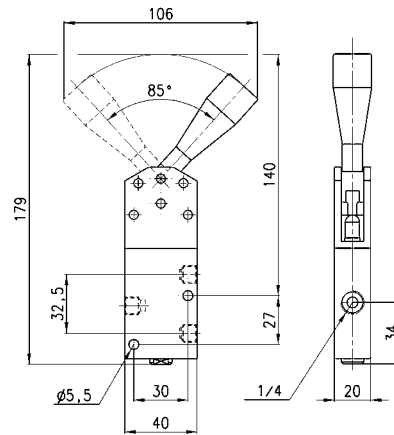
134-935TF



## Valve Mod. 134-900TF

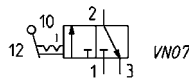
Cv = 1.3

Actuating force at 6 bar = 30N (6.7 lbf)  
 Operating pressure = 0 - 10 bar (0 - 145 psi)  
 Flow rate = 1250 NI/min. (44.1 SCFM)



Mod.

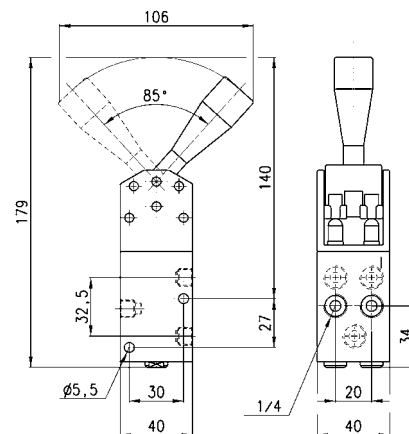
134-900TF



## Valve Mod. 154-900TF

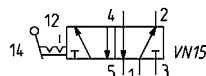
Cv = 1.3

Actuating force at 6 bar = 55N (12.3 lbf)  
 Operating pressure = 0 - 10 bar (0-145 psi)  
 Flow rate = 1250 NI/min. (44.1 SCFM)



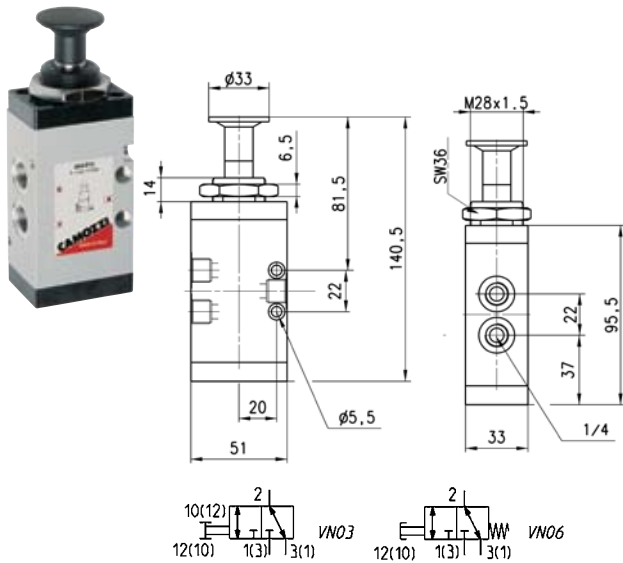
Mod.

154-900TF



Valves Mod. 434-910TF and 434-915TF Cv = 1.3

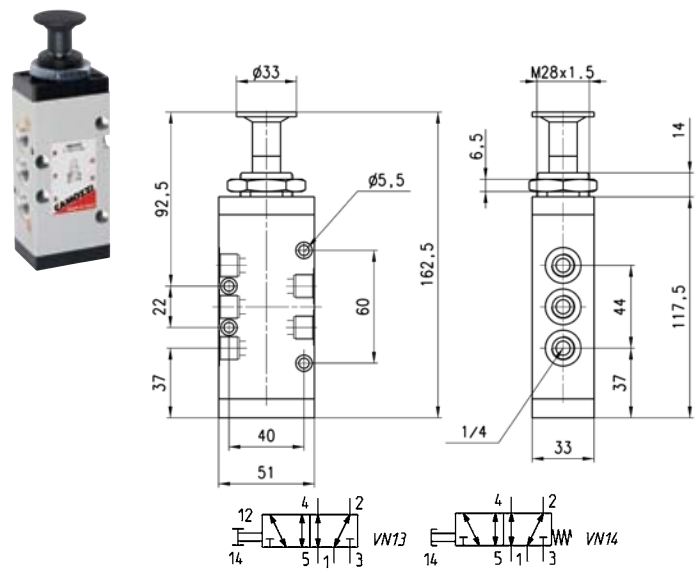
Mod. 434-910TF Actuation Force at 87 psi = 2.25 lbf  
 Mod. 434-915TF Actuation Force at 87 psi = 8.3 lbf



Mod.	Symbol
434-910TF	VN03
434-915TF	VN06

Valves Mod. 454-910TF and 454-915TF Cv = 1.3

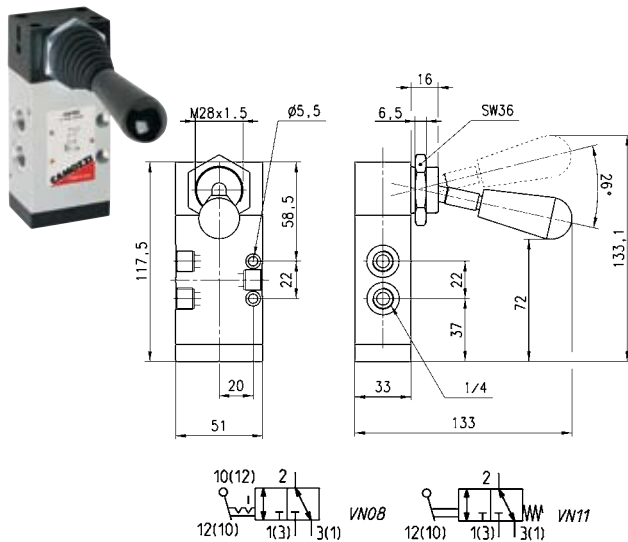
Mod. 454-910TF Actuation Force at 87 psi = 2.25 lbf  
 Mod. 454-915TF Actuation Force at 87 psi = 8.3 lbf



DIMENSIONS	
Mod.	Symbol
454-910TF	VN13
454-915TF	VN14

Valves Mod. 434-900TF and 434-905TF Cv = 1.3

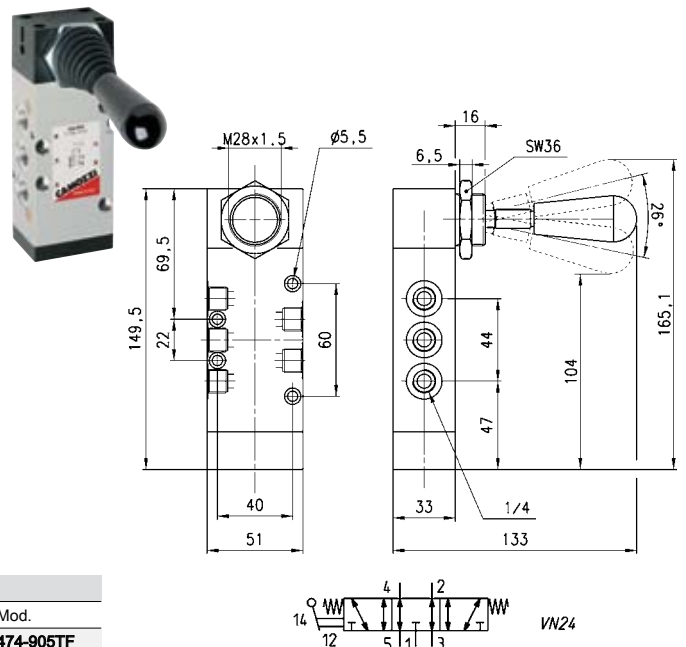
Mod. 434-900TF Actuation Force at 87 psi = 1.35 lbf  
 Mod. 434-905TF Actuation Force at 87 psi = 8.3 lbf  
 \*Detent force can be adjusted by means of 5 spring-loaded screws on the side of handle interface



Mod.	Symbol
434-900TF	VN08
434-905TF	VN11

Valves Mod. 454-900TF and 454-905TF Cv = 1.3

Mod. 454-900TF Actuation Force at 87 psi = 1.35 lbf  
 Mod. 454-905TF Actuation Force at 87 psi = 8.3 lbf  
 \*Detent force can be adjusted by means of 5 spring-loaded screws on the side of handle interface



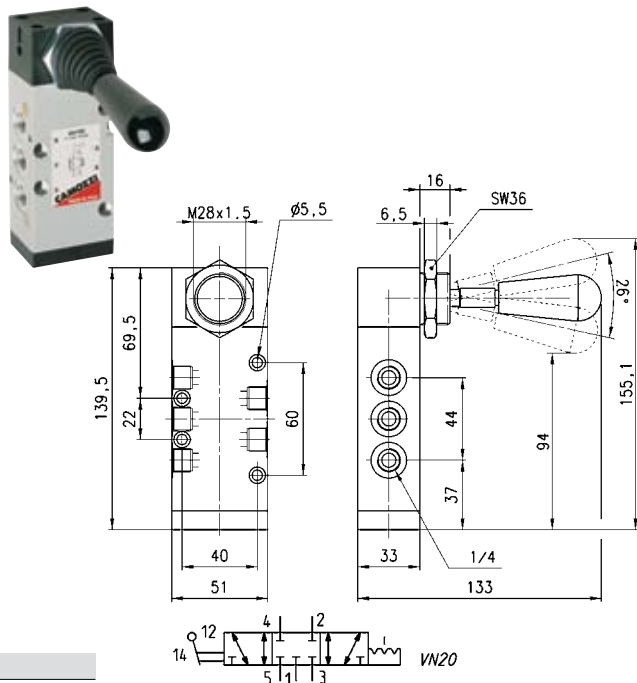
Mod.	Symbol
474-905TF	VN24

Valves Mod. 464-900TF

Cv = 1.3

Actuation Force at 87 psi = 1.35 lbf

\*Detent force can be adjusted by means of 5 spring-loaded screws on the side of handle interface

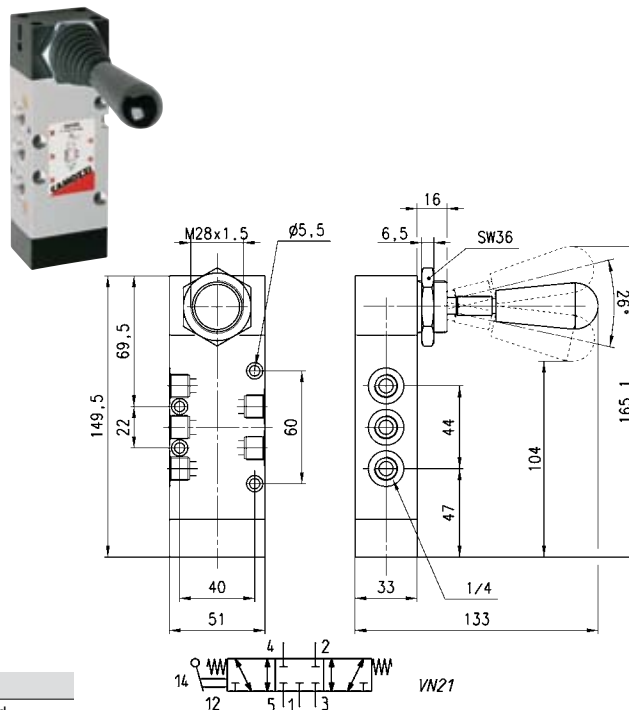


Mod.  
**464-900TF**

Valves Mod. 464-905TF

Cv = 1.3

Actuation Force at 87 psi = 2.25 lbf



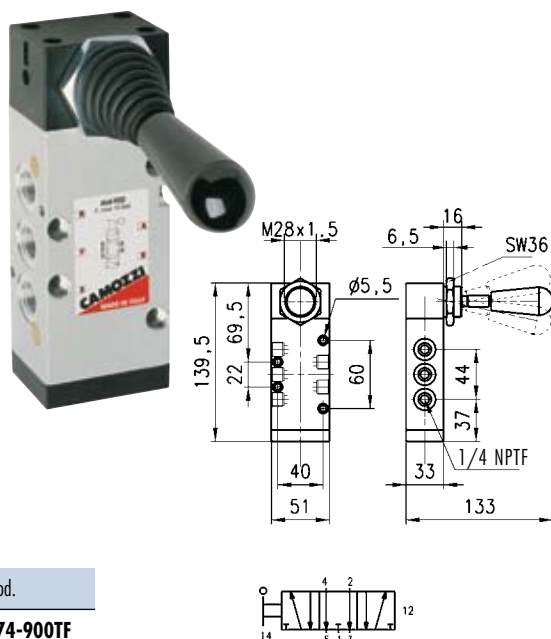
Mod.  
**464-905TF**

Valves Mod. 474-900TF

Cv = 1.3

Actuation Force at 87 psi = 1.35 lbf

\*Detent force can be adjusted by means of 5 spring-loaded screws on the side of handle interface

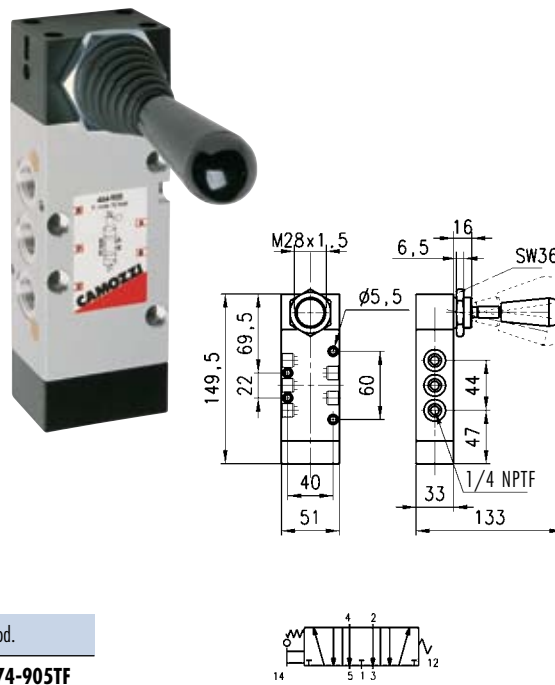


Mod.  
**474-900TF**

Valves Mod. 474-905TF

Cv = 1.3

Actuation Force at 87 psi = 2.25 lbf



Mod.  
**474-905TF**

## Foot Pedal - Pneumatic

10-32 UNF, 5/32" OD: 3-way/2-position (Series 2)

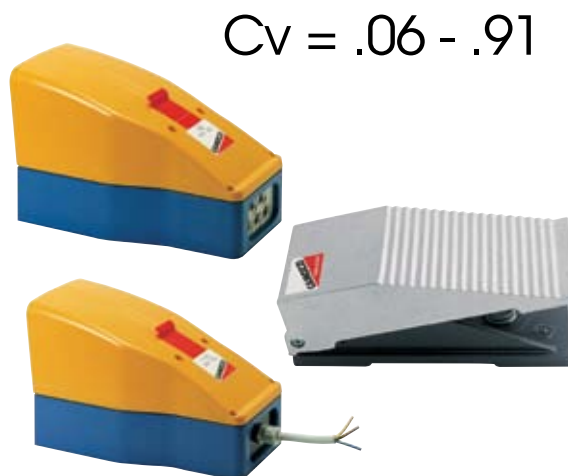
10-1/4" NPTF, 5-way/2-position (Series 3)

## Foot Pedal - Electrical

with Normally Closed/Normally Open contacts

### Series 2 Foot Pedal

10-32 UNF, 5/32" OD, 3-way/2-position Normally Closed



Cv = .06 - .91

The pedals can be supplied either in the pneumatically-operated or in the electrically-operated version. The pneumatically-operated type is available with a 5-way/2-position valve and 1/4" front ports which allow the fittings and silencers to be assembled more easily. A 3-way/2-position version can be obtained by simply plugging one of the two outlet ports, (2 or 4). The electrically-operated type is available with a deviation single-pole contact micro-switch and a front wire outlet (PG9). The pedal can be operated as spring return or Detented, by switching the selector placed under the small red door as shown on the drawing (x).

#### TECHNICAL SPECIFICATIONS Mod. 354N-925TF

Valve group	5-way/2-position (Series 3); 3-way/2-position (Series 2)
Construction	Spool-type (servocontrolled) (Series 3); Poppet type (Series 2)
Materials	Anodized body, stainless steel spool, Buna-N seals, plastic casing nylon; brass poppet (Series 2)
Assembly	Valve built into the pedal body
Threaded port sizes	Series 3: 1/4" NPTF, Series 2: 5/32" OD, or 10-32 UNF
Installation	On the floor
Operating temperature	32°F -125°F (dry air necessary down to 14° F)
Lubricant	Not required; otherwise oil compatible with BUNA-N seals (3°-10°E) (ISOVG32 grade; 32 centistrokes)

#### PNEUMATIC DATA Mod. 354N-925TF

Operating pressure	2.5 - 10 bar (36 to 145 psi)
Rated pressure	6 bar (87 psi)
Rated flow	Qn = 860 NL/Min., (30.36 SCFM)
CV Rating	.91
*Qn flowrate (SCFM) determined with a supply pressure of 6 bar (87 psi), and with a pressure drop of 1 bar (14.5 psi).	
**Dimensions are in millimeters	

#### TECHNICAL SPECIFICATIONS Mod. 3E2-925TF

Construction	Deviation single-pole contact microswitch
Assembly	Built into the pedal body
Port	By means of wire PG9
Installation	On the floor
Operating temperature	32°F -125°F



**Mod. 3E2-925 ELECTRICAL DATA**

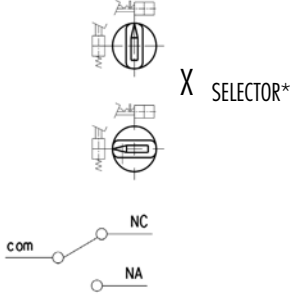
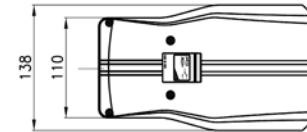
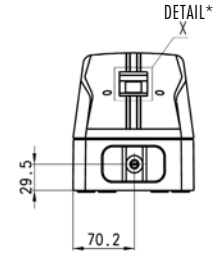
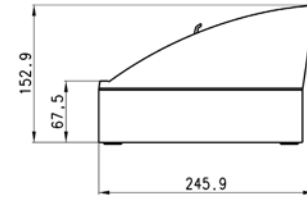


**Note:** 1. The inductive load is considered to have a load factor equal to 0.4 (a.c.) and a time constant equal to max. 7 m sec. (d.c.).  
 2. Light load means a load with start current equal to ten times the nominal current value.  
 3. Motor load means a load with a starting current equal to six times the nominal current value.

**CONTACT RATING**

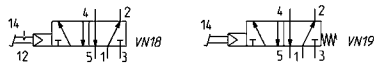
Nominal Voltage		resistive		light		Load (A) inductive		Amps motor	
		N.C.	N.O.	N.C.	N.O.	N.C.	N.O.	N.C.	N.O.
VAC	125 V	15	3	1.5	15	5	2.5		
	250 V	15	2.5	1.25	15	3	1.5		
	480 V	3	1.5	0.75	2.5	1.5	0.75		
VDC	8 V	15	3	1.5	15	10	5	2.5	
	14 V	15	3	1.5	10	10	5	2.5	
	30 V	6	3	1.5	5	5	5	2.5	
	125 V	0.4	0.4	0.4	0.4	0.05	5	0.05	0.05
	250 V	0.2	0.2	0.2	0.2	0.03	0.03	0.03	0.03

Actuating force at 6 bar: 17N (3.82 lbs)



\* Selector function allows user to choose spring return or Detented operation

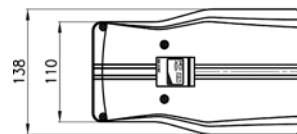
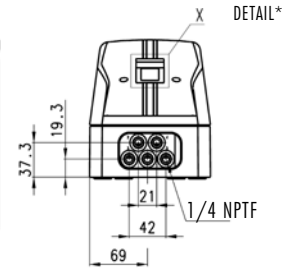
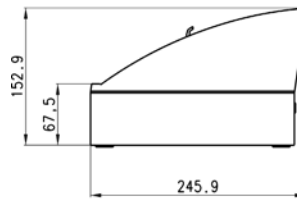
**Pneumatic - operated pedal Mod. 354N-925TF**



Mod.	Symbol
354N-925TF	VN18 - VN19

\* Selector function allows user to choose spring return or Detented operation

Actuating force at 6 bar: 17N (3.82 lbs)



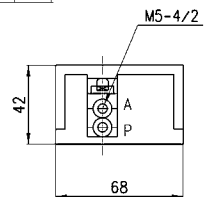
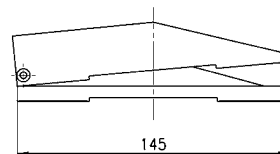
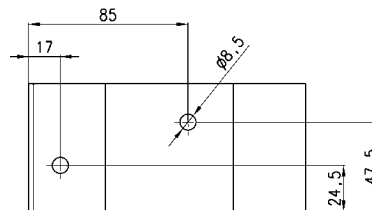
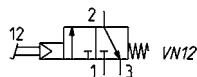
**Pneumatic foot operated pedal Series 2**

Cv = .06

Operating pressure = 2 - 8 bar  
 Flow rate = 60 NI/min.



Mod.
234-925
235-925



# Series VMS Slide Valve

Cv = .73 - 4.10

Series VMS, 3-way/2-position  
Ports M5, 1/8", 1/4", 3/8", 1/2", 3/4" NPTF

The VMS series slide valves are commonly used upstream of FRL units to ease repair and replacement. They can also be used in situations requiring the exhausting of all downstream air. This would assist in maintenance applications where ball valves may be too large and bulky to maneuver in tight assembly spaces. The exhausting of downstream air while simultaneously blocking inlet flow helps in building component groups to be tested in stages, and assembled later onto the main body of a machine.



## TECHNICAL SPECIFICATIONS

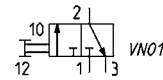
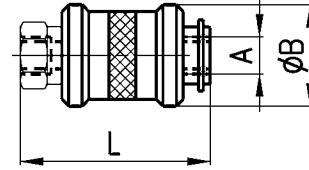
Valve group	3-way/2-position
Construction	Shuttle slide
Mounting	In/line thread ports
Materials	Nickel-Plated brass body, Buna-N seals
Threaded port sizes	M5, 1/8", 1/4", 3/8", 1/2" 3/4" NPTF
Installation	In-line
Operating temperature	32°F - 175°F, (dry air necessary down to 14° F)
Fluid	Filtered air
Lubricant	Not required; otherwise oil compatible with Buna-N, (3°- 10° E) (ISOVG32 grade: 32 centistokes)

## PNEUMATIC DATA

Operating pressure	0 - 10 bar (0 - 145 psi)		
Nominal pressure	6 bar (87 psi)		
Nominal flow	*Qn Series VMS: P→A M5	= 140 NL/min (4.9 SCFM)	1/8" = 600 NL/min (21.2 SCFM)
		1/4" = 1200 NL/min (42.4 SCFM)	3/8" = 2100 NL/min (74.1 SCFM)
		1/2" = 3350 NL/min (118.5 SCFM)	3/4" = 5350 NL/min (189 SCFM)
	A→R M5	= 145 NL/min (5.12 SCFM)	1/8" = 740 NL/min (26.2 SCFM)
		1/4" = 1780 NL/min (62.9 SCFM)	3/8" = 1830 NL/min (64.7 SCFM)
		1/2" = 4030 NL/min (142.5 SCFM)	3/4" = 5000 NL/min (176.8 SCFM)
Cv Rating (Inlet flow)	Series VMS:	M5 = 0.15	1/8" = 0.63
		1/4" = 1.26	3/8" = 2.21
		1/2" = 3.53	3/4" = 5.62

\*Qn flowrate (SCFM) determined with a supply pressure of 6 bar (87 psi), and with a pressure drop of 1 bar (14.5 psi).  
Exhausting flowrate (A→R), determined with an inlet pressure of 6 bar (87 psi), while exhausting to atmosphere.

## Valves Mod. VMS

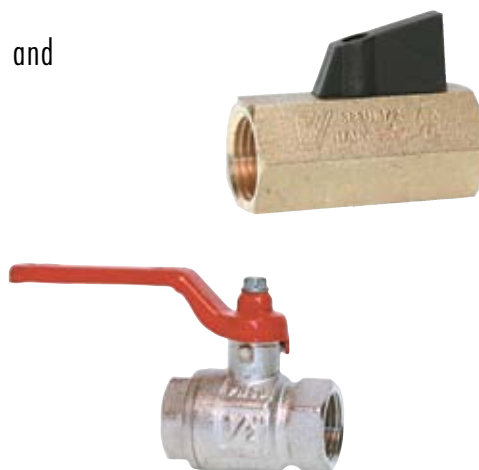


Mod.	NPTF A	ØB	L	Q* (NI/min) 1-2 (SCFM)	Q* (NI/min) 2-3 (SCFM)
<b>VMS-105-M5</b>	M5	15	33,5	140 (4.9)	145 (5.12)
<b>VMS-118-02PT</b>	1/8	25	48	600 (21.2)	740 (26.2)
<b>VMS-114-04PT</b>	1/4	30	58	1200 (42.4)	1780 (62.9)
<b>VMS-138-06PT</b>	3/8	35	70	2100 (74.1)	1830 (64.7)
<b>VMS-112-08PT</b>	1/2	40	80	3350 (118.5)	4030 (142.5)
<b>VMS-134-12PT</b>	3/4	49,5	83	5350 (189)	5000 (176.8)

# Series 2930, 2930N, 2940, 2960 Ball Valves - Full Flow Design - NPTF/INCH

Ports 1/4", 3/8", 1/2", 3/4", 1", 1 1/4",  
1 1/2", 2", 2 1/2", 3", 4", NPTF  
Nickel-Plated (2930 and 2940), Chrome-Plated (2930N) and  
Plain Brass (2960)

Electroless nickel-plated: this plating offers excellent corrosion resistance, and is an FDA-approved material, making the Camozzi ball valve suitable for food packaging, chemical processing, medical, dental, water treatment, and printing markets, in addition to standard application.



## TECHNICAL SPECIFICATIONS

Valve group	2/2, (way/positions)
Construction	Ball valve
Mounting	In-line
Materials	Brass body (2960), Nickel-Plated brass body (2930 and 2940), Chrome-Plated Brass Body (2930N) Zinc-plated steel handles (2940 and 2960), all others nylon Plastic handles (2930), Hardened chrome-plated brass ball Teflon seat (P.T.F.E.), O-rings in Viton
Threaded port sizes	1/8", 1/4", 3/8", 1/2" NPTF (2930) 1/4", 3/8", 1/2", 3/4", 1", 1-1/4", 1-1/2", 2" NPTF (2940)
Installation	In-line
Operating temperature	Series 2940 - 4°F to 300°F Series 2960 - 4°F to 340°F Series 2930 5° to 300°F
Fluid	Filtered air (for others, check with factory)

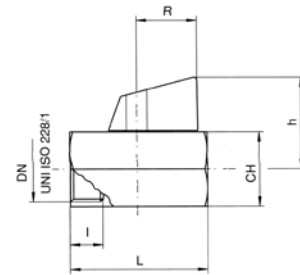
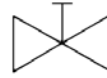
## PNEUMATIC DATA

Working pressure	Series 2940: 1/4", 3/8", 1/2"	710 psi	2-1/2"	-	260 psi
	3/4", 1"	570 psi	3"	-	230 psi
	1-1/4", 1-1/2"	430 psi	4"	-	200 psi
					2" - 360 psi
Nominal flow	Series 2930: 1/8", 1/4", 3/8", 1/2"	450 psi			
	Series 2960: All sizes	400 psi			
Nominal flow	Full flow design				

Mini Ball Valve, Series 2930

These valves are constructed of all brass nickel-plated body, hardened chrome-plated brass ball, teflon seat, and glass reinforced Nylon handle.

Kv - Flow coefficient in M<sup>3</sup>/h → 100kPa differential pressure (ΔP 14.5 psi)



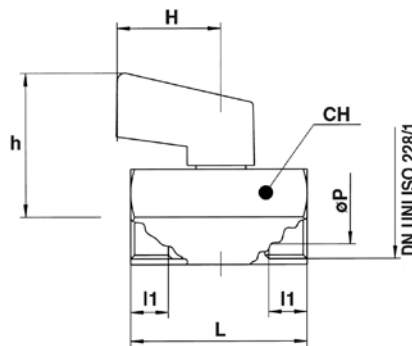
DIMENSIONS (in inches)

Economical Ball Valves		Ball Diam.										
Mod.	DN(NPTF)	σ P	CH	I	h	L	R	Cv	PSI	LBS	Kv(M <sup>3</sup> /h)	Kg
2930 1/8PT	1/8"	0.31	0.82	0.27	1.16	1.61	0.80	5.00	450	0.25	4.3	0.11
2930 1/4PT	1/4"	0.31	0.82	0.39	1.16	1.69	0.80	5.00	450	0.20	4.3	0.10
2930 3/8PT	3/8"	0.31	0.82	0.40	1.16	1.69	0.80	5.00	450	0.25	4.3	0.11
2930 1/2PT	1/2"	0.39	0.98	0.53	1.24	2.16	0.80	6.26	450	0.28	5.4	0.13

Mini Ball Valve, Series 2930 N

These valves are constructed of all chrome-plated, brass body, hardened chrome-plated brass ball, teflon seat, and light weight plastic handle.

Kv = Flow coefficient in M<sup>3</sup>/h → 100kPa differential pressure (ΔP 14.5 psi)



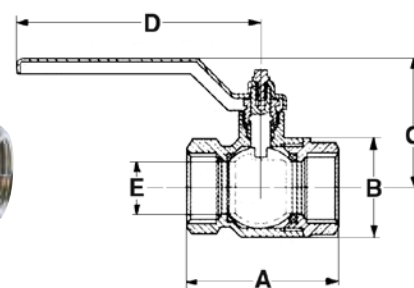
DIMENSIONS (in inches)

Economical Ball Valves (chrome-plated, brass body)

Mod.	DN(NPTF)	σ P	CH	I	h	L	R	Kv (M <sup>3</sup> /h)	Cv	Kg	PSI
2930 N-1/4PT	1/4"	0.31	.857	.384	1.437	1.614	1.063	4.3	5.00	0.11	450
2930 N-3/8PT	3/8"	0.31	.857	.394	1.437	1.614	1.063	4.3	5.00	0.11	450
2930 N-1/2PT	1/2"	0.39	.984	.433	1.484	1.811	1.063	5.4	6.26	0.14	450

Ball Valve, Series 2940

These valves are constructed of an electroless nickel-plated brass body, a steel handle, a hardened chrome-plated brass ball, and a teflon seat. These valves are suitable for industrial, pneumatic, hydraulic, and various domestic installations. Among the various types of compounds which can be transported through these valves are steam, gasoline, fuel, oils, kerosene, acids, and compressed air.



DIMENSIONS

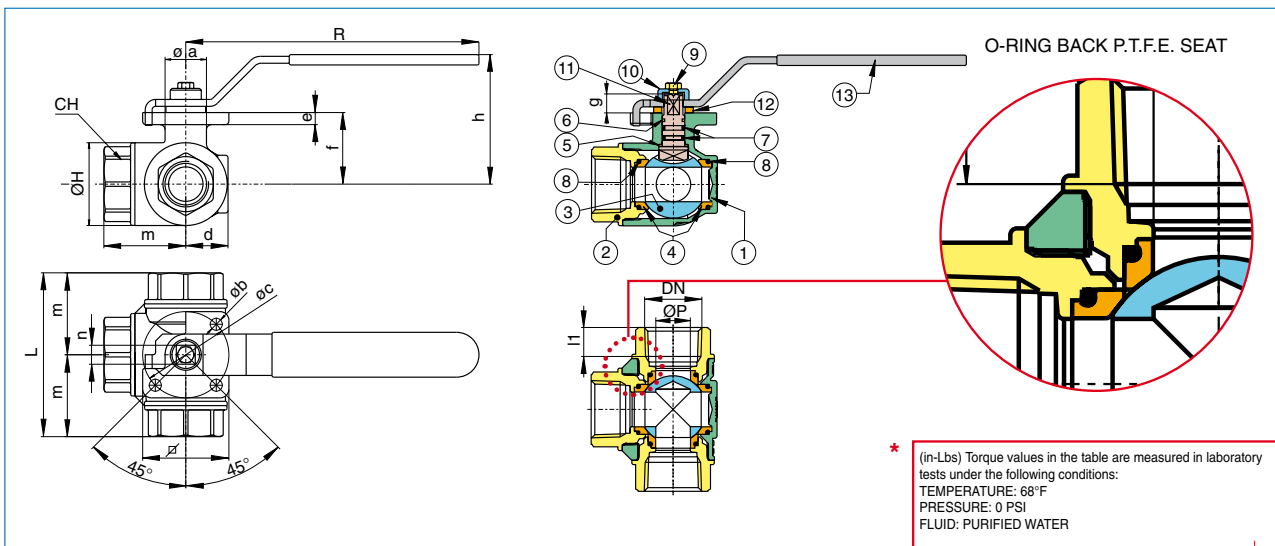
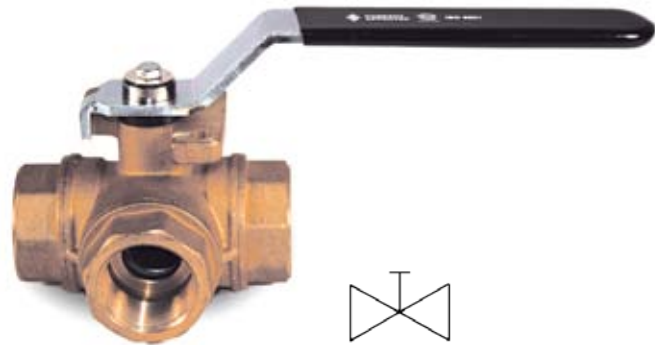
Electroless Nickel-Plated		A		B		C		D		E		Working
Mod.	NPTF Thread	mm	in	mm	in	mm	in	mm	in	mm	in	PSI
2940 1/4PT	1/4"	44.4	1.748	23.5	0.925	37.0	1.457	80.0	3.150	10.0	0.394	710
2940 3/8PT	3/8"	44.4	1.748	24.0	0.945	37.0	1.457	80.0	3.150	10.0	0.394	710
2940 1/2PT	1/2"	50.5	1.988	30.5	1.201	41.0	1.614	80.0	3.150	15.0	0.591	710
2940 3/4PT	3/4"	57.5	2.264	37.0	1.457	55.0	2.165	113.0	4.449	20.0	0.787	570
2940 1PT	1"	70.0	2.756	45.5	1.791	59.0	2.323	113.0	4.449	25.0	0.984	570
2940 1 1/4PT	1-1/4"	80.5	3.169	57.0	2.244	74.5	2.933	137.5	5.413	32.0	1.260	430
2940 1 1/2PT	1-1/2"	94.0	3.701	70.0	2.756	80.5	3.169	137.5	5.413	40.0	1.575	430
2940 2PT	2"	112.5	4.429	84.0	3.307	96.5	3.799	157.0	6.181	50.0	1.968	360
2940 2 1/2PT	2-1/2"	128.0	5.039	96.0	3.780	109.0	4.291	197.0	7.756	54.0	2.126	260
2940 3PT	3"	148.0	5.827	119.0	4.685	126.0	4.961	250.0	9.842	65.0	2.559	230
2940 4PT	4"	169.0	6.654	138.0	5.433	135.0	5.315	250.0	9.842	80.0	3.150	200



Min/Max working temperature: -20°C/+150°C (-4°F/+302°F)

Ball Valve, Series 2960 L-Passage, 3-way/2-position, Lockable

These valves are constructed of a brass body, a steel handle, a hardened chrome-plated brass ball, and a teflon seat. These valves are suitable for industrial, pneumatic, hydraulic, and various domestic installations. Among the various types of compounds which can be transported through these valves are steam, gasoline, fuel, oils, kerosene, acids, and compressed air.



N POS	PART NAME	MATERIAL	N PCS	SIZE	ØP	ØH	l1	L	m	CH	R	h	Øa	Øb	Øc	d	e	f	g	∠	n	CV	psi	Lbs	* in-Lbs
1	BODY	BRASS CW 617 NUNI EN 12165	1	1/4"	0.39	1.34	0.39	2.64	1.32	0.86	4.72	2.44	0.87	0.23	1.42 (ISO F03)	0.77	0.20	1.20	0.35	1.49	0.35	3.26	400	1.22	53.10
2	END CONNECTION	BRASS CW 617 NUNI EN 12165	3	3/8"	0.43	1.34	0.40	2.64	1.32	0.86	4.72	2.44	0.87	0.23	1.42 (ISO F03)	0.77	0.20	1.20	0.35	1.49	0.35	3.50	400	1.16	53.10
3	BALL	BRASS CW 617 NUNI EN 12165	1	1/2"	0.43	1.34	0.53	2.87	1.44	1.06	4.72	2.44	0.87	0.23	1.42 (ISO F03)	0.77	0.20	1.20	0.35	1.49	0.35	4.20	400	1.21	53.10
4	BALL SEAT	P.T.F.E	4	3/4"	0.59	1.53	0.55	3.19	1.60	1.25	4.72	2.52	0.87	0.23	1.42 (ISO F03)	0.87	0.20	1.29	0.35	1.49	0.35	7.00	400	1.44	53.10
5	THRUST WASHER	P.T.F.E	1	1"	0.79	1.89	0.66	3.74	1.87	1.61	6.69	2.95	0.94	0.27	1.97 (ISO F05)	1.00	0.28	1.63	0.43	1.97	0.43	12.83	400	2.64	150.46
6	STEM SEAL	P.T.F.E	1	1 1/4"	0.98	2.36	0.68	4.39	2.20	1.96	6.69	3.17	0.94	0.27	1.97 (ISO F05)	1.22	0.28	1.85	0.43	1.97	0.43	18.67	400	4.15	150.46
7	O-RING STEM	FKM (Viton®)	1	1 1/2"	1.26	2.83	0.68	4.86	2.43	2.16	6.69	3.66	1.26	0.27	1.97 (ISO F05)	1.79	0.28	2.34	0.43	1.97	0.43	29.75	400	6.02	150.46
8	O-RINGS BODY	FKM (Viton®)	4	2"	1.57	3.38	0.70	5.73	2.87	2.75	9.05	4.43	1.46	0.35	2.76 (ISO F07)	1.75	0.32	2.90	0.59	2.75	0.55	43.76	400	9.08	274.37
9	SCREW	Steel 6/S	1	2 1/2"	1.95	4.37	0.93	6.93	3.47	3.34	9.05	4.86	1.46	0.35	2.76 (ISO F07)	2.20	0.32	3.35	0.59	2.75	0.55	70.00	400	16.33	380.58
10	BUSH	BRASS CW 614 NUNI EN 12164	1	3"	1.95	4.45	1.01	7.08	3.54	4.13	9.05	4.86	1.46	0.35	2.76 (ISO F07)	2.20	0.32	3.35	0.59	2.75	0.55	70.00	400	19.55	380.58
11	STEM	BRASS CW 614 NUNI EN 12164	1																						
12	WASHER	NYLON	1																						
13	HANDLE	Fe DD 11 UNI EN 10111	1																						

# Chapter 2

## Mechanical Valves

### MECHANICAL VALVES

	<b>Series</b>	<b>Cv</b>	<b>Page</b>
Mechanically Operated Minivalves	2	.06	32
1/8" & 1/4" Mechanically Operated Valves	1 and 3	.52 - 1.31	36
1/8" Mechanically Operated Sensor Valves	3	.73	40
1/8" & 1/4" Mechanically Operated Sensor Valves	4	0.68 - 1.31	42



# Mechanical Valves Product Guide

$C_v = .06 - 1.32$

This type of valve is offered with ports from M5 to 1/4" in different versions including 3-way/2-position normally closed, 3-way/2-position normally open, and 5-way/2-position with a variety of operators to meet a wide range of uses. The valves are available in brass poppet style (Series 1 and 2), and spool style (Series 3 and 4).

Page 32

$C_v = 0.6$

Mechanically Operated Minivalves Series 2



3-way/2-position  
Ports M5, cartridge  $\varnothing 4$  mm (5/32" O.D.)

Page 36

$C_v = .52 - .73$

1/8" & 1/4" Mechanically Operated Valves Series 1 and 3



3-way/2-position and 5-way/2-position Ports 1/8", 1/4" NPTF

Page 40

$C_v = .73$

1/8" Ported Mechanically Operated Sensor Valves Series 3 Whisker Valve



3-way/2-position and 5-way/2-position Ports 1/8" NPTF

Page 42

$C_v = .68 - 1.32$

1/8" & 1/4" Ported Mechanically Operated Sensor Valves Series 4



3-way/2-position and 5-way/2-position Ports 1/8", 1/4" NPTF

## Series 2 Mechanically Operated Minivalves

Cv = .06

3-way/2-position  
Ports M5, cartridge  $\varnothing$  4 mm  
(10-32 UNF, 5/32" O.D.)

The mechanically operated Series 2 miniature valves with 3-way/2-position normally closed function are available with M5 threaded ports or with an integrated super-rapid fitting for diameter 4 mm tubes (5/32" OD). The devices are actuated by a plunger, roller/lever or a unidirectional lever.

These miniature valves have been designed to satisfy the application requirements of the controls industry, paying particular attention to the features which these components must have, i.e.:

- short operational stroke
- small dimensions
- fast and accurate signal

Operating phases (see individual dimension drawings):

A = total stroke

B = pre-stroke (closes exhaust)

C = effective stroke (opens outlet)



### TECHNICAL SPECIFICATIONS

Valve group	3-way/2-position
Construction	Poppet type
Mounting	On consoles
Material	Anodized body, Brass poppet gate, Buna-N seals, nickel-plated brass plungers
Threaded port sizes	M5 (10-32 UNF) thread, or 4 mm O.D. cartridge (5/32" O.D. tube connect)
Installation	Bulkhead, or single panel mount
Operating temperature	32° F - 175° F, (dry air necessary down to -4° F)
Fluid	Filtered air (25 micron or less recommended)
Lubricant	Not required; otherwise, only oil compatible with Buna-N, (3° - 10° E), (ISOVG 32 grade; 32 centistokes)

### PNEUMATIC DATA

Operating pressure	2 - 10 bar, (30 - 145 psi)
Nominal pressure	6 bar, (87 psi)
Nominal flow	*Qn = 60 NL/min. (2.12 SCFM)
Nominal diameter	2.5 mm
Cv Rating	0.06

\*Qn flowrate (SCFM) determined with a supply pressure of 6 bar, (87 psi), and with a pressure drop of 1 bar, (14.5 psi).

\*\*Dimensions are in millimeters

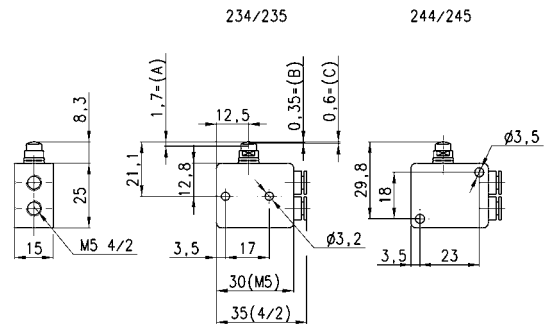
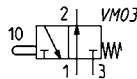
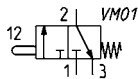
## CODING OF MINIVALVES

2	3	4	-	94	5
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<b>2</b>	SERIES
<b>3</b>	FUNCTION 3 = 3/2-way NC 4 = 3/2-way NO
<b>4</b>	PORTS 4 = cartridge $\varnothing$ 4 (5/32" OD) 5 = M5 (10-32 UNF)
<b>94</b>	ACTUATION 94 = plunger 95 = lever/roller 96 = unidirectional lever 98 = plunger, panel mounting
<b>5</b>	RESETTING 5 = spring return

## Minivalves

Operating pressure = 2 - 8 bar  
Flow rate = 60 NI/min.  
Actuating force at 6 bar = 6 N  
A = Complete stroke  
B = Centres closed position  
C = Effective stroke



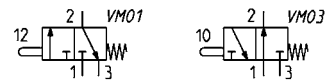
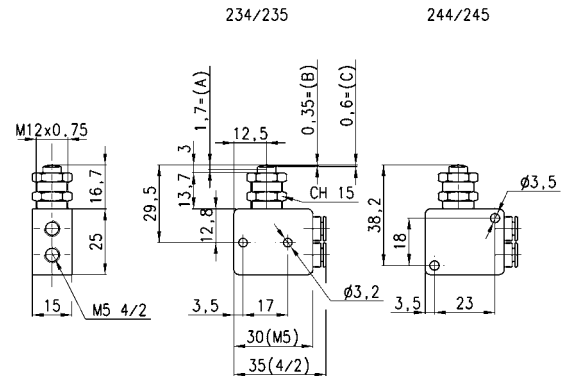
Mod.	SYMBOL
234-945	VM01
235-945	VM01
244-945	VM03
245-945	VM03

The company reserves the right to vary models and dimensions without notice.  
These products are designed for industrial applications and are not suitable for sale to the general public.



### Minivalves

Operating pressure = 2 - 8 bar  
 Flow rate = 60 NI/min.  
 Actuating force at 6 bar = 6 N  
 A = Complete stroke  
 B = Centres closed position  
 C = Effective stroke

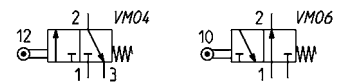
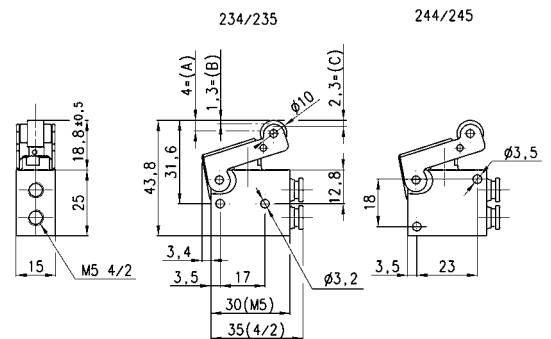


Mod.	SYMBOL
234-985	VM01
235-985	VM01
244-985	VM03
245-985	VM03



### Minivalves

Operating pressure = 2 - 8 bar  
 Flow rate = 60 NI/min.  
 Actuating force at 6 bar = 4 N  
 A = Complete stroke  
 B = Centres closed position  
 C = Effective stroke

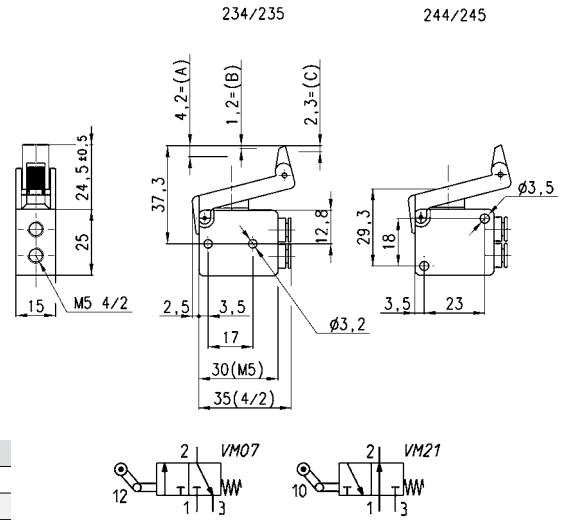


Mod.	SYMBOL
234-955	VM04
235-955	VM04
244-955	VM06
245-955	VM06



### Minivalves

Operating pressure = 2 - 8 bar  
 Flow rate = 60 NI/min.  
 Actuating force at 6 bar = 6 N  
 A = Complete stroke  
 B = Centres closed position  
 C = Effective stroke



Mod.	SYMBOL
234-965	VM07
235-965	VM07
244-965	VM21
245-965	VM21

## Series 1 and 3 Mechanically Operated Valves

Cv = .52 - 1.31

3-way/2-position and 5-way/2-position  
Ports 1/8" and 1/4" NPTF  
Series 1: 1/8" and 1/4" NPTF  
Series 3: 1/8" NPTF

The mechanically operated valves in the Series 3 (1/8") have been designed with three different types of actuation:

- plunger
- lever/roller
- unidirectional lever/roller

In each case, return is effected by a mechanical spring.

The Series 3, 3-way/2-position valves are normally closed in the rest position when the pressure is supplied at P and are normally open when the pressure is supplied at the connection R, the user port A remaining unchanged.

Moreover, the 5-way/2-position valves may be supplied via the ports R and S with two different pressures if a cylinder has to be operated using a delivery pressure which is different from the return pressure. They can be operated with vacuum down to -.9 bar (28" Hg). Additionally, the series 3 valves can be supplied with 2 different pressures into ports 3 and 5 if a cylinder requires different extend and retract forces. The series 1 valves offer a more rugged, compact design with steel operator interfaces.



### TECHNICAL SPECIFICATIONS

Valve group	3/2, 5/2, (way/positions)
Construction	Spool type Series 3; Poppet type series 1
Mounting	Mounting holes in valve body
Materials	Anodized body, Stainless steel spool, Buna-N seals
Threaded port size	1/8" and 1/4" NPTF
Installation	Single panel mount
Operating temperature	32° F - 175° F, (dry air necessary down to -4° F)
Fluid	Filtered air (25 micron or less recommended)
Lubricant	Not required; otherwise, oil compatible with Buna-N, (3° - 10° E) (ISOVG32 grade; 32 centistokes)

### PNEUMATIC DATA

Operating pressure	0 - 10 bar, (0 - 145 psi) (down to -.9 bar vacuum; 28" Hg with Series 3)
Nominal pressure	6 bar (87 psi)
Nominal flow	*Qn Series 1: 1/8" = 500 NL/min. (17.65 SCFM); 1/4" = 1250 NL/min. (44.14 SCFM) Series 3: 1/8" = 700 NL/min. (24.7 SCFM)
Nominal Diameter	1/8" = 5 mm
Cv Rating	Series 1: 1/8" = 0.52; 1/4" = 1.31 Series 3: 1/8" = 0.73

\*Qn flowrate (SCFM) determined with a supply pressure of 6 bar, (87 psi), and with a pressure drop of 1 bar, (14.5 psi)

\*\*Dimensions are in millimeters

**CODING OF MINIVALVES**

<b>3</b>	<b>3</b>	<b>8</b>	<b>-</b>	<b>94</b>	<b>5</b>	<b>TF</b>
----------	----------	----------	----------	-----------	----------	-----------

<b>3</b>	SERIES: 1 3
<b>3</b>	FUNCTION: 3 = 3/2 ways NC 4 = 3/2 ways NO (only Series 1) 5 = 5/2 ways
<b>8</b>	PORTS: 8 = 1/8 NPTF 4 = 1/4 NPTF (only Series 1)
<b>94</b>	ACTUATION: 94 = plunger 95 = lever/roller 96 = unidirectional roller
<b>5</b>	RESETTING: 5 = spring return
<b>TF</b>	TF = NPTF ports blank = BSP ports

**Valves Mod. 338-945TF** Cv = .73

Actuating force at 6 bar (87 psi) = 32N (7.19 lbs.)

**Valves Mod. 358-945TF** Cv = .73

Actuating force at 6 bar (87 psi) = 35N (7.87 lbs.)

**Valves Mod. 338-955TF** Cv = .73

Actuating force at 6 bar (87 psi) = 15N (3.37 lbs.)  
Note: roller and plunger are made of stainless steel. (AISI 303)

**Valves Mod. 358-955TF** Cv = .73

Actuating force at 6 bar (87 psi) = 17N (3.82 lbs.)  
Note: roller and plunger are made of stainless steel. (AISI 303)

The company reserves the right to vary models and dimensions without notice. These products are designed for industrial applications and are not suitable for sale to the general public.

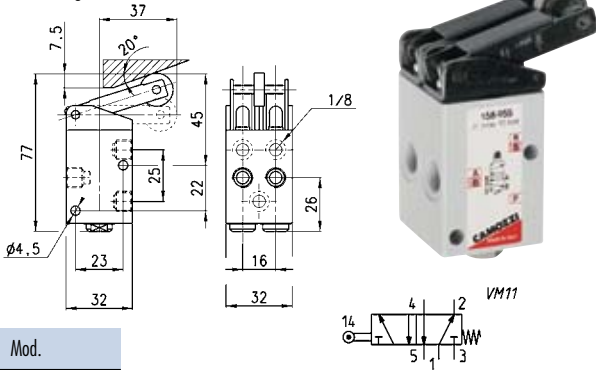




Valves Mod 158-955 TF

Cv = .52

Operating pressure = 0 - 10 bar (0 - 145 psi)  
 Flow rate = 500 NI/min. (17.65 SCFM)  
 Actuating force at 6 bar = 92N (20.65 lbs) total combined



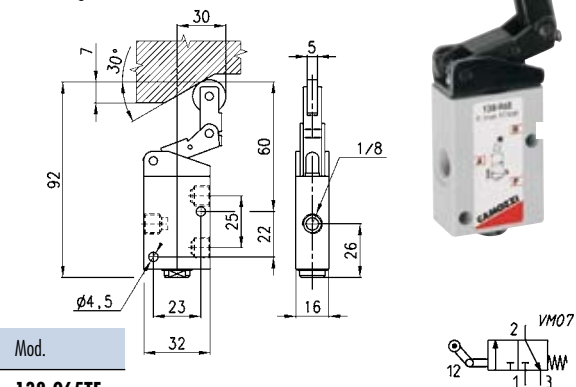
Mod.

158-955TF

Valves Mod 138-965 TF

Cv = .52

Operating pressure = 0 - 10 bar (0 - 145 psi)  
 Flow rate = 500 NI/min. (17.65 SCFM)  
 Actuating force at 6 bar = 41N (9.2 lbs)



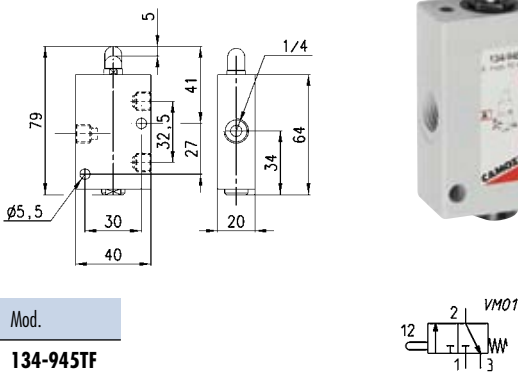
Mod.

138-965TF

Valves Mod 134-945 TF

Cv = 1.31

Operating pressure = 0 - 10 bar (0 - 145 psi)  
 Flow rate = 1250 NI/min. (44.14 SCFM)  
 Actuating force at 6 bar = 64N (14.37 lbs)



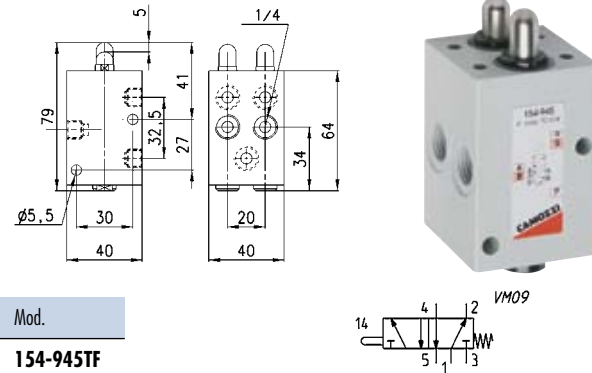
Mod.

134-945TF

Valves Mod 154-945 TF

Cv = 1.31

Operating pressure = 0 - 10 bar (0 - 145 psi)  
 Flow rate = 1250 NI/min. (44.14 SCFM)  
 Actuating force at 6 bar = 147N (33.0 lbs) total combined



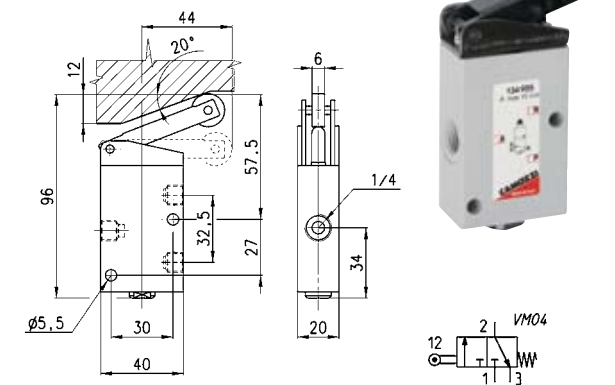
Mod.

154-945TF

Valves Mod 134-955 TF

Cv = 1.31

Operating pressure = 0 - 10 bar (0 - 145 psi)  
 Flow rate = 1250 NI/min. (44.14 SCFM)  
 Actuating force at 6 bar = 41N (9.2 lbs)



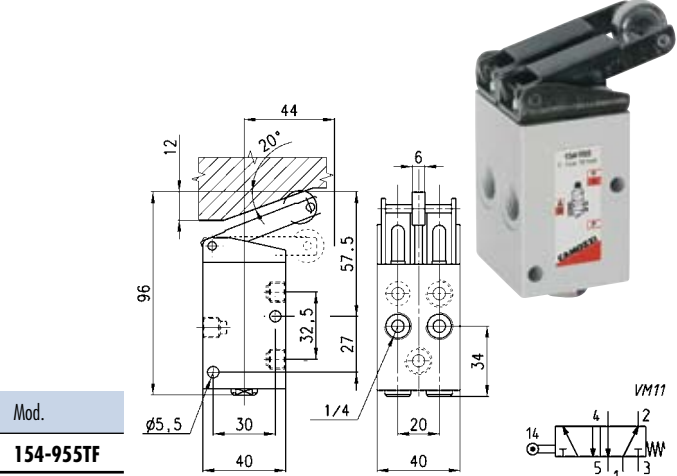
Mod.

134-955TF

Valves Mod 154-955 TF

Cv = 1.31

Operating pressure = 0 - 10 bar (0 - 145 psi)  
 Flow rate = 1250 NI/min. (44.14 SCFM)  
 Actuating force at 6 bar = 110N (24.7 lbs) total combined



Mod.

154-955TF

# Series 3 1/8" Ported Mechanically Operated Sensor Valves (Whisker Valve)

Cv = .73

## 3-way/2-position and 5-way/2-position Ports 1/8" NPTF

In order to facilitate the use of limit switch valves in applications where very low actuating forces and high flow rates are required, the Series 3 valves are equipped with new mechanical devices designed for this purpose. The Series 3 valve is designed with a mechanical lever which when operated releases an internal pilot signal to atmosphere. Actuation forces are less than 50g (2N); (.5 lbf) and the sensitivity can be increased by adding a "whisker" or rod of dia. 3mm to the lever (cross-thread of M5 x .8 can be used to hold "whisker-rod" in place)

The functions available are as follows:

for the 3 Series:

- 3-way/2-position normally closed or normally open (spring return)
- 5-way/2-position (spring return)

\* These valves have an internal mechanical spring return and a pilot-pressure spool plunger that shifts upon actuation of the lever by depressurizing the spool plunger. Valve symbols shown are "at rest" next to the actuator symbol.



### TECHNICAL SPECIFICATIONS

Valve group	3-way/2-position, 5-way/2-position
Construction	Spool-type (servocontrolled)
Mounting	Mounting holes in valve body
Materials	Anodized body, stainless steel spool, Buna-N seals
Threaded port sizes	1/8" NPTF
Installation	In any position
Operating temperature	32° F - 175° F, (dry air necessary down to -4° F)
Fluid	Filtered air (25 micron or less recommended)
Lubricant	Not required; otherwise, oil compatible with Buna-N, (3° - 10° E) (ISOVG 32 grade; 32 centistrokes)

### PNEUMATIC DATA

Operating pressure	4-10 bar (58-145 psi)
Nominal pressure	6 bar, (87 psi)
Nominal flow	*Qn Series 3: 1/8" = 700 NI/min. (24.7 SCFM) Cv ratin 1/8 NPTF" = .73
Nominal diameter	1/8" = 5 mm
Fluid	Filtered air

\* Qn = determined with supply pressure of 6 bar and with Dp = 1 bar  
Dimensions are in millimeters

## CODING OF MINIVALVES

<b>3</b>	<b>3</b>	<b>8</b>	<b>-</b>	<b>D15</b>	<b>-</b>	<b>9A5</b>	<b>TF</b>
<b>3</b>	SERIES: 3 4						
<b>3</b>	FUNCTION: 3 = 3/2-way NC 4 = 3/2-way NO 5 = 5/2-way						
<b>8</b>	PORTS: 8 = 1/8 NPTF 4 = 1/4 NPTF						
<b>D15</b>	D15 = pressure drop/spring 015 = pressure/spring 011 = pressure/pressure						
<b>9A5</b>	ACTUATION 9A5 = lever sensor, spring return 194 = plunger sensor, spring return 294 = plunger sensor, bistable 195 = lever/roller, spring return 295 = lever/roller, bistable		* These valves have an internal mechanical spring return and a pilot-pressure spool plunger that shifts upon actuation of the lever by depressurizing the spool plunger. Valve symbols shown are "at rest" next to the actuator symbol.				
<b>TF</b>	TF = NPTF ports blank = BSP ports						

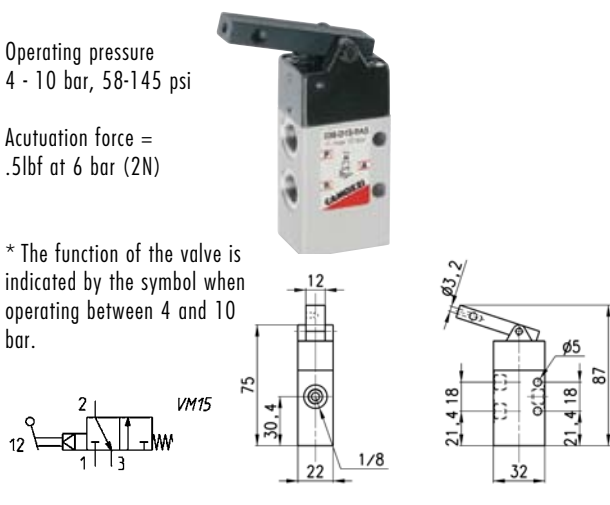
Valves Mod. **338-D15-9A5TF**

Cv = .73

Operating pressure  
4 - 10 bar, 58-145 psi

Actuation force =  
.5lbf at 6 bar (2N)

\* The function of the valve is indicated by the symbol when operating between 4 and 10 bar.

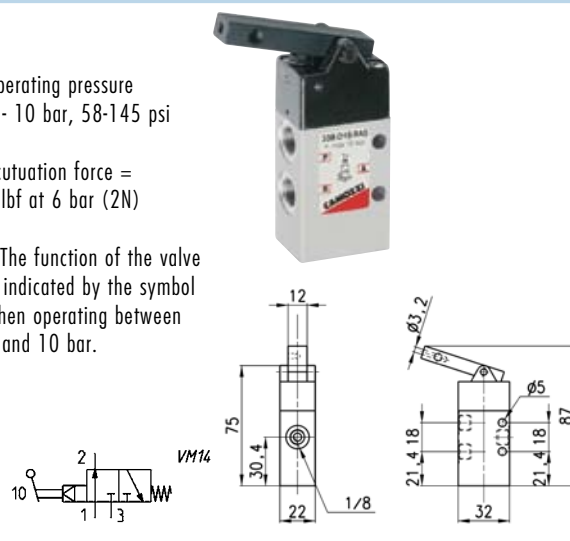
Valves Mod. **348-D15-9A5TF**

Cv = .73

Operating pressure  
4 - 10 bar, 58-145 psi

Actuation force =  
.5lbf at 6 bar (2N)

\* The function of the valve is indicated by the symbol when operating between 4 and 10 bar.

Valves Mod. **358-D15-9A5TF**

Cv = .73

Operating pressure  
4 - 10 bar, 58-145 psi

Actuation force =  
.5lbf at 6 bar (2N)

\* The function of the valve is indicated by the symbol when operating between 4 and 10 bar.



\* All "whisker-rod" holes in lever have M5 x 0.8 cross-drilled tap hole for securing rod.

## Series 4 1/8" & 1/4" Mechanically Operated Sensor Valves

Cv = 0.68 - 1.31

3-way/2-position and 5-way/2-position  
Ports 1/8", 1/4" NPTF

In order to facilitate the use of limit switch valves in applications where very low actuating forces and high flowrates are required, Series 4 valves are equipped with new mechanical devices designed for this purpose. The 4 Series includes one or two minivalves depending on the function which the valve must perform.\*

The mini valves reduce the actuation force required to operate the main valve.

The functions available are as follows:

- 5-way/2-position (monostable) - spring-return
- 5-way/2-position (bistable) - double-pilot detented

\*The mini-valves utilize a poppet valve to pilot-pressure the main spool plunger.



### GENERAL DATA

Construction	spool-type (servocontrolled); internal pilot-pressure spool plunger
Valve Function	3-way/2-position, 5-way/2-position
Materials	Anodized body, stainless steel spool, NBR seals
Ports	1/8", 1/4" NPTF
Operating Temperature	32° - 175°F (dry air necessary down to -4°F)

### PNEUMATIC DATA

Operating pressure	2.5 - 8 bar (36 - 116 psi) for single-pilot models
	2 - 8 bar (29 - 116 psi) for double-pilot models
Nominal Flow	Qn: 1/4" = 1250 NL/min. (44.1 SCFM) Cv = 1.31
	1/8" = 650 NL/min. (22.95 SCFM) Cv = 0.68

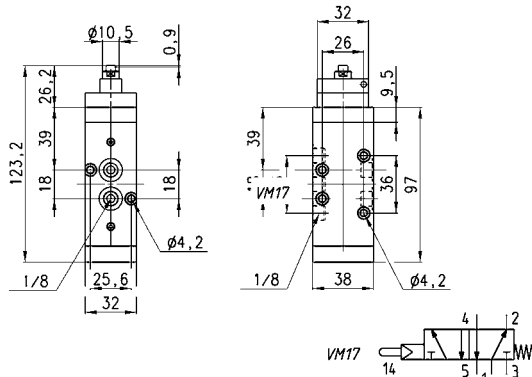
CODING							
3	3	8	-	D15	-	9A5	TF
3	SERIES: 3 4						
3	FUNCTION: 3 = 3/2-way NC 4 = 3/2-way NO 5 = 5/2-way						
8	PORTS: 8 = 1/8 NPTF 4 = 1/4 NPTF						
D15	D15 = pressure drop/spring 015 = pressure/spring 011 = pressure/pressure						
9A5	ACTUATION 9A5 = lever sensor, spring return 194 = plunger sensor, spring return 294 = plunger sensor, bistable 195 = lever/roller, spring return 295 = lever/roller, bistable						
TF	TF = NPTF ports blank = BSP ports						

\* Valves operate by internal pilot pressure against plunger when manual/mechanical poppet valves are actuated.

## Valves Mod. 458-015-194TF

Cv = 0.68

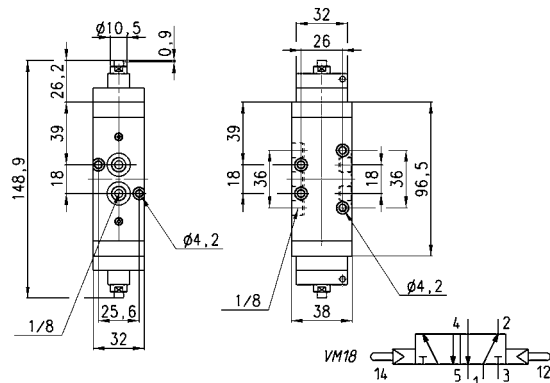
Operating pressure = 2.5 - 8 bar (36 - 116 psi)  
Flow rate = 650 Nl/min. (22.95 SCFM)  
Actuating force at 6 bar = 6 N (1.35 lbf)



## Valves Mod. 458-011-294TF

Cv = 0.68

Operating pressure = 2 - 8 bar (29 - 116 psi)  
Flow rate = 650 Nl/min. (22.95 SCFM)  
Actuating force at 6 bar = 6 N (1.35 lbf)

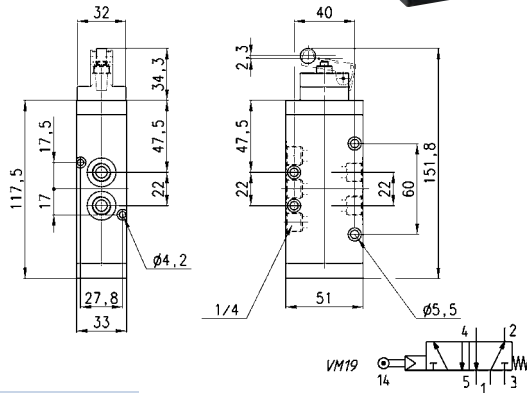




## Valves Mod. 454-015-195TF

Cv = 1.31

Operating pressure = 2.5 - 8 bar (36 - 116 psi)  
 Flow rate = 1250 NI/min. (44.1 SCFM)  
 Actuating force at 6 bar = 4 N (.9 lbf)



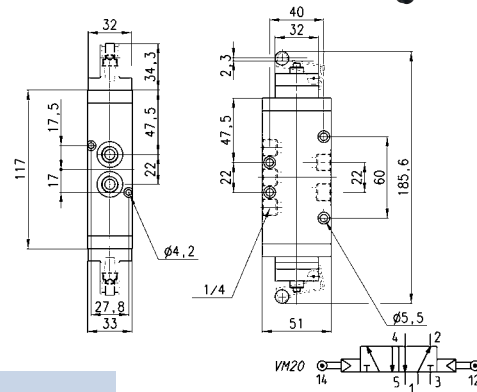
Mod.

454-015-195TF

## Valves Mod. 454-011-295TF

Cv = 1.31

Operating pressure = 2 - 8 bar (29 - 116 psi)  
 Flow rate = 1250 NI/min. (44.1 SCFM)  
 Actuating force at 6 bar = 4 N (.9 lbf)



Mod.

454-011-295TF

# Chapter 3

## Air-Pilot Valves

### AIR-PILOT VALVES

	<b>Series</b>	<b>Cv</b>	<b>Page</b>
Basic Logic Valves	2L	.07	50
Sender & Receiver Element	2L		52
Pneumatically Operated Amplifier Valve	2L	.13	54
Air-Pilot Operated Valves	3	.73 – 1.37	56
Air-Pilot Operated Valves	4	.73 – 2.00	64
Air-Pilot Operated Valves	7	.47 – .95	72
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Air-Pilot Operated Valves	9	.95 – 4.57	84
Regulator Plate ISO Size 1 (P-Regulation)	9		92
Regulator Plate ISO Size 1 (AB-Regulation)	9		94
Regulator Plate ISO Size 2 (P-Regulation)	9		96
Regulator Plate ISO Size 2 (AB-Regulation)	9		98
Regulator Plate ISO Size 3 (P-Regulation)	9		100
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NAMUR Interface	NA	1.05	104
Check Valves	VNR	.16 – 1.47	108
Pilot-Operated Check Valves	VBO-VBU		110
Quick Exhaust Valves	VSC and VSO	.05 – 4.73	114



## Air-Pilot Valves Product Guide

Cv = .07

Page 50

Cv = .07

Basic Logic Valves  
Series 2LCartridge Ø 4 mm  
(5/32" O.D. tube connection)

Page 52

Sender and receiver element  
Series 2L

Page 54

Cv = .13

Pneumatically Operated Amplifier Valve  
Series 2LMod. 2LA-AM (Amplifier Valve)  
3-way/2-position  
Ports 1/8" BSPP  
\*(Will accept Pro-Fit® fittings)

Page 56

Cv .73-1.37

Air-Pilot Valves & Remote Air-Pilot  
Series 31/8" NPTF, 3-way/2-position and 5-way/2-position  
1/4" NPTF, 3-way/2-position, 5-way/2-position, 5-way/3-position  
and dual 3-way/2-position valves

Page 64

Cv = .73 - 2.00

Air-Pilot Operated Valves  
Series 41/8", 1/4" NPTF, 3-way/2-position;  
5-way/2-position; 5-way/3-position  
1/2" NPTF 5-way/2-position

Page 72

Cv = .47 - .95

Air-Pilot Operated Valves  
Series 7 ISO 15407-1(VDMA 24563 )  
ISO 15407-1, Size 26mm (size 01) and 18mm (size 02)  
Side outlet manifold, Manifold assembly (non-plugin)  
5-way/2-position and 5-way/3-position

Page 80

Pressure Regulator Plates  
Series 7 VDMA 24563 ISO 15407-1



For 26mm-ISO 01 size valves only.  
Regulator Plate ISO Size 01 (P-regulation) 26mm



For 26mm-ISO 01 size valves only.  
Regulator Plate ISO Size 01 (AB-regulation) 26mm

Page 84

Cv = .95 - 4.57

Air-Pilot Operated Valves  
Series 9 ISO 5599/1 Standard

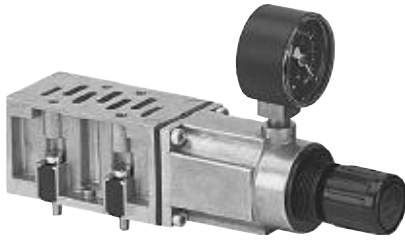


Assembly with sub-base (ISO 5599/1 Standards) non-plug-in  
Sizes 1, 2 and 3: 5-way/2-position; 5-way/3-position; single & double Air-Pilot valves.



Page 92

Regulator Plates ISO Sizes 1, 2 and 3  
Series 9 ISO 5999/1



For ISO Size 1, 2 and 3 valves only  
(P-regulation, AB-regulation)

Page 104

Cv = 1.05

Air-Pilot Operated  
Series NA Valves - Namur interface



Air-Pilot operated 1/4" NPTF  
3-way, 2-position; 5-way/2-position; and 5-way/3-position valves  
with Interface according NAMUR Standard

Page 108

Cv = 1.05

Check Valves  
Series VNR



Check valves VNR  
Ports M5 (10-32 UNF), 1/8", 1/4",

## Page 110

Pilot-Operated Check/Blocking Valves  
Series VBO - VBU (Nickel Plated)

Unidirectional (Pilot-Operated Check Valve)  
and Bidirectional (Blocking Valve)  
1/8", 1/4", 3/8", 1/2" NPTF  
Nominal diameters 5.5 - 8 - 11 mm

## Page 114

Quick Exhaust Valves  
Series VSC and VSO

Quick exhaust valves VSC, VSO  
Ports M5 (10-32 UNF), 1/8", 1/4",  
3/8", 1/2", NPTF  
cartridge ø4 mm (5/32" O.D.) (VSO only)

## Basic Logic Valves Series 2L

Cv = .07

Cartridge Ø 4 mm  
(5/32" O.D. tube connection)

These basic pneumatic logic valves provide a range of functions including "AND", "NOT", "OR", "YES" and "Memory".

Materials:

- Anodized Body
- Buna-N Seals (NBR)
- Nickel-Plated Brass Collet and Cartridge Assembly

Basic logic functions Series 2L are available in 5 different models and can be mounted separately by means of 2 passing holes in the body. Bracket Mod. 2LQ-8A allows to have the inlets and outlets on the front side, facilitating the mounting of the connection tubes.

All models are constructed with the pressure window incorporated, which allows an easy detection of any problems. Moreover the fittings are incorporated into the valve body and are super-rapid Ø4. The "NOT" element has an actuating pressure of 0.3 bar.



### TECHNICAL SPECIFICATIONS

Construction	Poppet Design (spool for Memory)
Valve group	Automatic valves (logic units)
Ports	Cartridge Ø4 mm (5/32" O.D. tube connection)
Operating pressure	32° - 175° F, (dry air necessary down to -4° F)
Lubricant	Not required; otherwise, oil compatible with Buna-N seals (3 - 10° F): ISOVG32 grade (32 centistokes)
Fluid	Air, with or without lubrication

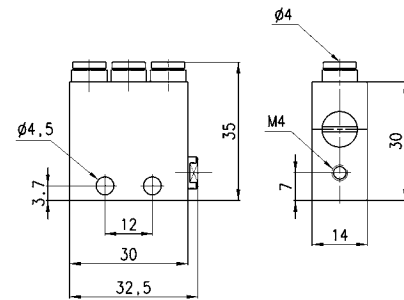
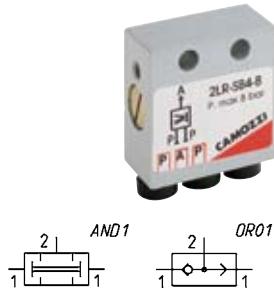
### PNEUMATIC DATA

Operating pressure	29 - 116 psi
Nominal flowrate	70 NL/min. (2.47 SCFM), Cv = .007
Dimensions in millimeters	

"Or", "And" Valve Mod. 2LR.../2LD... (5/32" O.D. Cartridges)

Cv = .07

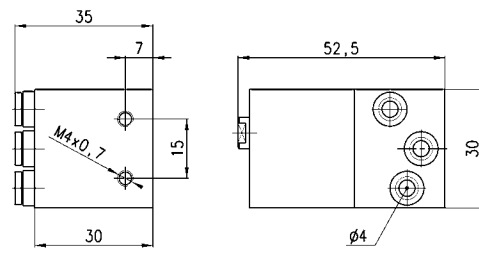
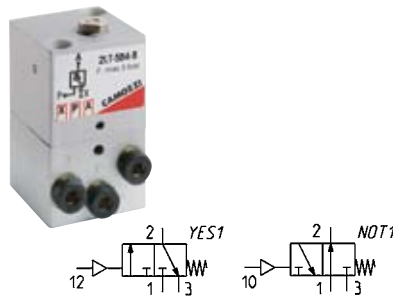
Mod.	
<b>2LR-SB4-B</b>	(OR)
Mod.	
<b>2LD-SB4-B</b>	(AND)



"Yes", "Not" Valve Mod. 2LS.../2LT... (5/32" O.D. Cartridges)

Cv = .07

Mod.	
<b>2LS-SB4-B</b>	(YES)
Mod.	
<b>2LT-SB4-B</b>	(NOT)

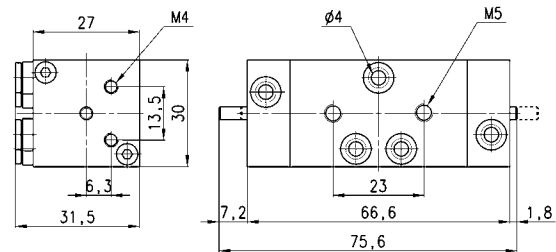
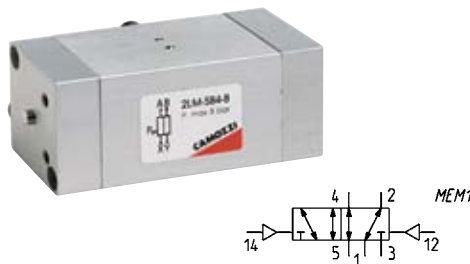


\* Minimum actuating pilot pressure is 0.3 bar (4.3 psi), at point "X" (10 or 12)

"Memory" Valve Mod. 2LM... (5/32" O.D. Cartridges)

Cv = .07

Mod.	
<b>2LM-SB4-B</b>	

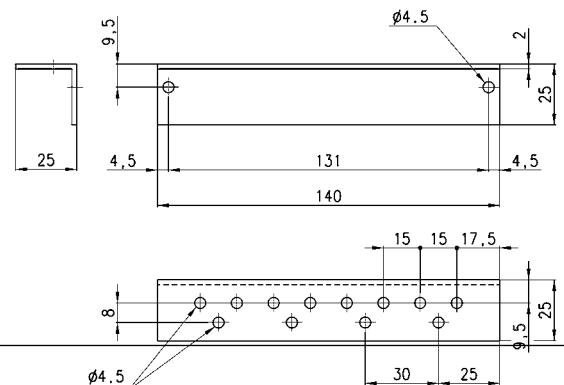


\* Operation: Pilot air signals at points 12 or 14 shift spool to direct main air from 1 to 2 or 1 to 4 respectively. "Memory" valve will continue to direct air to same outlet as last signal with or without pilot signal or until manual override stem on side of pilot is depressed.

Right-angle bracket Mod. 2LQ...

Cv = .07

Mod.	
<b>2LQ-BA</b>	



# Sender and Receiver Element Series 2L

## Mod. 2LB-SE (Sender)

## Mod. 2LB-SR (Receiver)

Both the sender and receiver should be supplied with filtered, non-lubricated compressed air. The sender requires a supply pressure of 0.3 - 2 bar. In the case of the receiver (max 8.7 psi), this is done in order to prevent the danger of contamination. The air jet from the sender interrupts the free outflow of the air jet at the receiver. A back pressure is produced which generates a control pressure at outlet A of the receiver. This pressure signal is typically sent to an amplifier valve. If an object breaks the air jet between the sender and the receiver, the signal drops to zero.

The air signal from the receiver element (2LB-SR) will typically become the input pilot signal to the amplifier valve (2LA-AM). Receiver element (2LB-SR) will typically connect its port 2 (or "A"), to the amplifier valve pilot port 12.



### TECHNICAL SPECIFICATIONS

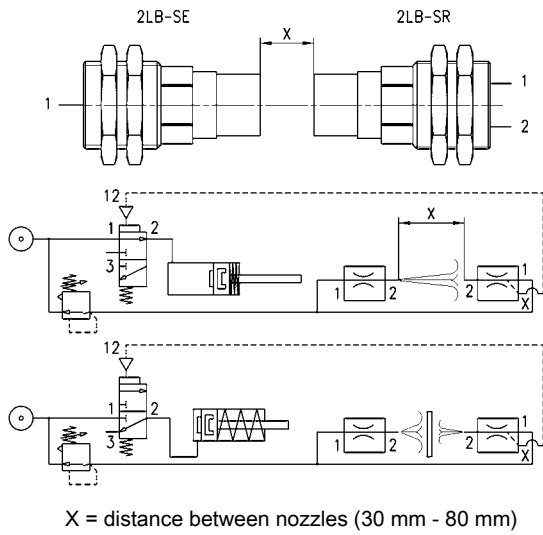
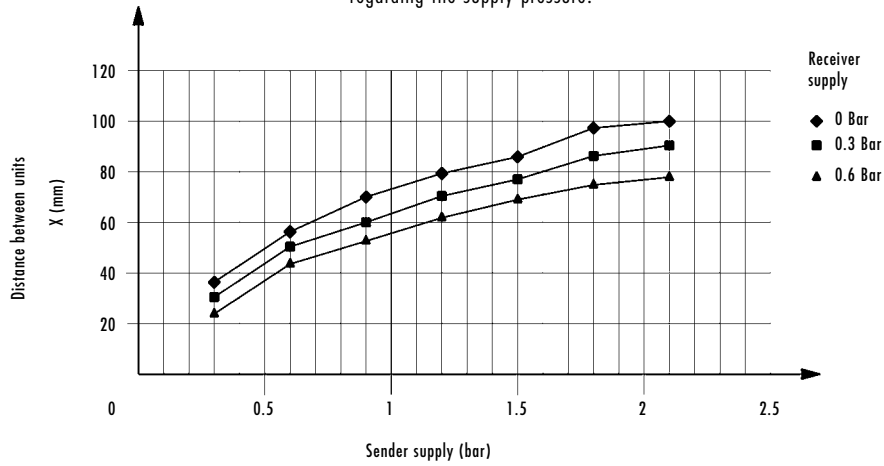
Materials	Anodized - brass
Construction	nozzle without moving parts
Mounting	M22 x 1 threaded body with bulkhead nuts
Installation diameter	22.5 mm
Mounting brackets	B 20-25 (Foot), E 20-25 (Flange)
Ports	M5 (10 - 32 UNF)

### PNEUMATIC DATA

Pressure	Sender (2LB-SE): (4.35 - 29 psi) min. 0.3 bar - max. 2 bar
Conditions of functioning	Receiver (2LB-SR): (.6 bar max), 8.7 psi max. PSR ≤ PSE (receiver's pressure is less or equal to sender's pressure)
Air consumption	P (2 bar) @ 45 NL/min; P (29 psi) = 1.59 SCFM
Max. distance between sender and receiver	see graph
Temperature	-20°C + 80°C; (-4° - 175° F)
Fluid	filtered air, without lubricant

Sender and receiver element Mod. 2LB...

Distance between sender and receiver regarding the supply pressure.

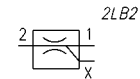
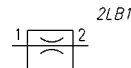
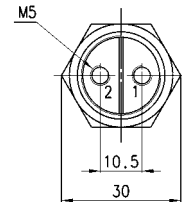
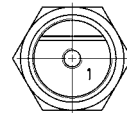
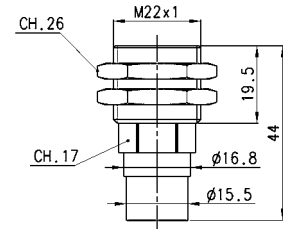
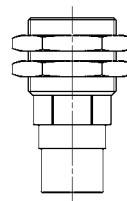


Mod. 2LB-SE

Mod. 2LB-SR

2LB-SE

2LB-SR



Mod.	Type	Min. pressure	Max pressure	Temperature	Symbol
2LB-SE	Sender	0.3 bar	2 bar	-20°C - +60°C	2LB1
2LB-SR	Receiver	0.3 bar	0.6 bar	-20°C - +60°C	2LB2

# Series 2L Pneumatically Operated Amplifier Valve

Cv = .13

Mod. 2LA-AM (Amplifier Valve)  
3-way/2-position  
Ports 1/8" BSPP  
\*(Will accept Pro-Fit® fittings)

The pneumatically operated amplifier valve is a 3-way/2-position normally closed valve, changing low pressure signals into 2 - 8 bar pressure signals.

The valve construction allows permanent reduced air consumption at rest.

Pilot pressure applied at Port 12 actuates valve and allows pressure (2 - 8 bar) to flow from inlet P to outlet A. 1 → 2. A constant "leak," or air consumption, occurs while unit is at rest from inlet 1 to atmosphere.



## TECHNICAL SPECIFICATIONS

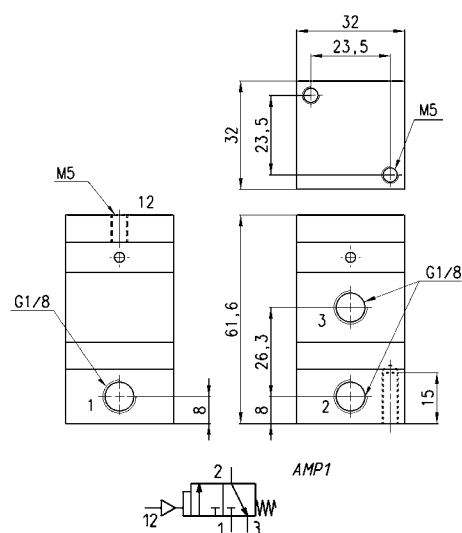
Construction	Poppet type
Valve group	3-way/2-position normally closed
Materials	Aluminum body, Buna-N seals
Mounting	By M5 (10-32 UNF) screws
Ports	1/8" BSP (accepts 1/8" Pro-Fit NPTF)
Installation	In any position
Temperature	32° - 175° F (Dry air required down to -4° F)

## PNEUMATIC DATA

Output pressure	Min. 2 - max. 8 bar (29-116 PSI)
Minimum signal input pressure	0.03 bar (.435 psi)
Maximum signal input pressure	0.6 bar (8.7psi)
Constant air consumption	at rest (6 bar)
	3.3 NL/min (.116 SCFM) via port 1 to atmosphere without signal present at 12
Nominal flow	120 NL/min (4.23 SCFM) P → A (1 → 2) Cv = 0.13 (when actuated)
Fluid	Filtered, not lubricated air

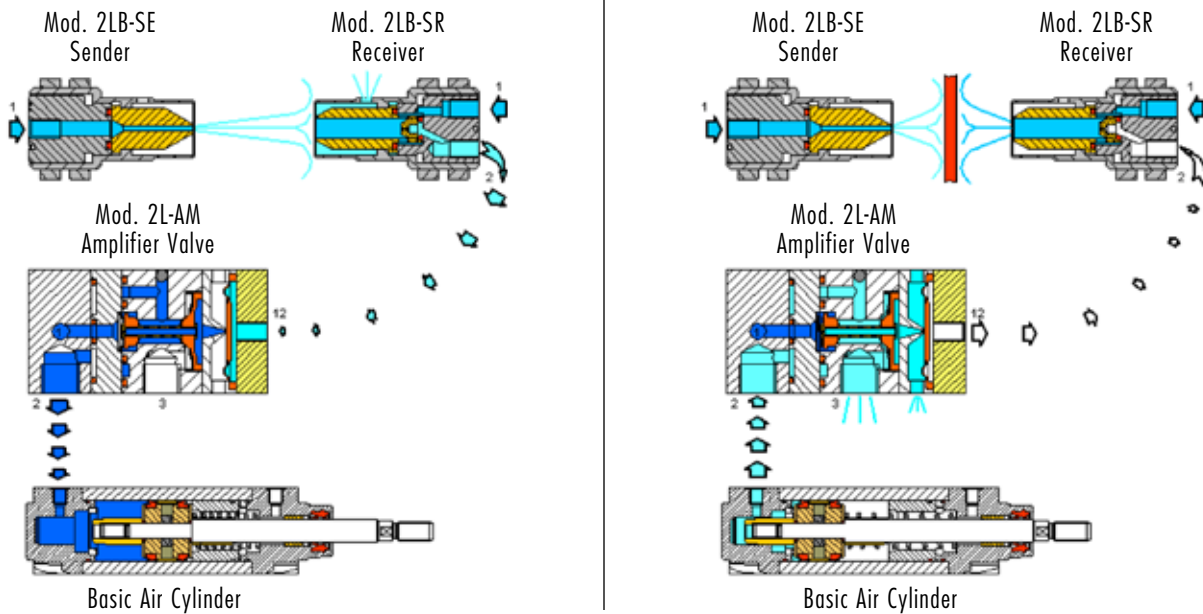
## VALVE MOD. 2LA-AM

Cv = .13



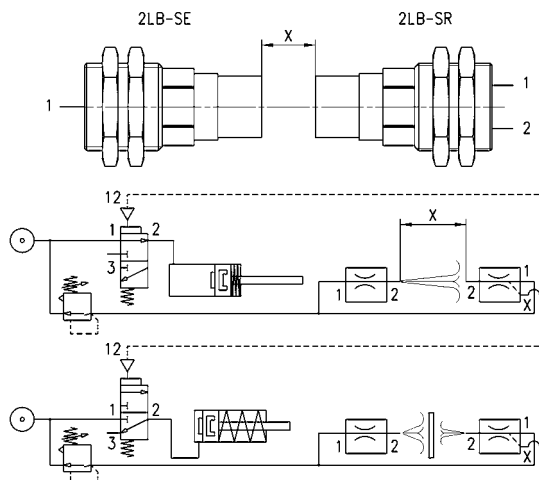


## Basic Assembly/Circuit Guide



The air signal from the receiver element (2LB-SR) will typically become the input pilot signal to the amplifier valve (2LA-AM). Receiver element (2LB-SR) will typically connect its port 2 (or "A"), to the amplifier valve pilot port 12.

Pilot pressure applied at Port 12 actuates valve and allows pressure (2 - 8 bar) to flow from inlet P to outlet A).  
 1 → 2. A constant "leak," or air consumption, occurs while unit is at rest from inlet 1 to atmosphere.



## Series 3 Air-Pilot Operated Valve

Cv= .73 - 1.37

Series 3: 1/8" NPTF, 3-way/2-position & 5-way/2-position  
1/4" NPTF, 3-way/2-position, 5-way/2-position, 5-way/3-position,  
and dual 3-way/2-position valves.

The pneumatically operated, 3-way/2-position, 5-way/2-position Series 3 valves have been designed with different methods of return: An Air-Pilot with mechanical spring, Air-Pilot return, or Air-Pilot with bias override return. This is possible due to the type of design consisting of a balanced spool, which means that it can be used for a very wide range of applications. (including reverse porting).

The 3-way/2-position valves are normally closed in the rest position when the pressure is supplied at P, and are normally open when the pressure is supplied at R, the use of A remaining unchanged. Moreover, the 5-way/2-position valves can be supplied via the ports R and S with two different pressures if a cylinder must be operated using a delivery pressure different from the return pressure.

On the valve series 3, two additional holes permit assembly onto the manifold CNVL without the use of a banjo bolt.

\*See manifold codes at the end of this section.

New versions of this valve have expanded the range to higher flow 1/4" ported valves as well as dual 3-way/2-position valves. 1/8" and 1/4" valves can be mounted on a common manifold by means of a transition plate.



#### TECHNICAL SPECIFICATIONS

Valve group	3-way/2-position, 5-way/2-position, 5-way/3-position and dual 3-way/2-position
Construction	Air-Pilot, in-line ported
Mounting	through holes in valve body
Materials	Anodized body, stainless steel spool, Buna-N seals
Threaded port sizes	1/4", 1/8" NPTF
Installation	in any position
Operating temperature	0 - 80°C (with dry air at -20°C), 32°F — 176°F (with dry air at -4°F)
Fluid	Filtered air (25 micron or less recommended)
Lubricant	Not required; otherwise, oil compatible with Buna-N, (3° - 10° E); ISOVG32 grade, 32 centistrokes

## PNEUMATIC DATA

Operating pressure	P = -.9 -10 bar (0-145 psi): (Down to 28" Hg possible)
Control pressure	min. press. (see valve description)
Nominal pressure	6 bar (87 psi)
Nominal flow	*Qn Series 3: 1/8" = 700 NL/min (24.7 SCFM), Cv= .73 1/4" = 1300 NL/min (45.9 SCFM), Cv = 1.37
Nominal diameter	ø1/8 = 5 mm, 1/4" = 7.5 mm
Fluid	filtered air, without lubrication** (25 micron or less recommended)
	*Qn = determined with supply pressure of 6 bar and with Dp = 1 bar. **If lubricated air is used, it is recommended to use ISOVG32 oil and never interrupt the lubrication.

## CODING OF PNEUMATICALLY OPERATED VALVES

3	3	8	D	-	015	-	02	-	U	7	7	TF
---	---	---	---	---	-----	---	----	---	---	---	---	----

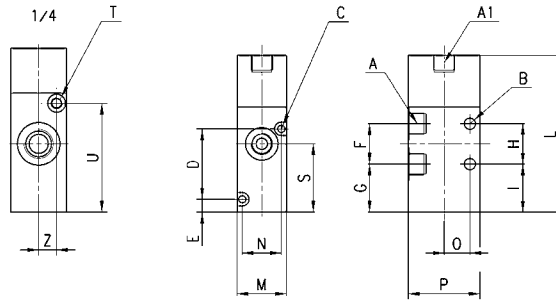
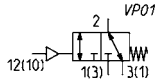
<b>3</b>	SERIES
<b>3</b>	NUMBER OF WAYS - POSITIONS: 3 = 3/2 NC 4 = 3/2 NO 5 = 5/2 6 = 5/3 CC 7 = 5/3 CO 8 = 5/3 CP 9 = 1x3/2 NC + 1x3/2 NO
<b>8</b>	PORTS: 8 = 1/8 4 = 1/4
<b>D</b>	VERSION: = standard D = double valve 2x3/2 L = for manifold assembly (only for solenoid valves 3/2 with 1/8 NPTF ports)
<b>015</b>	ACTUATION: 011 = double solenoid 015 = single solenoid, spring return 016 = single solenoid, pneumatic spring return E11 = double solenoid external servo-command E15 = single solenoid, external servo-command 033 = double air-pilot 035 = single air-pilot, spring-return
<b>22</b>	SOLENOID INTERFACE: 02 = mech. sol. 22 x 22
<b>U</b>	SOLENOID MATERIAL: U = PET G = PA A8 = PPS H8 = PA 6 V0 A7 = PPS
<b>7</b>	SOLENOID DIMENSIONS: 7 = 22 x 22 8 = 30 x 30
<b>7</b>	SOLENOID VOLTAGE: see the solenoids section in Master Catalog
	TYPE OF MANUAL OVERRIDE: = bistable, standard IL = bistable, lever type (available on demand) IM = monostable (available on demand)
<b>TF</b>	TF = NPTF ports blank = BSP ports

3-way/2-position valve, Single Air-Pilot, Spring Return

Cv = .73 - 1.37

Valve with Air Pilot and mechanical spring return.  
Minimum pilot pressure: 3 bar. (44 psi)

**Note:** Please specify model 338 for single application or 338L for manifold CNVL use.



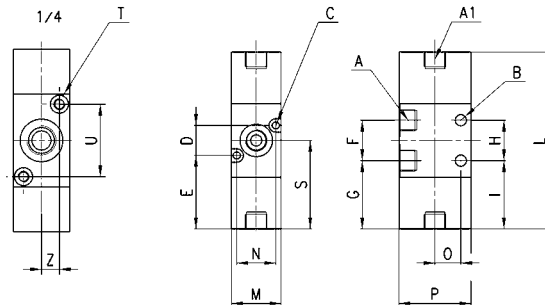
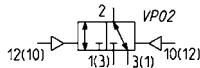
DIMENSIONS in millimeters (mm)

Mod.	Mounting	Function	Flow rate NL/min	Cv	min. pil P.	Ports NPTF		Pilot																
						A	A1	B	C	D	E	F	G	H	I	L	M	N	O	P	S	T	U	Z
<b>338-035TF</b>	without base	3-way/2-position NC	700	.73	3 bar	1/8	1/8	5	3.2	-	5.7	18	21.4	18	21.4	69.8	22	-	11.5	32	30.4	-	-	-
<b>338L-035TF</b>	on manifold	3-way/2-position NC	700	.73	3 bar	1/8	1/8	-	3.2	31.4	5.7	18	21.4	-	21.4	69.8	22	17.4	11.5	32	30.4	-	-	-
<b>334-035TF</b>	without base	3-way/2-position NC	1300	1.37	3 bar	1/4	-	4.1	-	-	-	22	21.4	22	21.4	73	25	-	16	40	32.4	M5	48.5	8

3-way/2-position valve, 1/8" port Double Air-Pilot

Cv = .73 - 1.37

Valve with double Air-Pilot  
Minimum pilot pressure: 2.5 bar. (29 psi)



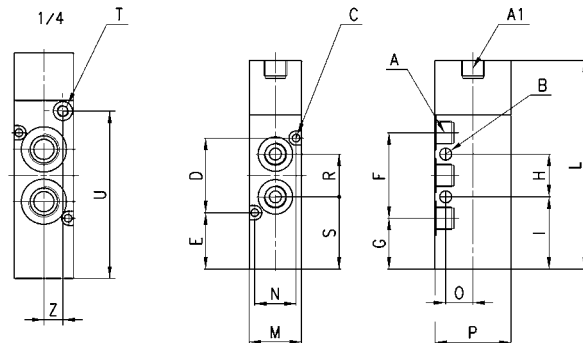
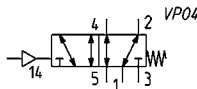
DIMENSIONS in millimeters (mm)

Mod.	Mounting	Function	Flow rate NL/min	Cv	min. pil P.	Ports NPTF		Pilot																
						A	A1	B	C	D	E	F	G	H	I	L	M	N	O	P	S	T	U	Z
<b>338-033TF</b>	without base	3-way/2-position NC	700	.73	2.5 bar	1/8	1/8	5	-	-	-	18	30.4	18	30.4	78.8	22	-	11.5	32	41.7	-	-	-
<b>338L-033TF</b>	on manifold	3-way/2-position NC	700	.73	2.5 bar	1/8	1/8	5	3.2	13.4	32.7	18	30.4	-	30.4	78.8	22	17.4	-	32	41.7	-	-	-
<b>334-033TF</b>	without base	3-way/2-position NC	1300	1.37	2.5 bar	1/4	-	4.1	-	-	-	22	29.7	22	29.7	81.3	25	-	16	40	40.7	M5	-	-

5-way/2-position valve, Single Air Pilot, Spring Return

Cv = .73 - 1.37

Valve with pneumatic operation  
mechanical spring return.  
Minimum pilot pressure: 2.5 bar. (36 psi)



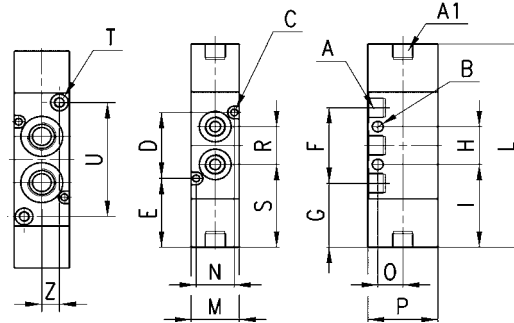
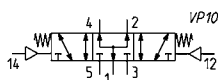
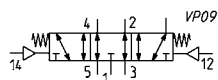
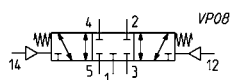
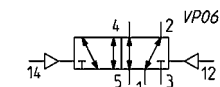
DIMENSIONS in millimeters (mm)

Mod.	Mounting	Function	Flow rate NL/min	Cv	min. pil P.	Ports NPTF		Pilot																
						A	A1	B	C	D	E	F	G	H	I	L	M	N	O	P	S	T	U	Z
<b>358-035TF</b>	without base/on manifold	5/2-way	700	.73	3 bar	1/8	1/8	5	3.2	31.4	23.8	36	21.4	18	30.4	87.8	22	17.4	11.5	32	30.4	-	-	-
<b>354-035TF</b>	without base/on manifold	5/2-way	1300	1.37	3 bar	1/4	-	4.1	3.2	36	25.4	44	21.4	22	30.4	95	25	21	16	40	32.4	M5	70.5	8

5-way/2-position and 5-way/3-position Double Air-Pilot Valve

Cv = .73 - 1.36

Valve with pneumatic actuation and differential return.  
Minimum pilot pressure: 2 bar. (29 psi)

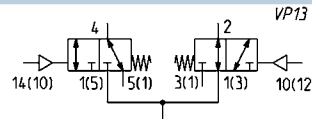
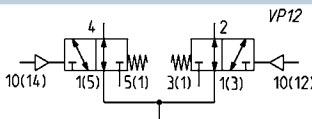
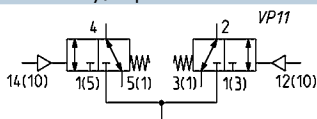


DIMENSIONS in millimeters (mm)

Mod.	Mounting	Function	Flow rate NL/min	Cv	P. min pil.	Ports		B	C	D	E	F	G	H	I	L	M	N	O	P	Pilot				Symbol
						NPTF A	Pilot A1														S	T	U	Z	
358-033TF	in line/ manifold	5/2	700	.73	2.5 bar	1/8	1/8	5	3.2	31.4	32.8	36	30.4	18	39.4	96.8	22	17.4	11.5	32	39.4	-	-	-	R1
354-033TF	in line/ manifold	5/2	1300	1.37	2.5 bar	1/4	-	4.1	3.2	36	33.7	44	29.7	22	40.7	103.3	25	21	16	40	40.7	M5	54.3	8	R1
368-033TF	in line/ manifold	5/3	700	.73	2.5 bar	1/8	1/8	5	3.2	31.4	32.8	36	30.4	18	39.4	96.8	22	17.4	11.5	32	39.4	-	-	-	U1
364-033TF	in line/ manifold	5/3	1200	1.26	2.5 bar	1/4	-	4.1	3.2	36	33.7	44	29.7	22	40.7	103.3	25	21	16	40	40.7	M5	54.3	8	U1
378-033TF	in line/ manifold	5/3	700	.73	2.5 bar	1/8	1/8	5	3.2	31.4	32.8	36	30.4	18	39.4	96.8	22	17.4	11.5	32	39.4	-	-	-	V1
374-033TF	in line/ manifold	5/3	1200	1.26	2.5 bar	1/4	-	4.1	3.2	36	33.7	44	29.7	22	40.7	103.3	25	21	16	40	40.7	M5	54.3	8	V1
388-033TF	in line/ manifold	5/3	700	.73	2.5 bar	1/8	1/8	5	3.2	31.4	32.8	36	30.4	18	39.4	96.8	22	17.4	11.5	32	39.4	-	-	-	Z1
384-033TF	in line/ manifold	5/3	1200	1.26	2.5 bar	1/4	-	4.1	3.2	36	33.7	44	29.7	22	40.7	103.3	25	21	16	40	40.7	M5	54.3	8	Z1

Dual 2 x 3-way/2-position Double Air-Pilot Valve

Cv = .73 - 1.26



DIMENSIONS in millimeters (mm)

Mod.	Mounting	Function	Flow rate NL/min	Cv	P. min pil.	Ports		B	C	D	E	F	G	H	I	L	M	N	O	P	Pilot				Symbol
						NPTF A	Pilot A1														S	T	U	Z	
338D-035TF	in line/ manifold	2x3/2 NC	700	.73	2.5 bar	1/8	1/8	5	3.2	31.4	32.8	36	30.4	18	39.4	96.8	22	17.4	11.5	32	39.4	-	-	-	R9
334D-035TF	in line/ manifold	2x3/2 NC	1200	1.26	2.5 bar	1/4	-	4.1	3.2	36	33.7	44	29.7	22	40.7	103.3	25	21	16	40	40.7	M5	54.3	8	R9
348D-035TF	in line/ manifold	2x3/2 NA	700	.73	2.5 bar	1/8	1/8	5	3.2	31.4	32.8	36	30.4	18	39.4	96.8	22	17.4	11.5	32	39.4	-	-	-	S9
344D-035TF	in line/ manifold	2x3/2 NA	1050	1.1	2.5 bar	1/4	-	4.1	3.2	36	33.7	44	29.7	22	40.7	103.3	25	21	16	40	40.7	M5	54.3	8	S9
398D-035TF	in line/ manifold	2x3/2 NC NA	700	.73	2.5 bar	1/8	1/8	5	3.2	31.4	32.8	36	30.4	18	39.4	96.8	22	17.4	11.5	32	39.4	-	-	-	T9
394D-035TF	in line/ manifold	2x3/2 NC NA	1050	1.1	2.5 bar	1/4	-	4.1	3.2	36	33.7	44	29.7	22	40.7	103.3	25	21	16	40	40.7	M5	54.3	8	T9

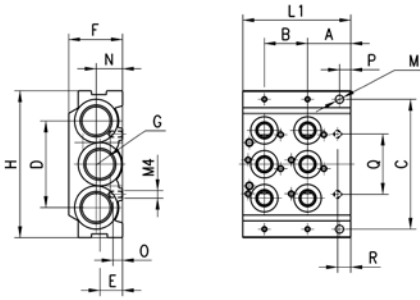
## Manifold Segments for Series 3, 1/8" and 1/4" valves (All mounting hardware & seals come with each manifold segment)

Accessories - manifold segments and adaptor plates - 1/2" common inlet & exhaust

Terminal module 2 positions.

The following is supplied:

- 3x O-Rings
- 2x fixing nuts
- 2x junction plugs
- 6x interface seals
- 4x fixing screws



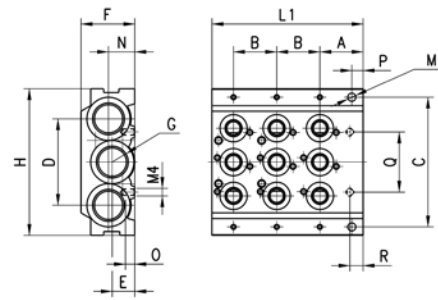
(to be used as a last station on manifold assembly)

DIMENSIONS																
Mod.	Series	A	B	C	D	E	F	H	L1	M	N	O	P	Q	R	G
<b>CNVL-3H2TF</b>	3 - 1/8"	23	23	69.5	46	12	29	78	57.5	4.3	14	5	6	32	7	3/8
<b>CNVL-4H2TF</b>	3 - 1/4"	26	26	88	60	14	29	98	65	4.3	-	5	5	38	7	1/2

Terminal module 3 positions.

The following is supplied:

- 3x O-Rings
- 2x fixing nuts
- 2x junction plugs
- 9x interface seals
- 6x fixing screws



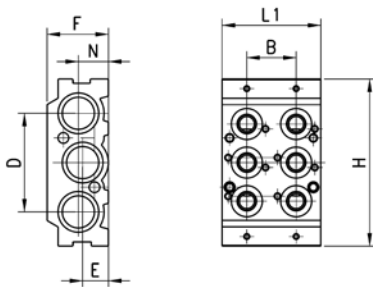
(to be used as a last station on manifold assembly)

DIMENSIONS																
Mod.	Series	A	B	C	D	E	F	H	L1	M	N	O	P	Q	R	G
<b>CNVL-3H3TF</b>	3 - 1/8"	23	23	69.5	46	12	29	78	80.5	4.3	14	5	6	32	7	3/8
<b>CNVL-4H3TF</b>	3 - 1/4"	26	26	88	60	14	29	98	91	4.3	-	5	5	38	7	1/2

Expansion module 2 positions.

The following is supplied:

- 3x O-Rings
- 2x fixing nuts
- 2x junction plugs
- 6x interface seals
- 4x fixing screws



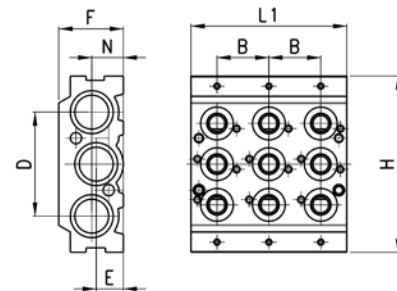
(to be used as an intermediate station on manifold assembly)

DIMENSIONS								
Mod.	Series	B	D	E	F	H	L1	N
<b>CNVL-3I2</b>	3 - 1/8"	23	46	12	29	78	46	14
<b>CNVL-4I2</b>	3 - 1/4"	26	60	14	29	98	52	-

Expansion module 3 positions. The

following is supplied:

- 3x O-Rings
- 2x fixing nuts
- 2x junction plugs
- 9x interface seals
- 6x fixing screws



(to be used as an intermediate station on manifold assembly)

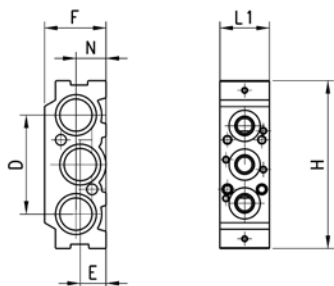
DIMENSIONS								
Mod.	Series	B	D	E	F	H	L1	N
<b>CNVL-3I3</b>	3 - 1/8"	23	46	12	29	78	69	14
<b>CNVL-4I3</b>	3 - 1/4"	26	60	14	29	98	65	-

## Manifold Segments for Series 3, 1/8" and 1/4" valves (All mounting hardware & seals come with each manifold segment)

### Accessories - manifold segments and adaptor plates

Expansion module 1 position The following is supplied:

- 3x O-Rings
- 2x fixing nuts
- 2x junction plugs
- 3x interface seals
- 2x fixing seals

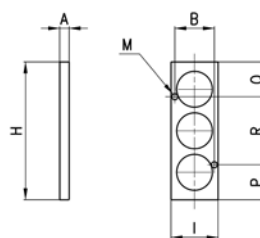


DIMENSIONS							
Mod.	Series	D	E	F	H	L1	N
<b>CNVL-311</b>	3 - 1/8"	46	12	29	78	23	14
<b>CNVL-411</b>	3 - 1/4"	60	14	29	98	26	-

Blanking plate for sub-base.

The item is used to blank one or more stations on a manifold base Mod.CNVL..., The following is supplied:

- 2x fixing screws
- 3x O-Rings

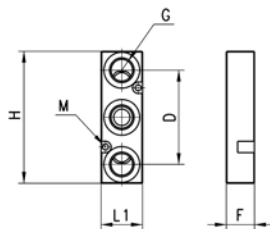


DIMENSIONS									
Mod.	Series	A	B	H	I	M	P	Q	R
<b>CNVL-1</b>	3 - 1/8"	5	17.4	52	22	3.2	10.3	10.3	31.4
<b>CNVL-4</b>	3 - 1/4"	5	21	73	25	3.2	18.5	18.5	36

Intermediate plate for manifolds.

The following is supplied:

- 3x O-Rings
- 2x fixing screws



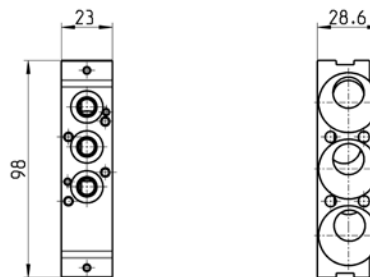
(to be used to create threaded ports on manifold station instead of valve interface)

DIMENSIONS								
Mod.	Series	G	H	M	F	L1	D	F
<b>CNVL-3PTF</b>	3 - 1/8"	1/4	70	3.2	29	22	50	15
<b>CNVL-4PTF</b>	3 - 1/4"	1/4	73	3.2	29	25	50	20

Interface plate between 358 and 354.

The following is supplied:

- 1x interface seal
- 2x screws
- 2x pins
- 2x plugs
- 6x O-Rings

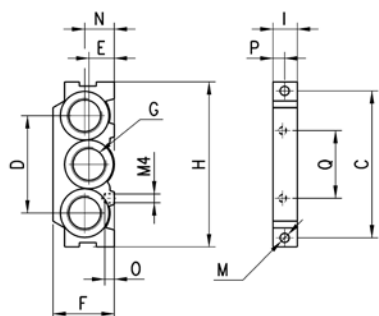


DIMENSIONS	
Mod.	
<b>CNVL-4H-3HTF</b>	

## Manifold Segments for Series 3, 1/8" and 1/4" valves (All mounting hardware & seals come with each manifold segment)

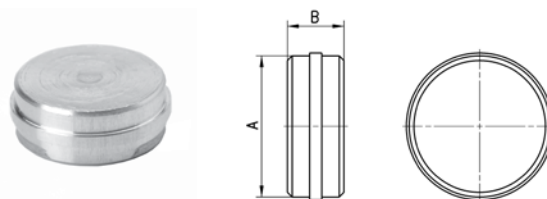
Accessories - manifold segments and adaptor plates - 1/2" common inlet & exhaust

End plate for manifolds.  
The following is supplied:  
2x fixing nuts



DIMENSIONS													
Mod.	Series	C	D	E	F	H	I	M	N	O	P	Q	G
<b>CNVL-3H</b>	3 - 1/8"	69.5	46	12	29	78	11.5	4.3	14	5	6	32	3/8
<b>CNVL-4H</b>	3 - 1/4"	88	60	14	29	98	13	4.3	-	5	8	29	1/2

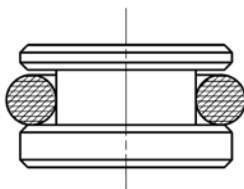
Blocking disk between manifold stations.



DIMENSIONS				
Mod.	Series	A	B	Supply
<b>CNVL-3H-TP</b>	3 - 1/8"	15.6	6	Channels diaphragm 1; 3; 5
<b>CNVL-3H-UP</b>	3 - 1/8"	15.6	6	Channels diaphragm 1
<b>CNVL-3H-JP</b>	3 - 1/8"	15.6	6	Channels diaphragm 3; 5
<b>CNVL-4H-TP</b>	3 - 1/4"	23.8	8	Channels diaphragm 1; 3; 5
<b>CNVL-4H-UP</b>	3 - 1/4"	23.8	8	Channels diaphragm 1
<b>CNVL-4H-JP</b>	3 - 1/4"	23.8	8	Channels diaphragm 3; 5

Blanking plug for 3-way/2-position valve mounted on manifold segments.

The following is supplied:  
1x blanking plug  
1x O-Ring



DIMENSIONS	
Mod.	Series
<b>CNVL - 3</b>	3 - 1/8"
<b>CNVL - 5</b>	3 - 1/4"





## Series 4 Air-Pilot operated valves

Cv= .73 - 2.00

Series 4: 1/8", 1/4" NPTF, 3-way/2-position;  
5-way/2-position; 5-way/3-position  
1/2" NPTF 5-way/2-position

The pneumatically operated, 3-way/2-position, 5-way/2-position Series 4 valves have been designed with different methods of return: an Air-Pilot with mechanical spring, Air-Pilot return, or Air-Pilot with bias return. This is possible due to the type of design consisting of a balanced spool, which means that it can be used for a very wide range of applications. (including reverse porting)

The 3-way/2-position valves are normally closed in the rest position when the pressure is supplied at P, and are normally open when the pressure is supplied at R, the use of A remaining unchanged. Moreover, the 5-way/2-position valves can be supplied via the ports R and S with two different pressures if a cylinder must be operated using a delivery pressure different from the return pressure.

On the Series 4 valves, two additional holes permit assembly onto the manifold CNVL without the use of a banjo bolt.

\* See pages at end of sections for manifold options.

Key - Series 4 valves incorporate a double lip (Z) seal against the spool. This seal design has improved wear and sealing properties against the spool and spacer glands for when the fluid media is less than optimal.



Key - Series 4 valves incorporate a more robust packed bore design than the Series 3 valves. This supports the improved (Z) seal design and better wear life of the seals.

### TECHNICAL SPECIFICATIONS

Valve group	3-way/2-position, 5-way/2-position, 5-way/3-position
Construction	Air-Pilot, in-line ported
Mounting	through holes in valve body
Materials	Anodized body, stainless steel spool, Buna-N seals
Threaded port sizes	1/8", 1/4", 1/2" NPTF
Installation	in any position
Operating temperature	0 - 80°C (with dry air at -20°C), 32°F — 176°F (with dry air at -4°F)
Fluid	Filtered air (32 micron or less recommended)
Lubricant	Not required; otherwise, oil compatible with Buna-N, (3° - 10° E) ISOVG32 grade (32 centistrokes)

Dimensions in millimeters (mm)

The company reserves the right to vary models and dimensions without notice. These products are designed for industrial applications and are not suitable for sale to the general public.

**PNEUMATIC DATA**

Operating pressure	P = -0.9 -10 bar, 0-145 psi (down to 28" Hg vacuum rated)
Control pressure	min. press. (see valve description)
Nominal pressure	6 bar - 87 psi
Nominal flow	*Qn Series 4: 1/8" = 700 NL/min. (24.72 SCFM), Cv = .73 1/4" = 1250 NL/min (43.7 SCFM), Cv= 1.3 1/2" = 1900 NL/min (67.1 SCFM), Cv= 2.00
Fluid	filtered air, without lubrication** (25 micron recommended)

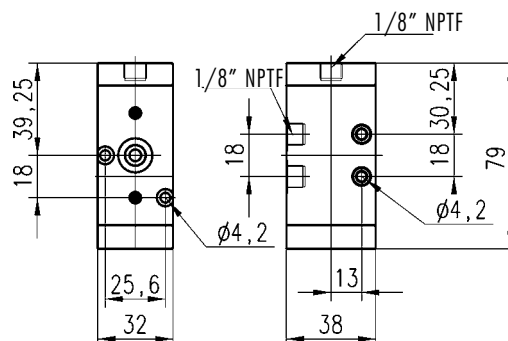
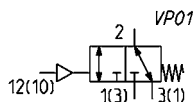
\*Qn = determined with supply pressure of 6 bar and with  $\Delta p = 1$  bar. \*\*If lubricated air is used, it is recommended to use ISOVG32 oil and never interrupt the lubrication.

**CODING OF PNEUMATICALLY OPERATED VALVES**

<b>4</b>	<b>5</b>	<b>4</b>	<b>-</b>	<b>015</b>	<b>-</b>	<b>22</b>	<b>-</b>	<b>U</b>	<b>7</b>	<b>7</b>	<b>TF</b>
<b>4</b>	SERIES										
<b>5</b>	NUMBER OF WAYS - POSITIONS:		5 = 5/2 3 = 3/2 NC 4 = 3/2 NO								
<b>4</b>	PORTS: 8 = 1/8 NPTF 4 = 1/4 NPTF 2C = G1/2										
<b>015</b>	ACTUATION: 011 = double solenoid (horizontal solenoids) V11 = double solenoid (vertical solenoids) - 1/4 NPTF port only 015 = single solenoid, spring return (horizontal solenoids) V15 = single solenoid, spring return (vertical solenoid) - 1/4 NPTF port only					016 = single solenoid, pneumatic spring return (horizontal solenoid) V16 = single solenoid, pneumatic spring return (vertical solenoid) - 1/4 NPTF port only 33 = pneumatic pneumatic 34 = pneumatic differential 35 = pneumatic spring					
<b>22</b>	SOLENOID INTERFACE:: 22 = mech. sol. 22 x 22 50 = mech. sol. 32 x 32 - only G1/2										
<b>U</b>	SOLENOID MATERIAL: U = PET                      A6 = PPS G = PA                      H8 = PA 6 V0										
<b>7</b>	SOLENOID DIMENSIONS: 6 = 32 x 32 solo G1/2      8 = 30 x 30 7 = 22 x 22                      9 = 22 x 58										
<b>7</b>	SOLENOID VOLTAGE: see solenoids section in Master Catalog										
	TYPE OF MANUAL OVERRIDE:		IL = bistable, lever type (available on demand) blank = bistable, standard      IM = monostable (available on demand)								
<b>TF</b>	TF = NPTF ports blank = BSP ports										

**3-way/2-position valve, 1/8" port, Air Pilot Spring Return**

Cv = .73

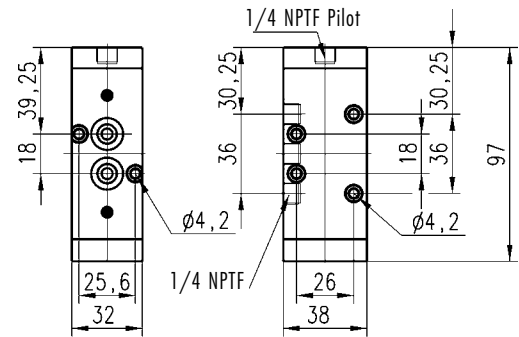
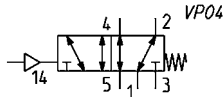


Mod.	Mounting	Function	Flow rate NL/min	P. min pil. bar (psi)
<b>438-35TF</b>	in line/manifold	3/2 NC	700	2.5 bar (36 psi)

## 5-way/2-position valve, 1/8" port, Air Pilot, Spring Return

Cv = .73

Valve with pneumatic actuation and spring.  
Minimum pilot pressure: 2.5 bar. (36 psi)

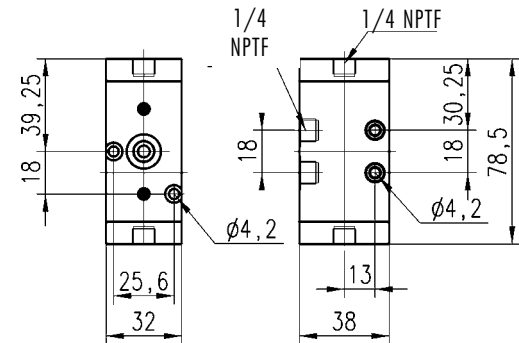
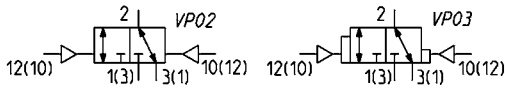


Mod.	Mounting	Function	Flow rate NL/min	P. min pil.
<b>458-35TF</b>	in line/manifold	5/2	700	2.5 bar (36 psi)

## 3-way/2-position valve, 1/8" port, Double Air Pilot (Mod. -34TF Bias Return)

Cv = .73

Valve with pneumatic actuation/return (-33 model),  
and differential return (-34 model).  
Minimum pilot pressure: 2 bar. (29 psi)

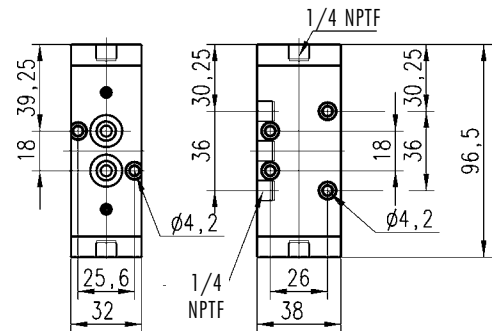
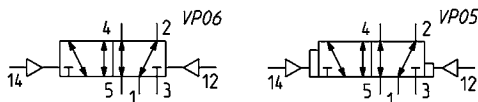


Mod.	Mounting	Function	Flow rate NL/min	P. min pil.
<b>438-33TF</b>	in line/manifold	3/2 NC	700	2 bar (29 psi)
<b>438-34TF</b>	in line/manifold	3/2 NC	700	2 bar (29 psi)

## 5-way/2-position valve, 1/8" port, Double Air Pilot (Mod. -34TF Bias Return)

Cv = .73

Valve with pneumatic actuation/return (-33 model),  
and differential return (-34 model).  
Minimum pilot pressure: 2 bar. (29 psi)



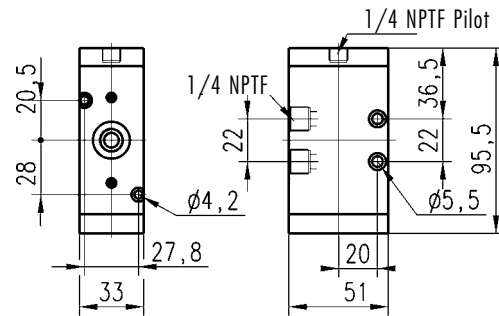
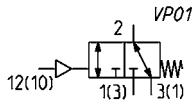
Mod.	Mounting	Function	Flow rate NL/min	P. min pil.
<b>458-33TF</b>	in line/manifold	5/2 NC	700	2 bar (29 psi)
<b>458-34TF</b>	in line/manifold	5/2 NC	700	2 bar (29 psi)

## 3-way/2-position valve, 1/4" port, Air Pilot, Spring Return

Cv = 1.31

Valve with pneumatic actuation  
and spring return.

Minimum pilot pressure: 2.5 bar. (36 psi)



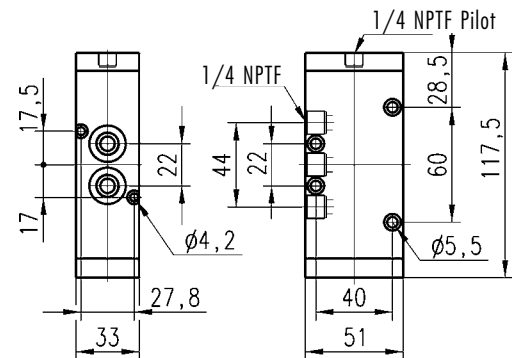
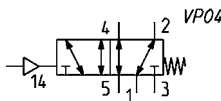
Mod.	Mounting	Function	Flow rate NL/min	P. min pil.
<b>434-35TF</b>	in line/manifold	3/2	1250	2.5 bar (36 psi)

## 5-way/2-position valve, 1/4" port, Air Pilot, Spring Return

Cv = 1.32

Valve with pneumatic actuation  
and mechanical spring return.

Minimum pilot pressure: 2.5 bar. (36 psi)



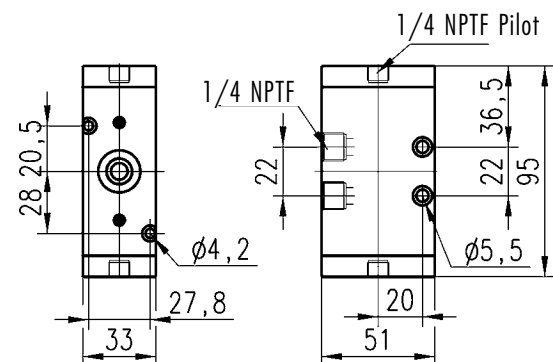
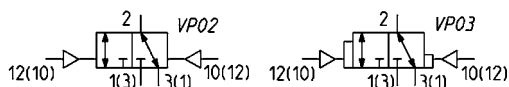
Mod.	Mounting	Function	Flow rate NL/min	P. min pil.
<b>454-35TF</b>	in line/manifold	5/2	1250	2.5 bar (36 psi)

## 3-way/2-position valve, 1/4" port, Double Air Pilot (Mod -34TF Bias Return)

Cv = 1.31

Valve with pneumatic actuation/return (-33 mod.)  
and differential return (-34 mod.)

Minimum pilot pressure: 2 bar. (29 psi)

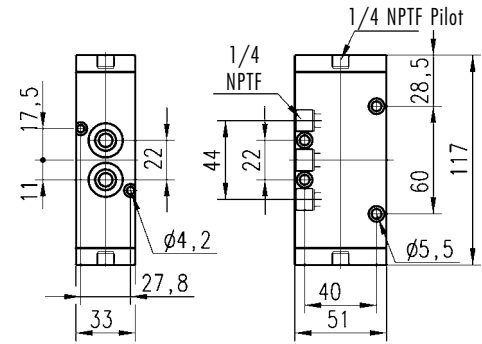
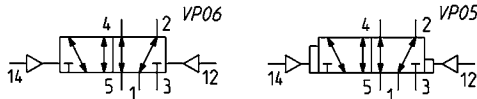


Mod.	Mounting	Function	Flow rate NL/min	P. min pil.
<b>434-33TF</b>	in line/manifold	3/2 NC	1250	2 bar (29 psi)
<b>434-34TF</b>	in line/manifold	3/2 NC	1250	2 bar (29 psi)

5-way/2-position valve, 1/4" port, Double Air Pilot (Mod. -34TF bias return)

Cv = 1.31

Valve with pneumatic actuation/return (-33 mod.) and differential return (-34 mod.)  
Minimum pilot pressure: 2 bar. (29 psi)

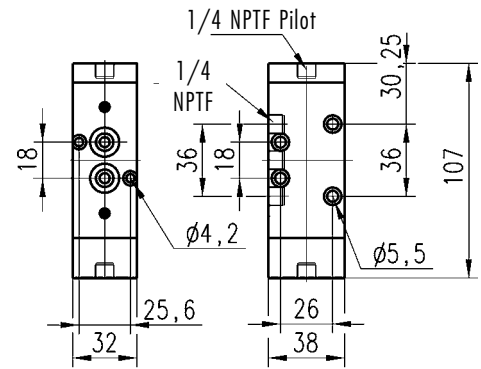
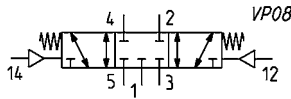


Mod.	Mounting	Function	Flow rate NL/min	P. min pil.
<b>454-33TF</b>	in line/manifold	5/2	1250	2 bar (29 psi)
<b>454-34TF</b>	in line/manifold	5/2	1250	2 bar (29 psi)

5-way/3-position closed-center valve, 1/8" port, Air Pilot with Spring to Center Position

Cv = .73

Valve with pneumatic actuation and central return by mechanical spring.  
Minimum pilot pressure: 2.5 bar. (36 psi)

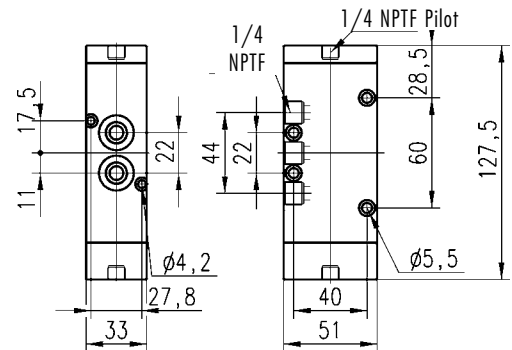
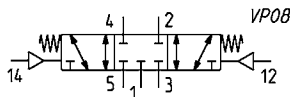


Mod.	Mounting	Function	Flow rate NL/min	P. min pil.
<b>468-33TF</b>	in line/manifold	5/3 CC	700	2.5 bar (36 psi)

5-way/3-position closed-center valve, 1/4" port, Air Pilot with Spring to Center Position

Cv = 1.31

Valve with pneumatic actuation and central return by mechanical spring.  
Minimum pilot pressure: 2.5 bar. (36 psi)

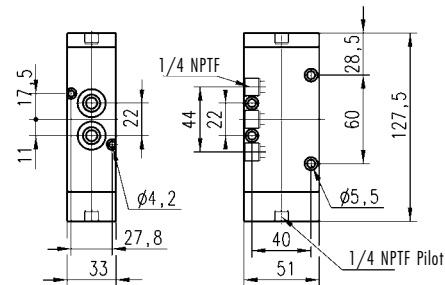
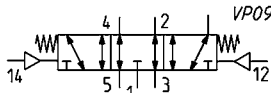


Mod.	Mounting	Function	Flow rate NL/min	P. min pil.
<b>464-33TF</b>	in line/manifold	5/3 CC	1250	2.5 bar (36 psi)

## 5-way/3-position open-center valve, 1/4" port, Air Pilot with Spring to Center Position (exhausting)

Cv = 1.31

Valve with pneumatic actuation and central return by mechanical spring.  
Minimum pilot pressure: 2.5 bar. (36 psi)

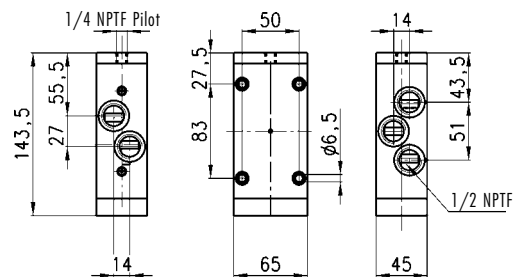
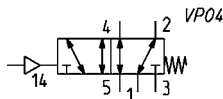


Mod.	Mounting	Function	Flow rate NL/min	P. min pil.
<b>474-33TF</b>	in line/manifold	5/3 OC	1250	2.5 bar (36 psi)

## 5-way/2-position valve, 1/2" port

Cv = 2.00

Valve with pneumatic Air-Pilot with spring return, actuation and mechanical spring return.  
Minimum pilot pressure: 2.5 bar (36 psi)



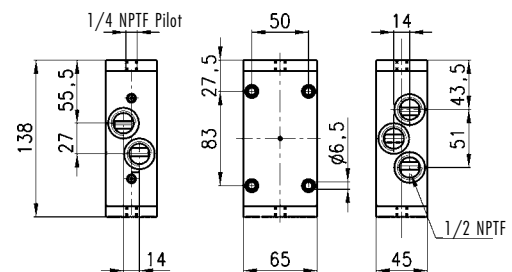
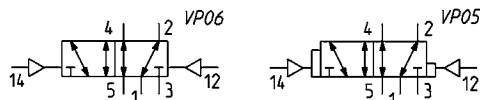
Contact factory for availability.

Mod.	Mounting	Function	Flow rate NL/min	P. min pil.
<b>452C-35TF</b>	in line	5/2	1900	2.5 bar (36 psi)

## 5-way/2-position valve, 1/2" port, Double Air-Pilot (Mod. -34TF bias return)

Cv = 2.00

Valve with pneumatic actuation/return (-33 mod.) and differential return (-34 mod.)  
Minimum pilot pressure: 2 bar (29 psi)



Contact factory for availability.

Mod.	Mounting	Function	Flow rate NL/min	P. min pil.
<b>452C-33TF</b>	in line/manifold	5/2	1900	2 bar (29 psi)
<b>452C-34TF</b>	in line/manifold	5/2	1900	2 bar (29 psi)

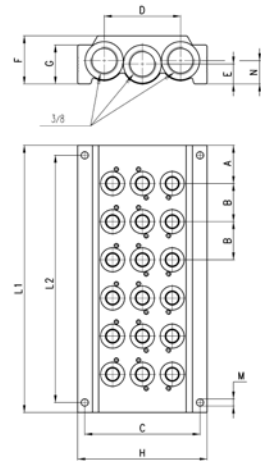
**Manifold base with common exhausts - Series 4 valves 1/8"**

FOR VALVES SERIES 4, 1/8 (3-WAY/2-POSITION, 5-WAY/2-POSITION OR 5-WAY/3-POSITIONS).

THE FOLLOWING IS SUPPLIED :

- N° 1 MANIFOLD
- N° 1 PAIR OF FIXING SCREWS PER VALVE POSITION
- N° 3 OR SEAL PER VALVE POSITION
- N° 2 GUIDES PER VALVE POSITION

\* AVAILABLE FROM 2 - 6 STATIONS



**DIMENSIONS**

Stations	Mod.	A	B	Inlet/Exhaust Ports NPTF	C	D	E	F	G	H	L1	L2	M	N
2	<b>CNVL-42TF</b>	28	33	3/8"	69.5	46	12	29	23.5	78	89	77	4.3	14
3	<b>CNVL-43TF</b>	28	33	3/8"	69.5	46	12	29	23.5	78	122	110	4.3	14
4	<b>CNVL-44TF</b>	28	33	3/8"	69.5	46	12	29	23.5	78	155	143	4.3	14
5	<b>CNVL-45TF</b>	28	33	3/8"	69.5	46	12	29	23.5	78	188	176	4.3	14
6	<b>CNVL-46TF</b>	28	33	3/8"	69.5	46	12	29	23.5	78	221	209	4.3	14

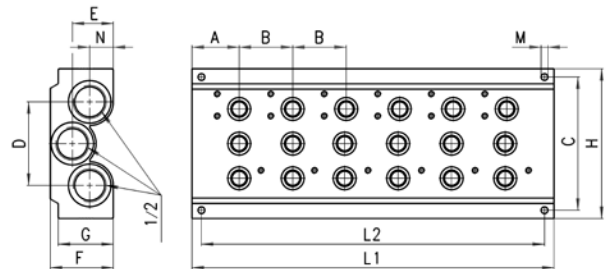
**Manifold base with common exhausts - Series 4 valves 1/4"**

FOR VALVES SERIES 4, 1/4 (3-WAY/2-POSITION, 5-WAY/2-POSITION OR 5-WAY/3-POSITIONS).

THE FOLLOWING IS SUPPLIED :

- N° 1 MANIFOLD
- N° 1 PAIR OF FIXING SCREWS PER VALVE POSITION
- N° 3 OR SEAL PER VALVE POSITION
- N° 2 GUIDES PER VALVE POSITION

\* AVAILABLE FROM 2 - 6 STATIONS



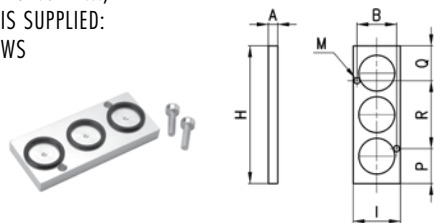
**DIMENSIONS**

Stations	Mod.	A	B	Inlet/Exhaust Ports NPTF	C	D	E	F	G	H	L1	L2	M	N
2	<b>CNVL-52TF</b>	30	34	1/2"	84.5	53	26	40	35	95	94	82	4.3	15
3	<b>CNVL-53TF</b>	30	34	1/2"	84.5	53	26	40	35	95	128	116	4.3	15
4	<b>CNVL-54TF</b>	30	34	1/2"	84.5	53	26	40	35	95	162	150	4.3	15
5	<b>CNVL-55TF</b>	30	34	1/2"	84.5	53	26	40	35	95	196	184	4.3	15
6	<b>CNVL-56TF</b>	30	34	1/2"	84.5	53	26	40	35	95	230	218	4.3	15



Blanking plate for CNVL manifolds

THE ITEM IS USED TO BLANK ONE OR MORE STATIONS ON A MANIFOLD BASE MOD.CNVL...,  
THE FOLLOWING IS SUPPLIED:  
2X FIXING SCREWS  
3X O-RINGS

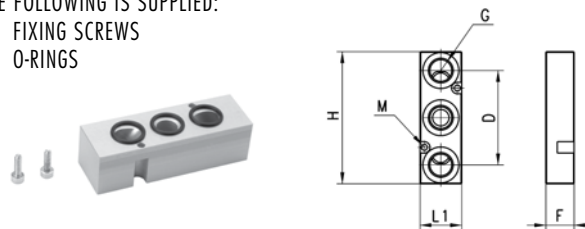


DIMENSIONS

Mod.	Series	A	B	H	I	M	P	Q	R
<b>CNVL/2</b>	4 - 1/8"	5	25.6	52	32	4.2	17	17	18
<b>CNVL/3</b>	4 - 1/4"	5	27.8	70	32.5	4.2	7.5	3.5	59

Intermediate plate for manifold with outlets

THE FOLLOWING IS SUPPLIED:  
2X FIXING SCREWS  
3X O-RINGS

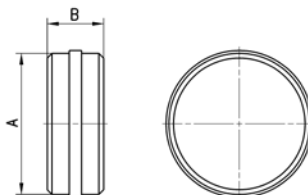


DIMENSIONS

Mod.	G	H	M	L1	D	F
<b>CNVL-4P</b>	1/4	73	3.2	25	50	20

Blocking Disk

MODULES SEPARATION BLANKING PLUG

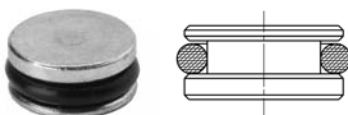


DIMENSIONS

Mod.	Series	A	B	Supply
<b>CNVL-3H-TP</b>	4 - 1/8"	15.6	6	Channels diaphragm 1; 3; 5
<b>CNVL-3H-UP</b>	4 - 1/8"	15.6	6	Channels diaphragm 1
<b>CNVL-3H-JP</b>	4 - 1/8"	15.6	6	Channels diaphragm 3; 5
<b>CNVL-4H-TP</b>	4 - 1/4"	23.8	8	Channels diaphragm 1; 3; 5
<b>CNVL-4H-UP</b>	4 - 1/4"	23.8	8	Channels diaphragm 1
<b>CNVL-4H-JP</b>	4 - 1/4"	23.8	8	Channels diaphragm 3; 5

Blanking plug for TCNVL manifolds for 3-way/2-position valves mounted on manifold segment

THE FOLLOWING IS SUPPLIED:  
1X BLANKING PLUG  
1X O-RING



DIMENSIONS

Mod.	Series
<b>TCNVL-3</b>	4 - 1/8"
<b>TCNVL-5</b>	4 - 1/4"

# Series 7 Air-Pilot Operated Valves

Cv = .47 — .95

(VDMA 24563 )  
ISO 15407-1, Size 26mm (size 01) and 18mm (size 02)  
Side outlet manifold, Manifold assembly (non-plug-in)  
5-way/2-position and 5-way/3-position



The Series 7 electropneumatically and pneumatically operated valves have been designed to comply with ISO 15407-1 (VDMA 24563) standards size 26mm (VDMA 01) and size 18mm (VDMA 02).

The electropneumatically operated valves have the following types of operation available:

- Air-Pilot, and air-spring return
- Air-Pilot operation and return



## TECHNICAL SPECIFICATIONS

Construction	Packed spool-type
Valve group	5-way/2-position, 5-way/3-position
Materials	Anodized aluminum body, spool, base nylon end covers, BUNA-N seals
Mounting	through holes in valve body onto manifold segments
Operating temperature	0° C min. +50° C max, (32°F — 122°F)
Lubricant	without lubrication**
Size	26 mm - size VDMA 01; 18 mm - size VDMA 02
Installation	in any position

## PNEUMATIC DATA

Operating pressure	P. max 7 bar (102 psi). See tables for minimum operating pressures.
Nominal pressure	6 bar - 87 psi (used for flow calculations)
Nominal flow	*Qn Size 26 mm: 900 NL/min; 31.8 SCFM ; Cv = .95 Size 18 mm: 450 NL/min; 15.9 SCFM; Cv = .47
Fluid	filtered air (5 micron or less), without lubrication**

\*Qn = determined with supply pressure of 6 bar and with  $\Delta p = 1$  bar \*\* If lubricated air is used, it is recommended to use ISOVG32 oil and never to interrupt the lubrication.

## CODING OF VALVES AND SOLENOID VALVES SERIES 7 WITH SUB-BASES - (ORDERED SEPARATELY)

7	5	1	-	N	1	A	-	P16	-	15	-	W	2	3	TF
---	---	---	---	---	---	---	---	-----	---	----	---	---	---	---	----

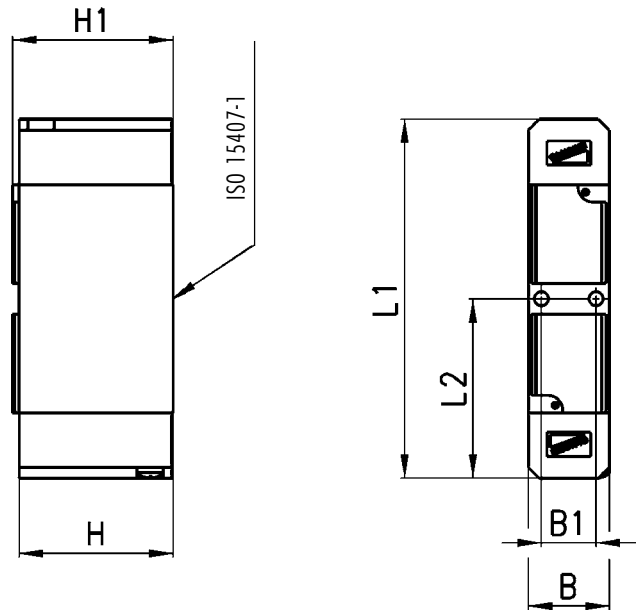
<b>7</b>	SERIES:
<b>5</b>	NUMBER OF WAYS - POSITIONS: 5 = 5/2 6 = 5/3 CC 7 = 5/3 CO 8 = 5/3 CP
<b>1</b>	SIZES: 1 = size 26 mm 2 = size 18 mm
<b>N</b>	SUBBASE: N = sub-base with front outlets
<b>1</b>	PORTS: 1 = 1/4 NPTF (Size 26 mm) 2 = 1/8 NPTF (Size 18 mm)
<b>A</b>	NUMBER OF SUBBASES: **A = 1 **B = 2 **C = 3 **D = 4 **E = 5 **F = 6 **G = 7 **H = 8 **K = 9 **L = 10 **M = 11 **N = 12 **P = 13 **R = 14 **S = 15
<b>P16</b>	ACTUATION: 33 = pneumatic, bistable 36 = pneumatic, monostable P11 = electro-pneumatic, bistable P16 = electro-pneumatic, monostable
<b>15</b>	SOLENOID INTERFACE: 15 = 15x15
<b>W</b>	SOLENOID TYPES: W = Series W *P = Series P
<b>2</b>	CONNECTION: * 1 = wire 300 mm (series W) 2 = 2 pins (series W 24V - 48V DC/AC) * 3 = 2 pins+earth (series W only 110V DC/AC) * 5 = 2 pins+earth (series P)
<b>3</b>	SOLENOID VOLTAGE: 3 = 24V DC * 4 = 48V DC * 6 = 110V DC * B = 24V 50/60 Hz * C = 48V 50/60 Hz * D = 110V 50/60 Hz
<b>TF</b>	TF = NPTF ports blank = BSP ports

5-way/2-position valves VDMA 01 - VDMA 02, Single Air-Pilot, Air-Spring Return

Cv = .47 - .95

The Series 7 solenoid valves with VDMA 01 - 02 interface which have Air-Pilot actuation and air-spring return, (via manifold porting) are suitable for mounting on a sub-base.  
For the correct use of the valve, the pilot pressure must be the same or higher than the operating pressure.  
The minimum operating pressure is 3 bar - 43.5 psi.

**Note:** Interface seals and fixing screws are packaged with the valve.



DIMENSIONS

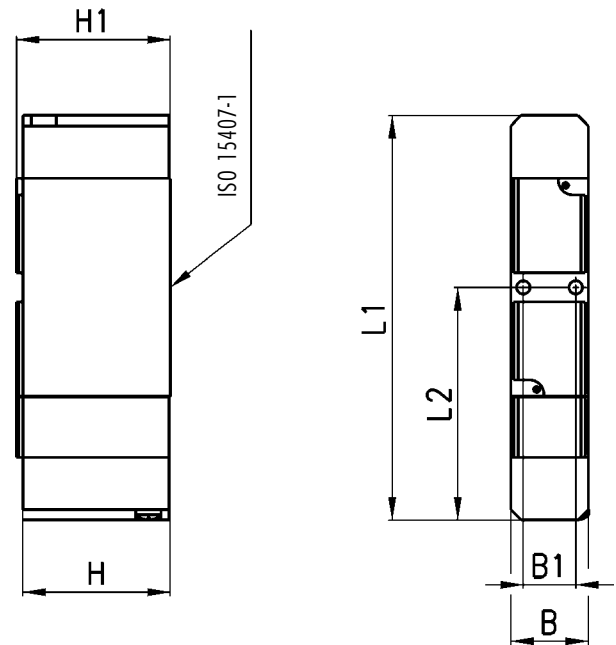
Mod.	Size ISO	B	B1	L1	L2	H	H1
<b>751-000-36</b>	01-26mm	26.5	19	99.7	49.85	39	40.5
<b>752-000-36</b>	02-18mm	18.5	12.5	82.2	41.1	35.2	36.7

5-way/2-position valves VDMA 01 - VDMA 02, Double Air-Pilot

Cv = .47 - .95

The Series 7 solenoid valves with VDMA 01 - 02 interface which have Air-Pilot actuation and return (via manifold porting) are suitable for mounting on a sub-base.  
The minimum operating pressure is 2 bar - 29 psi.

**Note:** Interface seals and fixing screws are packaged with the valve.



DIMENSIONS

Mod.	Size ISO	B	B1	L1	L2	H	H1
<b>751-000-33</b>	01-26mm	26.5	19	99.7	49.85	39	40.5
<b>752-000-33</b>	02-18mm	18.5	12.5	82.2	41.1	35.2	36.7

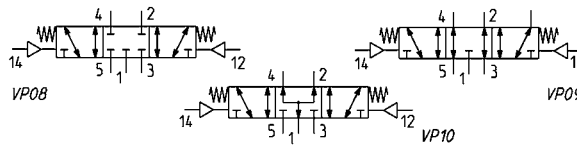
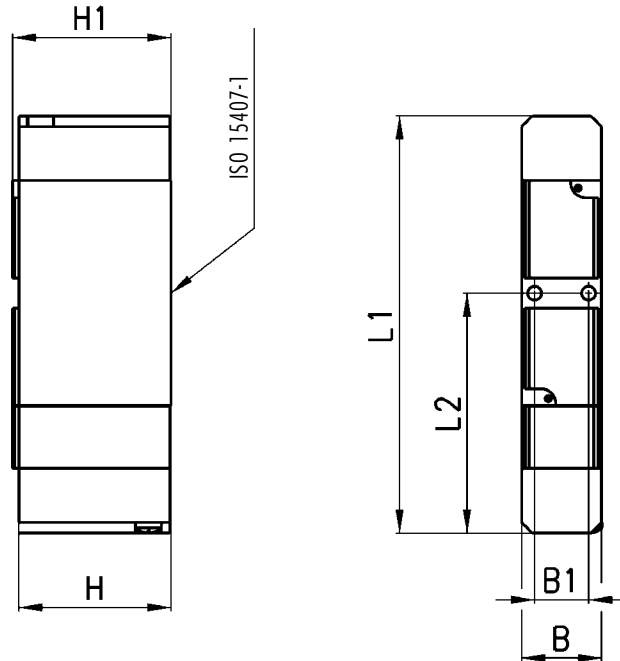
## 5-way/3-position valves ISO 26 mm - 18 mm, Double Air-Pilot, Spring Return to Center

Cv = .47 - .95

The Series 7 solenoid valves with VDMA 01 - 02 interface which have Air-Pilot actuation and mechanical spring return are suitable for mounting on a sub-base.

The minimum operating pressure is 3 bar - 43.5 psi.

**Note:** Interface seals and fixing screws are packaged with the valve.

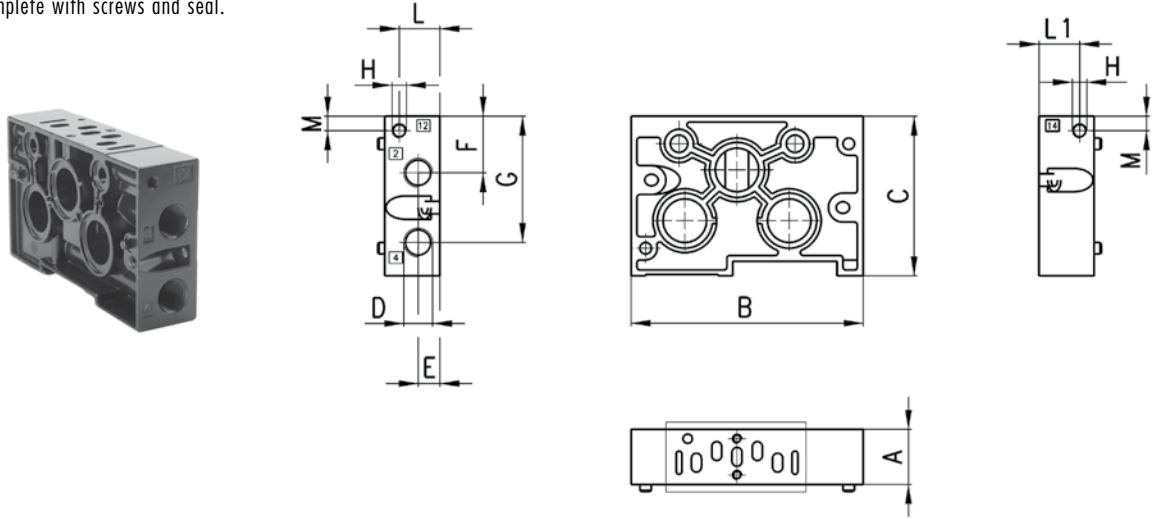


## DIMENSIONS

Mod.	Size ISO	B	B1	L1	L2	H	H1	Min. operating pressure	Symbol
<b>761-000-33</b>	26 mm	26,5	19	117,7	61,85	39	40,5	3 bar	VP08
<b>762-000-33</b>	18 mm	18,5	12,5	96,7	55,6	35,2	36,7	3 bar	VP08
<b>771-000-33</b>	26 mm	26,5	19	117,7	61,85	39	40,5	3 bar	VP09
<b>772-000-33</b>	18 mm	18,5	12,5	96,7	55,6	35,2	36,7	3 bar	VP09
<b>781-000-33</b>	26 mm	26,5	19	117,7	61,85	39	40,5	3 bar	VP10
<b>782-000-33</b>	18 mm	18,5	12,5	96,7	55,6	35,2	36,7	3 bar	VP10

Manifold bases with common inlet and exhaust ports and with outlet ports on the front

**Note:** complete with screws and seal.

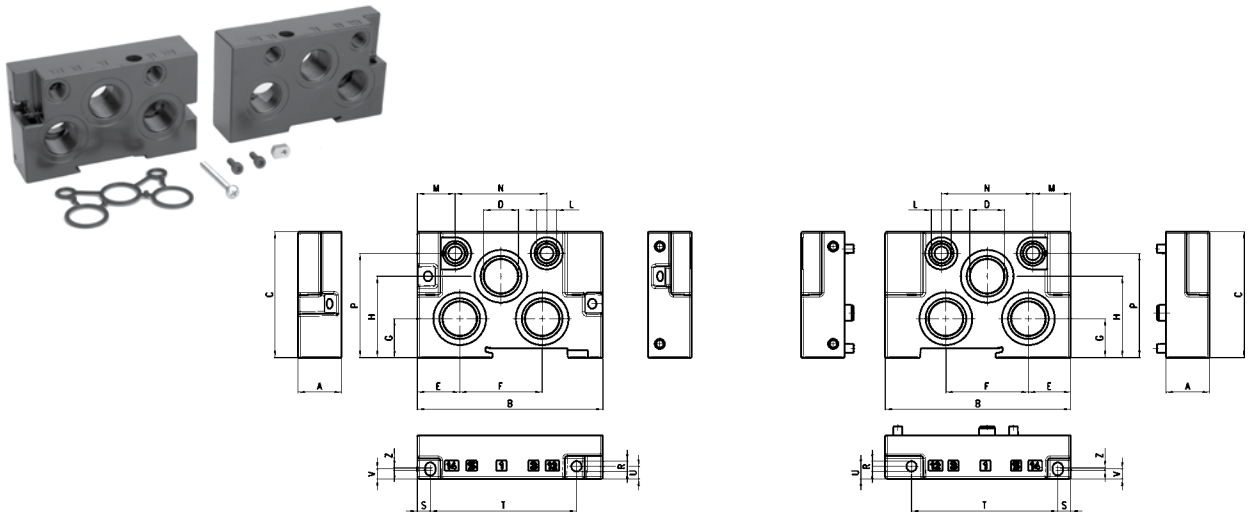


DIMENSIONS

		NPTF											
Mod.		Size ISO	A	B	C	D	E	F	G	H	L	L1	M
<b>701C-N1ATF</b>	for sub-base with separate pilots	26 mm	27	107	65	1/4	11	23	53	M5	20.7	20.7	6.5
<b>702C-N2ATF</b>	for sub-base with separate pilots	18 mm	19	81	55	1/8	7.5	19.5	44.5	M5	13	6	7
<b>701C-N1CTF</b>	for manifold pilot side ported	26 mm	27	107	65	1/4	11	23	53	M5	20.7	20.7	6.5
<b>702C-N2CTF</b>	for manifold pilot side ported	18 mm	19	81	55	1/8	7.5	19.5	44.5	M5	13	6	7

End blocks for manifold bases with common inlet and exhaust ports

**Note:** complete with screws and seal.

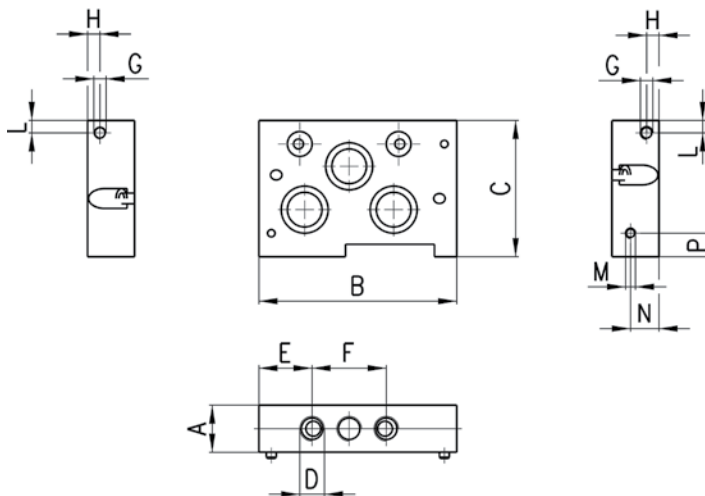


DIMENSIONS

		NPTF											NPTF						
Mod.	Size ISO	A	B	C	D	E	F	G	H	L	M	N	P	R	S	T	U	V	Z
<b>701C - HN1TF</b>	25 mm	27	107	65	1/2"	23	60	24.5	43	1/8	21.5	58	55.5	4.5	7.5	61.5	6	6.2	4
<b>702C - HN2TF</b>	18 mm	19	81	55	3/8"	18.5	36	17	35.5	1/8	16.5	40	45.5	4.5	4.65	63.85	5.5	4.35	1.3

Supply unit for manifold bases, (for auxiliary pressure supply or different pressure zones) with common inlet and exhaust ports

**Note:** complete with screws and seal.



DIMENSIONS

NPTF

Mod.	Size ISO	A	B	C	D	E	F	G	H	L	M	N	P
<b>701C-N1NTF</b>	26 mm	27	100	65	1/4	27	38	M5	6.5	10	M4	10	10
<b>702C-N2NTF</b>	18 mm	19	80	55	1/8	21.5	30	M5	5	5	M4	11.5	9.5

Diaphragm for manifold bases with common inlet and exhaust ports and with outlet ports on the front

Blocking Disc

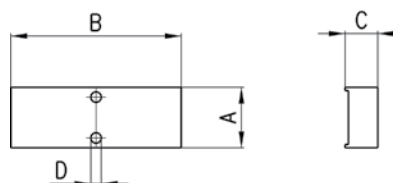


DIMENSIONS

Mod.	Size
<b>701C-N1A-TP</b>	01 (26 mm)
<b>702C-N2A-TP</b>	02 (18 mm)

Excluder tap - blanking plate for manifold bases

**Note:** complete with screws and seal.

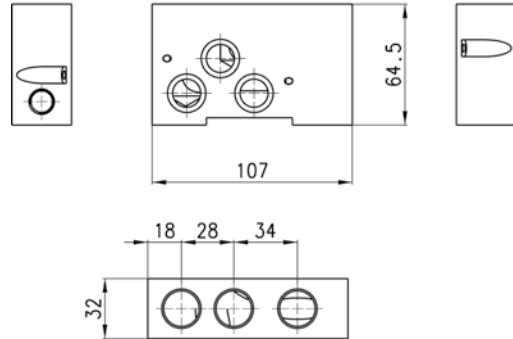


DIMENSIONS

Mod.	Size ISO	A	B	C	D
<b>701-TP</b>	26 mm	26.5	61.7	10	4.2
<b>702-TP</b>	18 mm	18.5	52.2	10	3.2

## Interfacd ISO 01 / ISO 02 - adapter: from 26mm (01) to 18mm (02)

The following is supplied:  
 N° 1 tap S2610 3/8  
 N° 5 OR  
 N° 2 screws



Mod.

**701C-702C-A-TF**



Cv =

# 3

## AIR PILOT VALVES

# Series 7 - VDMA 24563 (ISO 15407-1) Regulator Plate ISO Size 01 (P-regulation) 26mm

For 26mm-ISO 01 size valves only.

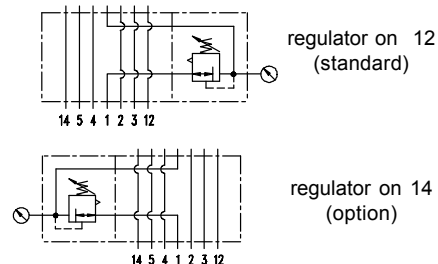
Part Number	ISO.01 P		
port size	VDMA 24563		
description	air line regulator with diaphragm and relieving feature		
mounting	arbitrary		
supply pressure	Pe max. 16 bar (not to exceed max. pressure of valve)		
reduced pressure	Pa 0.5-10 bar		
media and ambient			
temperature	max. 50°C (other temperature ranges available upon request)		
fixing	with connection board		
weight	0.340 kg		



Gauges supplied separately, shown only for installation

**replacement parts** \* (repair kit: ESA-ISO.01)

no	description	material	order-no.
1	intermediate plate	Al	---
2	sealing frame ISO.01-6	NBR	5.1801.06.000
3	body	Al	---
4	spring cage ISO.01-9	PBTP - Ms	8.1801.09.000
5	diaphragm	NBR - Ms	*
6	regulating spring 0-10 bar	St. - galvanized	5.1801.11.000
7	valve cone	NBR - Ms	*
8	spring DR.00-70	niro	5.1500.70.000
			*



**ordering information**

**12**

**ISO.01 P 14**

type

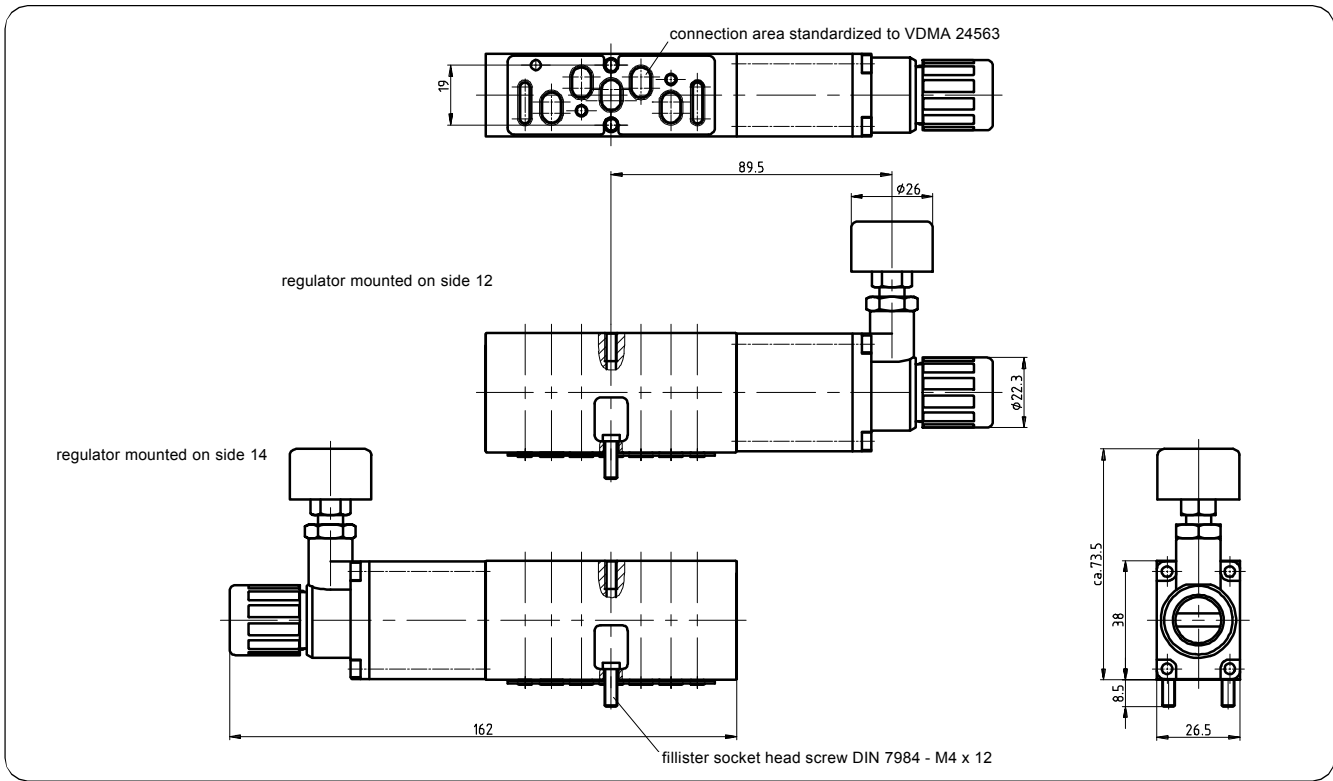
1 port side

**ordering example: ISO.01 P 14**

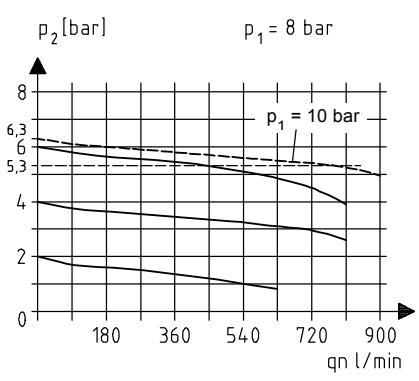
**application information**

– adjusting knob can be locked by depressing

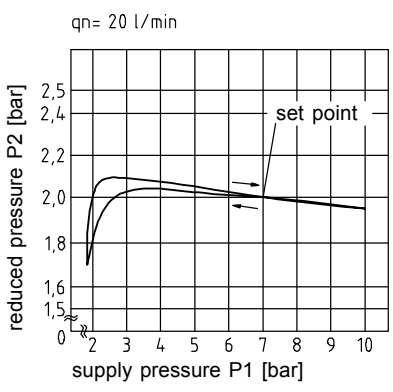
Dimensions (mm)



flow characteristics



pressure characteristics



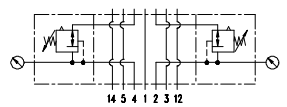
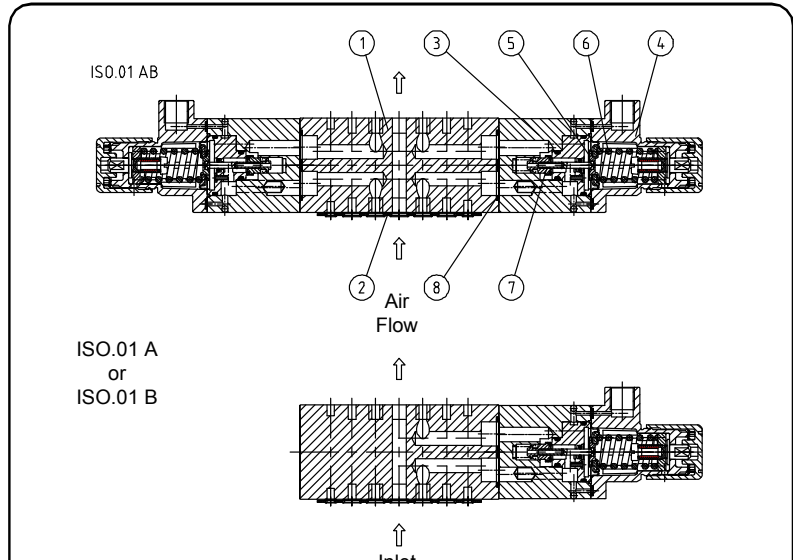
# Series 7 - VDMA 24563 (ISO 15407-1) Regulator Plate ISO Size 01 (AB-regulation) 26mm

For 26mm-ISO 01 size valves only.

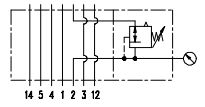
Part Number	ISO.01AB	ISO.01A	ISO.01B
port size	regulation on 4 & 2	regulation on 4	regulation on 2
	VDMA 24563		
description	air line regulator with diaphragm and relieving feature		
mounting	arbitrary		
supply pressure	Pe max. 16 bar (not to exceed max. pressure of valve)		
reduced pressure	Pa 0.5-10 bar		
media and ambient			
temperature	max. 50°C (other temperature ranges available upon request)		
fixing	with connection board		
weight	0.470 kg		0.340 kg



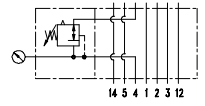
Gauges supplied separately, shown only for installation



regulation at 4 u. 2



regulation at 2



regulation at 4

ordering information	key
ISO.01	AB
ISO.01	A(4)
ISO.01	B(2)
type	
1 port side	

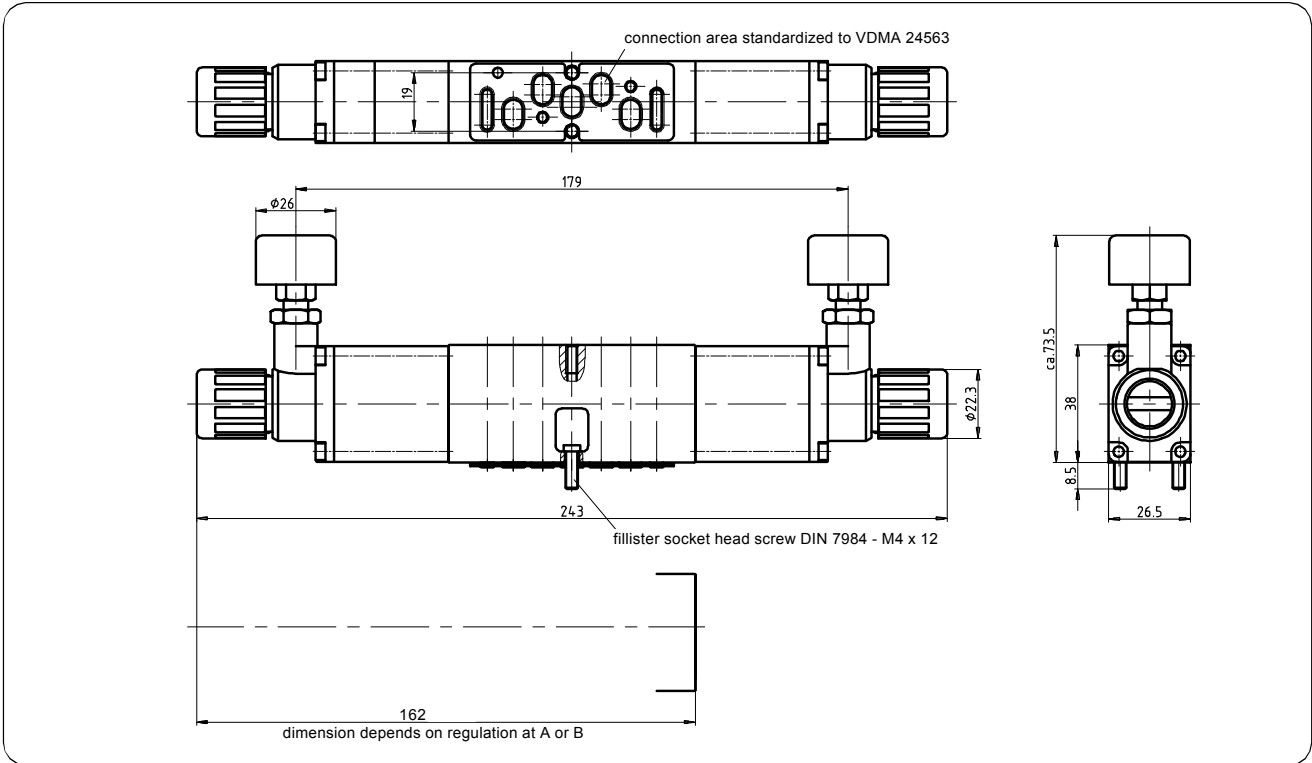
**replacement parts** \* (repair kit: ESA-ISO.01)

no	description	material	order-no.
1	intermediate plate	Al	---
2	sealing frame ISO.01-6	NBR	5.1801.06.000
3	body	Al	---
4	spring cage ISO.01-9	PBTP - Ms	8.1801.09.000
5	diaphragm	NBR - Ms	*
6	regulating spring 0-10 bar	St. - galvanized	5.1801.11.000
7	valve cone	NBR - Ms	*
8	spring DR.00-70	niro	5.1500.70.000
			*

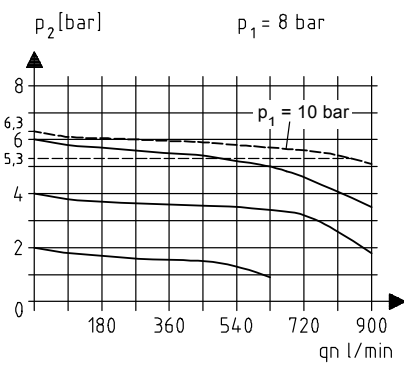
**application information**

- adjusting knob can be locked by depressing

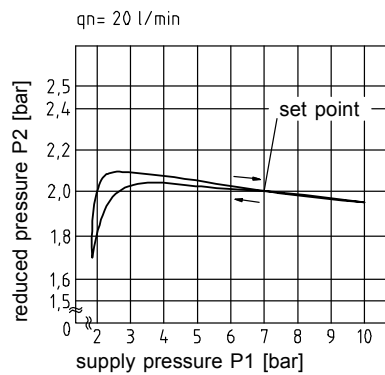
Dimensions (mm)



flow characteristics



pressure characteristics



## Series 9 Air-Pilot Operated Valves

Cv= .95 - 4.57

Assembly with sub-base (ISO 5599/1 Standards) non-plug-in  
 Sizes 1, 2 and 3: 5-way/2-position; 5-way/3-position; single & double Air-Pilot valves.

The Series 9 Air-Pilot operated valves have been manufactured in the sizes 1, 2 and 3, as recommended by the ISO Standards. Three different types of sub-base are available:

- single sub-base with side ports
- single sub-base with rear ports
- manifold sub-base with common exhausts complete with end blocks.

The Series 9 solenoid valves are also constructed so as to be actuated in different ways:

- Air-Pilot and spring return
- Air-Pilot and return
- Air-Pilot and differential
- Air-Pilot return (bias override)



### TECHNICAL SPECIFICATIONS

Construction	spool-type (servocontrolled) packed bore
Valve group	5-way/2-position and 5-way/3-position
Materials	Anodized aluminum body, stainless steel spool, BUNA-N seals
Mounting	threaded holes in sub-base
Size	1, 2 and 3 according to ISO 5599/1 standard
Installation	in any position
Operating temperature	0 - 60°C (using dry air at -20°C) (32°F — 140°F) (using dry air at -4°F)

### PNEUMATIC DATA

Operating pressure	max. press. 10 bar (for minimum pressures see descriptions); 145 psi max
Nominal pressure	6 bar (87 psi) nominal
Nominal flow	* Qn Size 1 = 900 NL/min; 31.8 SCFM, Cv= .95
	Size 2 = 1610 NL/min; 56.8 SCFM, Cv= 1.69
	Size 3 = 4350 NL/min; 153.6 SCFM, Cv= 4.57
Fluid	filtered air, without lubrication (25 micron or less recommended)**
*Qn = determined with supply pressure of 6 bar and with $\Delta p = 1$ bar. **If lubricated air is used, it is recommended to use ISOVG32 oil and to never interrupt the lubrication.	

## CODING OF SERIES 9 SOLENOID VALVES WITH SUB-BASE

9	5	1	-	C	1	B	-	P16	-	23	-	U	7	7	TF
<b>9</b>	SERIES														
<b>5</b>	NUMBER OF WAYS - POSITIONS: 5 = 5/2 6 = 5/3 CC 7 = 5/3 CO														
<b>1</b>	SIZE: 1 = size 1 2 = size 2 3 = size 3														
<b>C</b>	SUB-BASE: C = ISO (manifold outlets) F = ISO (single sub-base, side ports) G = ISO (single sub-base, rear ports) N = ISO (front outlet interface) N1A = (front outlet sub - base )														
<b>1</b>	PORTS - OUTLETS: Size 1 = 1/4 NPTF Size 2 = G3/8 Size 3 = G1/2														
<b>B</b>	NUMBER OF SUB-BASES: A = 1 *B = 2 *C = 3 *D = 4 *E = 5 *F = 6 *G = 7 *H = 8 *K = 9 *L = 10 *M = 11 *N = 12 *P = 13 *R = 14 *S = 15														
<b>P 16</b>	ACTUATION: 33 = pneumatic, pneumatic return 34 = pneumatic, differential pneumatic return 35 = pneumatic, mechanical spring return P11 = double solenoid (horizontal solenoids) P15 = single solenoid, spring return (horizontal solenoids) P16 = solenoid, pneumatic spring return (horizontal solenoids)														
<b>23</b>	SOLENOID INTERFACE: 23 = A531 - BC2														
<b>U</b>	SOLENOID MATERIAL: U = PET G = PA A8 = PPS H8 = PA 6 VO														
<b>7</b>	SOLENOID DIMENSIONS: 7 = 22 x 22 8 = 30 x 30 9 = 22 x 58														
<b>7</b>	SOLENOID VOLTAGE: see the solenoids section in Master Catalog														
<b>TF</b>	TF = NPTF ports blank = BSP ports														

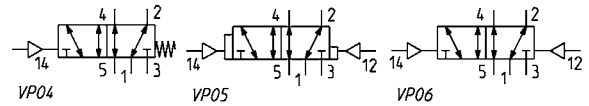
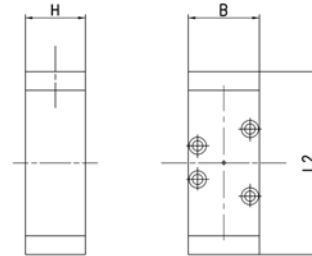
5-way/2-position valves, ISO 1, ISO 2, ISO 3, spring return and detented

Cv = .95 - 4.97

The Series 9 valves with ISO interface, size 1, 2 and 3, are available with the following types of actuation:

- pneumatic, with spring return (min. press. 2.5 bar) (36 psi)
- pneumatic actuation and differential return (min. press. 2 bar) (29 psi)
- pneumatic actuation and return (min. press. 2 bar) (29 psi)

**Note:** Packaging with ISO solenoid valves includes interface seals and fixing screws.



DIMENSIONS

Mod.	Size ISO	B	L2	H	Min. operating pressure	Symbol
951-000-35	1	38	98	32	2,5	VP04
952-000-35	2	51	118	33	2,5	VP04
953-000-35	3	65	163	45	2,5	VP04
951-000-34	1	38	98	32	2	VP05
952-000-34	2	51	118	33	2	VP05
953-000-34	3	65	163	45	2	VP05
951-000-33	1	38	98	32	2	VP06
952-000-33	2	51	118	33	2	VP06
953-000-33	3	65	163	45	2	VP06

5-way/3-position valve, ISO 1, ISO 2, ISO 3, spring return, with stable central position

Cv = .95 - 4.57

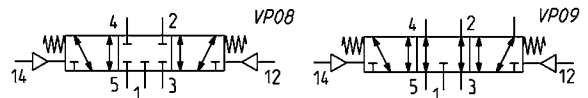
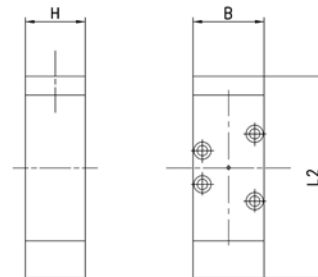
The Series 9 valves with ISO interface, size 1, 2 and 3, are available with pneumatic actuation and central return by a spring.

There are two types of function:

- with closed center
- with open center.

The minimum operating pressure is 2.5 bar. (36 psi)

**Note:** Packaging with ISO solenoid valves includes interface seals and fixing screws.

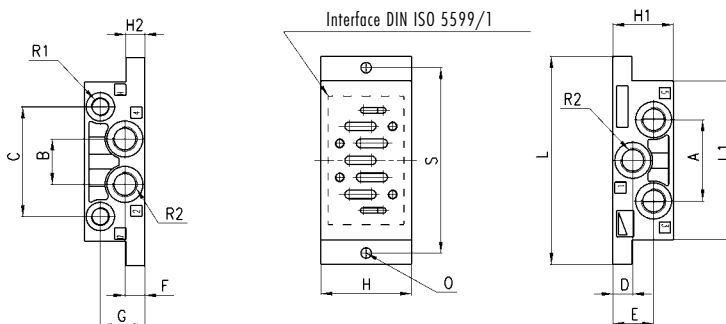


DIMENSIONS

Mod.	Size ISO	B	L2	H	Min. operating pressure	Symbol
961-000-33	1	38	108	32	2,5	VP08
962-000-33	2	51	128	33	2,5	VP08
963-000-33	3	65	173	45	2,5	VP08
971-000-33	1	38	108	32	2,5	VP09
972-000-33	2	51	128	33	2,5	VP09
973-000-33	3	65	173	45	2,5	VP09



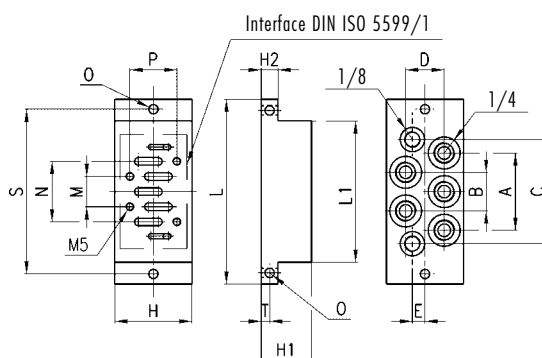
Single sub-base side outlets (VDMA 24345)



DIMENSIONS

DIMENSIONS		NPTF															
Mod.	Size	A	B	C	D	E	F	G	H	H1	H2	L	L1	O	R1	R2	S
<b>901-F1A TF</b>	1	43	24	58	21.5	10.5	10.5	23.5	48	32	10	110	84	5.5	1/8	1/4	98
<b>902-F2A TF</b>	2	56	30	74	26	14	14	30	57	40	13	124	95	6.5	1/8	3/8	112
<b>903-F3A TF</b>	3	68	32	90	17	17	17	22	71	32	18	149	119	6.5	1/8	1/2	136

Single sub-base with rear outlets (VDMA 24345)

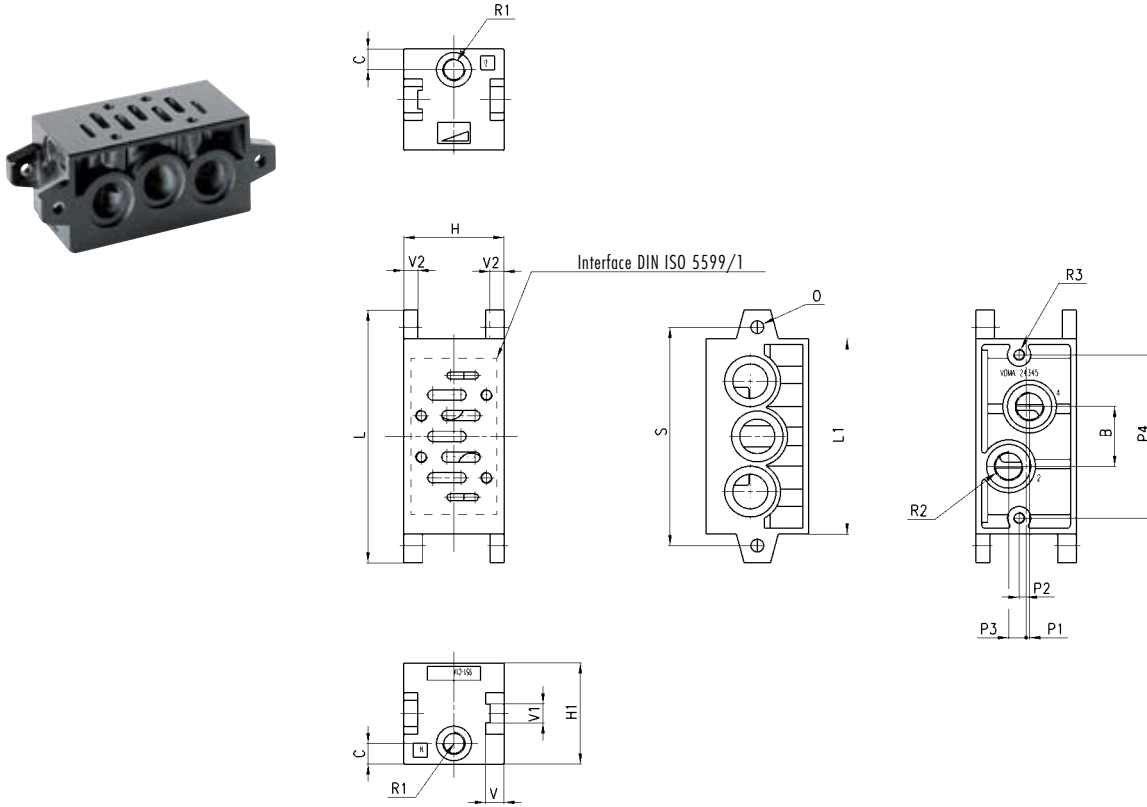


DIMENSIONS

DIMENSIONS		NPTF																		
Mod.	Size ISO	A	B	C	D	E	H	H1	H2	L	L1	M	N	O	P	R	R1	R2	S	T
<b>901-G1A TF</b>	1	46	23	61	23	7.5	46	30	10	110	84	18	36	5.5	28	M5	1/8	1/4	98	5
<b>902-G2A TF</b>	2	56	28	72	28	8	56	35	13	124	95	24	48	6.5	38	M6	1/8	3/8	112	6.5
<b>903-G3A TF</b>	3	68	34	90	34	10	71	32	18	149	119	32	64	6.5	48	M8	1/8	1/2	136	9

Manifold sub-base with common exhausts and inlet (VDMA 24345):(bottom outlets)

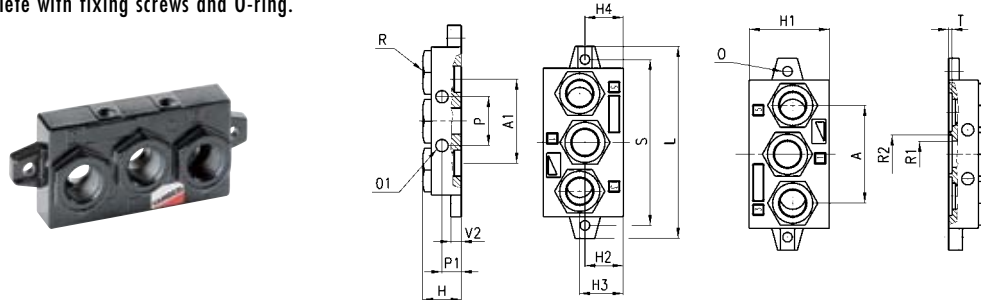
**Note:** complete with fixing screws and O-ring.



DIMENSIONS		NPTF																	
Mod.	Size	B	C	H	H1	L	L1	O	P1	P2	P3	P4	R1	R2	R3	S	V	V1	V2
<b>901-C1A TF</b>	1	26	8.5	43	44	110	85	5.5	1.5	3	7.5	71	1/8	1/4	M5	95	8	8	6
<b>902-C2A TF</b>	2	30	9	56	45	135	100	6.5	5	3	6	86	1/8	3/8	M6	115	11	11	8
<b>903-C3A TF</b>	3	38	10	71	54	190	140	9	6	3	8	130	1/8	1/2	M8	168	13	13	8

End block for manifold sub-base (VDMA 24345): for use with "C" manifolds only

**Note:** complete with fixing screws and O-ring.

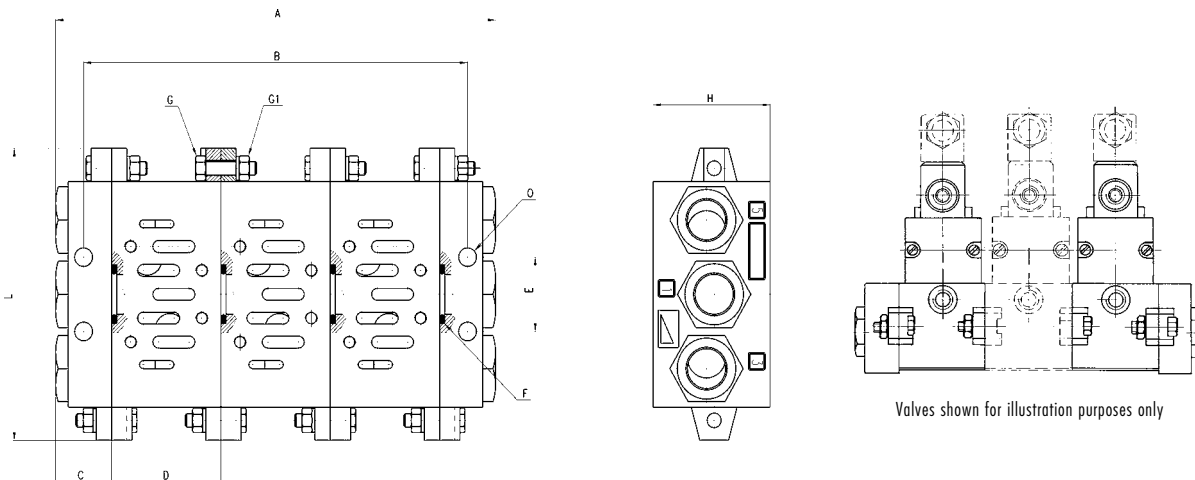


DIMENSIONS		NPTF																	
Mod.	Size	A	A1	H	H1	H2	H3	H4	L	O	O1	P	P1	R	øR1	øR2	S	T	V2
<b>901-H1 TF (pair)</b>	1	56	48	22	46	22	25	22	110	5.5	7	28	11	3/8	15	22.1	95	2	6
<b>902-H2 TF (pair)</b>	2	68	63	26	47	23	25	24	135	6.5	9	35	13	1/2	18.5	28.7	115	2	8
<b>903-H3 TF (pair)</b>	3	104	94	30	56	22	25	25	190	9	12	52	15	1	28	38	168	2.7	8

Assembly of manifold sub-base (VDMA 24345) assembly dimensions for "C" manifold with "H" end plates

Manifold assembly with valves

(with "C" manifolds & "H" end-blocks)

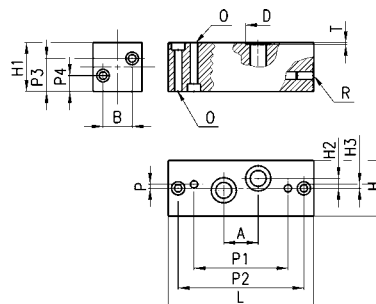


DIMENSIONS

Size	A	B	C	D	E	F	G	G1	H	L	O	
						O-Ring Part No.	UNI 5739	UNI 5588				
	n° D+2C	n° D+C										
1			22	43	28	3068	M5x20	M5	46	110	7	
2	n° D+2C	n° D+C	26	56	35	3093	M6x25	M6	47	135	9	
3	n° D+2C	n° D+C	30	71	52	4125	M8x25	M8	56	190	12	

Manifold segment adapter with front outlets (VDMA 24345): for use with "C" manifold to adapt to end outlets

**Note:** complete with fixing screws and O-ring.

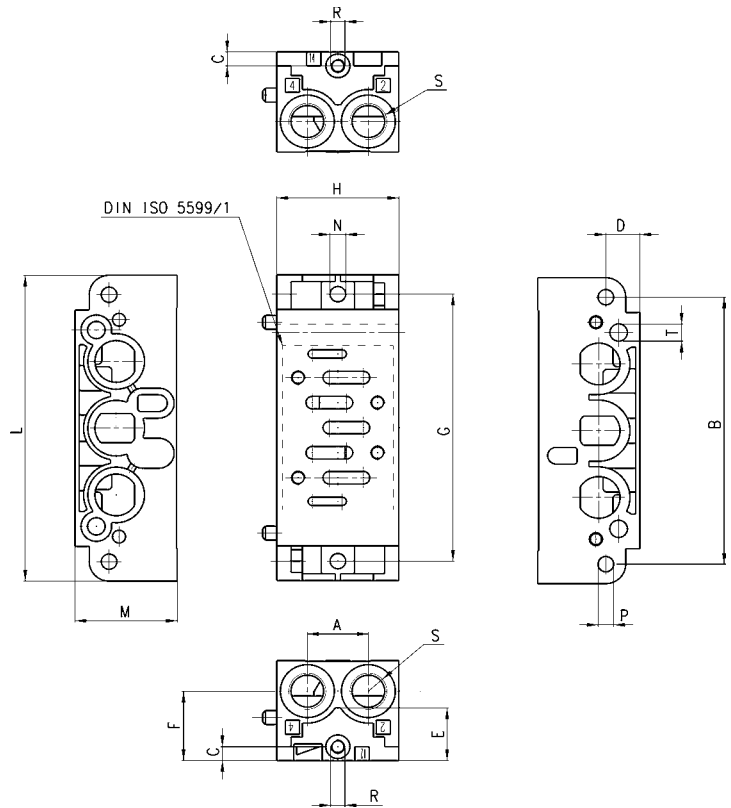


DIMENSIONS

DIMENSIONS												NPTF					
Mod.	Size	A	B	D	H	H1	H2	H3	L	O	P	P1	P2	P3	P4	R	T
<b>901-N1 TF</b>	1	26	22	19	42	37	7.5	1.5	110	5.5	3	71	95	25	12	1/4	1.4
<b>902-N2 TF</b>	2	30	29	23	55	40	6	5	135	6.5	3	86	115	26	14	3/8	1.4
<b>903-N3 TF</b>	3	38	36	27	70	45	8	6	190	9	3	130	168	29	17	1/2	1.4

Manifold bases with common inlet and exhaust ports and with outlet ports on the front (end)

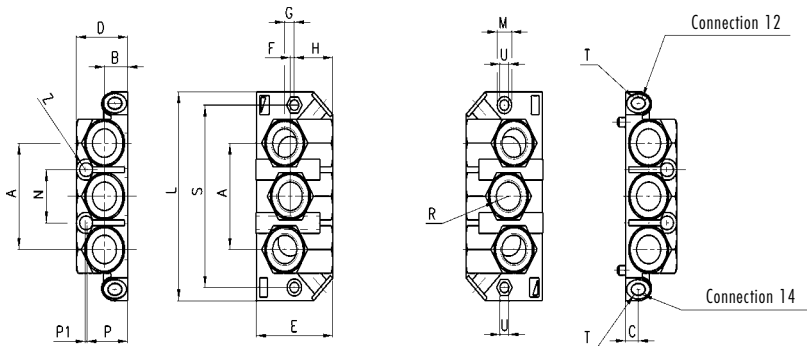
**Note:** complete with fixing screws and O-ring.



DIMENSIONS		NPTF														
Mod.	Size	A	B	C	D	E	F	G	H	L	M	N	P	R	S	T
<b>901-N1A TF</b>	1	21.5	96	5	12	19	25	96	43	110	36	5.5	5.5	M5	1/4	6.2

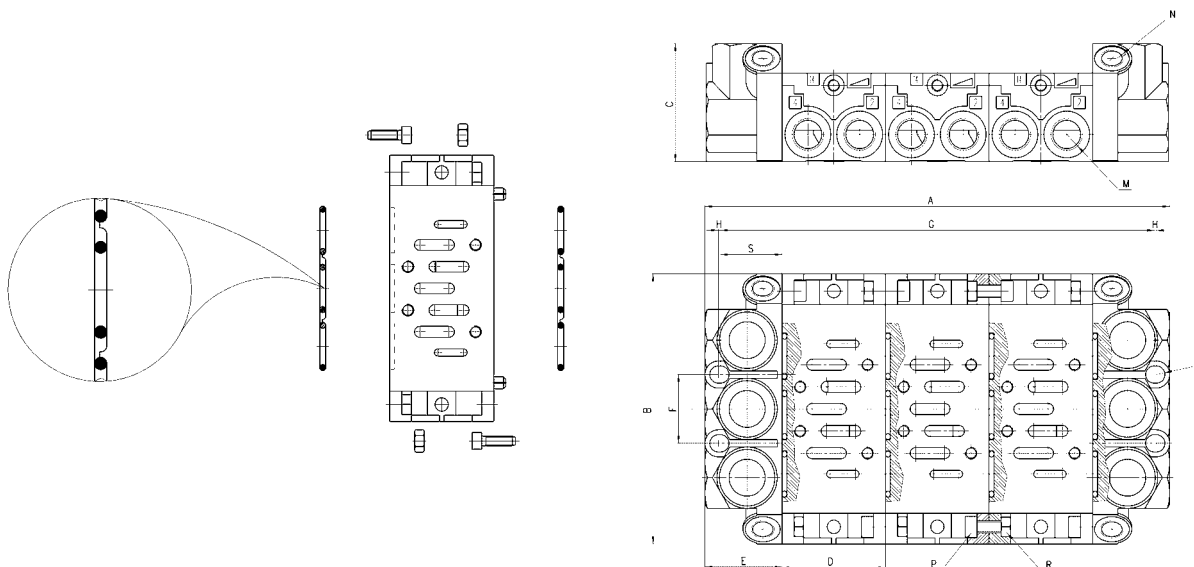
End blocks for manifold bases with front outlets: for use with "N1A" manifold units

**Note:** complete with fixing screws and O-ring.



DIMENSIONS		NPTF														NPTF			
Mod.	Size	A	B	C	D	E	F	G	H	L	M	N	P	P1	R	S	T	U	Z
<b>901-HN1 TF (pair)</b>	1	56	14.5	8	32	48	2.5	6	24	110	9	28	25.5	1	3/8"	96	1/8	5.5	3.5

Assembly for front outlet manifold sub-bases: (shown with "N1A" & "HN1" assembly dimensions in mm units)



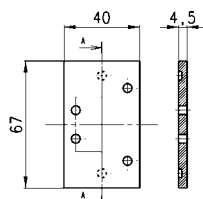
**DIMENSIONS**

**NPTF**

Size	A	B	C	D	E	F	G	H	L	M	N	UNI 5931		UNI 5588	
												P	R	S	
1	N° D+2E	110	48	43	32	28	n° D+2S	1	3.5	1/4	1/8	M5 x 14	M5	25.5	

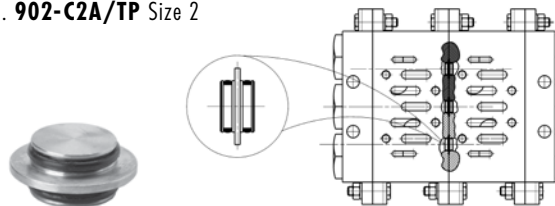
**Mod. 901-TP (ISO size 1 only)**

Cover plate for the positions which are not used.  
Complete with seals and screws.



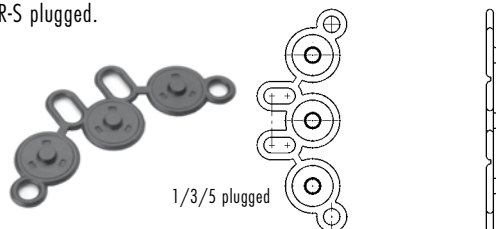
**Example of assembly - blocking discs**

Separation tap lines 1/3/5 to be used with manifold type 901C - 902C.  
Mod. **901-C1A/TP** Size 1  
Mod. **902-C2A/TP** Size 2



**Mod. 901-N1A/T - full blocking gasket**

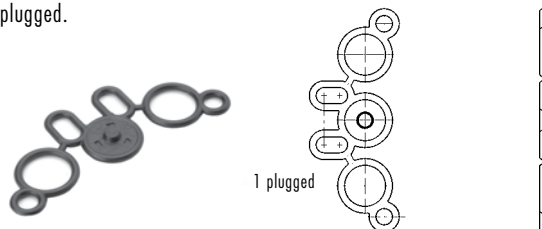
Separation joint to be used with manifold type 901N.  
P-R-S plugged.



(ISO size 1 only)

**Mod. 901 - N1A/TP - pressure blocking gasket**

Separation joint to be used with manifold type 901N.  
P plugged.



(ISO size 1 only)

# Series 9 - ISO 5599/1 Regulator Plate ISO Size 1 (P-regulation) Size 1

For ISO Size 1 valves only.

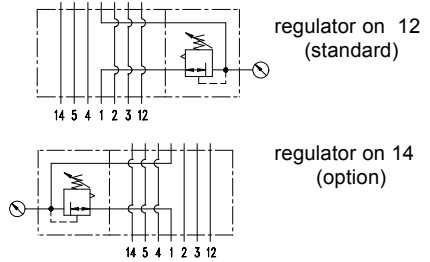
Part Number	ISO.1 P		
port size	DIN ISO 5599/1		
description	air line regulator with diaphragm and relieving feature,		
mounting	arbitrary		
supply pressure	Pe max. 16 bar (not to exceed max. pressure of valve)		
reduced pressure	Pa 0.5-12 bar		
media and ambient			
temperature	max. 50°C (other temperature ranges available upon request)		
fixing	with connection board		
weight	0.374 kg (without gauge)		



Gauges supplied separately, shown only for installation

**replacement parts** \* (repair kit: ESA-ISO.1)

no	description	material	order-no.
1	intermediate plate	zinc - Z 410	---
2	sealing frame ISO 1-58	NBR	9.9911.00.056
3	sealing frame ISO 1-59	NBR	*
4	body	zinc - Z 410	---
5	spring cage C.00-72	POM - Ms	8.2100.72.000
6	regulating spring C.11-66	St. - galvanized	5.2111.66.000
7	diaphragm	NBR - Ms	*
8	valve cone	NBR - Ms	*
9	spring C.11-87	niro	5.2111.87.000
10	spring cage lockable C.11-K	POM - Al	8.2111.72.001
11	lock cylinder C.33-52	Ms	5.2133.52.000



**ordering information key**

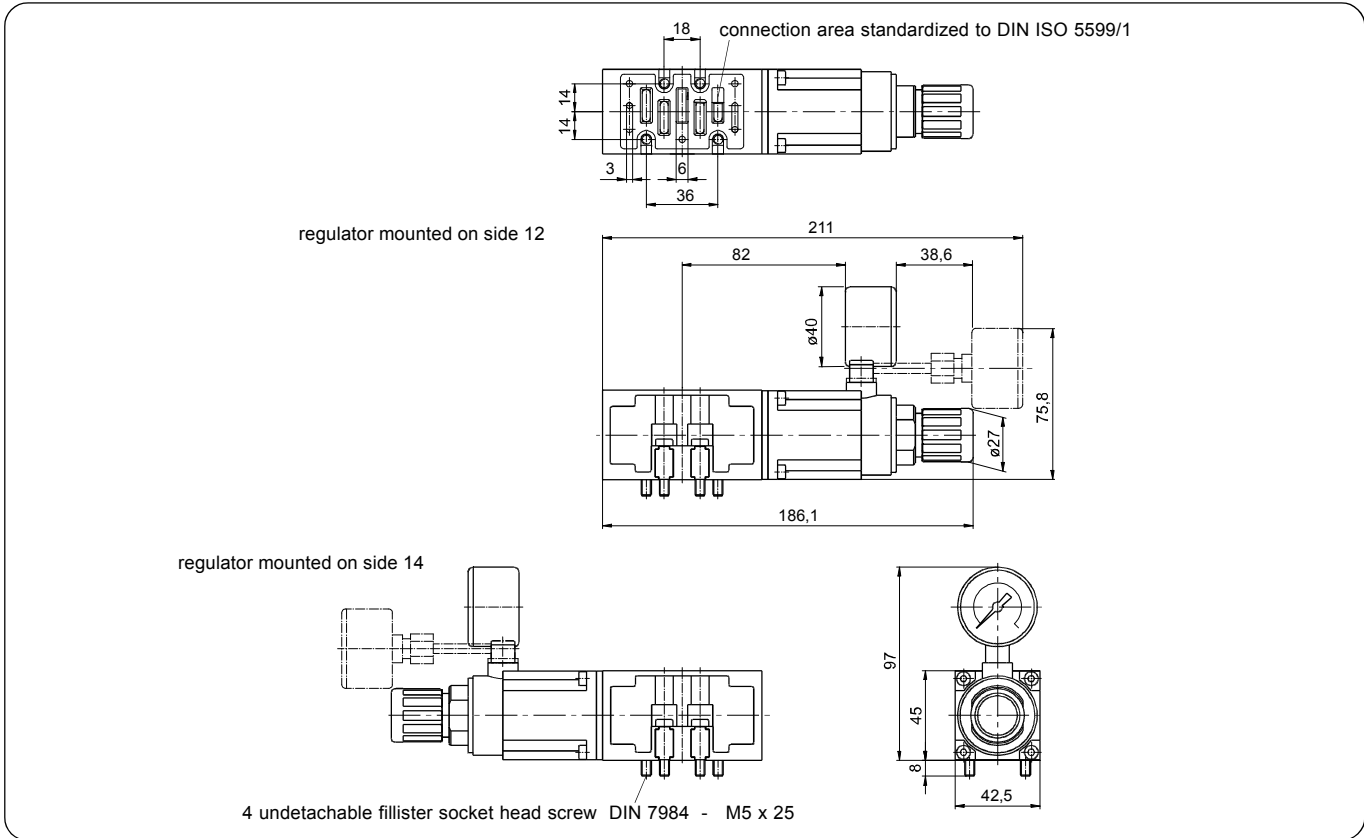
	<b>12</b>
<b>ISO.1 P</b>	<b>14</b>
type	
1 port side	

**ordering example: ISO.1 P 14**

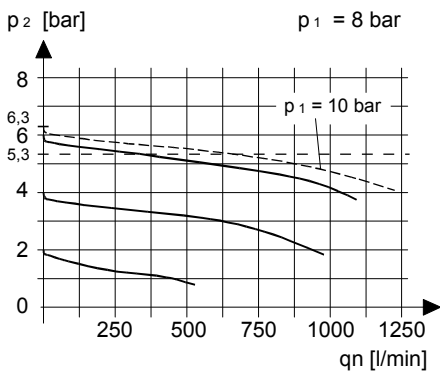
**application information**

- adjusting knob can be locked by depressing

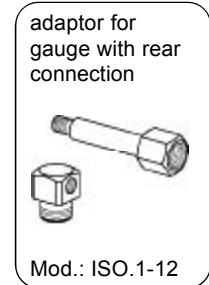
Dimensions (mm)



flow characteristics



accessories



# Series 9 - ISO 5599/1 Regulator Plate ISO Size 1 (AB-regulation) Size 1

For ISO Size 1 valves only.

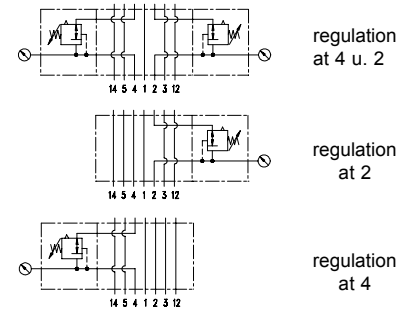
Part Number	ISO.1 AB	ISO.1 A	ISO.1 B
port size	regulation on 4 u. 2	regulation on 4	regulation on 2
	DIN ISO 5599/1		
description	air line regulator with diaphragm and relieving feature		
mounting	arbitrary		
supply pressure	Pe max. 16 bar (not to exceed max. pressure of valve)		
reduced pressure	Pa 0.5-12 bar		
media and ambient			
temperature	max. 50°C (other temperature ranges available upon request)		
fixing	with connection board		
weight	0.585 kg	0.374 kg	0.374 kg
	without gauge	without gauge	without gauge



Gauges supplied separately, shown only for installation

**replacement parts** \* (repair kit: ESA-ISO.1)

no	description	material	order-no.
1	intermediate plate	zinc - Z 410	---
2	sealing frame ISO 1-58	NBR	9.9911.00.056
3	sealing frame ISO 1-59	NBR	*
4	body	zinc - Z 410	---
5	spring cage C.00-72	POM - Ms	8.2100.72.000
6	regulating spring C.11-66	St. - galvanized	5.2111.66.000
7	diaphragm	NBR - Ms	*
8	valve cone	NBR - Ms	*
9	spring C.11-87	niro	5.2111.87.000
10	spring cage lockable C.11-K	POM - Al	8.2111.72.001
11	lock cylinder C.33-52	Ms	5.2133.52.000



**ordering information**

ISO.1	key
ISO.1	AB
ISO.1	A(4)
ISO.1	B(2)

type

1] port size

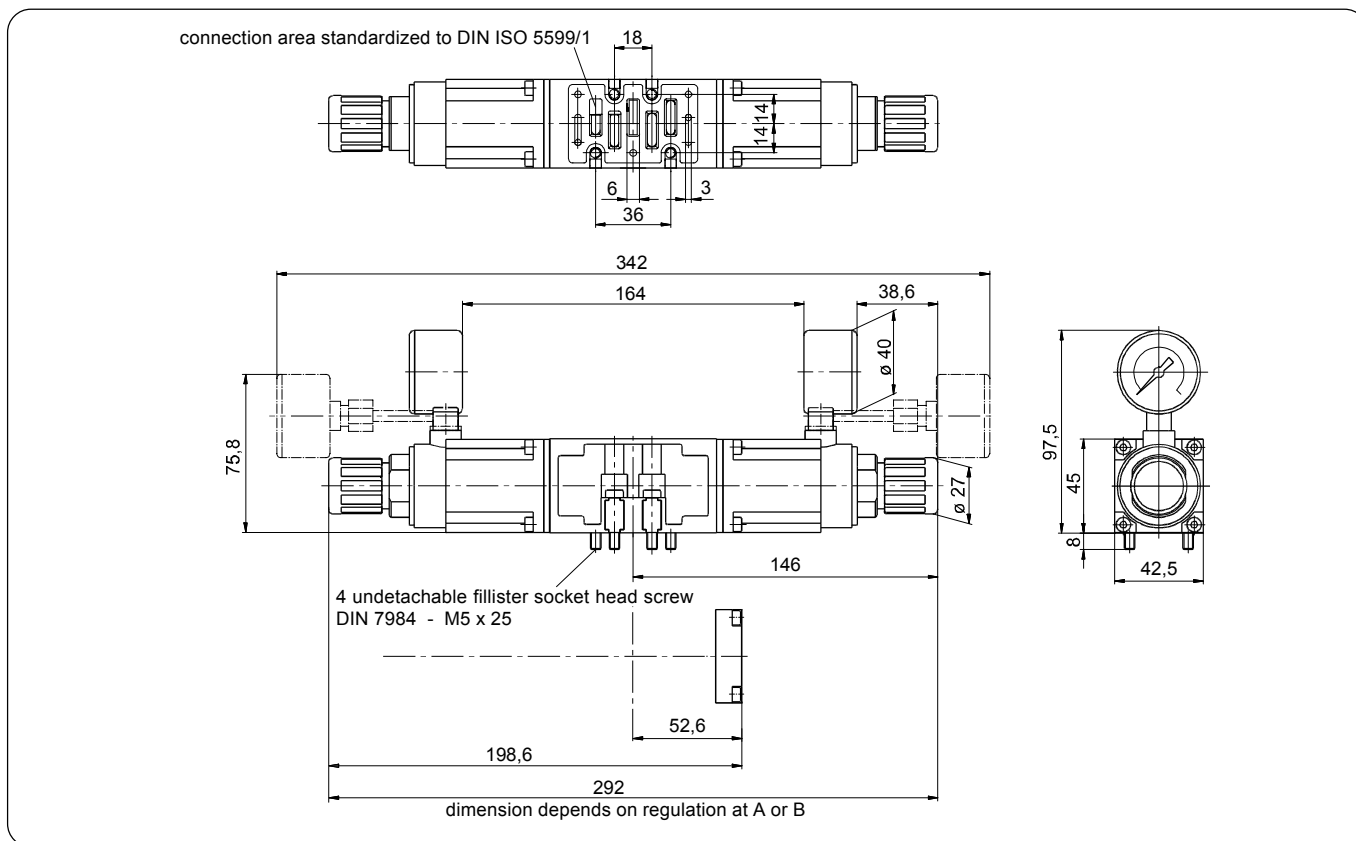
ordering example: ISO.1 AB

**application information**

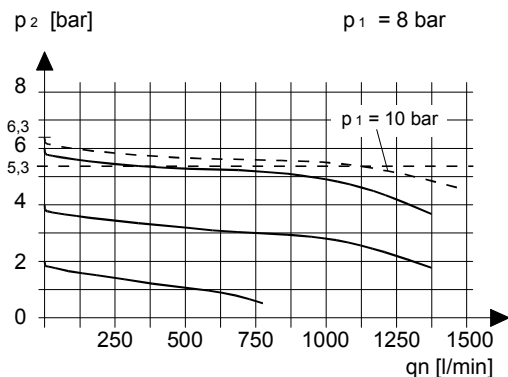
- adjusting knob can be locked by depressing



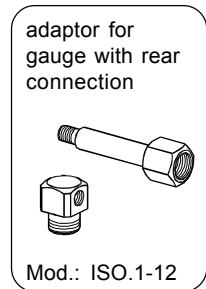
Dimensions (mm)



flow characteristics



accessories



# Series 9 - ISO 5599/1 Regulator Plate ISO Size 2 (P-regulation) Size 2

For ISO Size 2 valves only.

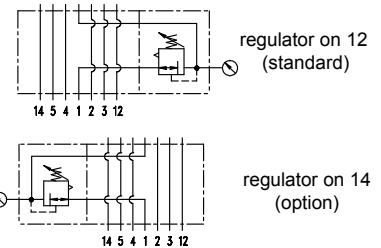
Part Number	ISO.2 P		
port size	DIN ISO 5599/1		
description	air line regulator with diaphragm and relieving feature,		
mounting	arbitrary		
supply pressure	Pe max. 16 bar (not to exceed max. pressure valve)		
reduced pressure	Pa 0.5-12 bar		
media and ambient			
temperature	max. 50°C (other temperature ranges available upon request)		
fixing	with connection board		
weight	1.680 kg (without gauge)		



Gauges supplied separately, shown only for installation

**replacement parts** \*(repair kit: ESA-ISO.2)

no	description	material	order-no.
1	intermediate plate	Al	---
2	sealing frame ISO.2-5	NBR	5.1822.05.000
3	body	zinc - Z 410	---
4	spring cage C.22-72	POM - Ms	8.2122.72.000
5	diaphragm	NBR - Ms	*
6	regulating spring 0-12 bar	St. - galvanized	5.2122.83.000
7	valve cone	NBR - Ms	*
8	spring C.22-87	niro	5.2122.87.000
9	sealing frame	NBR	*
10	bonnet	Al	---



**ordering information key**

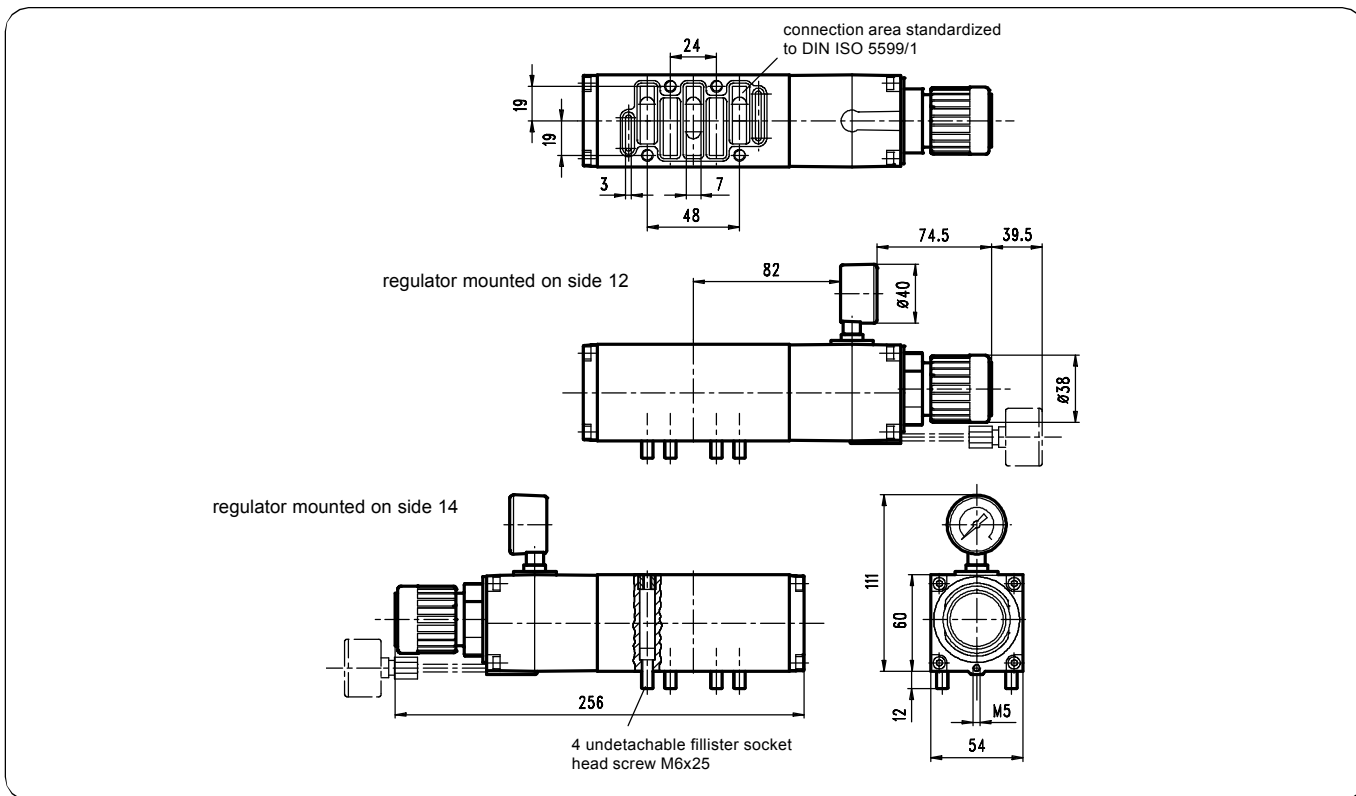
	<b>12</b>
<b>ISO.2 P</b>	<b>14</b>
type	
1 port side	

ordering example: ISO.2 P 14

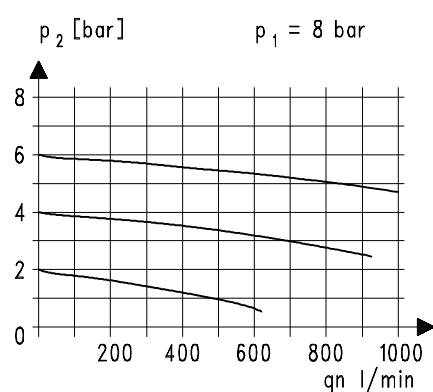
**application information**

- adjusting knob can be locked by depressing

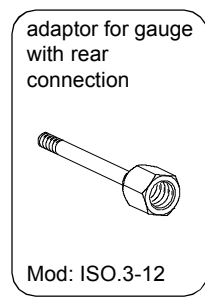
Dimensions (mm)



flow characteristics



accessories



# Series 9 - ISO 5599/1 Regulator Plate ISO Size 2 (AB-regulation) Size 2

For ISO Size 2 valves only.

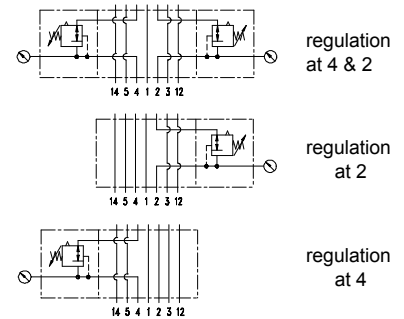
Part Number	ISO.2 AB	ISO.2 A	ISO.2 B
port size	regulation on 4 & 2	regulation on 4	regulation on 2
	DIN ISO 5599/1		
description	air line regulator with diaphragm and relieving feature		
mounting	arbitrary		
supply pressure	Pe max. 16 bar (not to exceed max. pressure valve)		
reduced pressure	Pa 0.5-12 bar		
media and ambient temperature	max. 50°C (other temperature ranges available upon request)		
fixing	with connection board		
weight	2.400 kg (without gauge)		



Gauges supplied separately, shown only for installation

**replacement parts** \* (repair kit: ESA-ISO.2)

no	description	material	order-no.
1	intermediate plate	Al	---
2	sealing frame ISO.2-5	NBR	5.1822.05.000
3	body	zinc - Z 410	---
4	spring cage C.22-72	POM - Ms	8.2122.72.000
5	diaphragm	NBR - Ms	*
6	regulating spring 0-12 bar	St. - galvanized	5.2122.83.000
7	valve cone	NBR - Ms	*
8	spring C.22-87	niro	5.2122.87.000
9	sealing frame	NBR	*



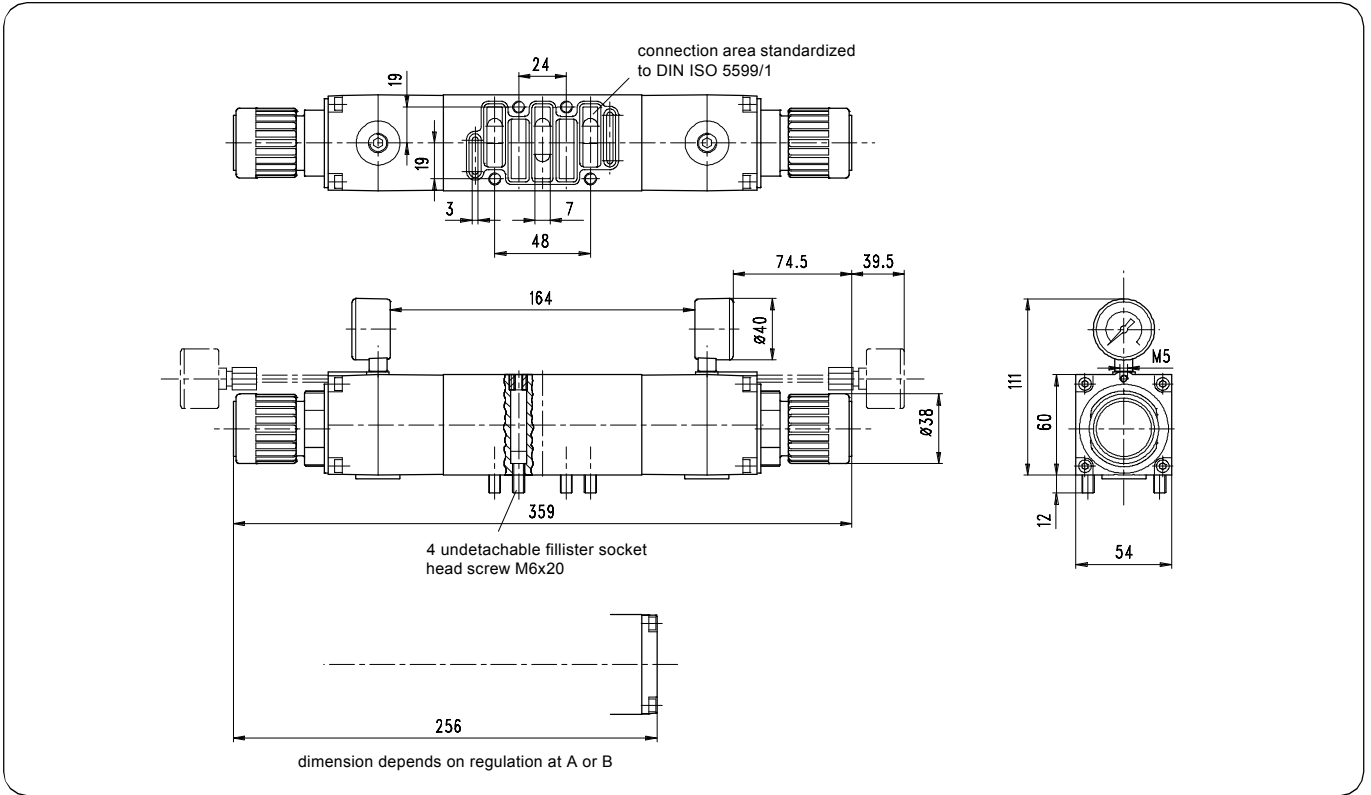
ordering information	key
<b>ISO.2 AB</b>	<b>AB</b>
<b>ISO.2 A (4)</b>	<b>A(4)</b>
<b>ISO.2 B (2)</b>	<b>B(2)</b>
type	
1 port side	

ordering example: ISO.2 AB

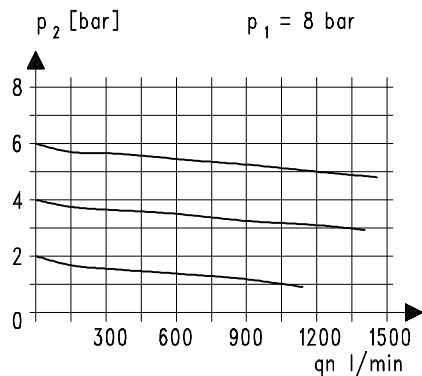
### application information

- adjusting knob can be locked by depressing

Dimensions (mm)

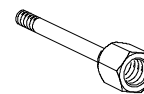


flow characteristics



accessories

adaptor for gauge with rear connection



Mod.: ISO.3-12

# Series 9 - ISO 5599/1 Regulator Plate ISO Size 3 (P-regulation) Size 3

For ISO Size 3 valves only.

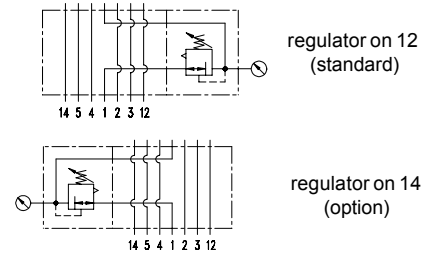
Part Number	ISO.3 P		
port size	DIN ISO 5599/1		
description	air line regulator with diaphragm and relieving feature		
mounting	arbitrary		
supply pressure	Pe max. 16 bar (not to exceed max. pressure of valve)		
reduced pressure	Pa 0.5-12 bar		
media and ambient			
temperature	max. 50°C (other temperature ranges available upon request)		
fixing	with connection board		
weight	2.210 kg (without gauge)		



Gauges supplied separately, shown only for installation

**replacement parts** \* ( repair kit: ESA-ISO.3 )

no	description	material	order-no.
1	intermediate plate	Al	---
2	sealing frame ISO.3-5	NBR	5.1833.05.000
3	body	Al	---
4	spring cage	POM - Ms	8.2133.72.000
5	diaphragm	NBR - Ms	*
6	regulating spring 0-12 bar	St. - galvanized	5.2133.08.000
7	valve cone	NBR - Ms	*
8	spring C.33-22	niro	5.2133.22.000
9	sealing frame	NBR	*
10	bonnet	Al	---
11	spring cage lockable C.33-K	POM - Al	8.2133.72.001
12	lock cylinder C.33-52	Ms	5.2133.52.000



### ordering information

ISO.3 P 12  
14

type

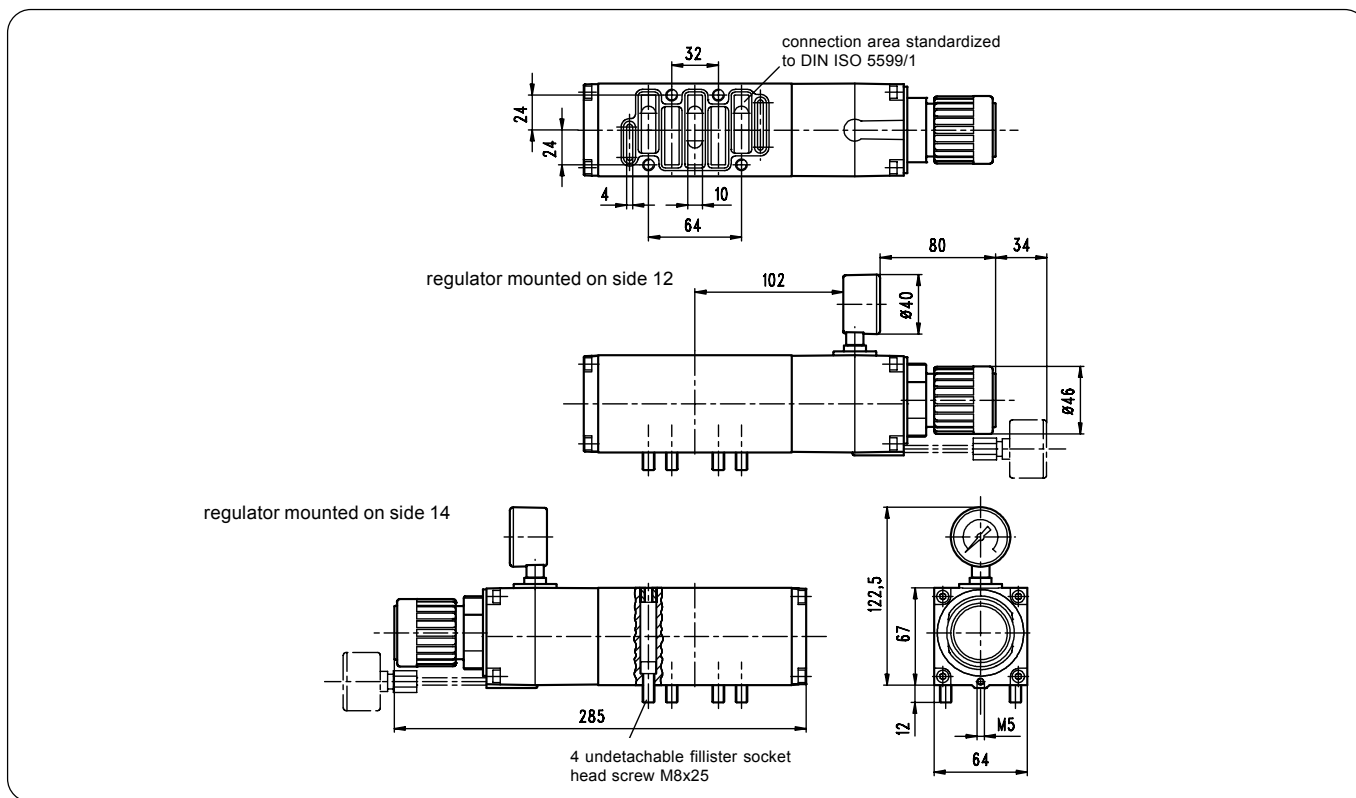
port side

ordering example: ISO.3 P 14

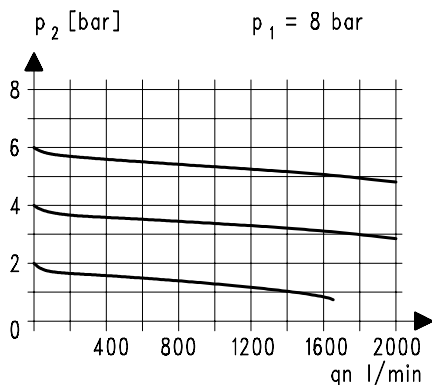
### application information

– adjusting knob can be locked by depressing

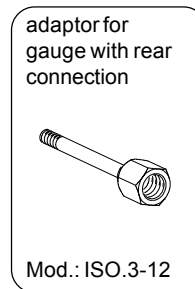
Dimensions (mm)



flow characteristics



accessories



# Series 9 - ISO 5599/1 Regulator Plate ISO Size 3 (AB-regulation) Size 3

For ISO Size 3 valves only.

Part Number	ISO.3 AB	ISO.3 A	ISO.3 B
port size	regulation at 4 & 2	regulation at 4	regulation at 2
	DIN ISO 5599/1		
description	air line regulator with diaphragm and relieving feature		
mounting	arbitrary		
supply pressure	Pe max. 16 bar (not to exceed max. pressure of valve)		
reduced pressure	Pa 0.5-12 bar		
media and ambient			
temperature	max. 50°C (other temperature ranges available upon request)		
fixing	with connection board		
weight	3.200 kg (without gauge)		

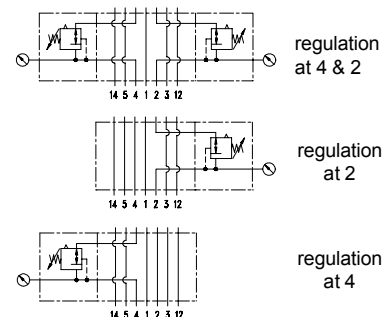


Gauges supplied separately, shown only for installation

↑ Inlet Flow

**replacement parts** \* ( repair kit: ESA-ISO.3 )

no	description	material	order-no.
1	intermediate plate	Al	---
2	sealing frame ISO.3-5	NBR	5.1833.05.000
3	body	Al	---
4	spring cage C.33-72	POM - Ms	8.2133.72.000
5	diaphragm	NBR - Ms	*
6	regulating spring 0-12 bar	St. - galvanized	5.2133.08.000
7	valve cone	NBR - Ms	*
8	spring C.33-22	niro	5.2133.22.000
9	sealing frame	NBR	*
10	spring cage lockable C.33-K	POM - Al	8.2133.72.001
11	lock cylinder C.33-52	Ms	5.2133.52.000



ordering information	Key
<b>ISO.3 AB</b>	<b>AB</b>
<b>ISO.3 A (4)</b>	<b>A (4)</b>
<b>ISO.3 B (2)</b>	<b>B (2)</b>
type	
1 port side	

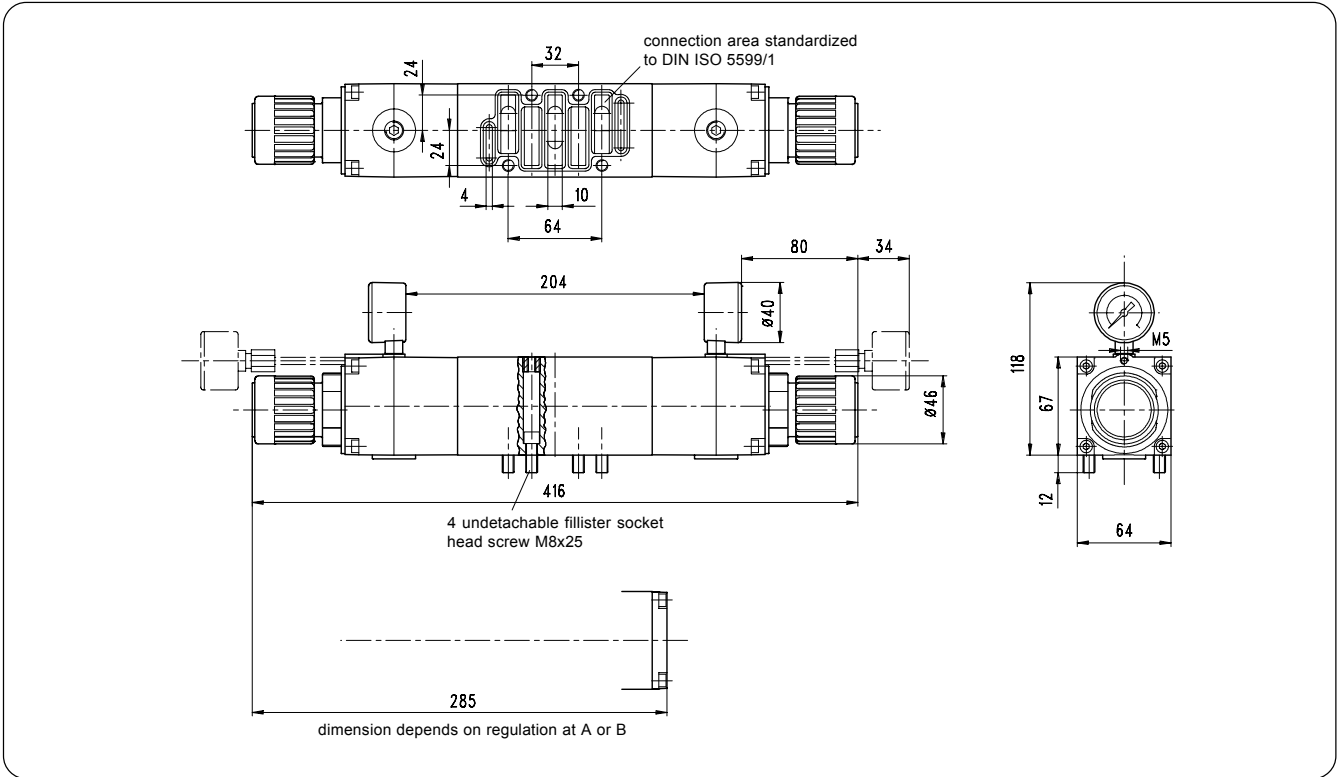
ordering example: ISO.3 AB

## application information

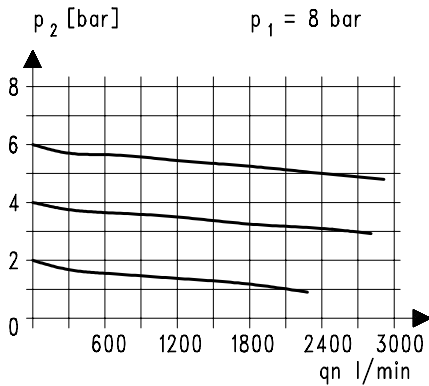
– adjusting knob can be locked by depressing



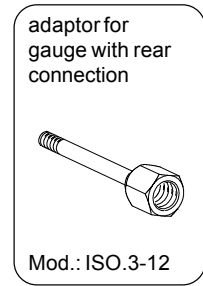
Dimensions (mm)



flow characteristics



accessories



## Series NA Valves (NAMUR Interface)

Cv= 1.05

Air-Pilot operated 1/4" NPTF  
3-way/2-position; 5-way/2-position; and 5-way/3-position valves  
with Interface according NAMUR Standard

The valves Series NA are available in versions:  
5-way/2-position and 3-way/2-position, Normally  
Closed or Normally Open. These are indirectly actuated  
valves and are available in single and double air pilot  
versions. The valve has a NAMUR interface pattern and  
can therefore be directly mounted on other suitable  
components that also have this hole pattern, such as  
certain rotary actuators, ball valves or process valves.  
The single air pilot version is equipped with a  
mechanical return spring.



## TECHNICAL SPECIFICATIONS

Construction	spool type (pilot operated)
Valve group	3-way/2-position, 5-way/2-position, 5-way/3-position
Materials	Anodized aluminum body - stainless steel spool - BUNA-N seals
Mounting	through 2 Ø5 holes in valve body; according to Namur interface
Ports	2-4 = NAMUR 1-3-5 = 1/4" NPTF
Installation	directly on surfaces with Namur Interface
Operating temperature	0 - 60°C (using dry air -20°C), 32°F — 140°F (using dry air -4°F)

## PNEUMATIC DATA

Operating pressure	1.5 - 10 bar double air pilot (22-145 psi); 2.5 - 10 bar single air pilot (36-145 psi)
Nominal pressure	6 bar (87 psi)
Nominal flow	*Qn = 1000 NL/min = 35.3 SCFM; Cv= 1.05
Nominal diameter	8 mm
Fluid	filtered air (25 micron), without lubrication**

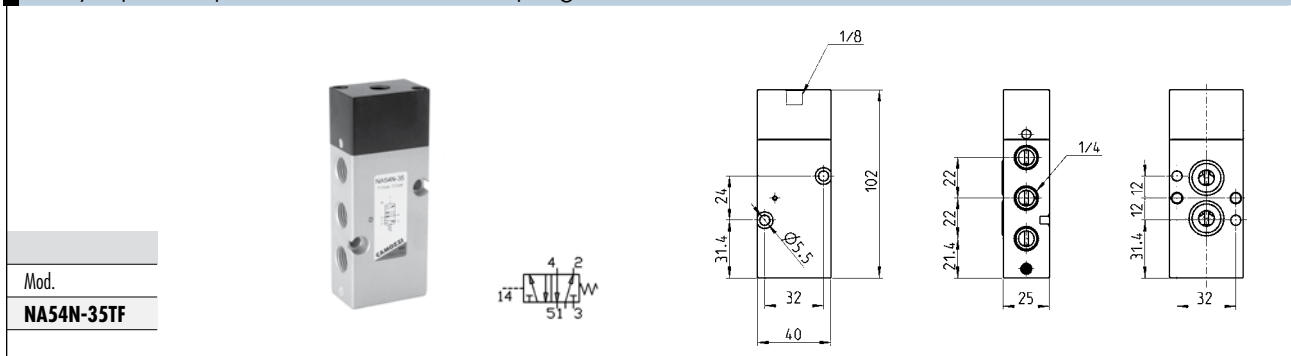
\*Qn = determined with supply pressure of 6 bar and with  $\Delta p = 1$  bar. \*\*If lubricated air is used, it is recommended to use ISOVG32 oil, and never interrupt the lubrication.

## CODING OF SERIES NA AIR PILOT VALVES

NA	5	4N	-	15	-	02	-	U	7	7	TF
<b>NA</b>	SERIES NAMUR										
<b>5</b>	NUMBER OF WAYS - POSITIONS: 3 = 3/2 NC 4 = 3/2 NO 5 = 5/2 6 = 5/3 CC 7 = 5/3 CO 8 = 5/3 CP										
<b>4N</b>	PORTS: 4N = 1/4 NPTF supply ports according NAMUR standards										
<b>15</b>	ACTUATION: 11 = double solenoid 15 = single solenoid, spring return 33 = pneumatic pneumatic 35 = pneumatic, spring										
<b>02</b>	SOLENOID INTERFACE: 02 = mech. sol. 22 x 22										
<b>U</b>	SOLENOID MATERIAL: A = PPS U = PET H = Self-extinguishing PA, Explosion-proof (30 x 30) G = PA										
<b>7</b>	SOLENOID DIMENSIONS: 7 = 22 x 22 8 = 30 x 30 9 = 22 x 22										
<b>0</b>	SOLENOID VOLTAGE: see solenoids section in Master Catalog										
<b>TF</b>	TF = NPTF ports blank = BSP ports										

## 5-way/2-position pneumatic valve, Air-Pilot, spring return,

Cv=1.05



Cv =

5-way/2-position pneumatic valve, Double Air-Pilot

Cv=1.05

Mod.	
<b>NA54N-33TF</b>	

5-way/3-position pneumatic valve

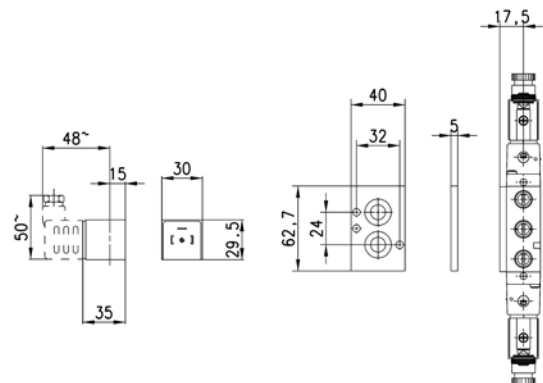
Cv=1.05

Mod.	Symbol	Function
<b>NA64N-33TF</b>	U1	Center Closed
<b>NA74N-33TF</b>	V1	Center Open
<b>NA84N-33TF</b>	Z1	Pressure Center

Single subbase Mod. NA54-PC

Distance plate for the mounting of Series H8 solenoids

Supplied with:  
2x screws  
2x O-rings



Mod.	
<b>NA54-PC</b>	

Cv =

# 3

## AIR PILOT VALVES

## Series VNR Check Valves

Cv = 0.5 - 8.66

### Check Valves VNR

Ports M5 (10-32 UNF), 1/8", 1/4", 3/8", 1/2", 3/4"



### TECHNICAL SPECIFICATIONS

Construction	Poppet type
Mounting	In-line
Materials	Nickel-plated brass body, Brass body, Buna-N seals, Polyurethane seals, Stainless steel spring
Port sizes	M5 (10-32 UNF), 1/8", 1/4", 3/8", 1/2" NPTF;
Installation	In-line
Operating temperature	32°F - 175°F, (dry air necessary down to -4°F)
Fluid	Filtered air
Lubricant	Oil compatible with Buna-N, (3° - 10° E)

### PNEUMATIC DATA

Operating pressure	0.2 - 10 bar (3 - 145 psi)
Nominal pressure	6 bar (87 psi)
Nominal flow	*Qn Series VNR: M5 = 50NL/Min. (1.7 SCFM); 1/8" = 600 NL/min. (21.18 SCFM) 1/4" = 1400 NL/min. (49.44 SCFM)
Lubricant	not required
Cv	M5 = .16; 1/8" = .63; 1/4" = 1.47

\*Qn flowrate (SCFM) determined with a supply pressure of 6 bar, (87 psi), and with a pressure drop of 1 bar, (14.5 psi).

\*\*\*Dimensions are in millimeters.

## Check Valves

The check valves in the VNR Series are available with M5 (10-32 UNF), 1/8" and 1/4" ports. They must be used when it is required to intercept a flow in one direction only. The design of these valves is of the poppet type and this feature allows operation at low pressures both when there is a free flow and during retention.

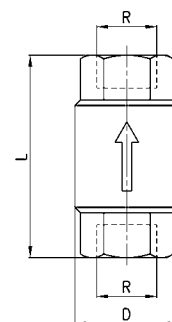
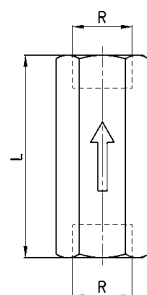
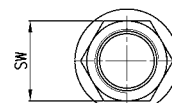
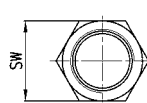
Materials used:

- OT58 (brass) body, Nickel Plated (1/4")
- Buna-N seals
- stainless steel spring
- internals brass



M5- 1/8- 1/4

3/8- 1/2- 3/4

**VNR-205-M5**

$Q_n^{**} = 50 \text{ NL/min}$  Minimum operating pressure = 1 bar (14.5 psi)

**VNR-210-02**

$Q_n^* = 600 \text{ NL/min}$  Minimum operating pressure = 0.2 bar (2.9 psi)

**VNR-843-07TF**

$Q_n^* = 1400 \text{ NL/min}$  Minimum operating pressure = 0.2 bar (2.9 psi)

\*  $Q_n$  = determined with 6 bar and  $D_p = 1 \text{ bar}$

\*\*  $Q_n$  = determined with 6 bar and  $D_p = 2 \text{ bar}$



VNR1

## DIMENSIONS in millimeters (mm)

Mod.	R NPTF	L	SW	D	Q (NL/min), (SCFM)	P min (bar)
<b>VNR-205-M5</b>	M5	25	8	9	50 (1.75)	1
<b>VNR-210-02</b>	1/8	34	13	15	600 (21.18)	0,2
<b>VNR-843-07TF</b>	1/4	43	17	20	1400 (49.44)	0,2
<b>VNR-238-06</b>	3/8	55	23	34,5	3000 (105)	0,02
<b>VNR-212-08</b>	1/2	58,5	27	34,5	5800 (203)	0,02
<b>VNR-234-12</b>	3/4	65	33	41,5	8000 (280)	0,06

## Series VBO - VBU (Nickel Plated) Pilot-Operated Check/Blocking Valves

Unidirectional (Pilot-Operated Check Valve)  
and Bidirectional (Blocking Valve) 1/8", 1/4", 3/8" NPTF  
Nominal diameters 5.5 - 8 - 11 mm

These valves have been designed to mount directly into the cylinder ports. The inner design of the blocking valves Series VBO and VBU allows a very high flow rate and reliable operation.



### TECHNICAL SPECIFICATIONS

Construction	poppet type
Valve group	pilot-operated check and blocking valves (pilot connection 5/32" OD)
Materials	OTS8 Nickel-Plated Brass Body, Buna-N seals, Teflon seal ring, internals brass
Mounting	by male thread
Ports	1/8" - 1/4" - 3/8" NPTF
Position	in any position
Operating temperature	from 0 to 80°C (with dry air -20°C) (32°F - 175°F (dry air necessary down to - 4° F))
Lubrication	not required, if necessary use oil compatible with Buna-N (3° - 10° E) (ISOVG32 grade)

### PNEUMATIC DATA

Operating pressure	VBU: 0.3 - 10 bar (4.35 - 145 psi), VBO: 0 - 10 bar (0 - 145 psi)
Nominal pressure	6 bar (87 psi)
Nominal flow	see graph
Nominal diam.	1/8" ø5.5 mm (.217") - 1/4" ø8 mm (.315") - 3/8" ø11 mm (.433")
Fluid	filtered air, without lubricant* (25 micron or less)

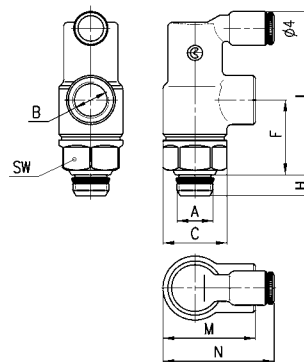
\*in the event that lubricated air is used, it is recommended to use oil ISOVG32. Once applied, the lubrication should never be interrupted.



**CODING OF UNIDIRECTIONAL AND BIDIRECTIONAL VALVES**

<b>VB</b>	<b>U</b>	<b>1/8</b>
<b>VB</b>	SERIES: VB	
<b>U</b>	VERSIONS: U = unidirectional O = bidirectional	
<b>1/8</b>	PORTS: 1/8 Sprint, NPTF compatible 1/4 Sprint, NPTF compatible 06 = 3/8" NPTF	

**Unidirectional blocking valve Mod. VBU and bidirectional blocking valve Mod. VBO**



DIMENSIONS (in inches)

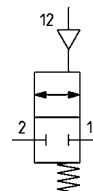
Mod.	A NPTF	B NPTF	C	F	H	L	M	N	SW
<b>VBU 1/8</b>	1/8"	1/8"	.665	.787	.216	1.692	.964	1.181	.590
<b>VBU 1/4</b>	1/4"	1/4"	.807	.984	.275	1.968	1.267	1.318	.748
<b>VBU 06</b>	3/8"	3/8"	1.055	1.299	.314	2.637	1.574	1.555	.944



VBU1

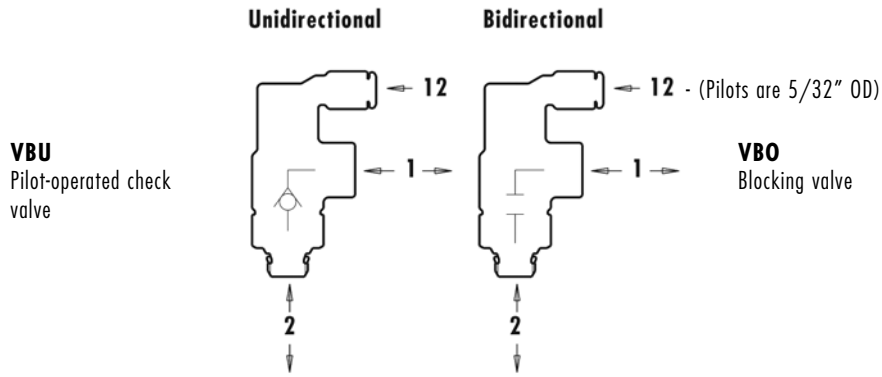
DIMENSIONS (in inches)

Mod.	A NPTF	B NPTF	C	F	H	L	M	N	SW
<b>VBO 1/8</b>	1/8"	1/8"	.665	.787	.216	1.692	.964	1.181	.590
<b>VBO 1/4</b>	1/4"	1/4"	.807	.984	.275	1.968	1.267	1.318	.748
<b>VBO 06</b>	3/8"	3/8"	1.055	1.299	.314	2.637	1.574	1.555	.944



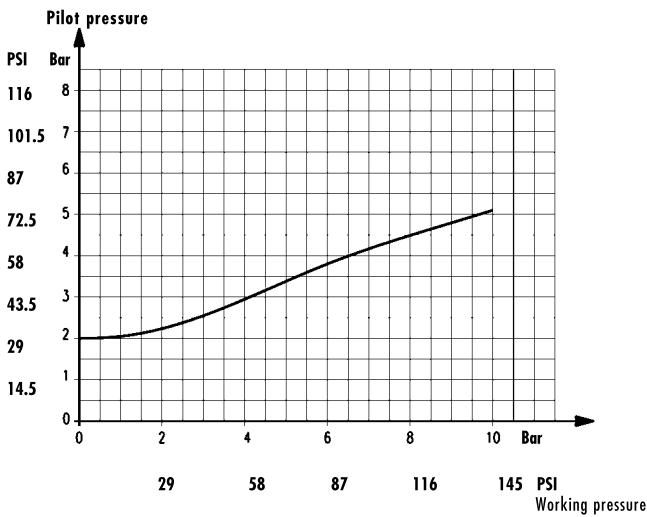
VBO1

**UNIDIRECTIONAL AND BIDIRECTIONAL BLOCKING VALVES**



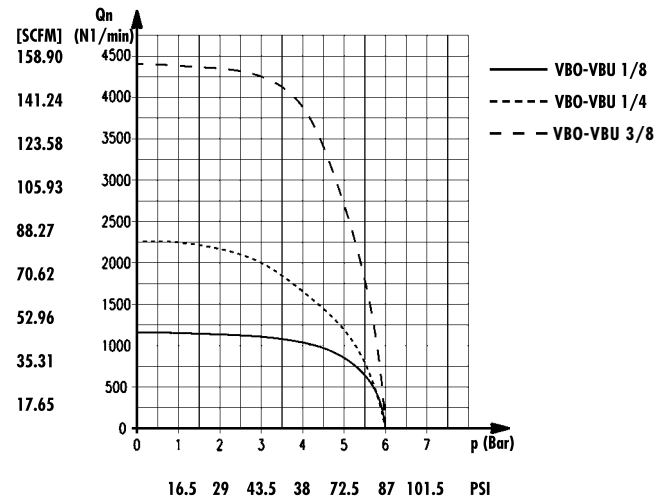
PILOT PRESSURE (BOTH VBU AND VBO)

The diagram below shows the relation between working pressure and pilot pressure required in order to operate the valve.  
 VBU - The opening pressure of the unidirectional valve is 0.3 bar (4.35 psi).



FLOW RATE (BOTH VBU AND VBO)

Flow Q (NL/min.) (SCFM)  
**N.B.:** Q is determined with an inlet pressure of 6 bar (87 psi).



FLOW RATE (BOTH VBU AND VBO 1/2")

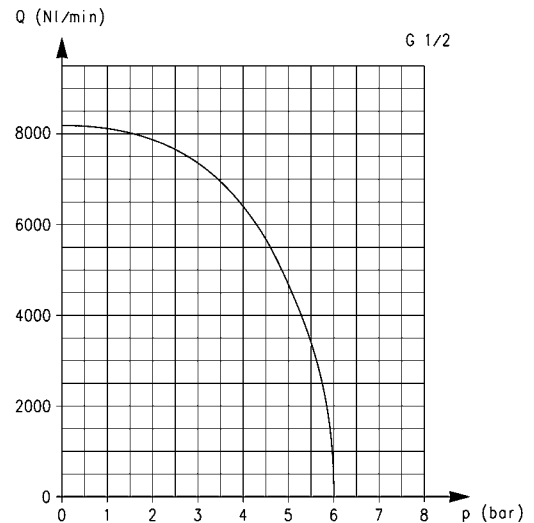
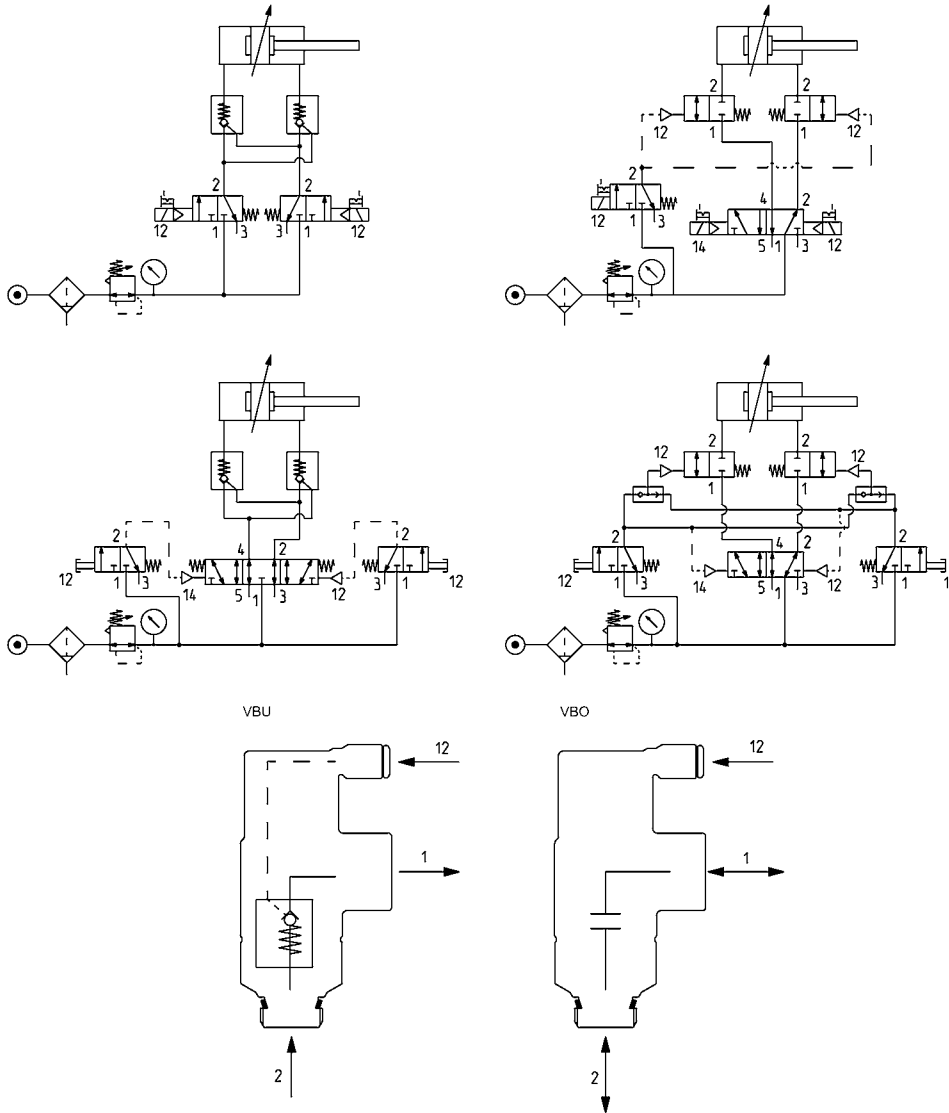


Diagram for valves VBU and VBO with G1/2 ports.

Q is the flow measured in NL/min and determined with an inlet pressure of 6 bar. The company reserves the right to vary models and dimensions without notice. These products are designed for industrial applications and are not suitable for sale to the general public.

APPLICATION SCHEMES (Examples Only)



## Series VSC and VSO Quick Exhaust Valves

Cv = .05 - 4.73

Quick exhaust valves VSC, VSO  
Ports M5 (10-32 UNF), 1/8", 1/4",  
3/8", 1/2", NPTF  
cartridge ø 4 mm (5/32" O.D.) (VSO only)



### TECHNICAL SPECIFICATIONS

Construction	Poppet type
Mounting	In-line
Materials	Nickel-plated brass body, Buna-N seals, Polyurethane seals
Port sizes	M5 (10-32 UNF), 1/8", 1/4", 3/8", 1/2" NPTF; 5/32" O.D. cartridge
Installation	In-line
Operating temperature	32°F - 175°F, (dry air necessary down to -4° F)
Fluid	Filtered air (25 micron or less)
Lubricant	Oil compatible with Buna-N, (3° - 10° E) (ISOVG32 grade)

### PNEUMATIC DATA

Operating pressure	0.3 - 10 bar, (5 - 145 psi)
Nominal pressure	6 bar (87 psi)
Nominal flow	
	Series VSC: P → A, 1/8" = 650 NL/min. (22.9 SCFM) 1/4" = 1100 NL/min. (38.8 SCFM)
	3/8" = 4500 NL/min. (158.9 SCFM) 1/2" = 4500 NL/min. (158.9 SCFM)
	A → R, 1/8" = 1000 NL/min. (35.3 SCFM) 1/4" = 1900 NL/min. (67.1 SCFM)
	3/8" = 6300 NL/min. (222.5 SCFM) 1/2" = 6300 NL/min. (222.5 SCFM)
	Series VSO: P → A, 5/32" O.D. = 30 NL/min. (1.06 SCFM)
Lubricant	A → R, 5/32" O.D. = 80 NL/min. (2.82 SCFM)
Cv	See Table

\*Qn flowrate (SCFM) determined with a supply pressure of 6 bar, (87 psi), and with a pressure drop of 1 bar, (14.5 psi).

\*\* Soft-seal repair kits are available for Series VSC Quick-exhaust valves.

\*\*\*Dimensions are in millimeters.

Quick exhaust valves Series VSO (connections are all 5/32" OD)

Quick exhaust valves are commonly used to increase the speed of cylinders or for rapid depressurisation of tanks containing compressed air. The models **VSO 425-M5** and **VSO 426-04** are specially designed for mounting on solenoid valves and valves incorporating a 5/32" O.D. port. We recommend that a silencer be mounted on the outlet (2931-M5).

Materials used:

- OT58 (brass) body, Nickel Plated
- Buna-N seals

Nominal flowrate

from P A Qn\* 50 NL/min. (1.76 SCFM)

from A R Qn\* 100 NL/min. (3.53 SCFM)

Qn\* = determined with 6 bar (87 psi) and DP = 1 bar (14.5 psi)

Minimum operating pressure = 1 bar (14.5 psi)

Cv Rating

from P A: Cv = 0.05

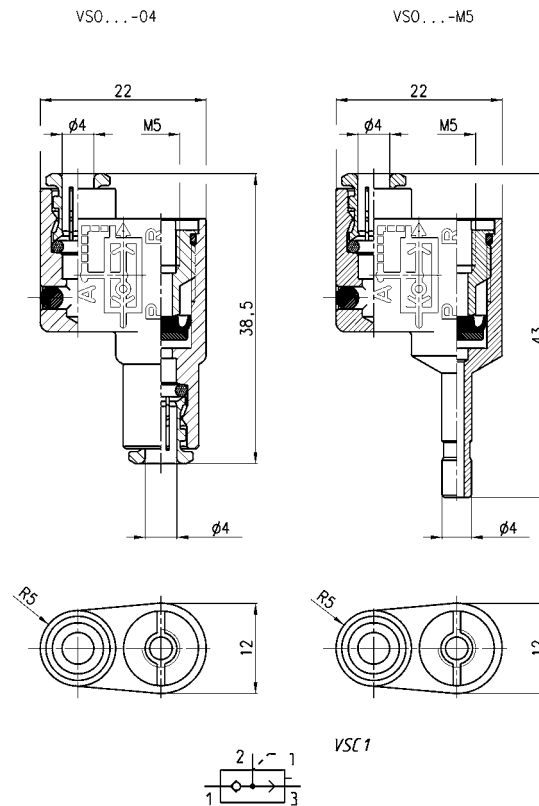
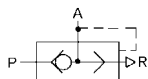
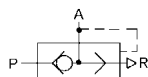
from A R: Cv = 0.1



**VSO 425-M5**



**VSO 426-04**



Mod.	
<b>VSO 425-M5</b>	
Mod.	
<b>VSO 426-04</b>	

Quick exhaust valves Series VSC

Quick exhaust valves are commonly used to increase the speed of cylinders or for rapid depressurisation of tanks containing compressed air. We recommend that a silencer be mounted on the outlet.

Materials used:

- OT58 (brass) body, Nickel Plated
- Desmopan seal (polyurethane)

**VSC 588-02** Qn = P A 650 NL/min Qn = A R 1000 NL/min

Minimum operating pressure = 0,5 bar

**VSC 544-04** Qn = P A 1100 NL/min Qn = A R 1900 NL/min

Minimum operating pressure = 0,3 bar

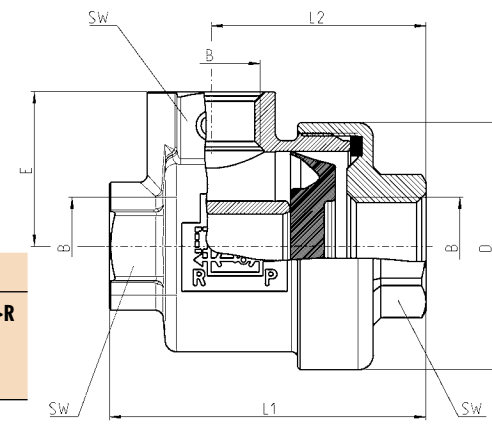
**VSC 538-06** Qn = P A 4500 NL/min Qn = A R 6300 NL/min

Minimum operating pressure = 0,2 bar

**VSC 522-08** Qn = P A 4500 NL/min Qn = A R 6300 NL/min

Minimum operating pressure = 0,2 bar

\* Qn = determined with 6 bar and Dp = 1 bar



Mod.	DIMENSIONS (in inches)						Flow (Qn)			
	B NPTF	D	E	L1	L2	SW	Inlet P→A SCFM	Cv	Exhausting A→R SCFM	Cv
<b>VSC 588-02</b>	1/8"	1.102	0.689	1.437	.984	.551	22.9	0.68	35.3	1.05
<b>VSC 544-04</b>	1/4"	1.299	0.807	1.653	1.122	.669	38.8	1.16	67.1	2.00
<b>VSC 538-06</b>	3/8"	1.692	1.063	2.263	1.555	.944	158.9	4.73	222.5	6.62
<b>VSC 522-08</b>	1/2"	1.692	1.063	2.302	1.555	.944	158.9	4.73	222.5	6.62



# Chapter 4

## Flow Control Valves and Accessories

### FLOW CONTROL VALVES & ACCESSORIES (NPTF/INCH)

	Series	Page
Composite Right Angle Flow Control Valves	TMCU-TMVU-TMCO	120
Right Angle Flow Control Valves	GMCU-MCU-GSCU-SCU GSVU-SVU-MVU-SCO-MCO	126
In-Line Flow Control Valves	RFU	138

### FLOW CONTROL VALVES & ACCESSORIES (BSP/METRIC)

	Series	Page
Compact Composite Flow Control Valves	PSCU-PMCU-PSVU PMVU-PSCO-PMCO	142
Composite Right Angle Flow Control Valves	TMCU-TMVU-TMCO	148
Banjo Right Angle Flow Control Valves	SCU-MCU-SVU-MVU SCO-MCO	154
Right Angle Flow Control Valves	GSCU-GMCU-GSVU-GMVU GSCO-GMCO	168
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Adjustable-Diaphragm Pressure Switches	PM	184
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Pressure Indicators	2950	184
Silencers	2901-2903-2921 2931-2938-2939-2905	188

## Flow Control Valves & Accessories Product Guide

Camozzi realizes the importance of these valves especially as actuator performance depends essentially on the right choice of automatic valve. The range includes flow regulators, quick release valves, flow control valves, basic logic functions and silencers with different specifications in order to meet most requirements.

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NPTF/INCH

Composite Right Angle Flow Control Valves  
Series TMCU - TMVU - TMCO



Unidirectional and bidirectional  
1/8", 1/4", 3/8", 1/2" NPTF  
Banjo flow controllers  
Nominal diameters  $\varnothing$  5,5 - 8 - 11

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NPTF/INCH

Right Angle Flow Control Valves  
Series GSCU - SCU,  
GMCU - MCU,  
GSVU - SVU,  
GMVU - MVU,  
GSCO - SCO,  
GMCO - MCO



Unidirectional and  
bidirectional  
banjo flow controllers  
Ports M5 (10-32 UNF),  
1/8", 1/4", 3/8", 1/2" NPTF

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NPTF/INCH

In-line Flow Control Valves  
Series RFU



Unidirectional RFU  
Panel or wall-mounted flow controllers  
Ports M5 (10-32 UNF), 1/8", 1/4", NPTF

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BSP/METRIC

Compact Composite Flow Control Valves  
Series PSCU - PMCU - PSVU - PMVU - PSCO -  
PMCO



Flow Control Valves  
Composite Flow Regulators with Banjo  
Unidirectional and Bidirectional (Meter-out, Meter-in, Needle Orifice)  
Ports G1/8, G1/4, G3/8 with metric mm O.D. tube connections

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BSP/METRIC

Composite Right Angle Flow Control Valves  
Series TMCU - TMVU - TMCO



Unidirectional and bidirectional  
G1/8, G1/4, G3/8, G1/2  
Banjo flow controllers  
Nominal diameters  $\varnothing$  5,5 - 8 - 11



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BSP/METRIC

Banjo Right Angle Flow Control Valves  
Series SCU -  
MCU - SVU -  
MVU - SCO - MCO



Unidirectional and bidirectional  
Swivel banjo flow controllers  
Ports M5, G1/8, G1/4, G3/8, G1/2

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BSP/METRIC

Right Angle Flow Control Valves  
Series GSCU -  
GMCU - GSVU -  
GMVU - GSCO -  
GMCO



Unidirectional and bidirectional  
M5, G1/8, G1/4  
banjo flow controllers  
Nominal diameters  $\varnothing 1,5$ ,  $\varnothing 3,5$ ,  $\varnothing 5$

Page 174

BSP/METRIC

In-line Flow Control Valves  
Series RFU - RFO



Unidirectional and bidirectional  
Inline flow controllers  
Ports M5, G1/8, G1/4, G3/8, G1/2

Page 180

BSP/METRIC

Needle Valves  
Series 28



Unidirectional and bidirectional  
M5, G1/8, G1/4  
Inline flow controllers  
Nominal diameters  $\varnothing 1,5$ ,  $\varnothing 3,5$ ,  $\varnothing 5$

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BSP/METRIC

Adjustable-Diaphragm Pressure Switches  
Series PM

Normally closed or open - Ports 1/8"

Electro-Pneumatic Transducer Series TRP

Normally closed or open - Ports 1/8"

Pressure Indicators Series 2950

Ports M5 (10-32 UNF)



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BSP/METRIC

Silencers Series 2901, 2903, 2921, 2931,  
2938, 2939, 2905, RSW



Ports M5 (10-32 UNF), G1/8, G1/4, G3/8, G1/2, G3/4, G1

## Composite Right Angle Flow Control Valves Series TMCU – TMVU – TMCO – NPTF/INCH

Meter In, Meter Out, Needle Orifice 1/8", 1/4", 3/8", 1/2" NPTF  
Tube OD 5/32", 1/4", 5/16", 3/8", 1/2"  
Reusable thread seal, PTFE seal ring (Teflon®) - **Pro-Fit®**

The Meter In, Meter Out, Needle Orifice flow controllers, series TMCU, TMVU, TMCO have been designed to offer a solution with reduced overall dimensions in combination with higher flow rate characteristics.

Their construction allows an easy assembly on cylinders and valves and offers the possibility of locking the regulation screw once it has been set.

The flow regulation range which is extremely wide and gradual has been optimized further, allowing a very accurate flow regulation over the whole scale.

For **Pro-Fit®** Torque Specifications, see Page 6.



### TECHNICAL SPECIFICATIONS

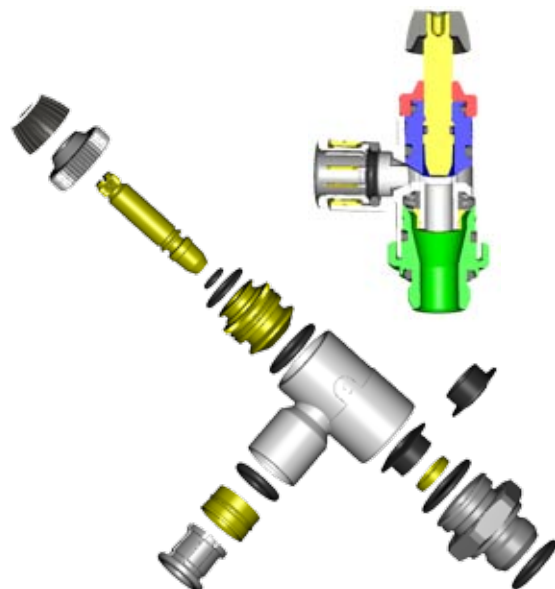
Construction	needle-type
Valve group	Meter In, Meter Out, Needle Orifice flow controlle
Materials	OT58 Nickel Plated Brass Threads and Collet - Technopolymer (Glass-Reinforced Nylon® 66 Resin) - BUNA-N Seals, PTFE thread seal
Mounting	by male thread
Ports	1/8", 1/4", 3/8", 1/2" NPTF
Position	in any position
Operating temperature	0 - 60°C (with dry air -20°C) (32°F - 140°F, with dry air -4°F). Consult factory for higher temperature requirements.

\*If lubricated air is used, it is recommended to use ISOVG32 oil. Once applied the lubrication should never be interrupted.

### PNEUMATIC DATA

Operating pressure	0.5 - 10 bar (7.25 - 145 psi)
Nominal pressure	6 bar (87 psi)
Nominal flow	see graph
Nominal diam.	Tube OD 5/32", 1/4", 5/16", 3/8", 1/2"
Fluid	filtered air

# Composite Flow Control Valves NPTF Threads with **Pro-Fit**® Teflon® Seals



## FEATURES

- All metal, Nickel-Plated collet and threads
- Strong, specialized Nylon compound body material
- Specialized O-ring choices for High-Temp, Low-Temp, Special Fluids, Food-Grade compatibility
- Patented **Pro-Fit**® Thread sealant system: Captured Teflon ring seals effectively on NPT and NPTF ports: (plus optional hybrid use on BSPP, BSPT or JIS (Rpt or Rc , G or Rg) thread ports)
- Broad Range of Tube/Thread combinations
- Removable Collet and tube o-rings
- Highly accurate Flow-rate repeatability & Higher Flow than typical brass bodied flow control valves
- Large ¼-Turn Locking-nut
- Precise Manual knob, w/ Internal hex-key
- Full Swivel design, NPTF and Metric/BSP, with integrated Push-In Fittings
- Meter-IN, Meter-OUT and Needle-Orifice flow designs for assembly on valves, cylinders or in-line use
- ANSI symbol stamped on all bodies
- Tube O.D. size stamped on all collet faces
- Meter-IN, Meter-OUT and Needle-Orifice flow designs for assembly on valves, cylinders or in-line use

## BENEFITS

### Collet

- Won't break like plastic release rings and bodies; More Durable design
- Higher holding force, with easier release
- Won't scratch tubes like "bite-ring" designs
- Less chance of micro-leakage and bubble-leaks over time due to damaged tubing

### Body

- Resistant to UV exposure
- Better resistance to stress-cracking, abrasion, solvents, detergents, hydrocarbons and other fluid media
- FDA/NSF approved materials, ( Including customized Nickel-Plating and o-ring options)
- Simplified manifold circuits with broader variety of fitting combinations and shapes to select
- Lighter weight for End-of-Arm tooling & Robotic handling,
- Compact design reduces overall dimensions for valve & cylinder assemblies, packaging applications and control cabinets
- 10% Reduction in Flow-Control size over previous brass bodies

### Design

- Accuracy and Repeatability of Flow-Control valves allows timing circuits to be design, faster OEM set-up and simplified MRO field installation and replacements
- Simplified manifold circuits with broader variety of Tube – Thread combinations to select
- Lighter weight for End-of-Arm tooling & Robotic handling
- Compact design reduces overall dimensions for valve assemblies, packaging applications and control cabinets
- More compact flow capacity reduces cylinder spacing with improved overall speed
- Fine tuning of flow with manual knob or hex-key adjustment
- Convertible into "Tamper-Proof" by removing manual knob and sealing hex-key slot
- Interchangeable Inch and Metric Thread adapters for "hybrid" Fittings and Flow-control valve requirements. (**Pro-Fit**® NPTF threads and BSP Spot-Face o-ring seals in opposite port standards)

## CODING OF FLOW CONTROL VALVES

TM	CU	04	-	02
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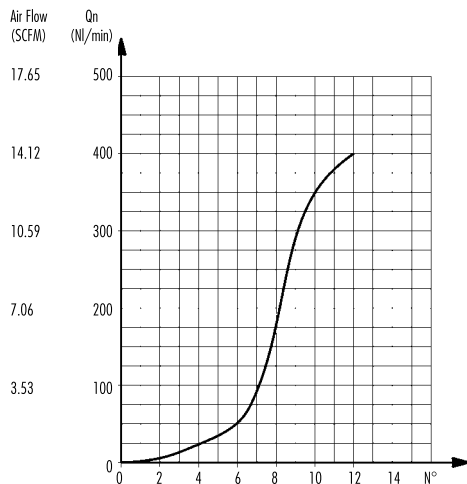
<b>TM</b>	ACTUATION: TM = manual
<b>CU</b>	ASSEMBLY: CU = on cylinders unidirectional, meter-out VU = on valves unidirectional, meter-in CO = bidirectional, needle-orifice valve
<b>04</b>	Tube OD Connection: 53 = 5/32" OD 04 = 1/4" OD 05 = 5/16" OD 06 = 3/8" OD 08 = 1/2" OD
<b>02</b>	Thread PORTS: 02 = 1/8" NPTF 04 = 1/4" NPTF 06 = 3/8" NPTF 08 = 1/2" NPTF

## METER IN, METER OUT, NEEDLE ORIFICE FLOW CONTROLLERS

To ensure the right choice of unidirectional flow controller, proceed as follows: calculate the quantity of air in NI/min (see cylinder Table); determine the stroke time of the cylinder; refer to graph to see which controller is the right type. In the case of bi-directional regulators, refer to the graph and check whether the flow control range is suitable for the work required.

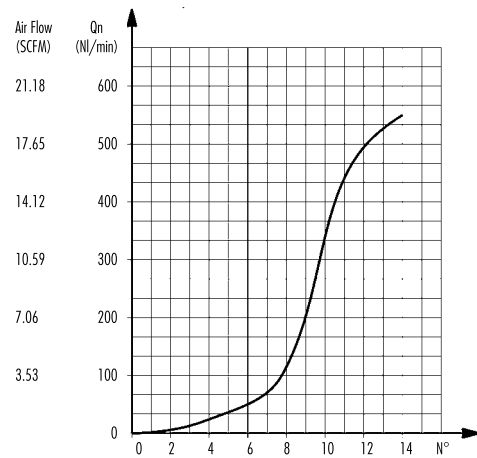
## TUBE OD 5/32"

Flow Qn (NI/min.) from 2 → 1 with needle OPEN: 400  
Flow Qn (NI/min.) from 2 → 1 with needle CLOSED: 280  
NB: Qn is determined with a supply pressure of 6 bar and with DP= 1 bar at the outlet  
N° = of screw turns



## TUBE OD 1/4"

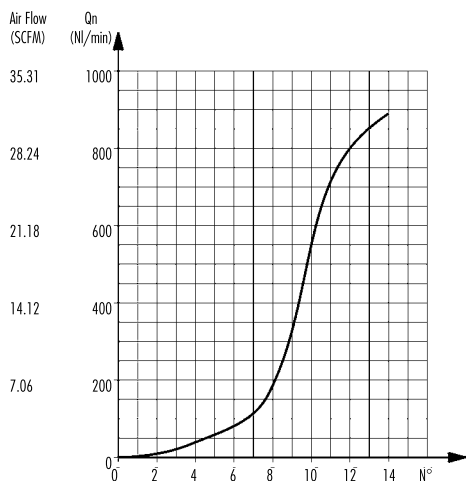
Flow Qn (NI/min.) from 2 → 1 with needle OPEN: 550  
Flow Qn (NI/min.) from 2 → 1 with needle CLOSED: 280  
NB: Qn is determined with a supply pressure of 6 bar and with DP= bar at the outlet  
N° = of screw turns



**METER IN, METER OUT, NEEDLE ORIFICE FLOW CONTROLLERS**

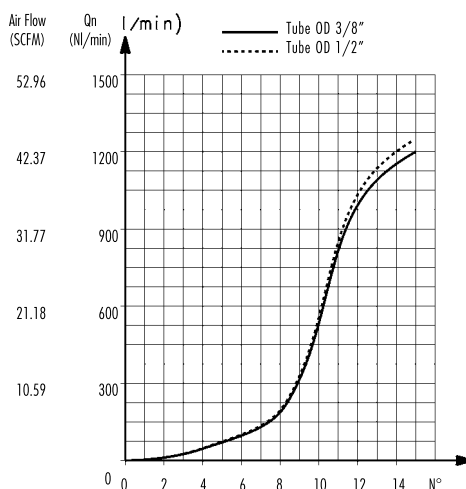
TUBE OD 5/16"

Flow Qn (NI/min.) from 2 @ 1 with needle OPEN: 890  
 Flow Qn (NI/min.) from 2 @ 1 with needle CLOSED: 460  
 NB: Qn is determined with a supply pressure of 6 bar and with DP= bar at the outlet  
 N° = of screw turns



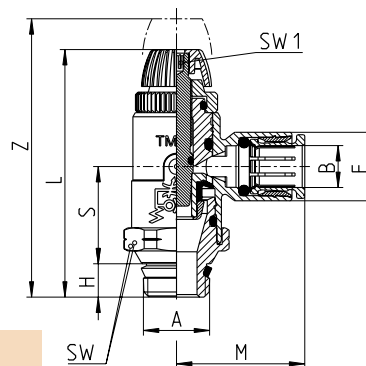
TUBE OD 3/8" - 1/2"

Flow Qn (NI/min.) from 2 @ 1 with needle OPEN: Ø 3/8"-1200/  
 Ø1/2"-1250  
 Flow Qn (NI/min.) from 2 @ 1 with needle CLOSED: Ø 3/8"-  
 600/Ø1/2"-600  
 NB: Qn is determined with a supply pressure of 6 bar and with DP= bar at the outlet  
 N° = of screw turns



**Meter-Out Valves Series TMCU**

Right angle flow controller for mounting on cylinders and valves.  
 Knurled screw adjustment, with internal hex slot.  
 Ports 1/8", 1/4", 3/8", 1/2" NPTF



DIMENSIONS (inches)

Mod.	A	B	F	H	L	M	S	SW	SW1	Z
	NPTF									
<b>TMCU 53-02</b>	1/8	5/32	0.453	0.197	1.654	0.846	0.728	0.630	0.059	1.929
<b>TMCU 04-02</b>	1/8	1/4	0.453	0.197	1.654	0.846	0.728	0.630	0.059	1.929
<b>TMCU 04-04</b>	1/4	1/4	0.453	0.256	1.732	0.846	0.709	0.630	0.059	2.008
<b>TMCU 05-04</b>	1/4	5/16	0.531	0.256	1.890	0.984	0.748	0.748	0.098	2.165
<b>TMCU 05-06</b>	3/8	5/16	0.531	0.295	1.929	0.984	0.748	0.748	0.098	2.205
<b>TMCU 06-04</b>	1/4	3/8	0.630	0.256	1.988	1.142	0.709	0.984	0.098	2.323
<b>TMCU 06-06</b>	3/8	3/8	0.630	0.295	1.988	1.142	0.709	0.984	0.098	2.323
<b>TMCU 06-08</b>	1/2	3/8	0.630	0.335	2.028	1.142	0.709	0.984	0.098	2.362

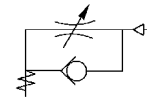
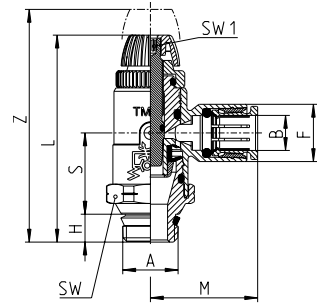
## Meter-In Valves Series TMVU

Meter-In Unidirectional flow controller for mounting on cylinders and valves. Knurled screw adjustment, with internal hex slot.  
Ports 1/8", 1/4", 3/8", 1/2" NPTF



## DIMENSIONS (inches)

Mod.	A	B	F	H	L	M	S	SW	SW1	Z
	NPTF	OD								
<b>TMVU 53-02</b>	1/8	5/32	0.453	0.197	1.654	0.846	0.728	0.630	0.059	1.929
<b>TMVU 04-02</b>	1/8	1/4	0.453	0.197	1.654	0.846	0.728	0.630	0.059	1.929
<b>TMVU 04-04</b>	1/4	1/4	0.453	0.256	1.732	0.846	0.709	0.630	0.059	2.008
<b>TMVU 05-04</b>	1/4	5/16	0.531	0.256	1.890	0.984	0.748	0.748	0.098	2.165
<b>TMVU 05-06</b>	3/8	5/16	0.531	0.295	1.929	0.984	0.748	0.748	0.098	2.205
<b>TMVU 06-04</b>	1/4	3/8	0.630	0.256	1.988	1.142	0.709	0.984	0.098	2.323
<b>TMVU 06-06</b>	3/8	3/8	0.630	0.295	1.988	1.142	0.709	0.984	0.098	2.323
<b>TMVU 06-08</b>	1/2	3/8	0.630	0.335	2.028	1.142	0.709	0.984	0.098	2.362



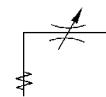
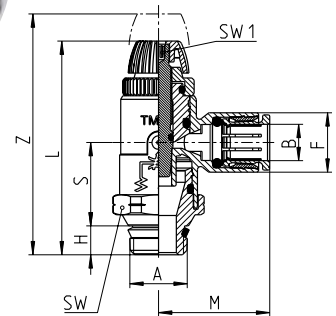
## Needle Orifice Valves Series TMCO

Needle Orifice Bi-directional flow controller for mounting on cylinders and valves. Knurled screw adjustment, with internal hex slot.  
Ports 1/8", 1/4", 3/8", 1/2" NPTF



## DIMENSIONS (inches)

Mod.	A	B	F	H	L	M	S	SW	SW1	Z
	NPTF	OD								
<b>TMCO 53-02</b>	1/8	5/32	0.453	0.197	1.654	0.846	0.728	0.630	0.059	1.929
<b>TMCO 04-02</b>	1/8	1/4	0.453	0.197	1.654	0.846	0.728	0.630	0.059	1.929
<b>TMCO 04-04</b>	1/4	1/4	0.453	0.256	1.732	0.846	0.709	0.630	0.059	2.008
<b>TMCO 05-04</b>	1/4	5/16	0.531	0.256	1.890	0.984	0.748	0.748	0.098	2.165
<b>TMCO 05-06</b>	3/8	5/16	0.531	0.295	1.929	0.984	0.748	0.748	0.098	2.205
<b>TMCO 06-04</b>	1/4	3/8	0.630	0.256	1.988	1.142	0.709	0.984	0.098	2.323
<b>TMCO 06-06</b>	3/8	3/8	0.630	0.295	1.988	1.142	0.709	0.984	0.098	2.323
<b>TMCO 06-08</b>	1/2	3/8	0.630	0.335	2.028	1.142	0.709	0.984	0.098	2.362





## Right Angle Flow Control Valves - Series GMCU - MCU, GSCU - SCU, GSVU - SVU, MVU, SCO, MCO NPTF/INCH

Meter-In, Meter-Out, Needle Orifice  
banjo flow controllers  
Series GMCU-MCU, GSCU-SCU,  
GSVU-SVU, MVU, SCO, MCO  
Ports M5 [10-32 UNF], 1/8", 1/4",  
3/8", 1/2" NPTF

These unidirectional and bidirectional flow controllers have been designed as small as possible so as to be mounted directly on valves or cylinders. The GMCU's and GSCU's feature Camozzi's new swivel design. This design features a fully rotatable swivel design and is constructed with a lower profile. The great variety of adjustable fittings makes it possible to complete the regulator with the most suitable system in relation to the available tube.



### TECHNICAL SPECIFICATIONS

Valve group	Unidirectional and bidirectional controller, [meter-in, meter-out, and needle valve]
Construction	Needle type
Mounting	Right-angle male thread
Materials	Nickel-plated brass body, Buna-N seals, Nylon gaskets
Port sizes	M5 [10-32 UNF], 1/8", 1/4", 3/8", 1/2" NPTF
Tube sizes	1/8", 5/32", 1/4", 3/8", 1/2" [O.D.]
Installation	Any position
Operating temperature	32° - 175° F, [dry air necessary down to -4° F]
Fluid	Filtered air
Lubricant	Oil compatible with Buna-N, [ 3° - 10° E]

### PNEUMATIC DATA

Operating pressure	1.0 - 10 bar, [14.5 - 145 psi]
Nominal pressure	6 bar, [87 psi]
Nominal flow	See graphs below
Nominal diameter	M5 [10-32 UNF] = 1.5mm [.059"], 1/8" = 2 mm [.079"] 1/4" = 4 mm [.157"], 3/8" = 7 mm [.275"]

\*Qn flowrate [SCFM] determined with a supply pressure of 6 bar, [87 psi], and with a pressure drop of 1 bar, [14.5 psi].

\*\*Dimensions are in inches



## Nickel-Plated Brass Flow-Control Valves: NPTF & Coated Threads (Optional)



### FEATURES

- Nickel-Plated, All-metal Collet and Release ring
- All-Metal, Nickel-Plated body and Threads,
- Compact Brass bodies from Brass forgings
- Specialized O-ring choices for High-Temp, Low-Temp, Special Fluids, Food-Grade compatibility
- Multiple Thread sealant systems: Vibra-Seal Coated (Optional), Std NPTF & O-Ring Spot Face seals
- Broad Range of configurations
- Removable Collet and tube o-rings
- Highly accurate Flow-rate repeatability & Higher Flow
- Manual Adjustment knob w/ internal hex-key slot or Screw-Driver slot
- Hex Locking-nut
- Precise Manual knob, w/ Internal hex-key
- Full Swivel design, NPTF and Metric/BSP, with integrated Push-In Fittings or Female thread ports
- Alternate Non-Swivel design with Banjo Tube connections and thread adapters
- Meter-IN, Meter-OUT and Needle-Orifice flow designs for assembly on valves, cylinders or in-line use
- Alternate sintered bronze banjo for fully adjustable silencer/muffler with speed control for exhaust port mounting, ( see Part No. 2905 to add to any banjo flow control body)

### BENEFITS

#### Collet

- Won't break like plastic release rings and bodies; More Durable design
- Higher holding force, with easier release
- Won't scratch tubes like "bite-ring" designs
- Less chance of micro-leakage and bubble-leaks over time due to damaged tubing

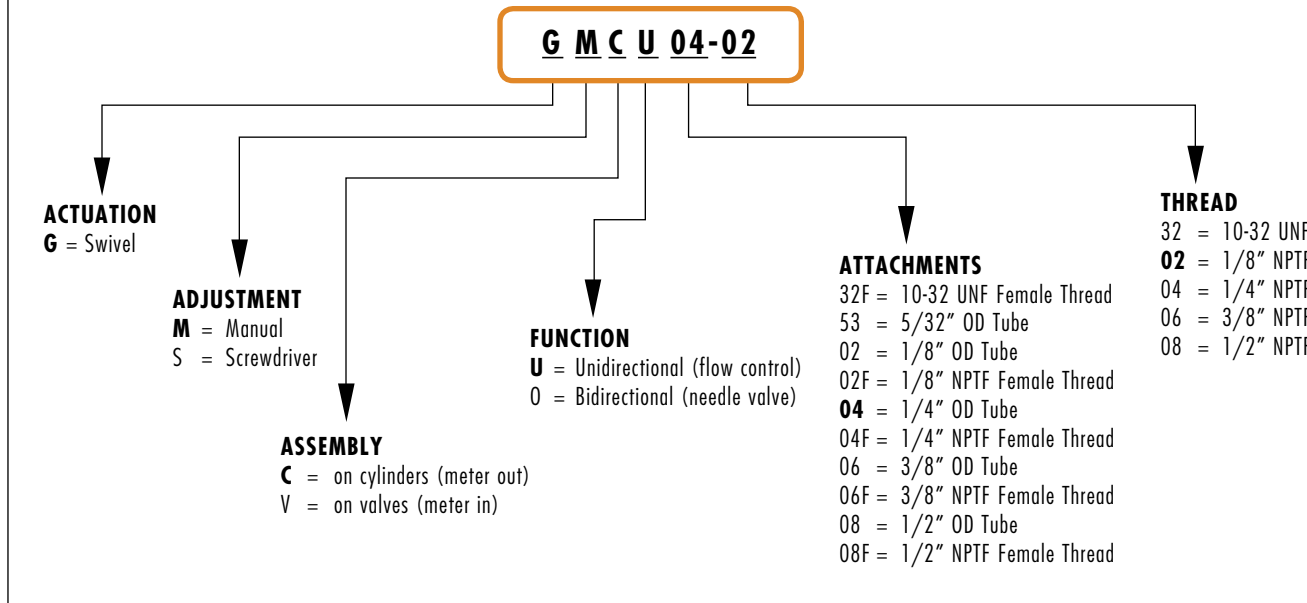
#### Body

- Resistant to UV exposure
- Better resistance to stress-cracking, abrasion, solvents, detergents, hydrocarbons and other fluid media
- FDA/NSF approved materials, ( Including customized Nickel-Plating and o-ring options)
- Simplified manifold circuits with broader variety of fitting combinations and shapes to select
- Lighter weight for End-of-Arm tooling & Robotic handling,
- Compact design reduces overall dimensions for valve & cylinder assemblies, packaging applications and control cabinets
- 25 % Reduction in overall Body size, compared to previous Brass-Banjo line

#### Design

- Accuracy and Repeatability of Flow-Control valves allows timing circuits to be design, faster OEM set-up and simplified MRO field installation and replacements
- Simplified manifold circuits with broader variety of Tube – Thread combinations to select
- Lighter weight for End-of-Arm tooling & Robotic handling
- Compact design reduces overall dimensions for valve assemblies, packaging applications and control cabinets
- More compact flow capacity reduces cylinder spacing with improved overall speed
- Fine tuning of flow with manual knob or screw-driver adjustment
- Convertible into "Tamper-Proof" by removing manual knob or sealing screw-driver slot
- Interchangeable Inch and Metric Tube O.D. banjo connections and thread adapters for "hybrid" Fittings and Flow-control valve requirements

**CODING OF FLOW CONTROL VALVES**



**IDENTIFICATION OF DIFFERENT TYPES**

(on hex of valve)



SCU  
MCU



SVU  
MVU



SCU  
MCO

**AVAILABLE BANJO FLOW CONTROLLERS**



GMCU/6610  
GMVU  
MCO

MCU/2023  
MVU  
MCO

GSCU/6610  
GSVU  
SCO

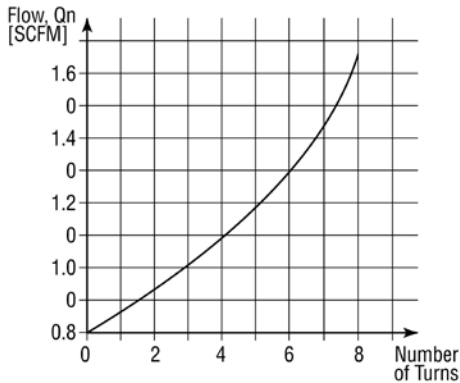
SCU/2023  
SVU  
SCO

**METER IN, METER OUT, NEEDLE ORIFICE FLOW CONTROLLERS**

To ensure the right choice of unidirectional flow controller, proceed as follows: calculate the quantity of air in NL/min (see cylinder Table); determine the stroke time of the cylinder; refer to graph to see which controller is the right type. In the case of bidirectional regulators, refer to the graph and check whether the flow control range is suitable for the work required. (NB: Qn is determined with a supply pressure of 6 bar and with  $\Delta P = 1$  bar at the outlet. N° = number of screw turns.)

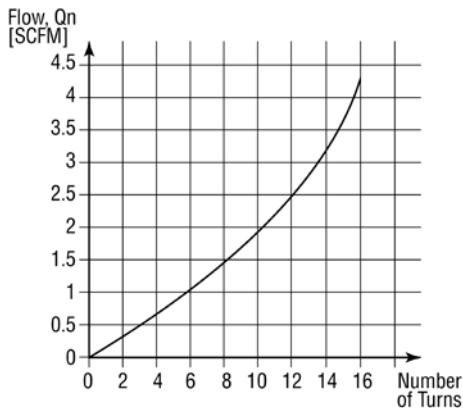
**53-32**

Flow Qn (NL/min.) from B → A with needle OPEN: 60 NL/min.  
(2.12 SCFM)  
Flow Qn (NL/min.) from B → A with needle CLOSED: 43 NL/min.  
(1.52 SCFM)



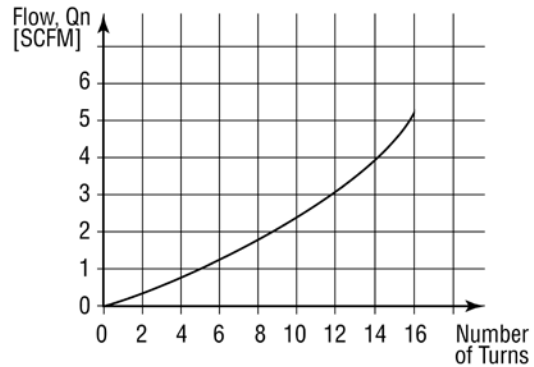
**53-02**

Flow Qn (NL/min.) from B → A with needle OPEN: 107 NL/min  
(3.78 SCFM)  
Flow Qn (NL/min.) from B → A with needle CLOSED: 28.3 NL/min.  
(1.0 SCFM)



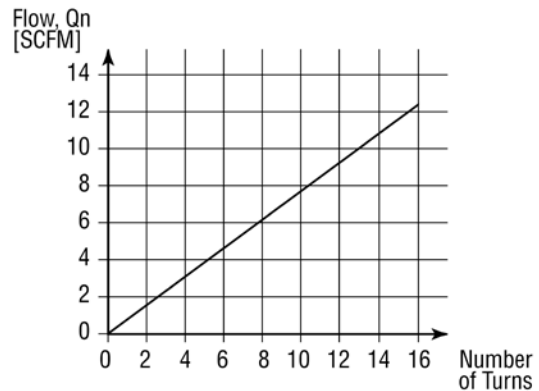
**04-02**

Flow Qn (NL/min.) from B → A with needle OPEN: 164 NL/min.  
(5.79 SCFM)  
Flow Qn (NL/min.) from B → A with needle CLOSED: 33.0 NL/min.  
(1.17 SCFM)



**04-04**

Flow Qn (NL/min.) from B → A with needle OPEN: 367 NL/min  
(12.96 SCFM)  
Flow Qn (NL/min.) from B → A with needle CLOSED: 133.0 NL/min  
(4.71 SCFM)

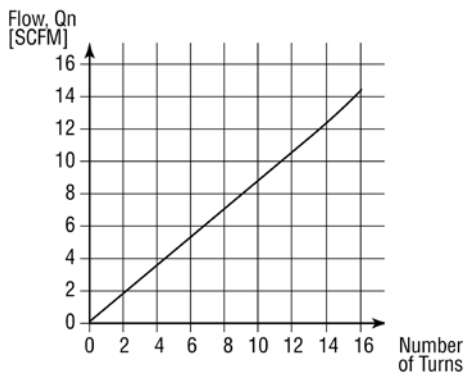


**UNIDIRECTIONAL AND BIDIRECTIONAL FLOW CONTROLLERS**

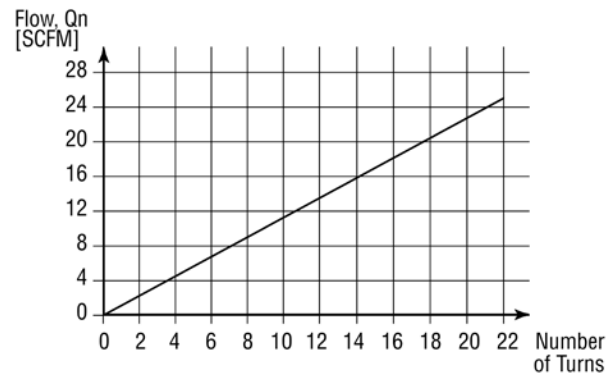
To ensure the right choice of unidirectional flow controller, proceed as follows: calculate the quantity of air in NL/min (see cylinder Table); determine the stroke time of the cylinder; refer to graph to see which controller is the right type. In the case of bidirectional regulators, refer to the graph and check whether the flow control range is suitable for the work required. (NB: Qn is determined with a supply pressure of 6 bar and with  $\Delta P = 1$  bar at the outlet. N° = number of screw turns.)

**06-04**

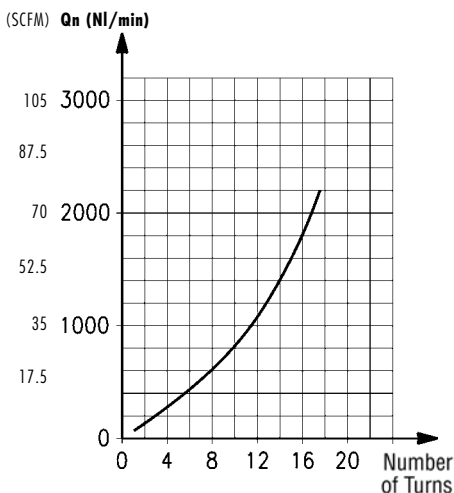
Flow Qn (NL/min.) from B → A with needle OPEN: 466 NL/min.  
(16.45 SCFM)  
Flow Qn (NL/min.) from B → A with needle CLOSED: 153 NL/min.  
(5.40 SCFM)

**06-06**

Flow Qn (NL/min.) from B → A with needle OPEN: 875 NL/min.  
(30.90 SCFM)  
Flow Qn (NL/min.) from B → A with needle CLOSED: 428 NL/min.  
(15.11 SCFM)

**08-08**

Flow Qn (NL/min.) from 2 → 1 with needle OPEN: 2570 (90.75 SCFM)  
Flow Qn (NL/min.) from 2 → 1 with needle CLOSED: 1330 (46.95 SCFM)  
NB: Qn is determined with a supply pressure of 6 bar and with  $\Delta P = 1$  bar at the outlet  
N° = number of screw turns.



Meter-Out Valves Series GMCU

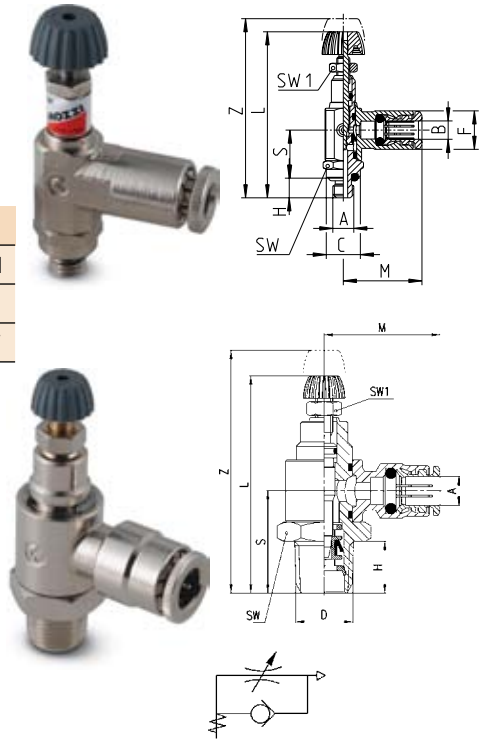
Meter-out unidirectional flow controller for mounting on cylinders or valves. It has a manual adjustment with a right-angle push to connect tube fitting.

DIMENSIONS (in inches)

Mod.	A	B	C	S	H	L	Z	M	F	SW	SW1
	UNF	OD									
<b>GMCU 53-32</b>	10-32	5/32	.307	.433	.177	1.448	1.614	.709	.346	.315	.217

DIMENSIONS (in inches)

Mod.	OD A	THREAD D	S	H	L	Z	M	SW	SW1
	NPTF								
<b>GMCU 53-02</b>	5/32	1/8	.781	.315	1.775	2.011	.885	.551	.275
<b>GMCU 04-02</b>	1/4	1/8	.781	.315	1.775	2.011	.984	.551	.275
<b>GMCU 04-04</b>	1/4	1/4	.939	.472	1.994	2.227	1.063	.748	.275
<b>GMCU 06-04</b>	3/8	1/4	.939	.472	1.994	2.227	1.181	.748	.275
<b>GMCU 06-06</b>	3/8	3/8	.961	.472	2.223	2.538	1.240	.866	.393



Meter-Out Valves Series GMCU & MCU

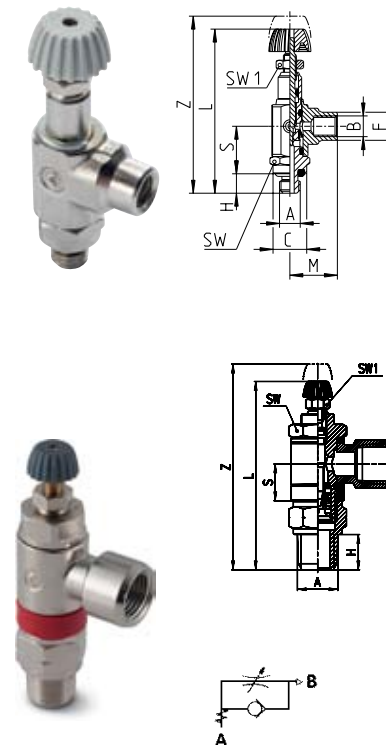
Meter-out unidirectional flow controller for mounting cylinders or valves. It has a manual adjustment with right-angle female threads.

DIMENSIONS (in inches)

Mod.	A	B	C	S	H	L	Z	M	F	SW	SW1
	UNF	UNF									
<b>GMCU 32F-32</b>	10-32	10-32	.307	.433	.177	1.448	1.614	.433	.256	.315	.217

DIMENSIONS

Mod.	Banjo Female Thread	A	S	H	L	Z	SW	SW1
	NPTF	NPTF						
<b>MCU 02F-02</b>	1/8"	1/8"	.511	.374	2.375	2.564	.551	.275
<b>MCU 04F-04</b>	1/4"	1/4"	.453	.511	2.844	3.090	.669	.275
<b>MCU 06F-06</b>	3/8"	3/8"	.484	.511	2.950	3.252	.748	.393
<b>MCU 08F-08</b>	1/2"	1/2"	1.023	.610	4.685	5.295	1.063	.669



Meter-Out Valves Series GSCU

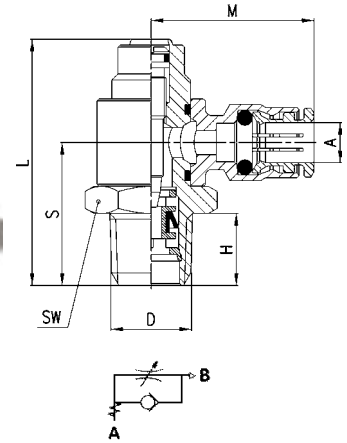
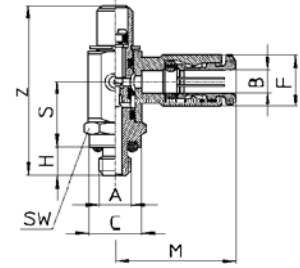
Meter-out unidirectional flow controller for mounting on cylinders or valves. It has a screwdriver adjustment with a right-angle push to connect tube fitting.

DIMENSIONS (in inches)

Mod.	A	OD B	C	S	H	L	M	F	SW
<b>GSCU 53-32</b>	10-32	5/32	.307	.433	.177	1.080	.709	.346	.315

DIMENSIONS (in inches)

Mod.	OD A	THREAD D	S	H	L	M	SW
		<b>NPTF</b>					
<b>GSCU 53-02</b>	5/32	1/8	.781	.315	1.441	.885	.551
<b>GSCU 04-02</b>	1/4	1/8	.781	.315	1.441	.984	.551
<b>GSCU 04-04</b>	1/4	1/4	.939	.472	1.594	1.063	.748
<b>GSCU 06-04</b>	3/8	1/4	.939	.472	1.594	1.181	.748
<b>GSCU 06-06</b>	3/8	3/8	.961	.472	1.791	1.240	.866



Meter-Out Valves Series GSCU & SCU

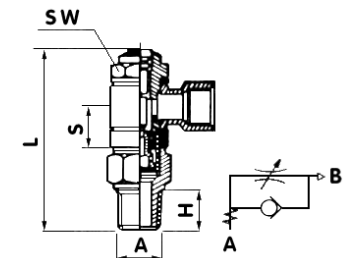
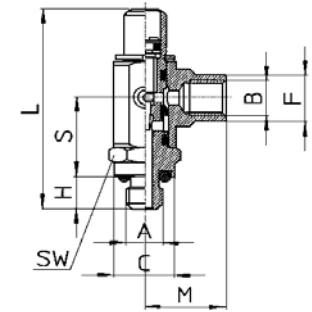
Meter-out unidirectional flow controller for mounting on cylinders or valves. It has screwdriver adjustment with right-angle female threads.

DIMENSIONS (in inches)

Mod.	A	B	C	S	H	L	M	F	SW
	UNF	UNF							
<b>GSCU 32F-32</b>	10-32	10-32	.307	.433	.177	1.080	.413	.256	.315

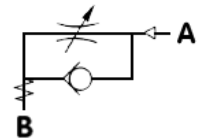
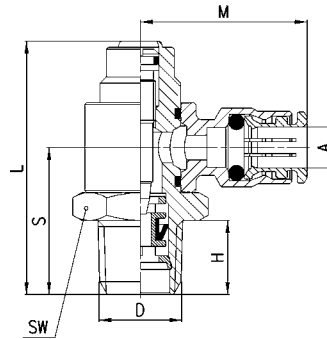
DIMENSIONS

Mod.	Banjo Female Thread	A	S	H	L	SW
	<b>NPTF</b>	<b>NPTF</b>				
<b>SCU 02F-02</b>	1/8"	1/8"	.511	.374	2.000	.551
<b>SCU 04F-04</b>	1/4"	1/4"	.453	.511	2.250	.669
<b>SCU 06F-06</b>	3/8"	3/8"	.484	.511	2.440	.748
<b>SCU 08F-08</b>	1/2"	1/2"	1.023	.610	3.169	1.063



Meter-In Valves Series GSVU

Meter-in unidirectional flow control designed to be mounted on cylinders or valves. It has a screwdriver adjustment with a right-angle push to connect tube fitting.

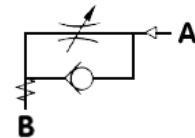
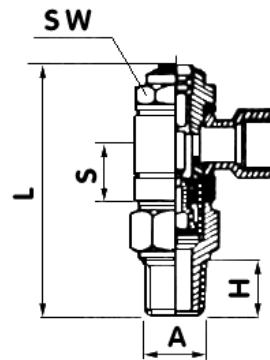


DIMENSIONS

Mod.	OD A	D	S	H	L	M	SW
	NPTF						
GSVU 53-02	5/32	1/8	.781	.315	1.441	.885	.551
GSVU 04-02	1/4	1/8	.781	.315	1.441	.984	.551
GSVU 04-04	1/4	1/4	.939	.472	1.594	1.063	.748
GSVU 06-04	3/8	1/4	.939	.472	1.594	1.181	.748
GSVU 06-06	3/8	3/8	.961	.472	1.791	1.240	.866

Meter-In Valves Series SVU

Meter-in unidirectional flow control designed to be mounted on valves or cylinders. It has a screwdriver adjustment with right-angle female threads.



DIMENSIONS (in inches)

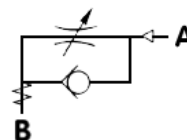
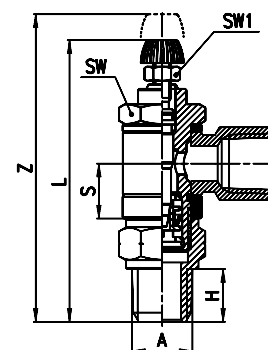
Mod.	Banjo Female Thread	A	S	H	L	SW
	UNF	UNF				
SVU 32F-32	10-32	10-32	.216	.177	1.141	.315
	NPTF	NPTF				
SVU 02F-02	1/8"	1/8"	.511	.374	2.000	.551
SVU 04F-04	1/4"	1/4"	.453	.511	2.250	.669
SVU 08F-08	1/2"	1/2"	1.023	.610	3.169	1.036

Meter-In Valves Series MVU

Meter-in unidirectional flow control designed to be mounted on valves or cylinders. It has a manual adjustment with right-angle female threads.

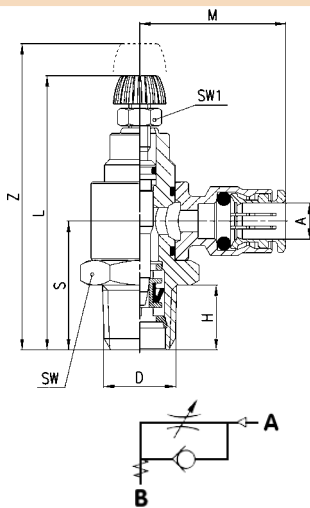
DIMENSIONS (in inches)

Mod.	Banjo Female Thread	A	S	H	L	Z	SW	SW1
	UNF	UNF						
<b>MVU 32F-32</b>	10-32	10-32	.216	.177	1.500	1.670	.315	.216
	NPTF	NPTF						
<b>MVU 02F-02</b>	1/8"	1/8"	.511	.374	2.375	2.564	.551	.275
<b>MVU 04F-04</b>	1/4"	1/4"	.453	.511	2.844	3.090	.669	.275
<b>MVU 08F-08</b>	1/2"	1/2"	1.023	.610	4.685	5.295	1.063	.669



Meter-In Valves Series GMVU

Meter-in unidirectional flow control designed to be mounted on valves or cylinders. It has a manual adjustment with a right-angle push to connect tube fitting.

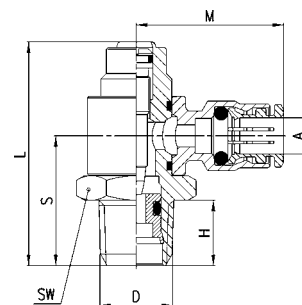


DIMENSIONS (in inches)

Mod.	OD A	THREAD D	S	H	L	Z	M	SW	SW1
		NPTF							
<b>GMVU 53-02</b>	5/32	1/8	.781	.315	1.775	2.011	.885	.551	.275
<b>GMVU 04-02</b>	1/4	1/8	.781	.315	1.775	2.011	.984	.551	.275
<b>GMVU 04-04</b>	1/4	1/4	.939	.472	1.994	2.227	1.063	.748	.275
<b>GMVU 06-04</b>	3/8	1/4	.939	.472	1.994	2.227	1.181	.748	.275

Needle Orifice Valves Series GSCO

This needle-orifice bidirectional flow control is designed with a needle orifice. It has a screwdriver adjustment with a right-angle push to connect tube fitting.



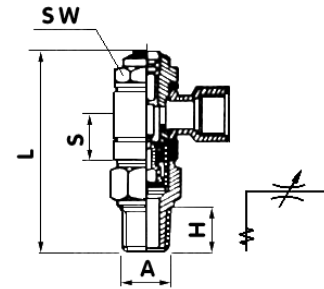
DIMENSIONS (in inches)

Mod.	OD A	D	S	H	L	M	SW
		NPTF					
<b>GSCO 53-02</b>	5/32	1/8	.781	.315	1.441	.885	.551
<b>GSCO 04-02</b>	1/4	1/8	.781	.315	1.441	.984	.551
<b>GSCO 04-04</b>	1/4	1/4	.939	.472	1.594	1.063	.748
<b>GSCO 06-04</b>	3/8	1/4	.939	.472	1.594	1.181	.748
<b>GSCO 06-06</b>	3/8	3/8	.961	.472	1.791	1.240	.866



Needle Orifice Valves Series SCO

This needle-orifice bidirectional flow control is designed with a needle orifice. It has a screwdriver adjustment with right-angle female threads.

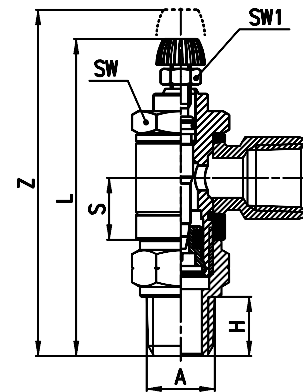


DIMENSIONS (in inches)

Part No.	Banjo Female Thread	A	S	H	L	SW
	<b>UNF</b>	<b>UNF</b>				
<b>SCO 32F-32</b>	10-32	10-32	.216	.177	1.141	.315
	<b>NPTF</b>	<b>NPTF</b>				
<b>SCO 02F-02</b>	1/8"	1/8"	.511	.374	2.000	.551
<b>SCO 04F-04</b>	1/4"	1/4"	.453	.511	2.250	.669
<b>SCO 08F-08</b>	1/2"	1/2"	1.023	.610	3.169	1.063

Needle Orifice Valves Series MCO

This needle-orifice bidirectional flow control is designed with a needle orifice. It has a manual adjustment with right-angle female threads.

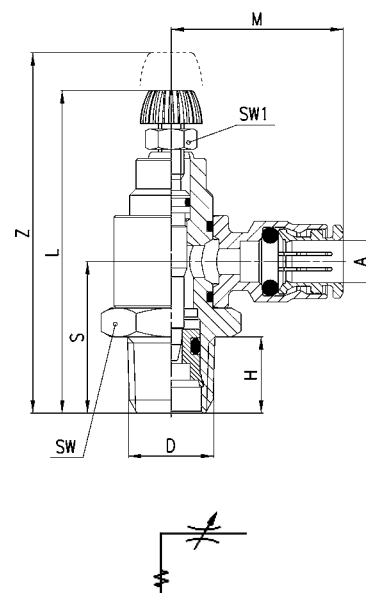


DIMENSIONS (in inches)

Mod.	Banjo Female Thread	A	S	H	L	Z	SW	SW1
	<b>UNF</b>	<b>UNF</b>						
<b>MCO 32F-32</b>	10-32	10-32	.216	.177	1.500	1.670	.315	.216
	<b>NPTF</b>	<b>NPTF</b>						
<b>MCO 02F-02</b>	1/8"	1/8"	.511	.374	2.375	2.564	.551	.275
<b>MCO 04F-04</b>	1/4"	1/4"	.453	.511	2.844	3.090	.669	.275
<b>MCO 08F-08</b>	1/2"	1/2"	1.023	.610	4.685	5.295	1.063	.669

## Needle Orifice Valves Series GMCO

This needle-orifice bidirectional flow control is designed with a needle orifice. It has a manual adjustment with a right-angle push to connect tube fitting.

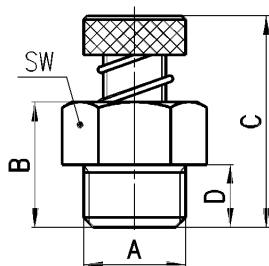


DIMENSIONS (in inches)

Mod.	OD A	THREAD D NPTF	S	H	L	Z	M	SW	SW1
GMCO 53-02	5/32	1/8	.781	.315	1.775	2.011	.885	.551	.275
GMCO 04-02	1/4	1/8	.781	.315	1.775	2.011	.984	.551	.275
GMCO 04-04	1/4	1/4	.939	.472	1.994	2.227	1.063	.748	.275
GMCO 06-04	3/8	1/4	.939	.472	1.994	2.227	1.181	.748	.275

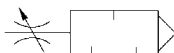
## Flow control valves with silencer Series RSW

Flow control valves with silencer.  
Connections: G1/8, G1/4, G1/2



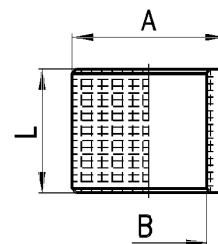
DIMENSIONS (MM)

Mod.	A BSP	B	C	D	SW
RSW 1/8	G1/8	13	22	6	12
RSW 1/4	G1/4	16	27	8	16
RSW 1/2	G1/2	26	35	11	26



## Silencer bushing Series 2905

Silencer Bushing for Mod. SCO... or MCO...



DIMENSIONS (MM)

Mod.	A	S	H
2905 1/8	14	10	14,5
2905 1/4	18	13,5	14,5
2905 3/8	21	16,8	14,5



## In-line Flow Control Valves Series RFU - NPTF/INCH

Panel or wall-mounted flow controllers

In-line/Unidirectional, RFU

Ports M5 [10-32 UNF],

1/8", 1/4" NPTF

The unidirectional flow controllers are equipped with M5 [10-32 UNF], 1/8" and 1/4" ports, each of which is available with two different types of adjustment (see diagrams).

They are used mainly for controlling the speed of cylinders.

They may be mounted on control panels or cylinders, as required.



### TECHNICAL SPECIFICATIONS

Valve group	Unidirectional controller, [meter-in, meter-out]
Construction	In-Line Needle type
Mounting	Through holes in body, or control panel
Materials	Aluminum body, Brass needle, Buna-N seals
Port sizes	M5 [10-32 UNF], 1/8", 1/4", NPTF
Installation	As required
Operating temperature	32° - 175° F, [dry air necessary down to -4° F]
Fluid	Filtered air
Lubricant	Oil compatible with Buna-N, [3° - 10° E]

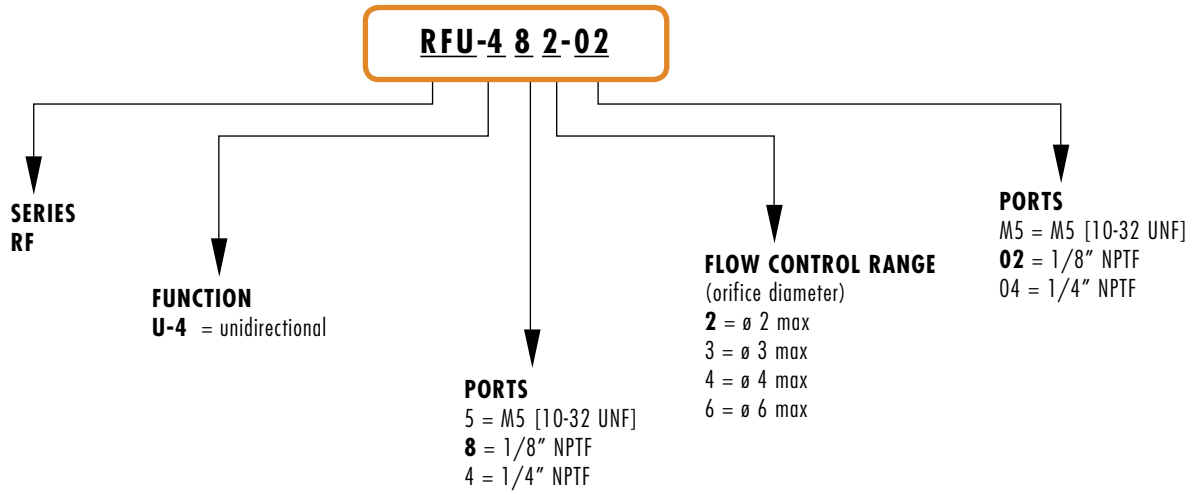
### PNEUMATIC DATA

Operating pressure	1.0 - 10 bar, [14.5 - 145 psi]
Nominal pressure	6 bar, [87 psi]
Nominal flow	See graphs
Nominal diameter (Flow Orifice)	1/8" = 2 mm [.079"], or 3 mm [.118"]
	1/4" = 4 mm [.157"], or 6 mm [.236"]

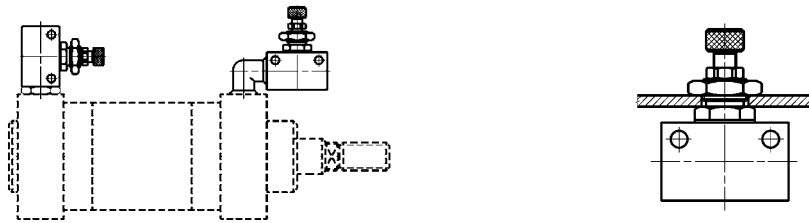
\*Qn flowrate [SCFM] determined with a supply pressure of 6 bar, [87 psi], and with a pressure drop of 1 bar, [14.5 psi].

\*\*Dimensions are in inches

**CODING OF FLOW CONTROLLERS**



**EXAMPLES OF VALVE MOUNTING ASSEMBLY**



**UNIDIRECTIONAL FLOW CONTROLLERS**

To ensure the right choice of 1/4" unidirectional flow controller Mod. RFU 444 or Mod. RFU 446, proceed as follows: calculate the quantity of air in NL/min. (see cylinder table), determine the stroke time of the cylinder; refer to the graph to see which controller is the right type. In the case of bidirectional regulators, refer to the graph and check whether the flow control range is suitable for the work required.

1/8" NPFT

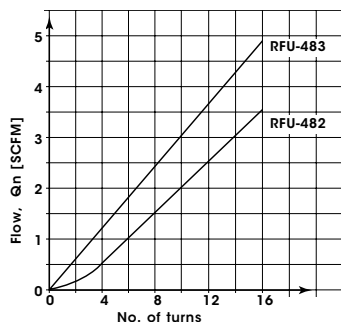
**RFU 482-02  
RFU 483-02**

Mod. RFU 482 flow from B → A needle type  
 OPEN = 149 NL/min [6.32 SCFM]  
 CLOSED = 130.5 NL/min [4.61 SCFM]

Mod. RFU 483 flow from B → A needle type  
 OPEN = 180 NL/min [6.36 SCFM]  
 CLOSED = 140 NL/min [4.94 SCFM]

NB: Qn is determined with a pressure of 6 bar at the inlet and ΔP = 1 bar at the outlet.

N° = number of

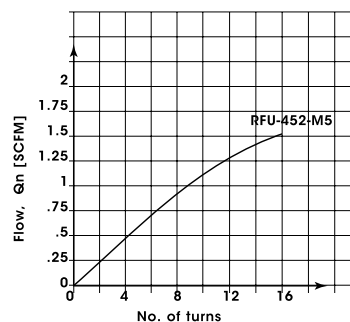


M5 [10-32 UNF]

**RFU 452-M5**

Mod. RFU-452 flow from B → A needle type  
 OPEN = 55 NL/min [1.94 SCFM]  
 CLOSED = 41 NL/min [1.45 SCFM]

NB: Qn is determined with a pressure of 6 bar at the inlet and ΔP=1 bar at the outlet.  
 N° = number of screw turns



1/4" NPFT

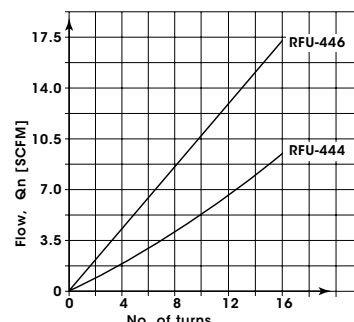
**RFU 444-04  
RFU 446-04**

Mod. RFU 444 flow from B → A needle type  
 OPEN = 680 NL/min [24.01 SCFM]  
 CLOSED = 534 NL/min [18.86 SCFM]

Mod. RFU 446 flow from B → A needle type  
 OPEN = 680 NL/min [24.01 SCFM]  
 CLOSED = 534 NL/min [18.86 SCFM]

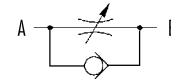
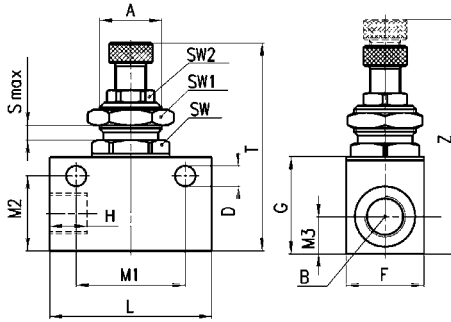
NB: Qn is determined with a pressure of 6 bar at the inlet and ΔP = 1 bar at the outlet.

N° = number of screw turns.



Unidirectional flow controller Series RFU

To regulate the speed of a cylinder, the air flow from the chamber which is being discharged must be regulated. For this reason, the unidirectional flow controller must be connected as follows: connect the threaded outlet marked A to the cylinder inlet and the threaded outlet marked B to the valve user port.



DIMENSIONS (in inches)

Mod.	A	B	H	D	F	G	L	M1	M2	M3	T	Z	SMax	SW	SW1	SW2
	<b>METRIC</b>	<b>UNF</b>														
<b>RFU 452-M5</b>	M10x1	10-32	.256	.165	.551	.630	1.02	.728	.520	.280	1.54	1.750	.118	.472	.551	.315
		<b>NPTF</b>														
<b>RFU 482-02</b>	M12X1	1/8"	.354	.177	.629	.826	1.338	.964	.649	.315	1.811	2.007	.157	.551	.669	.354
<b>RFU 483-02</b>	M12X1	1/8"	.354	.177	.629	.826	1.338	.964	.649	.315	1.811	2.007	.157	.551	.669	.354
<b>RFU 444-04</b>	M20x1.5	1/4"	.492	.255	.984	1.181	2.047	1.377	.944	.472	2.362	2.716	.275	.866	.944	.551
<b>RFU 446-04</b>	M20x1.5	1/4"	.492	.255	.984	1.181	2.047	1.377	.944	.472	2.362	2.716	.275	.866	.944	.551

# Compact Flow Control Valves Series PSCU, PMCU, PSVU, PMVU, PSCO, PMCO

Unidirectional and bidirectional flow regulators with ports M5, G1/8, G1/4, G3/8 and with banjo in brass (port M5) or in technopolymer (ports G1/8, G1/4, G3/8)



These unidirectional and bidirectional flow controllers have been designed as small as possible so as to be mounted directly on valves or cylinders. The great variety of adjustable fittings makes it possible to complete the regulator with the most suitable system in relation to the available tube.

All models are supplied complete with banjo flow controllers.

## GENERAL DATA

<b>Construction</b>	needle type
<b>Valve group</b>	unidirectional and bidirectional controller
<b>Materials</b>	body, regulation screw: stainless steel (M5), brass (G1/8 - G1/4 - G3/8) collet and insert = brass banjo: brass (M5), technopolymer (G1/8 - G1/4 - G3/8) controller = technopolymer - seals = NBR
<b>Mounting</b>	by male thread
<b>Ports</b>	M5 - G1/8 - G1/4 - G3/8
<b>Installation</b>	in any position
<b>Operating temperature</b>	0°C - 60°C (with dry air -20°C); 32° - 175° F, [dry air necessary down to -4° F]
<b>Operating pressure</b>	1 - 10 bar; 14.5 - 145 psi
<b>Nominal pressure</b>	6 bar; 87 psi
<b>Nominal flow</b>	see graph
<b>Nominal diameter</b>	M5 = 1.5 mm - G1/8 = 2 mm - G1/4 = 4 mm - G3/8 = 7 mm
<b>Fluid</b>	filtered air

Dimensions in millimeters (mm)

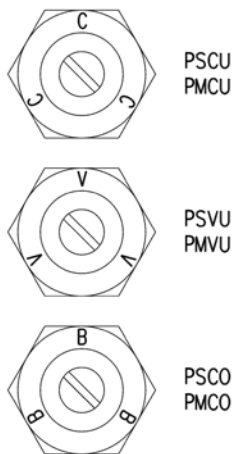


## CODING EXAMPLE

<b>P</b>	<b>M</b>	<b>CU</b>	<b>7</b>	<b>04</b>	<b>-</b>	<b>1/8</b>	<b>-</b>	<b>4</b>
<b>P</b>	SERIES							
<b>M</b>	ACTUATION: M = Manual S = Screwdriver							
<b>CU</b>	ASSEMBLY: CU = on cylinders unidirectional, meter-out VU = on valves unidirectional, meter-in CO = bidirectional, needle-orifice valve							
<b>7</b>	VERSIONS: 6 = needle (screwdriver operated) 7 = needle (manual operated)							
<b>04</b>	NOMINAL DIAMETER: 02 = Ø1.5 MAX 04 = Ø2 MAX 06 = Ø4 MAX 08 = Ø7 MAX							
<b>1/8</b>	PORTS: M5 = M5 1/8 = G1/8 1/4 = G1/4 3/8 = G3/8							
<b>4</b>	TUBE: 4 = Ø 4 6 = Ø 6 8 = Ø 8 10 = Ø 10 12 = Ø 12							

To ensure the right choice of unidirectional flow controller, proceed as follows:  
calculate the quantity of air in NI/min (see cylinders table); determine the stroke time of the cylinder; refer to graph to see which is the right type of controller.

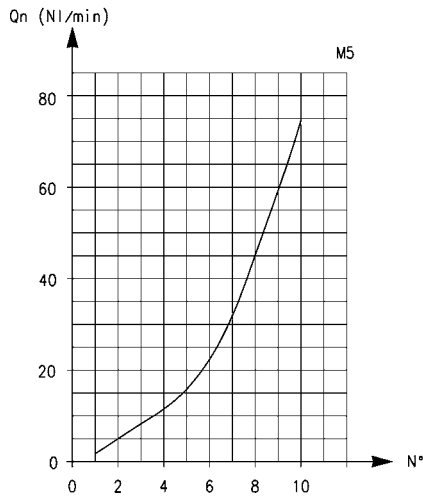
## UNIDIRECTIONAL AND BIDIRECTIONAL FLOW CONTROLLERS



IDENTIFICATION OF DIFFERENT TYPES:  
PSCU - PMCU = assembly directly on the cylinders  
PSVU - PMVU = assembly directly on the valves  
PSCO - PMCO = assembly directly on the cylinders or valves

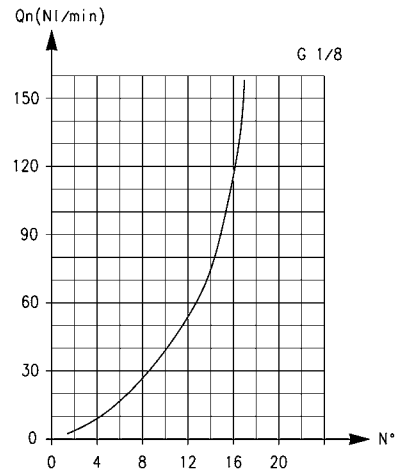
Dimensions in millimeters (mm)

UNIDIRECTIONAL AND BIDIRECTIONAL FLOW CONTROL REGULATORS



Flow Qn (NI/min.) from 2 → 1 with controller OPEN: 70  
 Flow Qn (NI/min.) from 2 → 1 with controller CLOSED: 33

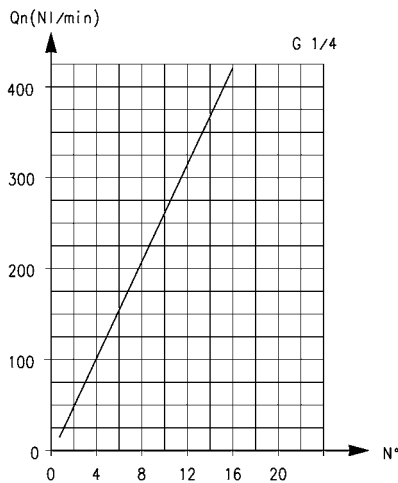
Qn = supply pressure of 6 bar and with  $\Delta P = 1$  bar at the outlet  
 N° = number of screw turns



Flow Qn (NI/min.) from 2 → 1 with controller OPEN: 200  
 Flow Qn (NI/min.) from 2 → 1 with controller CLOSED: 70

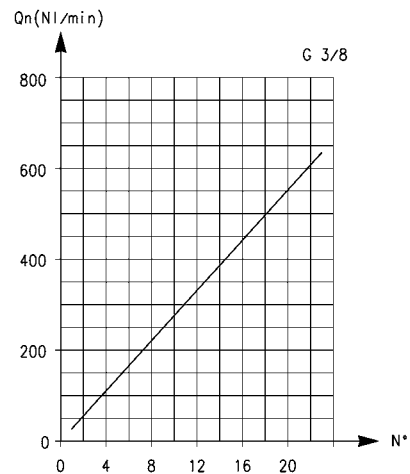
Qn = supply pressure of 6 bar and with  $\Delta P = 1$  bar at the outlet  
 N° = number of screw turns

UNIDIRECTIONAL AND BIDIRECTIONAL FLOW CONTROL REGULATORS



Flow Qn (NI/min.) from 2 → 1 with controller OPEN: 530  
 Flow Qn (NI/min.) from 2 → 1 with controller CLOSED: 160

Qn = supply pressure of 6 bar and with  $\Delta P = 1$  bar at the outlet  
 N° = number of screw turns



Flow Qn (NI/min.) from 2 → 1 with controller OPEN: 710  
 Flow Qn (NI/min.) from 2 → 1 with controller CLOSED: 410

Qn = supply pressure of 6 bar and with  $\Delta P = 1$  bar at the outlet  
 N° = number of screw turns

## Unidirectional flow controllers Series PSCU



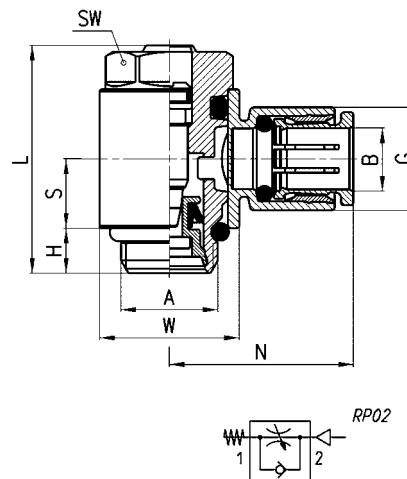
For mounting on single-acting or double-acting cylinders.

A screwdriver must be used to adjust the registration setting.

Ports: M5, G1/8, G1/4 and G3/8.



Port M5: banjo in brass



## DIMENSIONS

Mod.	A	B	G	H	L	N	S	W	SW
PSCU 602-M5-4	M5	4	8.6	3.5	21.5	18	5.7	8	8
PSCU 602-M5-6	M5	6	10.4	3.5	21.5	19	5.7	8	8
PSCU 604-1/8-4	G1/8	4	11.6	5	27	21	7.75	14	12
PSCU 604-1/8-6	G1/8	6	11.6	5	27	21	7.75	14	12
PSCU 604-1/8-8	G1/8	8	13.9	5	27	22.5	7.75	14	12
PSCU 606-1/4-6	G1/4	6	13.9	6	30.5	24.5	9.25	18.6	15
PSCU 606-1/4-8	G1/4	8	13.9	6	30.5	24.5	9.25	18.6	15
PSCU 606-1/4-10	G1/4	10	16.1	6	30.5	27	9.25	18.6	15
PSCU 608-3/8-10	G3/8	10	20.2	7	36.5	29	11	22	18
PSCU 608-3/8-12	G3/8	12	20.2	7	36.5	29	11	22	18

## Unidirectional flow controllers Series PMCU



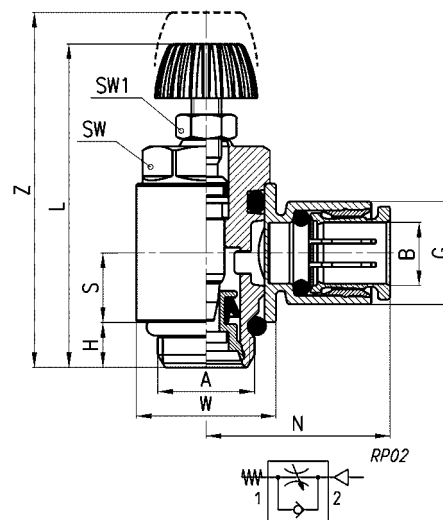
For mounting on single-acting or double-acting cylinders.

A manually operated knurled screw must be used to adjust the registration setting.

Ports: M5, G1/8, G1/4 and G3/8.



Port M5: banjo in brass



## DIMENSIONS

Mod.	A	B	G	H	L	N	S	W	SW	SW1	Z
PMCU 702-M5-4	M5	4	8.6	3.5	31	18	5.7	8	8	5.5	35
PMCU 702-M5-6	M5	6	10.4	3.5	31	19	5.7	8	8	5.5	35
PMCU 704-1/8-4	G1/8	4	11.6	5	36.5	21	7.75	14	12	7	42.5
PMCU 704-1/8-6	G1/8	6	11.6	5	36.5	21	7.75	14	12	7	42.5
PMCU 704-1/8-8	G1/8	8	13.9	5	36.5	22.5	7.75	14	12	7	42.5
PMCU 706-1/4-6	G1/4	6	13.9	6	42	24.5	9.25	18.6	15	7	48
PMCU 706-1/4-8	G1/4	8	13.9	6	42	24.5	9.25	18.6	15	7	48
PMCU 706-1/4-10	G1/4	10	16.1	6	42	27	9.25	18.6	15	7	48
PMCU 708-3/8-10	G3/8	10	20.2	7	48.5	29	11	22	18	10	56.5
PMCU 708-3/8-12	G3/8	12	20.2	7	48.5	29	11	22	18	10	56.5

## Unidirectional flow controllers Series PSVU



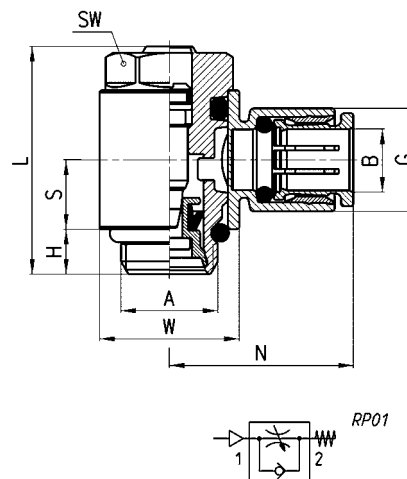
For mounting on valves.

A screwdriver must be used to adjust the registration setting.

Ports: M5, G1/8, G1/4 and G3/8.



Port M5: banjo in brass



## DIMENSIONS

Mod.	A	B	G	H	L	N	S	W	SW
PSVU 602-M5-4	M5	4	8.6	3.5	21.5	18	5.7	8	8
PSVU 602-M5-6	M5	6	10.4	3.5	21.5	19	5.7	8	8
PSVU 604-1/8-4	G1/8	4	11.6	5	27	21	7.75	14	12
PSVU 604-1/8-6	G1/8	6	11.6	5	27	21	7.75	14	12
PSVU 604-1/8-8	G1/8	8	13.9	5	27	22.5	7.75	14	12
PSVU 606-1/4-6	G1/4	6	13.9	6	30.5	24.5	9.25	18.6	15
PSVU 606-1/4-8	G1/4	8	13.9	6	30.5	24.5	9.25	18.6	15
PSVU 606-1/4-10	G1/4	10	16.1	6	30.5	27	9.25	18.6	15
PSVU 608-3/8-10	G3/8	10	20.2	7	36.5	29	11	22	18
PSVU 608-3/8-12	G3/8	12	20.2	7	36.5	29	11	22	18

Dimensions in millimeters (mm)

Unidirectional flow controllers Series PMVU

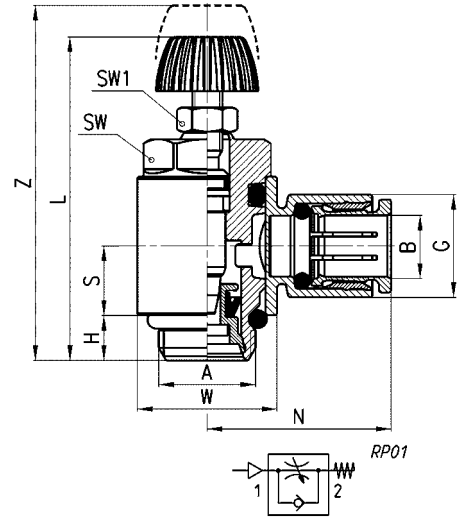


For mounting on valve.  
A manually operated knurled screw must be used to adjust the registration setting.  
Ports: M5, G1/8, G1/4 and G3/8.



Port M5: banjo in brass

DIMENSIONS											
Mod.	A	B	G	H	L	N	S	W	SW	SW1	Z
PMVU 702-M5-4	M5	4	8.6	3.5	31	18	5.7	8	8	5.5	35
PMVU 702-M5-6	M5	6	10.4	3.5	31	19	5.7	8	8	5.5	35
PMVU 704-1/8-4	G1/8	4	11.6	5	36.5	21	7.75	14	12	7	42.5
PMVU 704-1/8-6	G1/8	6	11.6	5	36.5	21	7.75	14	12	7	42.5
PMVU 704-1/8-8	G1/8	8	13.9	5	36.5	22.5	7.75	14	12	7	42.5
PMVU 706-1/4-6	G1/4	6	13.9	6	42	24.5	9.25	18.6	15	7	48
PMVU 706-1/4-8	G1/4	8	13.9	6	42	24.5	9.25	18.6	15	7	48
PMVU 706-1/4-10	G1/4	10	16.1	6	42	27	9.25	18.6	15	7	48
PMVU 708-3/8-10	G3/8	10	20.2	7	48.5	29	11	22	18	10	56.5
PMVU 708-3/8-12	G3/8	12	20.2	7	48.5	29	11	22	18	10	56.5



Bidirectional flow controllers Series PSCO

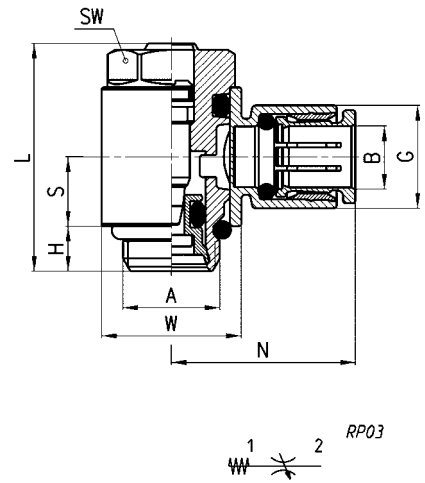


A screwdriver must be used to adjust the registration setting.  
Ports: M5, G1/8, G1/4 and G3/8.



Port M5: banjo in brass

DIMENSIONS										
Mod.	A	B	G	H	L	N	S	W	SW	
PSCO 602-M5-4	M5	4	8.6	3.5	21.5	18	5.7	8	8	
PSCO 602-M5-6	M5	6	10.4	3.5	21.5	19	5.7	8	8	
PSCO 604-1/8-4	G1/8	4	11.6	5	27	21	7.75	14	12	
PSCO 604-1/8-6	G1/8	6	11.6	5	27	21	7.75	14	12	
PSCO 604-1/8-8	G1/8	8	13.9	5	27	22.5	7.75	14	12	
PSCO 606-1/4-6	G1/4	6	13.9	6	30.5	24.5	9.25	18.6	15	
PSCO 606-1/4-8	G1/4	8	13.9	6	30.5	24.5	9.25	18.6	15	
PSCO 606-1/4-10	G1/4	10	16.1	6	30.5	27	9.25	18.6	15	
PSCO 608-3/8-10	G3/8	10	20.2	7	36.5	29	11	22	18	
PSCO 608-3/8-12	G3/8	12	20.2	7	36.5	29	11	22	18	



Bidirectional flow controllers Series PMCO

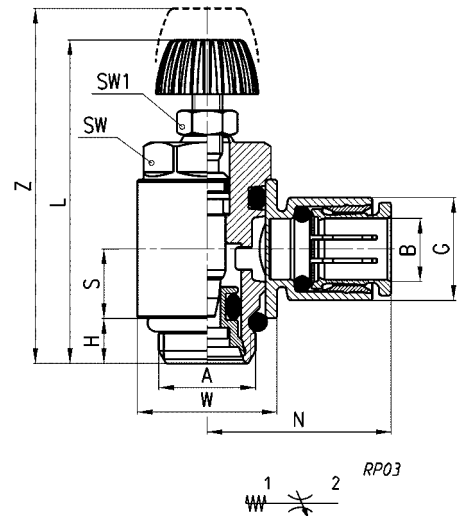


A manually operated knurled screw must be used to adjust the registration setting.  
Ports: M5, G1/8, G1/4 and G3/8.



Port M5: banjo in brass

DIMENSIONS											
Mod.	A	B	G	H	L	N	S	W	SW	SW1	Z
PMCO 702-M5-4	M5	4	8.6	3.5	31	18	5.7	8	8	5.5	35
PMCO 702-M5-6	M5	6	10.4	3.5	31	19	5.7	8	8	5.5	35
PMCO 704-1/8-4	G1/8	4	11.6	5	36.5	21	7.75	14	12	7	42.5
PMCO 704-1/8-6	G1/8	6	11.6	5	36.5	21	7.75	14	12	7	42.5
PMCO 704-1/8-8	G1/8	8	13.9	5	36.5	22.5	7.75	14	12	7	42.5
PMCO 706-1/4-6	G1/4	6	13.9	6	42	24.5	9.25	18.6	15	7	48
PMCO 706-1/4-8	G1/4	8	13.9	6	42	24.5	9.25	18.6	15	7	48
PMCO 706-1/4-10	G1/4	10	16.1	6	42	27	9.25	18.6	15	7	48
PMCO 708-3/8-10	G3/8	10	20.2	7	48.5	29	11	22	18	10	56.5
PMCO 708-3/8-12	G3/8	12	20.2	7	48.5	29	11	22	18	10	56.5



Dimensions in millimeters (mm)



## Composite Right Angle Flow Control Valves Series TMCU-TMVU-TMCO- BSP/METRIC

Meter In, Meter Out, Needle Orifice G1/8, G1/4, G3/8, G1/2  
Banjo flow controllers  
Nominal diameters Ø 2 - 3.8 - 5.8 - 8 mm

The Meter In, Meter Out, Needle Orifice flow controllers, series TMCU, TMVU, TMCO have been designed to offer a solution with reduced overall dimensions in combination with higher flow rate characteristics.

Their construction allows an easy assembly on cylinders and valves and offers the possibility of locking the regulation screw once it has been set. The flow regulation range which is extremely wide and gradual has been optimized further, allowing a very accurate flow regulation over the whole scale.



### TECHNICAL SPECIFICATIONS

Construction	needle-type
Valve group	Meter In, Meter Out, Needle Orifice flow controller
Materials	OT58 Nickel-plated brass threads and collet - technopolymer (glass-reinforced Nylon® 66 resin) - NBR, BUNA-N seals
Mounting	by male thread
Ports	G1/8, G1/4, G3/8, G1/2
Installation	in any position (spot face o-ring thread seal)
Operating temperature	0 - 60°C (with dry air -20°C) (32°F - 140°F, with dry air -4°F)
*If lubricated air is used, it is recommended to use ISOVG32 oil. Once applied the lubrication should never be interrupted.	

### PNEUMATIC DATA

Operating pressure	0.5 - 10 bar (7.25 - 145 psi)
Nominal pressure	6 bar (87 psi)
Nominal flow	see graph
Nominal dia.	Tube 4 ø2 mm (.079") - Tube 6 ø3.8 mm (.150") - Tube 8 ø5.8 mm (.228") - Tube 10 and 12 ø8 mm (.315")
Fluid	filtered air

Dimensions in millimeters (mm)

# Composite Flow Control Valves: BSP Threads with Spot-Face O-Ring Seals



## FEATURES

- All metal, Nickel-Plated collet and threads
- Strong, specialized Nylon® compound body material
- Specialized O-ring choices for High-Temp, Low-Temp, Special Fluids, Food-Grade compatibility
- Multiple Thread sealant systems: O-Ring Spot Face seals effectively on BSPP, BSPT or JIS ( Rpt or Rc , G or Rg) thread ports
- Broad Range of Tube / Thread combinations
- Removable Collet and tube o-rings
- Highly accurate Flow-rate repeatability & Higher Flow than typical brass bodied flow control valves
- Large ¼-Turn Locking-nut
- Precise Manual knob, w/ Internal hex-key
- Full Swivel design, NPTF and Metric/BSP, with integrated Push-In Fittings
- Meter-IN, Meter-OUT and Needle-Orifice flow designs for assembly on valves, cylinders or in-line use
- ANSI symbol stamped on all bodies
- Tube O.D. size stamped on all collet faces
- Meter-IN, Meter-OUT and Needle-Orifice flow designs for assembly on valves, cylinders or in-line use

## BENEFITS

### Collet

- Won't break like plastic release rings and bodies; More Durable design
- Higher holding force, with easier release
- Won't scratch tubes like "bite-ring" designs
- Less chance of micro-leakage and bubble-leaks over time due to damaged tubing

### Body

- Resistant to UV exposure
- Better resistance to stress-cracking, abrasion, solvents, detergents, hydrocarbons and other fluid media
- FDA/NSF approved materials, ( Including customized Nickel-Plating and o-ring options)
- Simplified manifold circuits with broader variety of fitting combinations and shapes to select
- Lighter weight for End-of-Arm tooling & Robotic handling,
- Compact design reduces overall dimensions for valve & cylinder assemblies, packaging applications and control cabinets
- 10% Reduction in Flow-Control size over previous brass bodies

### Design

- Accuracy and Repeatability of Flow-Control valves allows timing circuits to be design, faster OEM set-up and simplified MRO field installation and replacements
- Simplified manifold circuits with broader variety of Tube – Thread combinations to select
- Lighter weight for End-of-Arm tooling & Robotic handling
- Compact design reduces overall dimensions for valve assemblies, packaging applications and control cabinets
- More compact flow capacity reduces cylinder spacing with improved overall speed
- Fine tuning of flow with manual knob or hex-key adjustment
- Convertible into "Tamper-Proof" by removing manual knob and sealing hex-key slot
- Interchangeable Inch and Metric Thread adapters for "hybrid" Fittings and Flow-control valve requirements. ( Pro-Fit NPTF threads and BSP Spot-Face o-ring seals in opposite port standards)

Dimensions in millimeters (mm)

## CODING EXAMPLE

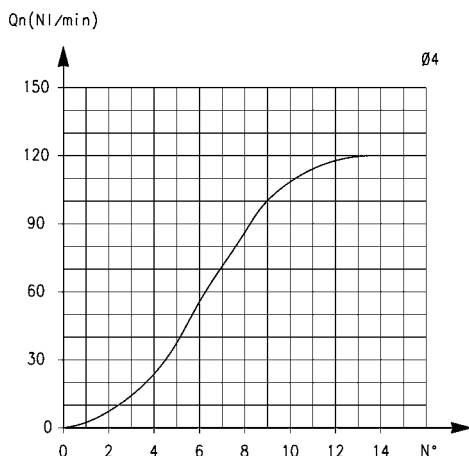
<b>TM</b>	<b>CU</b>	<b>9</b>	<b>74</b>	<b>-</b>	<b>1/8</b>	<b>-</b>	<b>6</b>
-----------	-----------	----------	-----------	----------	------------	----------	----------

<b>TM</b>	ACTUATION: TM = manual
<b>CU</b>	ASSEMBLY: CU = on cylinders unidirectional, meter-out VU = on valves unidirectional, meter-in CO = bidirectional, needle-orifice valve
<b>9</b>	VERSIONS: 9 = manual needle
<b>74</b>	REGULATION: step - ø tube 72 = 2 4 74 = 3.8 6 76 = 5.8 8 78 = 8 10
<b>1/8</b>	PORTS: 1/8 1/4 3/8 1/2
<b>6</b>	Ø TUBE: 4 6 8 10

To ensure the right choice of unidirectional flow controller, proceed as follows: calculate the quantity of air in NI/min (see cylinder Table); determine the stroke time of the cylinder; refer to graph to see which controller is the right type.

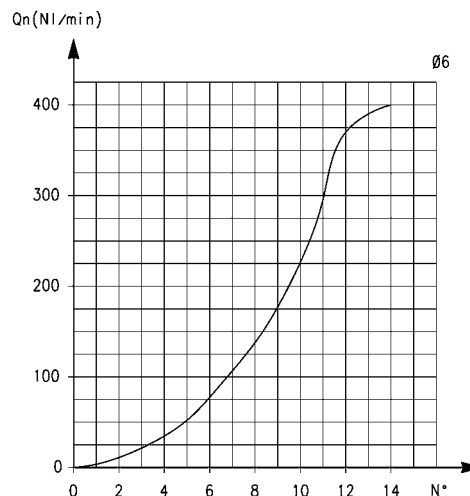


## UNIDIRECTIONAL AND BIDIRECTIONAL FLOW CONTROL REGULATORS



## TUBE Ø4

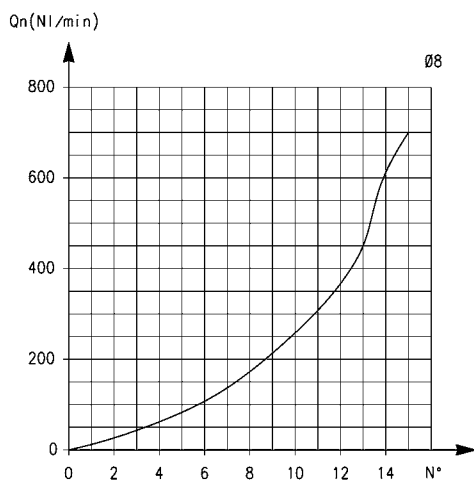
Flow  $Q_n$  (NI/min.) from 2 → 1 with controller OPEN: 400  
 Flow  $Q_n$  (NI/min.) from 2 → 1 with controller CLOSED: 280  
 $Q_n$  is determined with a supply pressure of 6 bar and with  $\Delta P = 1$  bar at the outlet  
 $N^\circ$  = number of screw turns.



## TUBE Ø6

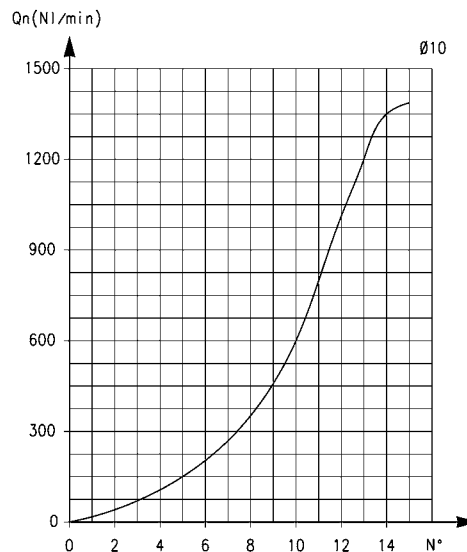
Flow  $Q_n$  (NI/min.) from 2 → 1 with controller OPEN: 550  
 Flow  $Q_n$  (NI/min.) from 2 → 1 with controller CLOSED: 280  
 $Q_n$  is determined with a supply pressure of 6 bar and with  $\Delta P = 1$  bar at the outlet  
 $N^\circ$  = number of screw turns.

## UNIDIRECTIONAL AND BIDIRECTIONAL FLOW CONTROL REGULATORS



## TUBE Ø8

Flow  $Q_n$  (NI/min.) from 2 → 1 with controller OPEN: 890  
 Flow  $Q_n$  (NI/min.) from 2 → 1 with controller CLOSED: 460  
 $Q_n$  is determined with a supply pressure of 6 bar and with  $\Delta P = 1$  bar at the outlet  
 $N^\circ$  = number of screw turns.



## TUBE Ø10

Flow  $Q_n$  (NI/min.) from 2 → 1 with controller OPEN: Ø 10-1200/Ø12-1250  
 Flow  $Q_n$  (NI/min.) from 2 → 1 with controller CLOSED: Ø 10-600/Ø12-600  
 $Q_n$  is determined with a supply pressure of 6 bar and with  $\Delta P = 1$  bar at the outlet  
 $N^\circ$  = number of screw turns.

Dimensions in millimeters (mm)

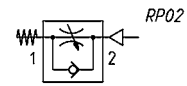
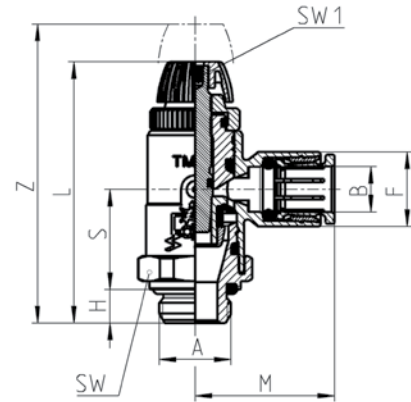
## Valves Series TMCU



Unidirectional flow controller for mounting on single-acting or double-acting cylinders.  
Adjustment of setting by a hexagonal male key or a manually operated knurled screw.  
Ports: G1/8, G1/4, G3/8, G1/2

## DIMENSIONS

Mod.	A	B	F	H	L	M	S	SW	SW1	Z
<b>TMCU 972-1/8-4</b>	G1/8	4	11,5	5	43	21,5	16,5	16	1,5	50
<b>TMCU 974-1/8-6</b>	G1/8	6	11,5	5	43	21,5	16,5	16	1,5	50
<b>TMCU 974-1/4-6</b>	G1/4	6	11,5	6	44	21,5	16,5	17	1,5	51
<b>TMCU 976-1/8-8</b>	G1/8	8	13,5	5	47	25	17,5	19	2,5	54
<b>TMCU 976-1/4-8</b>	G1/4	8	13,5	6	48,5	25	18	19	2,5	55,5
<b>TMCU 976-3/8-8</b>	G3/8	8	13,5	7	49,5	25	18	20	2,5	56,5
<b>TMCU 978-3/8-10</b>	G3/8	10	16	7	51	29	17	25	2,5	59,5
<b>TMCU 978-1/2-10</b>	G1/2	10	16	8	52	29	17	25	2,5	60,5



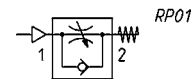
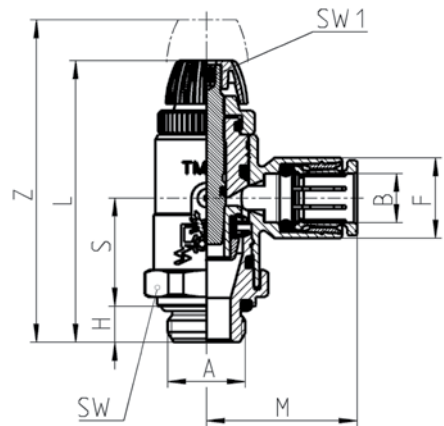
## Valves Series TMVU



Unidirectional flow controller for mounting on valves.  
Adjustment of setting by a hexagonal male key or a manually operated knurled screw.  
Ports: G1/8, G1/4, G3/8, G1/2

## DIMENSIONS

Mod.	A	B	F	H	L	M	S	SW	SW1	Z
<b>TMVU 972-1/8-4</b>	G1/8	4	11,5	5	43	21,5	16,5	16	1,5	50
<b>TMVU 974-1/8-6</b>	G1/8	6	11,5	5	43	21,5	16,5	16	1,5	50
<b>TMVU 974-1/4-6</b>	G1/4	6	11,5	6	44	21,5	16,5	17	1,5	51
<b>TMVU 976-1/8-8</b>	G1/8	8	13,5	5	47	25	17,5	19	2,5	54
<b>TMVU 976-1/4-8</b>	G1/4	8	13,5	6	48,5	25	18	19	2,5	55,5
<b>TMVU 976-3/8-8</b>	G3/8	8	13,5	7	49,5	25	18	20	2,5	56,5
<b>TMVU 978-3/8-10</b>	G3/8	10	16	7	51	29	17	25	2,5	59,5
<b>TMVU 978-1/2-10</b>	G1/2	10	18	8	52	29	17	25	2,5	60,5



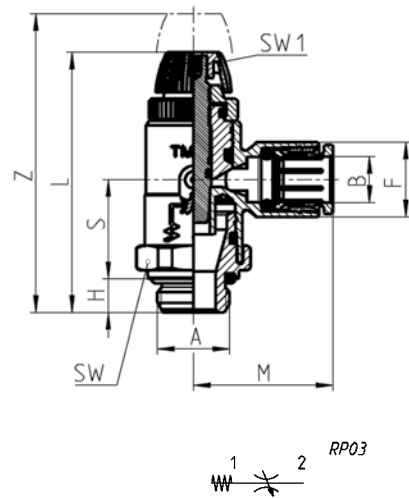
## Valves Series TMCO

Bidirectional flow controller.  
Adjustment of setting by a hexagonal male key or a manually operated knurled screw.  
Ports: G1/8, G1/4, G3/8, G1/2



## DIMENSIONS

Mod.	A	B	F	H	L	M	S	SW	SW1	Z
<b>TMCO 972-1/8-4</b>	G1/8	4	11,5	5	43	21,5	16,5	16	1,5	50
<b>TMCO 974-1/8-6</b>	G1/8	6	11,5	5	43	21,5	16,5	16	1,5	50
<b>TMCO 974-1/4-6</b>	G1/4	6	11,5	6	44	21,5	16,5	17	1,5	51
<b>TMCO 976-1/8-8</b>	G1/8	8	13,5	5	47	25	17,5	19	2,5	54
<b>TMCO 976-1/4-8</b>	G1/4	8	13,5	6	48,5	25	18	19	2,5	55,5
<b>TMCO 976-3/8-8</b>	G3/8	8	13,5	7	49,5	25	18	20	2,5	56,5
<b>TMCO 978-3/8-10</b>	G3/8	10	16	7	51	29	17	25	2,5	59,5
<b>TMCO 978-1/2-10</b>	G1/2	10	16	8	52	29	17	25	2,5	60,5



Dimensions in millimeters (mm)

# Banjo Flow Control Valves

## Series SCU, MCU, SVU, MVU, SCO, MCO

Unidirectional and bidirectional flow control valves

Banjo flow control regulators

Ports M5, G1/8, G1/4, G3/8, G1/2



These unidirectional and bidirectional flow controllers have been designed as small as possible so as to be mounted directly on valves or cylinders.

The great variety of adjustable fittings makes it possible to complete the regulator with the most suitable system in relation to the available tube.

Only the G1/2 model is supplied complete with banjo flow controllers. For the other models the banjo and flow controller is to be requested separately.

### GENERAL DATA

<b>Construction</b>	needle type
<b>Valve group</b>	unidirectional and bidirectional controller
<b>Materials</b>	body and regulation screw: M5 = stainless steel; 1/8 - 1/4 - 3/8 - 1/2 = Nickel-plated brass bodies, plain brass adjustment screw seals = NBR
<b>Mounting</b>	by male thread
<b>Ports</b>	M5 - G1/8 - G1/4 - G3/8 - G1/2
<b>Installation</b>	in any position
<b>Operating temperature</b>	0°C - 80°C (with dry air - 20°C)
<b>Operating pressure</b>	1 - 10 bar
<b>Nominal pressure</b>	6 bar
<b>Nominal flow</b>	see graph
<b>Nominal diameter</b>	M5 = 1,5 mm - G1/8 = 2 mm - G1/4 = 4 mm - G3/8 = 7 mm - G1/2 = 12 mm
<b>Fluid</b>	filtered air

Dimensions in millimeters (mm)

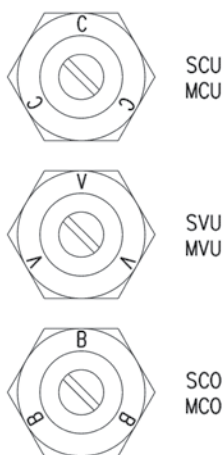
## CODING EXAMPLE

M	CU	7	02	-	M5
---	----	---	----	---	----

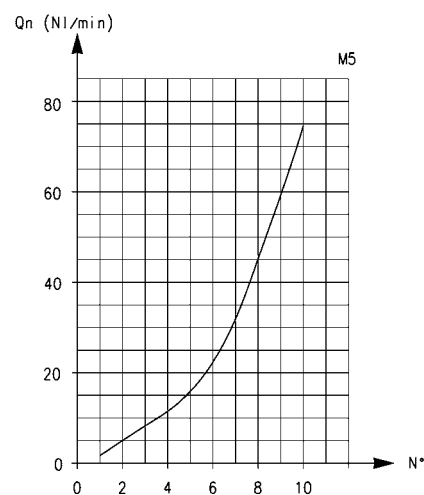
<b>M</b>	ACTUATION: M = Manual S = Screwdriver
<b>CU</b>	ASSEMBLY / VALVE TYPE: CU = directly on double-acting cylinders / unidirectional VU = directly on valves / unidirectional CO = directly on valves exhaust / bidirectional
<b>7</b>	VERSIONS: 6 = needle (screwdriver operated) 7 = needle (manual operated)
<b>02</b>	NOMINAL DIAMETER: 02 = $\varnothing$ 1,5 max 04 = $\varnothing$ 2 max 06 = $\varnothing$ 4 max 08 = $\varnothing$ 7 max 10 = $\varnothing$ 12 max
<b>M5</b>	PORTS: M5 = M5 1/8 = G1/8 1/4 = G1/4 3/8 = G3/8 1/2 = G1/2

To ensure the right choice of unidirectional flow controller, proceed as follows: calculate the quantity of air in NI/min (see cylinder Table); determine the stroke time of the cylinder; refer to graph to see which controller is the right type.

## UNIDIRECTIONAL AND BIDIRECTIONAL FLOW CONTROLLERS



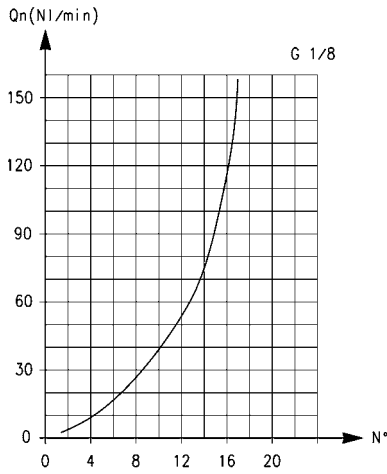
IDENTIFICATION (SEE CODING EXAMPLE)



Flow  $Q_n$  (NI/min.) from 2 → 1 with controller OPEN: 70  
 Flow  $Q_n$  (NI/min.) from 2 → 1 with controller CLOSED: 33  
 $Q_n$  = supply pressure of 6 bar and with  $\Delta P$  = 1 bar at the outlet  
 $N^\circ$  = number of screw turns.

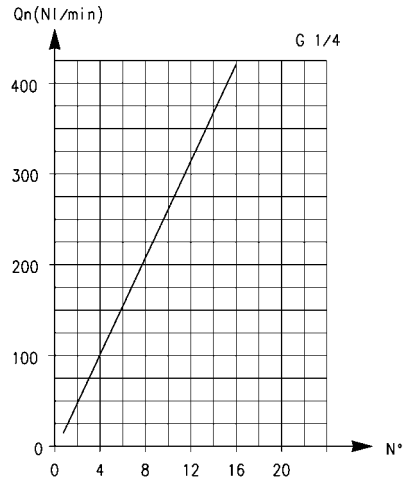
Dimensions in millimeters (mm)

UNIDIRECTIONAL AND BIDIRECTIONAL FLOW CONTROL REGULATORS



Flow Qn (NI/min.) from 2 → 1 with controller OPEN: 200  
 Flow Qn (NI/min.) from 2 → 1 with controller CLOSED: 70

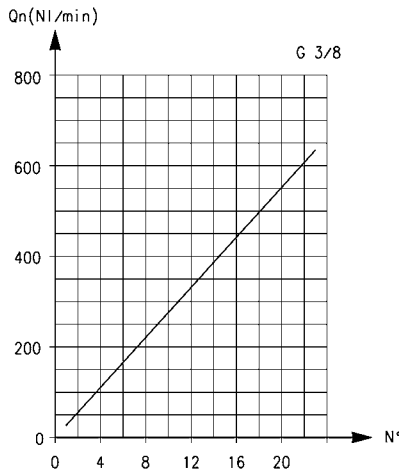
Qn = supply pressure of 6 bar and with  $\Delta P = 1$  bar at the outlet  
 N° = number of screw turns.



Flow Qn (NI/min.) from 2 → 1 with controller OPEN: 530  
 Flow Qn (NI/min.) from 2 → 1 with controller CLOSED: 160

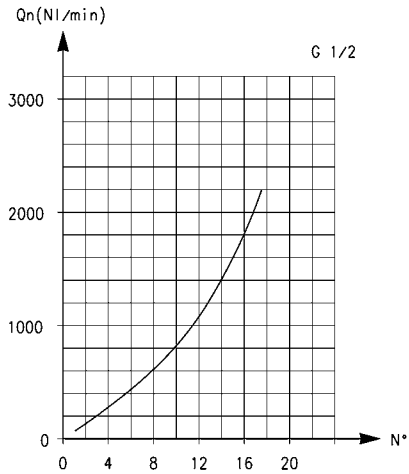
Qn = supply pressure of 6 bar and with  $\Delta P = 1$  bar at the outlet  
 N° = number of screw turns.

UNIDIRECTIONAL AND BIDIRECTIONAL FLOW CONTROL REGULATORS



Flow Qn (NI/min.) from 2 → 1 with controller OPEN: 710  
 Flow Qn (NI/min.) from 2 → 1 with controller CLOSED: 410

Qn = supply pressure of 6 bar and with  $\Delta P = 1$  bar at the outlet  
 N° = number of screw turns.



Flow Qn (NI/min.) from 2 → 1 with controller OPEN: 2570  
 Flow Qn (NI/min.) from 2 → 1 with controller CLOSED: 1330

Qn = supply pressure of 6 bar and with  $\Delta P = 1$  bar at the outlet  
 N° = number of screw turns.

## Valves Series SCU

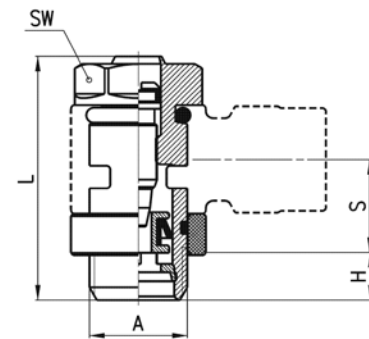
Unidirectional flow controller for mounting on single-acting or double-acting cylinders.  
Adjustment of setting by a screwdriver.  
Ports: M5, G1/8, G1/4 and G3/8.

Assembly with fittings Mod. 6610; 6620; 1610; 1620; 2023; 1170.

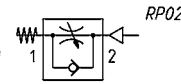


## DIMENSIONS

Mod.	A	H	L	S	SW
<b>SCU 602-M5</b>	M5	3,5	21,5	5,5	8
<b>SCU 604-1/8</b>	G1/8	5	31,5	12,5	12
<b>SCU 606-1/4</b>	G1/4	6	32,5	12,5	15
<b>SCU 608-3/8</b>	G3/8	7	40,5	12,5	18



Note: M5 flow controllers must be used together with M6 adjustable fittings.



## Valves Series MCU

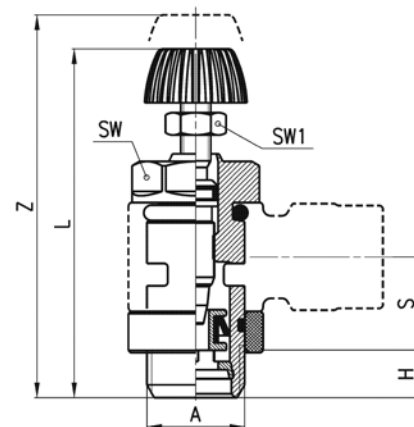
Unidirectional flow controller for mounting on single-acting or double-acting cylinders.  
Adjustment of setting by a manually operated knurled screw.  
Ports: M5, G1/8, G1/4, G3/8.

Assembly with fittings Mod. 6610; 6620; 1610; 1620; 2023; 1170.

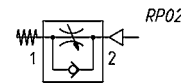


## DIMENSIONS

Mod.	A	H	L	S	SW	SW1	Z
<b>MCU 702-M5</b>	M5	3,5	31	5,5	8	5,5	35
<b>MCU 704-1/8</b>	G1/8	5	41	12,5	12	7	46
<b>MCU 706-1/4</b>	G1/4	6	43,5	12,5	15	7	49
<b>MCU 708-3/8</b>	G3/8	7	52,5	12,5	18	10	60,5



Note: M5 flow controllers must be used together with M6 adjustable fittings.



## Valves Series SVU

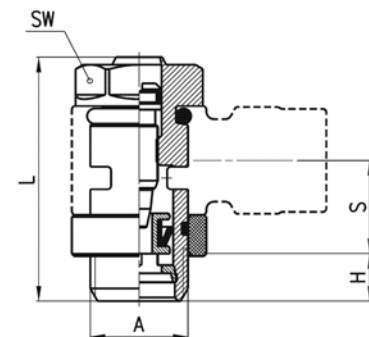
Unidirectional flow controller for mounting on valves.  
Adjustment of setting by a screwdriver.  
Ports: M5, G1/8, G1/4.

Assembly with fittings Mod. 6610; 6620; 1610; 1620; 2023; 1170.

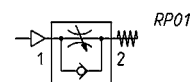


## DIMENSIONS

Mod.	A	H	L	S	SW
<b>SVU 602-M5</b>	M5	3,5	21,5	5,5	8
<b>SVU 604-1/8</b>	G1/8	5	31,5	12,5	12
<b>SVU 606-1/4</b>	G1/4	6	32,5	12,5	15



Note: M5 flow controllers must be used together with M6 adjustable fittings.



Dimensions in millimeters (mm)

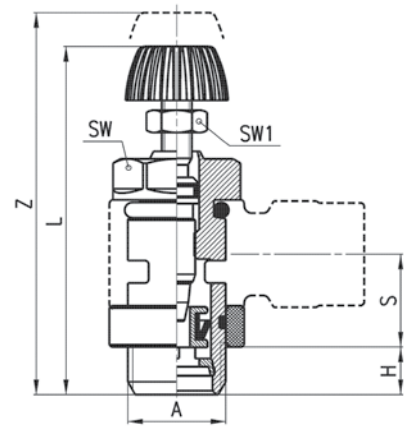
**Valves Series MVU**

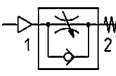


Unidirectional flow controller for mounting on valve.  
Adjustment of setting by a manually operated knurled screw.  
Ports: M5, G1/8, G1/4.

Assembly with fittings Mod. 6610; 6620; 1610; 1620; 2023; 1170.

DIMENSIONS							
Mod.	A	H	L	S	SW	SW1	Z
<b>MVU 702-M5</b>	M5	3,5	31	5,5	8	5,5	35
<b>MVU 704-1/8</b>	G1/8	5	41	12,5	12	7	46
<b>MVU 706-1/4</b>	G1/4	6	43,5	12,5	15	7	49



Note: M5 flow controllers must be used together with M6 adjustable fittings.  RP01

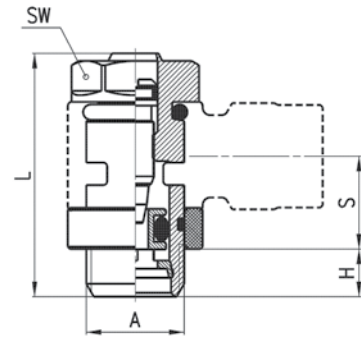
**Valves Series SCO**




Bidirectional flow controller.  
Adjustment of setting by a screwdriver.  
Ports: M5, G1/8, G1/4.

Assembly with fittings Mod. 6610; 6620; 1610; 1620; 2023; 1170; 2905.

DIMENSIONS					
Mod.	A	H	L	S	SW
<b>SCO 602-M5</b>	M5	3,5	21,5	5,5	8
<b>SCO 604-1/8</b>	G1/8	5	31,5	12,5	12
<b>SCO 606-1/4</b>	G1/4	6	32,5	12,5	15



Note: M5 flow controllers must be used together with M6 adjustable fittings.  RP03

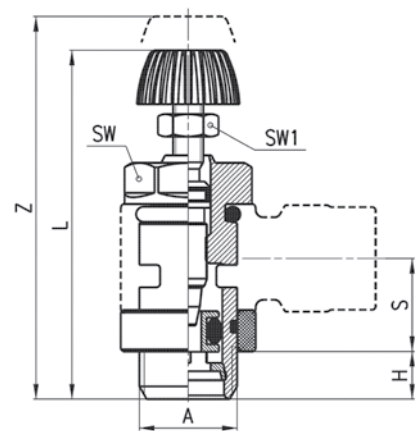
**Valves Series MCO**

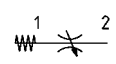


Bidirectional flow controller.  
Adjustment of setting by a manually operated knurled screw.  
Ports: M5, G1/8, G1/4.

Assembly with fittings Mod. 6610; 6620; 1610; 1620; 2023; 1170; 2905.

DIMENSIONS							
Mod.	A	H	L	S	SW	SW1	Z
<b>MCO 702-M5</b>	M5	3,5	31	5,5	8	5,5	35
<b>MCO 704-1/8</b>	G1/8	5	41	12,5	12	7	46
<b>MCO 706-1/4</b>	G1/4	6	43,5	12,5	15	7	49



Note: M5 flow controllers must be used together with M6 adjustable fittings.  RP03

Dimensions in millimeters (mm)



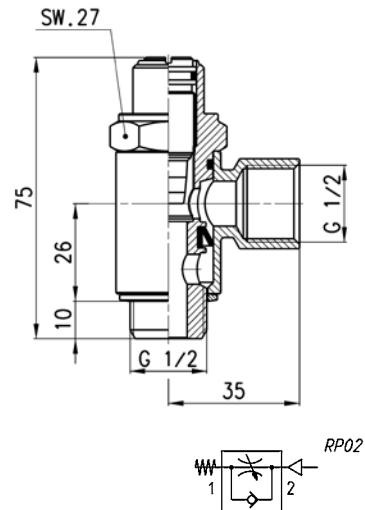
## Valves Series SCU

Unidirectional flow controller for mounting on single-acting or double-acting cylinders. Screwdriver adjustment.



Mod.

SCU 610-1/2



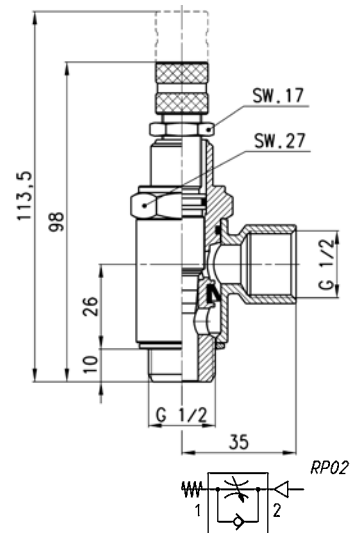
## Valves Series MCU

Unidirectional flow controller for mounting on single-acting or double-acting cylinders. Adjustment of setting by a manually operated knurled screw.



Mod.

MCU 710-1/2



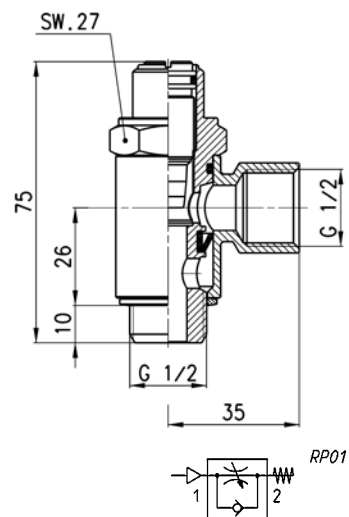
## Valves Series SVU

Unidirectional flow controller for mounting on valves. Screwdriver adjustment.



Mod.

SVU 610-1/2

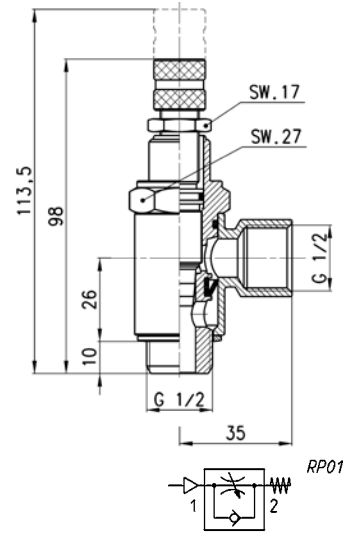


Dimensions in millimeters (mm)



## Valves Series MVU

Unidirectional flow controller for mounting on valve.  
Adjustment of setting by a manually operated knurled screw.



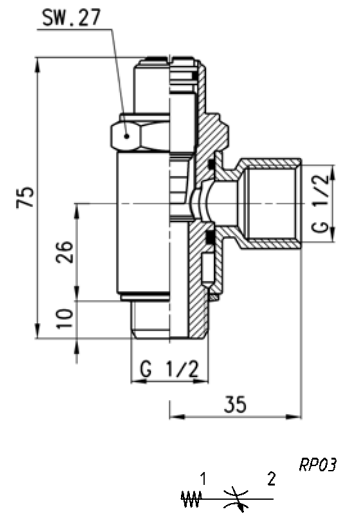
Mod.

MVU 710-1/2



## Valves Series SCO

Bidirectional flow controller.  
Screwdriver adjustment.



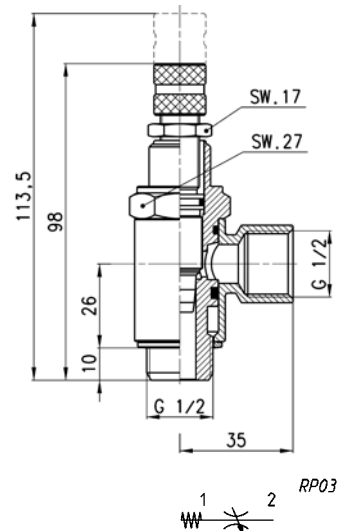
Mod.

SCO 610-1/2



## Valves Series MCO

Bidirectional flow controller.  
Adjustment of setting by a manually operated knurled screw.



Mod.

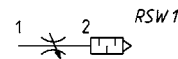
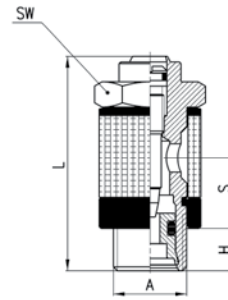
MCO 710-1/2

Dimensions in millimeters (mm)

## Silenced exhaust controller Mod. SCO + 2905



The flow control valve Mod. SCO- and the silencer Mod. 2905 are supplied separately.  
For further information about the silencer see page 162 & 167.



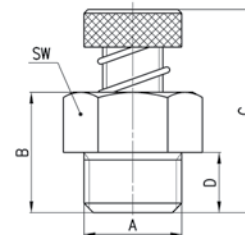
## DIMENSIONS

Mod.	A	H	L	S	SW
<b>SCO + 2905</b>	M5	3.5	21.5	5.5	8
<b>SCO + 2905</b>	1/8	6	35.5	12.5	14
<b>SCO + 2905</b>	1/4	8	37.5	12.5	17

## Flow control valves with silencer Series RSW



Flow control valves with silencer.  
Ports: G1/8, G1/4, G1/2.



SIL1



## DIMENSIONS

Mod.	A	B	C	D	SW	Qn*(NI/mm)
<b>RSW 1/8</b>	G1/8	13	22	6	12	410
<b>RSW 1/4</b>	G1/4	16	27	8	16	650
<b>RSW 1/2</b>	G1/2	26	35	11	26	1590

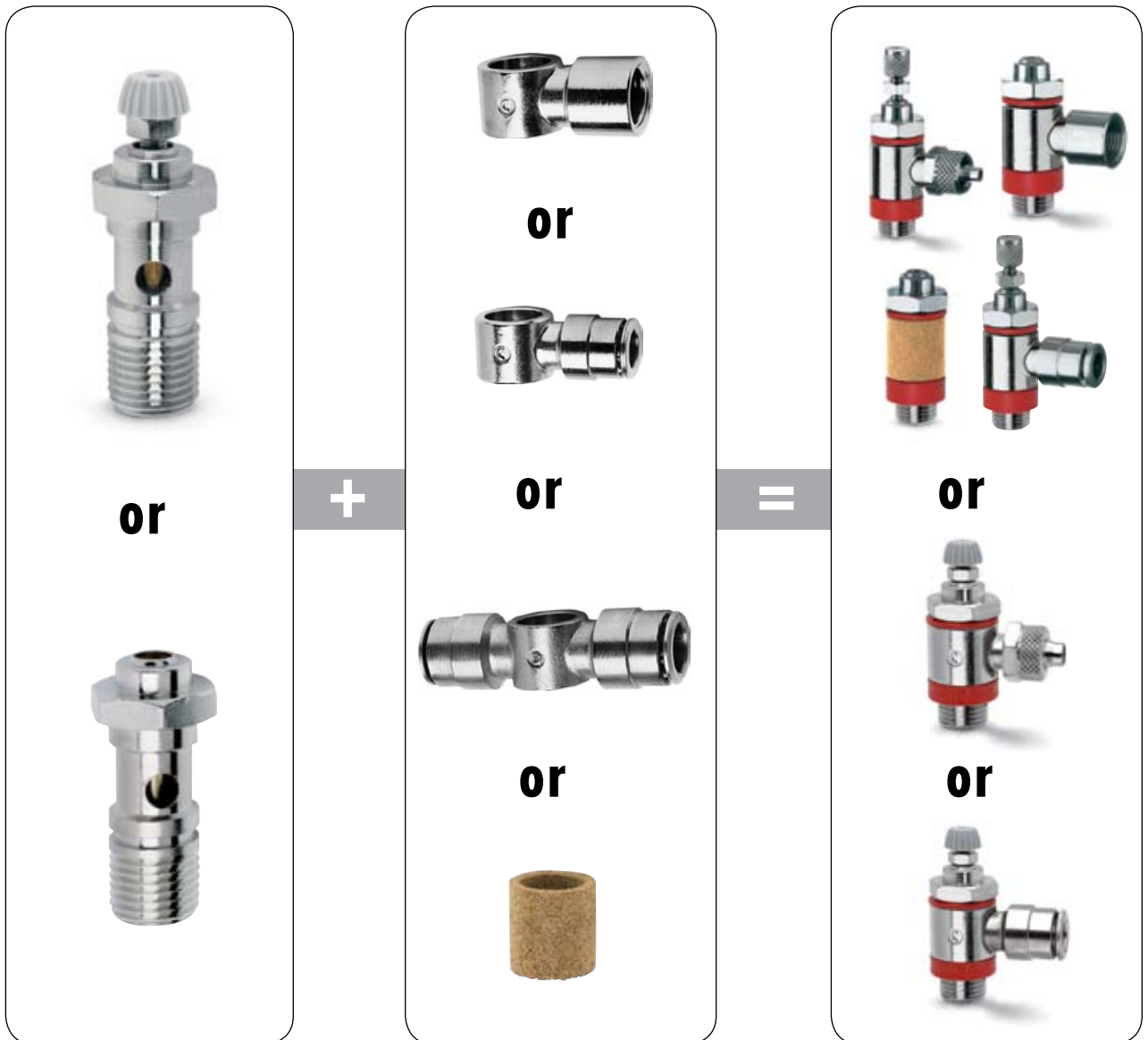
\*determined with supply pressure  
6 bar with free flow; ensuring  
screw is open to maximum output.

Dimensions in millimeters (mm)

# Banjo-Style Flow Control Valve Assembly

## BSP Non-Swivel models and customized NPTF models not shown in catalog, or hybrids

1. Older style flow-control valves with banjo tube/thread connections and stud valve types may be assembled in a variety of combinations.
2. Select any stud valve flow-control type; Meter-In, Meter-Out, or Needle –Orifice with either Manual or Screwdriver adjustment, ( i.e. MCU-, SCU-, MVU-, SVU-, MCO-, SCO- from BSP flow control body offering).
3. Select desired banjo connection, either inch OD, metric/mm OD, metric compression, female thread or silencer ring from banjo offerings in Fittings section of catalog , ( i.e. 6610 04-02, 6610 6-1/8, 2023 02-02, 2023 1/4-1/4, 1610 6/4-1/8, 2905 1/4, etc.)
4. Select thread adapter to “close” the final assembly and hold banjo in place, ( i.e. 2520 02-1/8, 2520 04-1/4, 2520 1/4-1/4, 2520 1/8-1/8), depending on final thread choice of BSP or NPTF threads.



Dimensions in millimeters (mm)

## Fittings Mod. 1631 with gaskets

01... = Single Banjo Stem  
 02... = Double Banjo Stem  
 03... = Triple Banjo Stem



Mod.

1631 01-

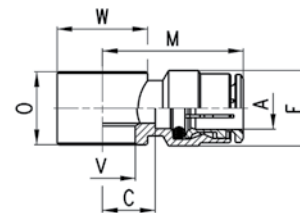
1631 02-

1631 03-

Drawings and dimensions on  
 page 4/2.05.09

## Fittings Mod. 6610

Single Banjo



## DIMENSIONS

Mod.	A	C	F	M	O	V	W	Weight (g)
6610 4-M5	4	5	9	19	9	5,1	Ø 9	9
6610 4-M6	4	5	9	19	9	5,1	Ø 9	8 •
6610 4-1/8	4	7,5	9	21,5	14,5	9,8	Ø 14	14
6610 5-M5	5	5	10	20	9	5,1	Ø 9	9
6610 5-M6	5	5	10	20	9	5,1	Ø 9	8 •
6610 5-1/8	5	8	10	23	14,5	9,8	Ø 14	16
6610 6-M5	6	6,5	12,7	22,5	9	5,1	Ø 10	12
6610 6-M6	6	6,5	12,7	22,5	9	5,1	Ø 10	12 •
6610 6-1/8	6	8	12,7	24	14,5	9,8	Ø 14	16
6610 6-1/4	6	10	12,7	26	14,5	13,2	Ø 18	19
6610 8-1/8	8	8	14,2	25,5	14,5	9,8	Ø 14	19
6610 8-1/4	8	10	14,2	27,5	14,5	13,2	Ø 18	22
6610 8-3/8	8	11	14,2	28,5	14,5	16,7	Ø 21	23
6610 10-1/4	10	8,8	16,5	29	14,5	13,2	Ø 18	22 *
6610 10-3/8	10	10,3	16,5	30,5	14,5	16,7	Ø 21	23 *
6610 12-1/2	12	12,8	16,5	32	14,5	21	Ø 26	37 *

• = assembly required with Mod.  
 SCU, SVU, SCO... M5 only  
 \* = assembly required with Mod.  
 1635 only

Dimensions in millimeters (mm)

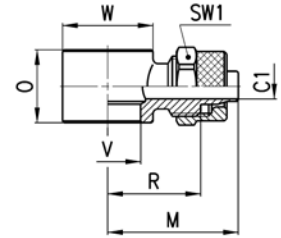
## Fittings Mod. 1610

## Single Banjo



## DIMENSIONS

Mod.	Tube	C1	M	O	R	V	W	SW1	Weight (g)
1610 5/3-M5	5/3	2	17	9	10,5	5,1	∅ 9	8	8
1610 5/3-M6	5/3	2	17	9	10,5	5,1	∅ 9	8	7 •
1610 5/3-1/8	5/3	2	22,5	14,5	16	9,8	∅ 14	8	13
1610 6/4-M5	6/4	3	18	9	10,5	5,1	∅ 9	9	8
1610 6/4-M6	6/4	2	18	9	10,5	5,1	∅ 9	9	8 •
1610 6/4-1/8	6/4	3	24	14,5	16,5	9,8	∅ 14	12	18
1610 6/4-1/4	6/4	3	26	14,5	18,5	13,2	∅ 18	12	21
1610 6/4-3/8	6/4	3	28	14,5	20,5	16,7	∅ 21	12	22
1610 8/6-1/8	8/6	5	24	14,5	16,5	9,8	∅ 14	14	19
1610 8/6-1/4	8/6	5	26	14,5	18,5	13,2	∅ 18	14	22
1610 8/6-3/8	8/6	5	28	14,5	20,5	16,7	∅ 21	14	25
1610 10/8-1/8	10/8	6,5	25	14,5	16,5	9,8	∅ 14	16	25 *
1610 10/8-1/4	10/8	6,5	27	14,5	18,5	13,2	∅ 18	16	24 *
1610 10/8-3/8	10/8	6,5	29,5	14,5	21	16,7	∅ 21	16	28 *
1610 10/8-1/2	10/8	6,5	32	14,5	23,5	21	∅ 26	16	35 *
1610 12/10-3/8	12/10	8	31,5	14,5	21,5	16,7	∅ 21	19	36 *
1610 12/10-1/2	12/10	8,5	33,5	14,5	23,5	21	∅ 26	19	40 *
1610 15/12,5-1/2	15/12,5	11	36,5	14,5	25	21	∅ 26	22	48 *



\* = Assembled with Mod. 1635  
 • = Assembled with Mod. SCU, SVU, SCO... M5

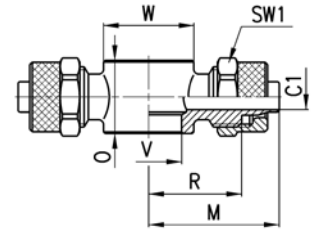
## Fittings Mod. 1620

## Double Banjo



## DIMENSIONS

Mod.	Tube	C1	M	O	R	V	W	SW1	Weight (g)
1620 6/4-M5	6/4	3	18	9	10,5	5,1	∅ 9	9	12
1620 6/4-1/8	6/4	3	24	14,5	16,5	9,8	∅ 14	12	29
1620 6/4-1/4	6/4	3	26	14,5	18,5	13,2	∅ 18	12	31
1620 8/6-1/8	8/6	5	24	14,5	16,5	9,8	∅ 14	14	31
1620 8/6-1/4	8/6	5	26	14,5	18,5	13,2	∅ 18	14	34



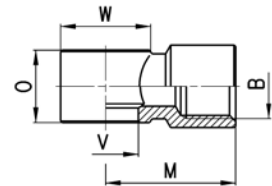
## Fittings Mod. 2023 35

## Single Thread Banjo



## DIMENSIONS

Mod.	B	M	O	V	W	Weight (g)
2023 M5-M5	M5	10,5	9	5,1	∅ 9	6
2023 M5-M6	M6	10,5	9	5,1	∅ 9	6 •
2023 1/8-1/8	G1/8	20	14,5	9,8	∅ 14	14
2023 1/4-1/4	G1/4	23,5	14,5	13,2	∅ 18	21 *
2023 3/8-3/8	G3/8	26,5	14,5	16,7	∅ 21	27 *

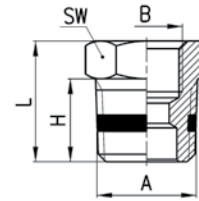


• = assembly with Mod. SCU, SCO, SVU... M5  
 ★ = assembly with Mod. 1635

Dimensions in millimeters (mm)

## Fittings Mod. S2530

BSPT Reducing Nipple Sprint®

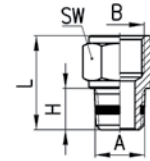


## DIMENSIONS

Mod.	A	B	H	L	SW	Weight (g)
<b>S2530 1/4-1/8</b>	R1/4	G1/8	11	16	14	9
<b>S2530 3/8-1/8</b>	R3/8	G1/8	11,5	16,5	17	16
<b>S2530 1/2-1/8</b>	R1/2	G1/8	14	19,5	22	13
<b>S2530 3/8-1/4</b>	R3/8	G1/4	11,5	16,5	17	33
<b>S2530 1/2-1/4</b>	R1/2	G1/4	14	19,5	22	32
<b>S2530 1/2-3/8</b>	R1/2	G3/8	14	19,5	22	22

## Fittings Mod. S2520

BSPT Male Reducing Extension Sprint®



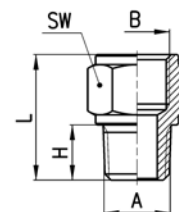
## DIMENSIONS

Mod.	A	B	H	L	SW	Weight (g)
<b>S2520 1/8-1/8</b>	R1/8	G1/8	7,5	17,5	13	11
<b>S2520 1/8-1/4</b>	R1/8	G1/4	7,5	19	17	15
<b>S2520 1/8-3/8</b>	R1/8	G3/8	7,5	20	20	19
<b>S2520 1/4-1/4</b>	R1/4	G1/4	11	22,5	17	17
<b>S2520 1/4-3/8</b>	R1/4	G3/8	11	23,5	20	33
<b>S2520 1/4-1/2</b>	R1/4	G1/2	11	27,5	24	34
<b>S2520 3/8-3/8</b>	R3/8	G3/8	11,5	24	20	36
<b>S2520 3/8-1/2</b>	R3/8	G1/2	11,5	28	24	56
<b>S2520 1/2-1/2</b>	R1/2	G1/2	14	30,5	24	41

Dimensions in millimeters (mm)

## Fittings Mod. 2520

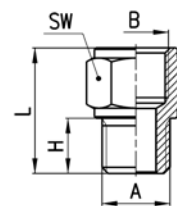
BSPT Male Reducing Extension



DIMENSIONS						
Mod.	A	B	H	L	SW	Weight (g)
2520 1/8-1/8	R1/8	G1/8	7,5	17,5	13	9
2520 1/8-1/4	R1/8	G1/4	7,5	19	17	15
2520 1/8-3/8	R1/8	G3/8	7,5	20	20	19
2520 1/4-1/4	R1/4	G1/4	11	22,5	17	17
2520 1/4-3/8	R1/4	G3/8	11	23,5	20	21
2520 1/4-1/2	R1/4	G1/2	11	27,5	24	35
2520 3/8-3/8	R3/8	G3/8	11,5	24	20	23
2520 3/8-1/2	R3/8	G1/2	11,5	28	24	37
2520 1/2-1/2	R1/2	G1/2	14	30,5	24	41

## Fittings Mod. 2521

Metric-BSP Reducing Extension



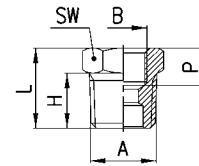
DIMENSIONS						
Mod.	A	B	H	L	SW	Weight (g)
2521 M5-1/8	M5	G1/8	4	14	13	7
2521 1/8-1/8	G1/8	G1/8	6	16	13	8
2521 1/8-1/4	G1/8	G1/4	6	17,5	17	14
2521 1/8-3/8	G1/8	G3/8	6	18,5	20	30
2521 1/4-1/4	G1/4	G1/4	8	19,5	17	16
2521 1/4-3/8	G1/4	G3/8	8	20,5	20	20
2521 1/4-1/2	G1/4	G1/2	8	24,5	24	33
2521 3/8-3/8	G3/8	G3/8	9	21,5	20	22
2521 3/8-1/2	G3/8	G1/2	9	25,5	24	35
2521 1/2-1/2	G1/2	G1/2	10	26,5	24	36

Dimensions in millimeters (mm)



## Fittings Mod. 2530

BSPT Reducing

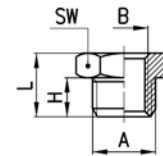


## DIMENSIONS

Mod.	A	B	H	L	P	SW	Weight (g)
2530 1/4-1/8	R1/4	G1/8	11	16	6	14	9
2530 3/8-1/8	R3/8	G1/8	11,5	16,5	8,5	17	17
2530 1/2-1/8	R1/2	G1/8	14	19,5	9,5	22	12
2530 3/8-1/4	R3/8	G1/4	11,5	16,5	7	17	34
2530 1/2-1/4	R1/2	G1/4	14	19,5	9,5	22	30
2530 1/2-3/8	R1/2	G3/8	14	19,5	8	22	24
2530 3/4-3/8	R3/4	G3/8	16,5	23	11,5	27	67
2530 3/4-1/2	R3/4	G1/2	16,5	23,5	9,5	27	48
2530 1-1/2	R1	G1/2	19	27	14	34	131

## Fittings Mod. 2531

BSP Reducing



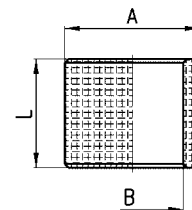
## DIMENSIONS

Mod.	A	B	H	L	SW	Weight (g)
2531 1/8-M5	G1/8	M5	6	10,5	13	8 *
2531 1/4-1/8	G1/4	G1/8	8	13	17	11 *
2531 3/8-1/8	G3/8	G1/8	9	14	19	17
2531 3/8-1/4	G3/8	G1/4	9	14	19	12 *
2531 1/2-1/8	G1/2	G1/8	10	15,5	24	32
2531 1/2-1/4	G1/2	G1/4	10	15,5	24	29
2531 1/2-3/8	G1/2	G3/8	10	15,5	24	22 *

\* = with through-out thread

## Silencing bush Series 2905

For flow control valves Mod. SCO and MCO



## DIMENSIONS

Mod.	A	B	L
2905 1/8	14	10	14.5
2905 1/4	18	13.5	14.5
2905 3/8	21	16.8	14.5

Dimensions in millimeters (mm)

## Right Angle Flow Control Valves Series GSCU, GMCU, GSVU, GMVU, GSCO, GMCO

Unidirectional and bidirectional flow control valves  
Banjo flow controllers nominal diameters 1,5 - 3,5 - 5 mm  
Ports M5, G1/8 and G1/4



These unidirectional and bidirectional flow controllers have been designed as small as possible to enable mounting directly on valves or cylinders. The flow regulation range is wide and gradual, allowing the regulation to be very accurate either at minimum or maximum flow.

### GENERAL DATA

<b>Construction</b>	needle - type
<b>Valve group</b>	unidirectional and bidirectional controller
<b>Materials</b>	body and screws M5 inox; 1/8 - 1/4 - 3/8 - 1/2 OT58 seals NBR
<b>Mounting</b>	by male threaded
<b>Installation</b>	in any position
<b>Operating temperature</b>	0°C - 80°C (with dry air -20°C)
<b>Operating pressure</b>	1 - 10 bar
<b>Nominal pressure</b>	6 bar
<b>Nominal flow</b>	see graph
<b>Nominal diameter</b>	M5 = 1.5 mm - G1/8 = 2 mm - G1/4 = 4 mm G3/8 = 7 mm - G1/2 = 12 mm
<b>Fluid</b>	filtered air

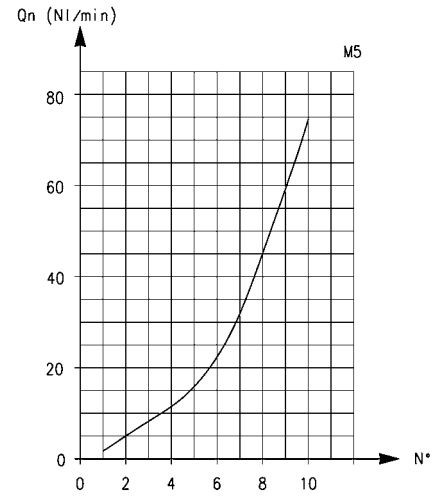
Dimensions in millimeters (mm)

## CODING EXAMPLE

<b>GM</b>	<b>CU</b>	<b>9</b>	<b>03</b>	<b>-</b>	<b>1/8</b>	<b>-</b>	<b>6</b>
<b>GM</b>	ACTUATION: GM = manual GS = screwdriver						
<b>CU</b>	ASSEMBLY: CU = on cylinders unidirectional VU = on valves unidirectional CO = bidirectional						
<b>9</b>	VERSIONS: 8 = needle (screwdriver operated) 9 = needle (manually operated)						
<b>03</b>	FLOW CONTROL RANGE:						
	size	Ø tube					
	13 = 1.5	3					
	14 = 1.5	4					
	03 = 3.5	6					
	04 = 3.5	8					
	05 = 5	8					
	06 = 5	10					
<b>1/8</b>	PORTS: M5 1/8 1/4						
<b>6</b>	Ø TUBE: 3 4 6 8 10						

To ensure the right choice of unidirectional flow controller, proceed as follows: calculate the quantity of air in NI/min (see cylinder Table); determine the stroke time of the cylinder; refer to graph to see which controller is the right type.

## UNIDIRECTIONAL AND BIDIRECTIONAL FLOW CONTROL REGULATORS



To ensure the right choice of unidirectional flow controller, proceed as follows: calculate the quantity of air in NI/min (see cylinder Table); determine the stroke time of the cylinder; refer to graph to see which controller is the right type.

In the case of bidirectional regulators, refer to the graph and check whether the flow control range is suitable for the work required.

M5

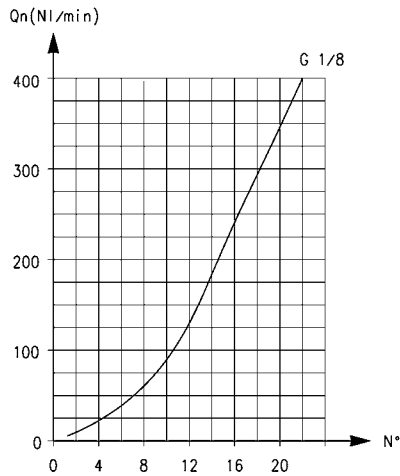
Flow Qn (NI/min.) from 2 → 1 with controller OPEN: 70

Flow Qn (NI/min.) from 2 → 1 with controller CLOSED: 33

N° = number of screw turns

NB: Qn is determined with a supply pressure of 6 bar and with  $\Delta P = 1$  bar at the outlet.

## UNIDIRECTIONAL AND BIDIRECTIONAL FLOW CONTROL REGULATORS



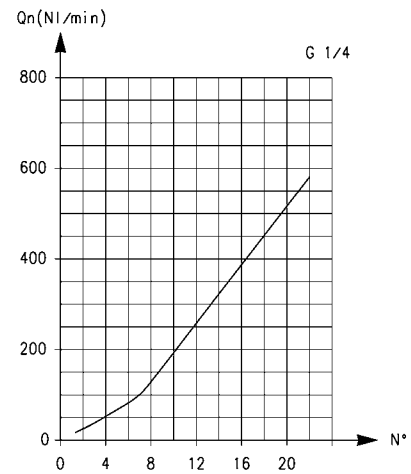
G1/8

Flow Qn (NI/min.) from 2 → 1 with controller OPEN: 440

Flow Qn (NI/min.) from 2 → 1 with controller CLOSED: 170

N° = number of screw turns

NB: Qn is determined with a supply pressure of 6 bar and with  $\Delta P = 1$  bar at the outlet.



G1/4

Flow Qn (NI/min.) from 2 → 1 with controller OPEN: 790

Flow Qn (NI/min.) from 2 → 1 with controller CLOSED: 460

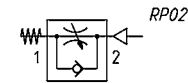
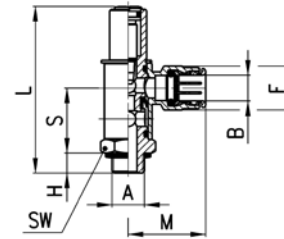
N° = number of screw turns

NB: Qn is determined with a supply pressure of 6 bar and with  $\Delta P = 1$  bar at the outlet.

## Valves Series GSCU



Unidirectional flow controller for mounting on single-acting or double-acting cylinders.  
Screwdriver adjustment.  
Ports: M5, G1/8, G1/4 .



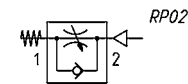
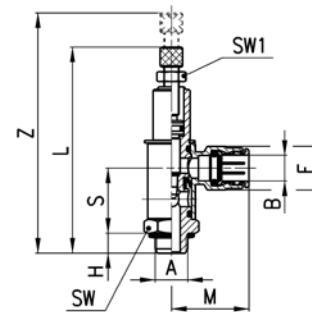
## DIMENSIONS

Mod.	A	B	S	H	L	M	F	SW
<b>GSCU 813-M5-3</b>	M5	3	12	3	27,5	12,5	6,5	8
<b>GSCU 814-M5-4</b>	M5	4	12	3	27,5	19	8,8	8
<b>GSCU 803-1/8-6</b>	G1/8	6	22,5	5	50	26,5	13	14
<b>GSCU 804-1/8-8</b>	G1/8	8	22,5	5	50	28	15	14
<b>GSCU 805-1/4-8</b>	G1/4	8	27	7	67,5	28,5	15	19
<b>GSCU 806-1/4-10</b>	G1/4	10	27	7	67,5	31	17,5	19

## Valves Series GMCU



Unidirectional flow controller for mounting on single-acting or double-acting cylinders.  
Knurled screw adjustment.  
Ports: M5, G1/8, G1/4.



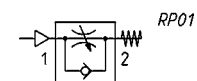
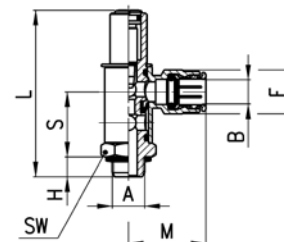
## DIMENSIONS

Mod.	A	B	S	H	L	Z	M	F	SW	SW1
<b>GMCU 913-M5-3</b>	M5	3	12	3	37	42,5	12,5	6,5	8	5,5
<b>GMCU 914-M5-4</b>	M5	4	12	3	37	42,5	19	8,8	8	5,5
<b>GMCU 903-1/8-6</b>	G1/8	6	22,5	5	65,5	72,5	26,5	13	14	7
<b>GMCU 904-1/8-8</b>	G1/8	8	22,5	5	65,5	72,5	28	15	14	7
<b>GMCU 905-1/4-8</b>	G1/4	8	27	7	85	97,5	28,5	15	19	10
<b>GMCU 906-1/4-10</b>	G1/4	10	27	7	85	97,5	31	17,5	19	10

## Valves Series GSVU



Unidirectional flow controller for mounting on valves.  
Screwdriver adjustment.  
Ports: M5, G1/8, G1/4.



## DIMENSIONS

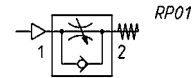
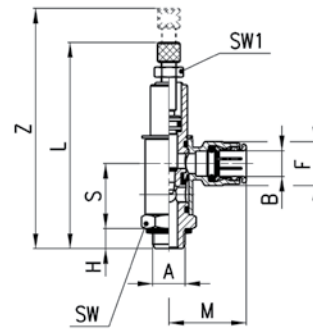
Mod.	A	B	S	H	L	M	F	SW
<b>GSVU 813-M5-3</b>	M5	3	12	3	27,5	12,5	6,5	8
<b>GSVU 814-M5-4</b>	M5	4	12	3	27,5	19	8,8	8
<b>GSVU 803-1/8-6</b>	G1/8	6	22,5	5	50	26,5	13	14
<b>GSVU 804-1/8-8</b>	G1/8	8	22,5	5	50	28	15	14
<b>GSVU 805-1/4-8</b>	G1/4	8	27	7	67,5	28,5	15	19
<b>GSVU 806-1/4-10</b>	G1/4	10	27	7	67,5	31	17,5	19

Dimensions in millimeters (mm)

## Valves Series GMVU



Unidirectional flow controller for mounting on valve.  
Adjustment of setting by a manually operated knurled screw.  
Ports: M5, G1/8, G1/4.



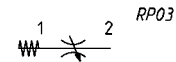
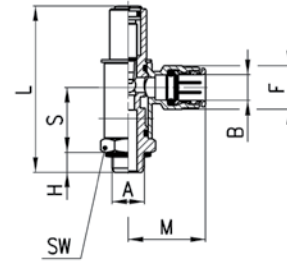
## DIMENSIONS

Mod.	A	B	S	H	L	Z	M	F	SW	SW1
GMVU 913-M5-3	M5	3	12	3	37	42,5	12,5	6,5	8	5,5
GMVU 914-M5-4	M5	4	12	3	37	42,5	19	8,8	8	5,5
GMVU 903-1/8-6	G1/8	6	22,5	5	50	72,5	26	13	14	7
GMVU 904-1/8-8	G1/8	8	22,5	5	50	72,5	28	15	14	7
GMVU 905-1/4-8	G1/4	8	27	7	67,5	97,5	29	15	19	10
GMVU 906-1/4-10	G1/4	10	27	7	67,5	97,5	31	17,5	19	10

## Valves Series GSCO



Bidirectional flow controller.  
Screwdriver adjustment.  
Ports: M5, G1/8, G1/4.



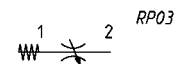
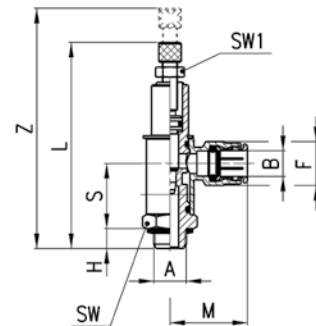
## DIMENSIONS

Mod.	A	B	S	H	L	M	F	SW
GSCO 813-M5-3	M5	3	12	3	27,5	12,5	6,5	8
GSCO 814-M5-4	M5	4	12	3	27,5	19	8,8	8
GSCO 803-1/8-6	G1/8	6	22,5	5	50	26,5	13	14
GSCO 804-1/8-8	G1/8	8	22,5	5	50	28	15	14
GSCO 805-1/4-8	G1/4	8	27	7	67,5	28,5	15	19
GSCO 806-1/4-10	G1/4	10	27	7	67,5	31	17,5	19

## Valves Series GMCO



Bidirectional flow controller.  
Adjustment of setting by a manually operated knurled screw.  
Ports: M5, G1/8, G1/4.



## DIMENSIONS

Mod.	A	B	S	H	L	Z	M	F	SW	SW1
GMCO 913-M5-3	M5	3	12	3	37	42,5	12,5	6,5	8	5,5
GMCO 914-M5-4	M5	4	12	3	37	42,5	19	8,8	8	5,5
GMCO 903-1/8-6	G1/8	6	22,5	5	65,5	72,5	26,5	13	14	7
GMCO 904-1/8-8	G1/8	8	22,5	5	65,5	72,5	28	15	14	7
GMCO 905-1/4-8	G1/4	8	27	7	85	97,5	28,5	15	19	10
GMCO 906-1/4-10	G1/4	10	27	7	85	97,5	31	17,5	19	10

Dimensions in millimeters (mm)



# In-line Flow Control Valves Series RFU - RFO

Unidirectional and bidirectional flow control valves

Ports: M5, G1/8, G1/4, G3/8 and G1/2

Nominal diameter: M5 = 1,5 mm; G1/8 = 2 and 3 mm;

G1/4 = 4 and 6 mm; G3/8 and G1/2 = 7 mm



- » Series RFU: unidirectional flow control valves for the speed regulation of a cylinder
- » Series RFO: bidirectional flow control valves for the air flow regulation in both directions and for the pressurization or depressurization of a container.

The unidirectional flow controllers are equipped with M5, G1/8, G1/4, G3/8 and G1/2 ports.

G1/8 and G1/4 ports are available with two different types of adjustment (see diagrams), whereas M5, G3/8 and G1/2 ports have just one type of adjustment. All models can be panel or wall mounted or they can be mounted on cylinders, as required.

To choose the most suitable model, it is recommended to:

1. calculate the quantity of air in NI/min (see the cylinders tables in the catalogo introduction);
2. determine the stroke time of the cylinder;
3. check the flow diagrams (see pages 2/7.20.03 and 2/7.20.04).

## GENERAL DATA

Construction	needle-type
Valve group	unidirectional and bidirectional controller
Materials	AL body - brass needle (not nickel-plated) - NBR seals
Mounting	with screws in the holes of the valve body or panel mounted
Threaded ports	M5 - G1/8 - G1/4 - G3/8 - G1/2
Installation	as required
Operating temperature	0°C - 80°C (with dry air - 20°C)
Operating pressure	1 - 10 bar (for models with M5 - G1/8 - G1/4 ports) 2 - 10 bar (for models with G3/8 - G1/2 ports)
Nominal pressure	6 bar
Nominal flow	see graph
Nominal diameter	M5 = 1,5 - G1/8 = 2 or 3 mm - G1/4 = 4 or 6 mm - G3/8 and G1/2 = 7 mm
Fluid	filtered air

Dimensions in millimeters (mm)



## CODING EXAMPLE

RF

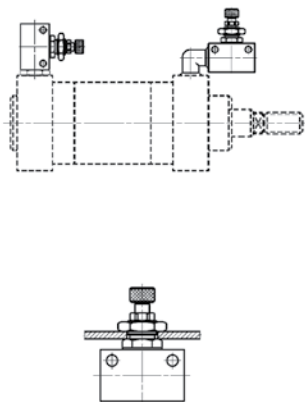
U4

8

2

<b>RF</b>	SERIES: RF
<b>U4</b>	FUNCTION: U4 = unidirectional O3 = bidirectional
<b>8</b>	PORTS: 8 = G1/8 4 = G1/4 5 = M5 6 = G3/8 7 = G1/2
<b>2</b>	FLOW CONTROL RANGE: 2 = $\varnothing$ 2 max 3 = $\varnothing$ 3 max 4 = $\varnothing$ 4 max 6 = $\varnothing$ 6 max 7 = $\varnothing$ 7 max

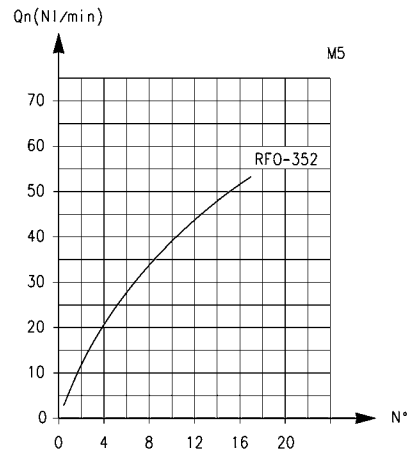
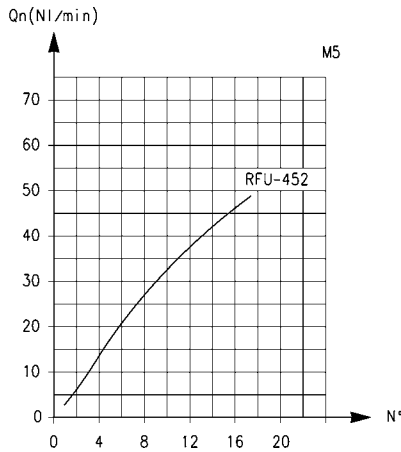
## EXAMPLES OF VALVES SERIES RFO - RFU ASSEMBLY



## ASSEMBLY EXAMPLES

Dimensions in millimeters (mm)

FLOW DIAGRAMS (1 → 2) - VALVES SERIES RFU / RFO - M5 PORTS



RFU 452-M5: flow from 2 → 1 needle type OPEN = 55 NI/min  
CLOSED = 41 NI/min

RFO 352-M5

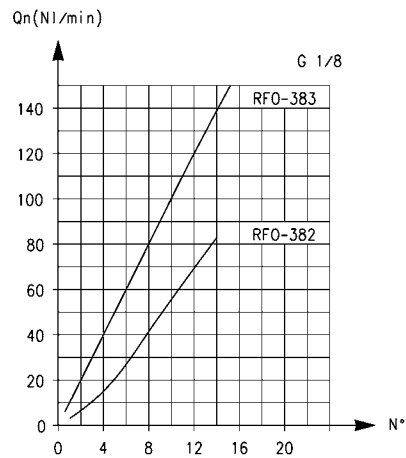
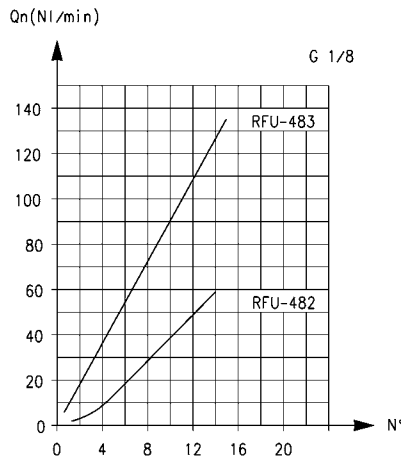
N° = number of screw turns

N° = number of screw turns

Note: the flow (Qn) is determined with a pressure of 6 bar at the inlet and ΔP = 1 bar at the outlet.

Note: the flow (Qn) is determined with a pressure of 6 bar at the inlet and ΔP = 1 bar at the outlet.

FLOW DIAGRAMS (1 → 2) - VALVES SERIES RFU / RFO - G1/8 PORTS



RFU 482-1/8: flow from 2 → 1 needle type OPEN = 149 NI/min  
CLOSED = 130,5 NI/min  
RFU 483-1/8: flow from 2 → 1 needle type OPEN = 180 NI/min  
CLOSED = 140 NI/min

RFO 382-1/8 - RFO 383-1/8

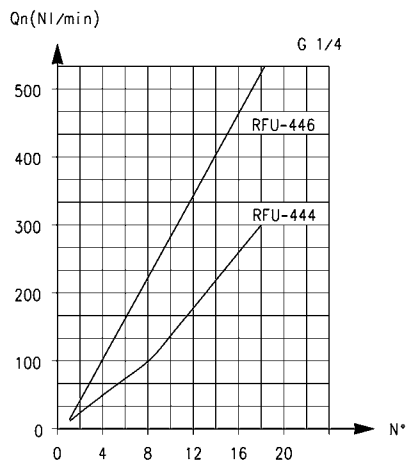
N° = number of screw turns

N° = number of screw turns

Note: the flow (Qn) is determined with a pressure of 6 bar at the inlet and ΔP = 1 bar at the outlet.

Note: the flow (Qn) is determined with a pressure of 6 bar at the inlet and ΔP = 1 bar at the outlet.

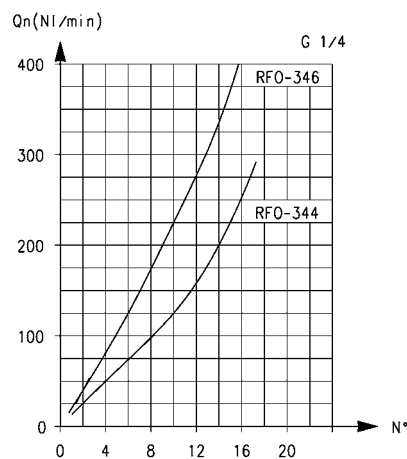
## FLOW DIAGRAMS (1 → 2) - VALVES SERIES RFU / RFO - G1/4 PORTS



RFU 444-1/4: flow from 2 → 1 needle type OPEN = 680 NI/min  
CLOSED = 534 NI/min  
RFU 446-1/4: flow from 2 → 1 needle type OPEN = 680 NI/min  
CLOSED = 534 NI/min

N° = number of screw turns

Note: the flow (Qn) is determined with a pressure of 6 bar at the inlet and  $\Delta P = 1$  bar at the outlet.

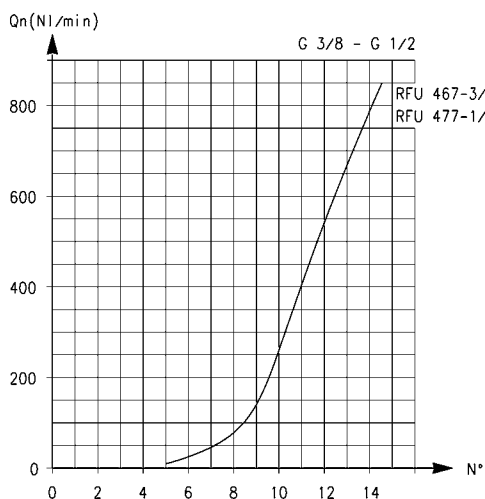


RFO 344-1/4 - RFO 346-1/4

N° = number of screw turns.

Note: the flow (Qn) is determined with a pressure of 6 bar at the inlet and  $\Delta P = 1$  bar at the outlet.

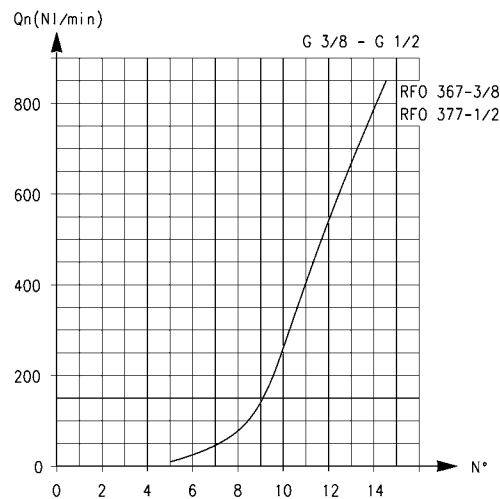
## FLOW DIAGRAMS (1 → 2) - VALVES SERIES RFU / RFO - G3/8, G1/2 PORTS



RFU 467-3/8: flow from 2 → 1 needle type OPEN = 1700 NI/min  
CLOSED = 1700 NI/min  
RFU 477-1/2: flow from 2 → 1 needle type OPEN = 1700 NI/min  
CLOSED = 1700 NI/min

N° = number of screw turns

Note: the flow (Qn) is determined with a pressure of 6 bar at the inlet and  $\Delta P = 1$  bar at the outlet.



RFO 367-3/8 - RFO 377-1/2

N° = number of screw turns

Note: the flow (Qn) is determined with a pressure of 6 bar at the inlet and  $\Delta P = 1$  bar at the outlet.

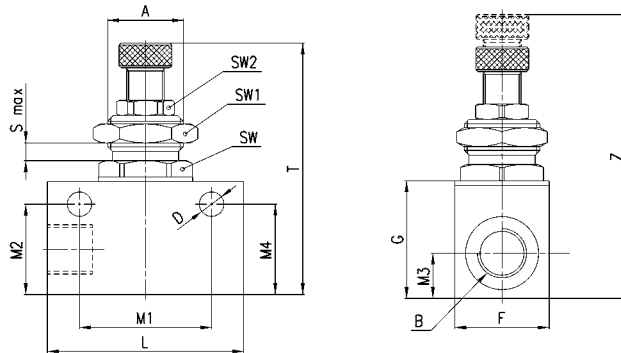
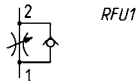
Unidirectional flow control valves Series RFU

To regulate the cylinder speed, the discharging chamber air flow has to be controlled. Therefore, it is recommended to connect the valve threaded outlet 1 to the cylinder inlet and the outlet 2 to the valve user port.



TABLE NOTE:

\* knurled ring nut



DIMENSIONS

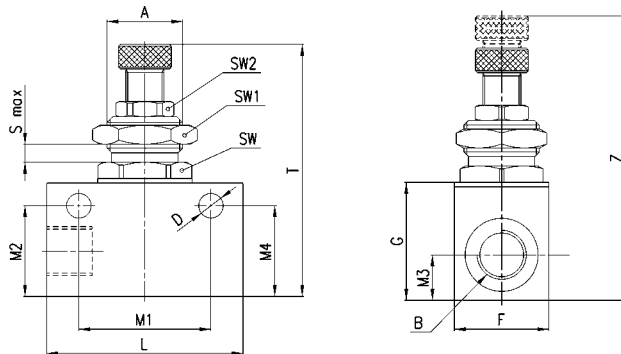
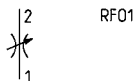
Mod.	øN	A	B	D	F	G	L	M1	M2	M3	M4	T	Z	S <sub>Max</sub>	SW	SW1	SW2
<b>RFU 452-M5</b>	1,5	M10x1	M5	4,2	14	16	26	18,5	13,2	7	13,2	39	44,5	3	12	14	8
<b>RFU 482-1/8</b>	2	M12x1	G1/8	4,5	16	21	34	24,5	16,5	8	16,5	46	51	4	14	17	9
<b>RFU 483-1/8</b>	3	M12x1	G1/8	4,5	16	21	34	24,5	16,5	8	16,5	46	51	4	14	17	9
<b>RFU 444-1/4</b>	4	M20x1,5	G1/4	6,5	25	30	52	35	24	12	24	60	69	7	22	24	14
<b>RFU 446-1/4</b>	6	M20x1,5	G1/4	6,5	25	30	52	35	24	12	24	60	69	7	22	24	14
<b>RFU 467-3/8</b>	7	M18x1	G3/8	6,5	27	42	56	43	34,5	28	7,5	75	85	8	22	22	*
<b>RFU 477-1/2</b>	7	M18x1	G1/2	6,5	27	42	56	43	34,5	28	7,5	75	85	8	22	22	*

Bidirectional flow control valves Series RFO



TABLE NOTE:

\* knurled ring nut



DIMENSIONS

Mod.	øN	A	B	D	F	G	L	M1	M2	M3	M4	T	Z	S <sub>Max</sub>	SW	SW1	SW2
<b>RFO 352-M5</b>	1,5	M10x1	M5	4,2	14	16	26	18,5	13,2	7	13,2	39	44,5	3	12	14	8
<b>RFO 382-1/8</b>	2	M12x1	G1/8	4,2	16	21	34	24,5	16,5	8	16,5	46	51	4	14	17	9
<b>RFO 383-1/8</b>	3	M12x1	G1/8	4,5	16	21	34	24,5	16,5	8	16,5	46	51	4	14	17	9
<b>RFO 344-1/4</b>	4	M20x1,5	G1/4	6,5	25	30	52	35	24	12	24	60	69	7	22	24	14
<b>RFO 346-1/4</b>	6	M20x1,5	G1/4	6,5	25	30	52	35	24	12	24	60	69	7	22	24	14
<b>RFO 367-3/8</b>	7	M18x1	G3/8	6,5	27	42	56	43	34,5	28	7,5	75	85	8	22	22	*
<b>RFO 377-1/2</b>	7	M18x1	G1/2	6,5	27	42	56	43	34,5	28	7,5	75	85	8	22	22	*

Dimensions in millimeters (mm)



# Needle Valves Series 28

Bidirectional flow control valves  
Ports G1/8, G1/4, G3/8, G1/2



These are bidirectional control valves made entirely of nickel-plated brass, with NBR seals and a technopolymer control knob.

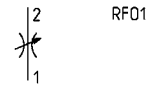
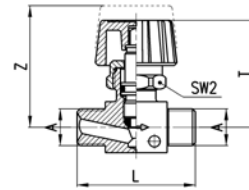
They are suitable for regulating compressed air, water or mineral oil. For models 2810, 2820, 2819 and 2829 exists the possibility to connect plastic, brass or copper tubes, using nut Mod. 1303 and cushion sleeve Mod. 1310/1320.

## GENERAL DATA

<b>Construction</b>	cone - type
<b>Materials</b>	body = nickel-plated brass control knob = technopolymer seals = NBR
<b>Ports</b>	G1/8, G1/4, G3/8, G1/2
<b>Installation</b>	as required
<b>Operating pressure</b>	0°C - 80°C (with dry air - 20°)
<b>Operating pressure</b>	0 - 10 bar
<b>Nominal flowrate</b>	see table

Dimensions in millimeters (mm)

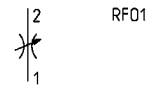
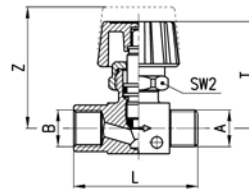
Valve Mod. 2810



## DIMENSIONS

Mod.	A	L	T	Z	SW2	$\Delta 1\text{bar NI/min}$	Free flow NI/min
<b>2810 1/8</b>	G1/8	40	37	42,5	19	415	590
<b>2810 1/4</b>	G1/4	42	37	42,5	19	508	740
<b>2810 3/8</b>	G3/8	42	37	42,5	19	620	900
<b>2810 1/2</b>	G1/2	54	42	48	22	1540	2080

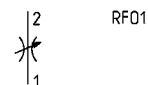
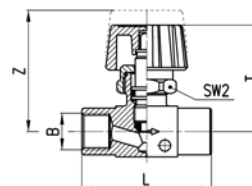
Valve Mod. 2820



## DIMENSIONS

Mod.	A	B	L	T	Z	SW2	$\Delta 1\text{bar NI/min}$	Free flow NI/min
<b>2820 1/8</b>	G1/8	G1/8	41	37	42,5	19	400	640
<b>2820 1/4</b>	G1/4	G1/4	44	37	42,5	19	530	840
<b>2820 3/8</b>	G3/8	G3/8	55,5	41,5	48	22	1415	1990
<b>2820 1/2</b>	G1/2	G1/2	59	42	49	22	1520	2150

Valve Mod. 2830

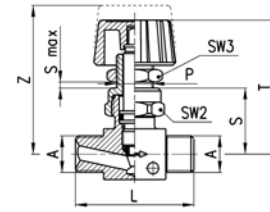


## DIMENSIONS

Mod.	B	L	T	Z	SW2	$\Delta 1\text{bar NI/min}$	Free flow NI/min
<b>2830 1/8</b>	G1/8	42	37	42,5	19	415	635
<b>2830 1/4</b>	G1/4	46	37	42,5	19	530	850
<b>2830 3/8</b>	G3/8	62	41,4	48	22	1415	1980
<b>2830 1/2</b>	G1/2	64	42	49	22	1520	2100

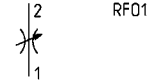
Dimensions in millimeters (mm)

Valve Mod. 2819

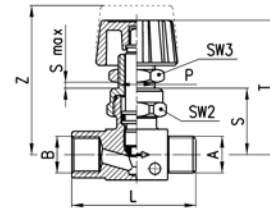


## DIMENSIONS

Mod.	A	L	P	S	T	Z	S <sub>Max</sub>	SW2	SW3
<b>2819 1/8</b>	G1/8	40	1/4	23	47	52,5	7	19	17
<b>2819 1/4</b>	G1/4	42	1/4	23	47	52,5	7	19	17

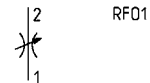


Valve Mod. 2829

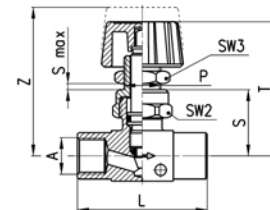


## DIMENSIONS

Mod.	A	B	L	P	S	T	Z	S max	SW2	SW3
<b>2829 1/8</b>	G1/8	G1/8	41	1/4	23	47	52,5	7	19	17
<b>2829 1/4</b>	G1/4	G1/4	44	1/4	23	47	52,5	7	19	17

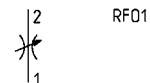


Valve Mod. 2839



## DIMENSIONS

Mod.	A	L	P	S	T	Z	S max	SW2	SW3
<b>2839 1/8</b>	G1/8	42	1/4	23	47	52,5	7	19	17
<b>2839 1/4</b>	G1/4	46	1/4	23	47	52,5	7	19	17
<b>2839 3/8</b>	G3/8	62	14X1	28	56,5	63	7	22	17
<b>2839 1/2</b>	G1/2	64	14X1	29	57	64	7	22	17



Dimensions in millimeters (mm)





## Pressure switches, Transducers and Pressure Indicators

Series PM: adjustable-diaphragm pressure switches, with visual scale, with exchange contacts (SPST, SPDT)

Series TRP: electro-pneumatic transducers

Series 2950: pressure indicators, ports M5



Series PM diaphragm pressure switches are available with NC (normally closed) contacts and with NO (normally open) contacts.

Series PM681 pressure switches with setting visual scale comply with EN60730 standards and are suitable for signalling pressure through a normally open Reed contact.

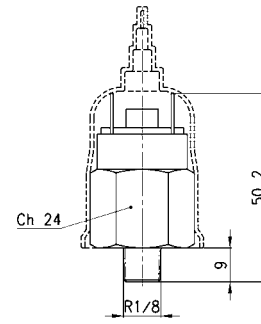
A regulating screw, which can be adjusted using a small screwdriver, allows the switch to be set to the required pressure. The calibrated diaphragm enables an electrical signal to be generated or inhibited depending on the pressure set.

### GENERAL DATA

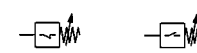
Construction	with adjustable diaphragm
Mounting	using thread in body
Ports	R1/8, G1/4 (serie PM) - tube 4/2 (series TRP) - M5 (series 2950)
Operating temperature	-5° - +60°C, (23 - 140 deg F)
Pressure	1 - 10 bar max.
Voltage	220 V
Max. power	100 VA
Protection class	IP54
Max. nr. of pulses per 1'	200
Lifetime	106
Max current	0.5 A
Isolation voltage	1500 V

Dimensions in millimeters (mm)

Series PM - adjustable-diaphragm pressure switches



PMNC PMNO

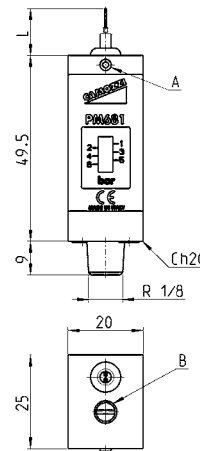


PMNC = normally closed  
PMNO = normally open

Mod.	Function	Max Voltage	Max Power	Service Type	Insulation voltage	Symbol
PM11-NC	NC = normally closed	48 V AC DC	24 VA	Heavy	500 V	PMNC
PM11-NA	NA = normally open	48 V AC DC	24 VA	Heavy	500 V	PMNO

Series PM681-... - pressure switches with setting visual scale

In compliance with EN60730 standards  
Electric connection: PVC cable 2 x 0.22 mm  
Electric contact: Reed SPST Normally Open Contact  
Body in anodized aluminium and threaded fitting in brass  
Hysteresis: 0.8 bar max

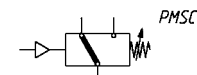
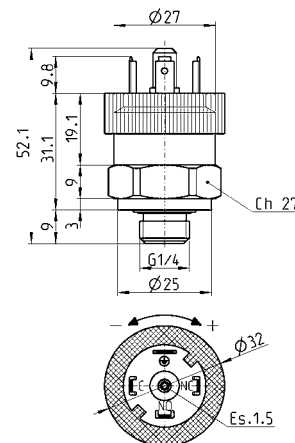


A = LOCKING SET SCREW

B = PRESSURE ADJUSTMENT SCREW

Mod.	L	Max switch voltage	Max switch current	Max switch capacity	Max fluid temperature	Max pressure	Setting range	Weight
PM681-1	1 m	48 V	0.5 A	10 W	60°C	20 bar	1 - 6 bar	95 g
PM681-3	3 m	48 V	0.5 A	10 W	60°C	20 bar	1 - 6 bar	95 g

Series PM - pressure switch with exchange contacts (SPDT contacts)



(\*) SC = exchange contacts

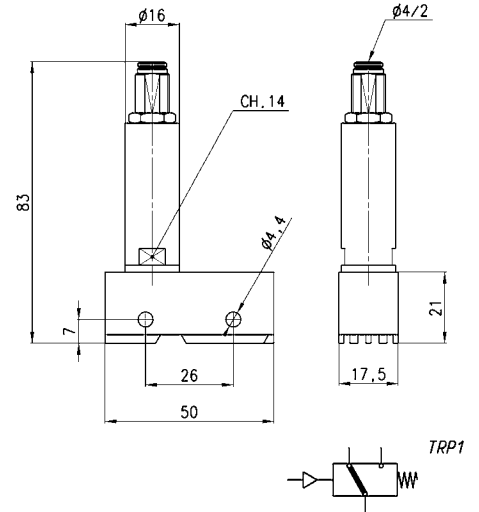
DIMENSIONS						
Mod.	Function	Max Voltage	Operating Temperature	Actuation time	Setting range	Max Hysteresis
PM11-SC	SC (*)	250 V AC 30 V DC	- 25 C° + 85 C°	> 0,1 ms	2 - 10 bar	0.8 bar

Dimensions in millimeters (mm)

Electro-pneumatic transducer Series TRP



The TRP Series transducer is specially designed to convert a pneumatic signal into an electrical signal. The contacts are NC (normally closed) or NO (normally open), thus making it possible to generate or eliminate current when the pneumatic signal is present. Minimum operating pressure 2,5 bar.

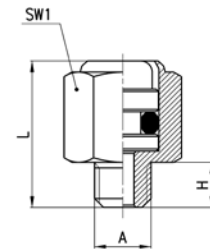


Mod.  
**TRP-8**

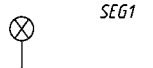
Pressure indicators Series 2950



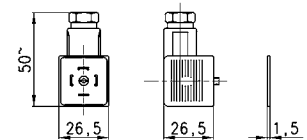
The pressure indicator Mod. 2950-M5 is passive element (no spring, red colour). It is useful for detecting pressure manually without having to remove the connections.



Mod.	A	H	L	SW1
<b>2950 M5</b>	M5	4	13.5	8



Three-pole connector 124-830 for Pressure switch SC



Mod.  
**124-830**

Dimensions in millimeters (mm)



## Silencers

Series: 2901 - 2903 - 2921 - 2931 - 2938 - 2939 - 2905 - RSW

Ports: M5, G1/8, G1/4, G3/8, G1/2, G3/4, G1



The silencers are indispensable elements for eliminating or reducing the characteristic noise of compressed air during discharge operations. They should always be placed on the outlets of 3/2, 5/2 or 5/3-way valves.

When carrying out maintenance, the silencers should be degreased using white spirit or paraffin and compressed air blown through them in the opposite direction to operation.

Flow rate: determined with inlet supply 6 bar and output in atmosphere.

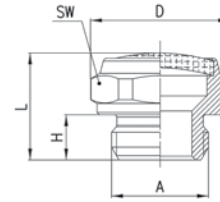
Noise level: determined through a test which is carried out using a phonometer. Placing the phonometer one meter away from the application at the same height for a period of ten seconds gives an average reading of the noise generated.

### GENERAL DATA

Construction	body with male and female thread
Materials used for body	2901 - 2903: brass 2921 - 2931: coppering steel 2938 - 2939: polyethylene
Materials used for silencing	2901 - 2903: stainless steel 2921 - 2931: bronze (sintered) 2938 - 2939: polyethylene
Ports	M5 - G1/8 - G1/4 - G3/8 - G1/2 - G3/4 - G1

Dimensions in millimeters (mm)

## Silencers Series 2901



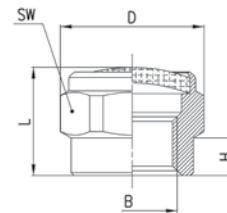
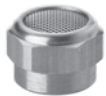
SIL1



## DIMENSIONS

Mod.	A	D	H	L	SW	Max. Oper. Pressure	Flow rate NI/Min	Noise db (A)
<b>2901 1/8</b>	G1/8	15,3	5	12	14	10	700	76
<b>2901 1/4-17</b>	G1/4	18,5	6	14	17	10	1000	78
<b>2901 1/4-22</b>	G1/4	23,5	6	15	22	10	1600	80
<b>2901 3/8</b>	G3/8	23,5	7	16	22	10	1500	76
<b>2901 1/2</b>	G1/2	29,5	8	17,5	27	10	3400	86
<b>2901 3/4</b>	G3/4	34	9	20	32	6	4100	87
<b>2901 1</b>	G1	43	11	24,5	40	6	7600	88

## Silencers Series 2903



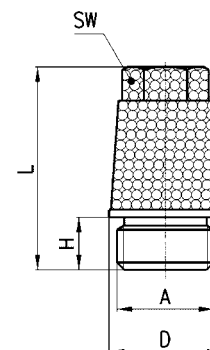
SIL1



## DIMENSIONS

Mod.	B	D	H	L	SW	Max. Oper. Pressure	Flow rate NI/Min	Noise db(A)
<b>2903 1/8</b>	G1/8	15,3	4	11	14	10	700	74

## Silencers Series 2921



SIL1

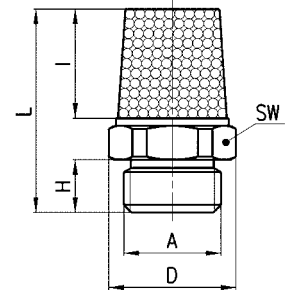


## DIMENSIONS

Mod.	A	D	H	L	SW	Max. Oper. Pressure	Flow rate NI/Min	Noise db(A)
<b>2921 1/8</b>	G1/8	12	4,5	21,5	8	10	1730	81
<b>2921 1/4</b>	G1/4	15	6	28	10	10	3300	85
<b>2921 3/8</b>	G3/8	19	8	37	13	10	4250	79
<b>2921 1/2</b>	G1/2	23	9	43,5	15	10	6800	87
<b>2921 3/4</b>	G3/4	30	10	56	19	10	9800	84
<b>2921 1</b>	G1	37	12	67	24	10	10900	86

Dimensions in millimeters (mm)

Silencers Series 2931



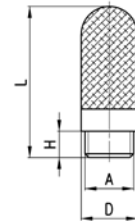
DIMENSIONS

Mod.	A	D	H	I	L	SW	Max. Oper. Pressure	Flow rate NI/Min	Noise db (A)
<b>2931 M5</b>	M5	7,7	4	8	16,5	7	10	450	69
<b>2931 M7</b>	M7	9	5	8,5	20	8	10	1130	76
<b>2931 1/8</b>	G1/8	13	4,5	13	21	12	10	1927	88
<b>2931 1/4</b>	G1/4	16,2	6	16,5	27	15	10	3200	86
<b>2931 3/8</b>	G3/8	20	7	23	35,5	19	10	4560	81
<b>2931 1/2</b>	G1/2	24,5	8	28	42	23	10	6800	87
<b>2931 3/4</b>	G3/4	32	9	37	54	30	10	9600	84
<b>2931 1</b>	G1	38,5	11	47	67	36	10	10800	86

SIL 1



Silencers Series 2938



DIMENSIONS

Mod.	A	D	H	L	Max. Oper. Pressure	Flow rate NI/Min	Noise db (A)
<b>2938 M5</b>	M5	6,5	4,1	23	10	546	67
<b>2938 1/8</b>	G1/8	12,5	5,7	34	10	1441	75
<b>2938 1/4</b>	G1/4	15,5	7	42,5	10	2752	79
<b>2938 3/8</b>	G3/8	18,5	11,5	67,5	10	4735	73
<b>2938 1/2</b>	G1/2	23,5	11	77	10	8534	86

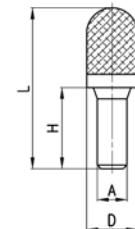
SIL 1



Operating temperature:  
- 40 / + 80 °C

Silencers Series 2939

Operating temperature:  
- 40 / + 80 °C



DIMENSIONS

Mod.	øA	D	H	L	Max. Oper. Pressure	Flow rate NI/Min	Noise db (A)
<b>2939 4</b>	4	7	16	32	10	335	80
<b>2939 6</b>	6	12,5	20,5	45	10	632	79 *
<b>2939 8</b>	8	13,5	21,5	43,5	10	1229	89 *
<b>2939 10</b>	10	15,5	26,5	57,5	10	2650	87 *

SIL 1

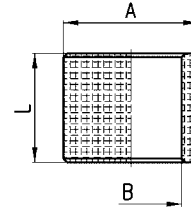


\* this code can be used on the Valve Island Series F (see the section 2/3.16).



### Silencing bush Series 2905

For flow control valves Mod. SCO and MCO



DIMENSIONS			
Mod.	A	B	L
<b>2905 1/8</b>	14	10	14.5
<b>2905 1/4</b>	18	13.5	14.5
<b>2905 3/8</b>	21	16.8	14.5

Dimensions in millimeters (mm)





Valve Body or Main Part Number		
Series	Part Number w/ Description	SAP Code
3	334D-015-02 DOUBLE SOLENOID VALVES	20-5310-6200
3	334D-015-02 DOUBLE SOLENOID VALVES	20-5310-6200
3	334D-035 DOUBLE SPOOL VALVES	20-5310-3500
3	334D-035 DOUBLE SPOOL VALVES	20-5310-3500
3	334D-E15-02 DOUBLE SOLENOID VALVES	20-5310-6700
3	334D-E15-02 DOUBLE SOLENOID VALVES	20-5310-6700
3	334-E11-02 SOLENOID VALVES	20-5334-4700
3	334-E15-02 SOLENOID VALVES	20-5334-6700
3	344-015-02 SOLENOID VALVES	20-5344-6200
3	344-035 SPOOL VALVES	20-5344-3500
3	344D-015-02 DOUBLE SOLENOID VALVES	20-5312-6200
3	344D-015-02 DOUBLE SOLENOID VALVES	20-5312-6200
3	344D-035 DOUBLE SPOOL VALVES	20-5312-3500
3	344D-035 DOUBLE SPOOL VALVES	20-5312-3500
3	344D-E15-02 DOUBLE SOLENOID VALVES	20-5312-6700
3	344D-E15-02 DOUBLE SOLENOID VALVES	20-5312-6700
3	344-E15-02 SOLENOID VALVES	20-5344-6700
3	354-011-02 SOLENOID VALVES	20-5354-4200
3	354-015-02 SOLENOID VALVES	20-5354-6200
3	354-033 SPOOL VALVES	20-5354-3300
3	354-035 SPOOL VALVES	20-5354-3500
3	354-E11-02 SOLENOID VALVES	20-5354-4700
3	354-E15-02 SOLENOID VALVES	20-5354-6700
3	364-011-02 SOLENOID VALVES	20-5364-4200
3	364-033 SPOOL VALVES	20-5364-3300
3	364-E11-02 SOLENOID VALVES	20-5364-4700
3	374-011-02 SOLENOID VALVES	20-5374-4200
3	374-033 SPOOL VALVES	20-5374-3300
3	374-E11-02 SOLENOID VALVES	20-5374-4700
3	384-011-02 SOLENOID VALVES	20-5384-4200
3	384-033 SPOOL VALVES	20-5384-3300
3	384-E11-02 SOLENOID VALVES	20-5384-4700
3	394D-015-02 DOUBLE SOLENOID VALVES	20-5314-6200
3	394D-015-02 DOUBLE SOLENOID VALVES	20-5314-6200
3	394D-035 DOUBLE SPOOL VALVES	20-5314-3500
3	394D-035 DOUBLE SPOOL VALVES	20-5314-3500
3	394D-E15-02 DOUBLE SOLENOID VALVES	20-5314-6700
3	394D-E15-02 DOUBLE SOLENOID VALVES	20-5314-6700
4	432C-015 SOLENOID VALVE	20-6432-6100

Main Spare Parts Kit*** (Internal Parts)	
Main Kit Part Number	SAP Code
KW-334D	60HM100-5310
KW-334D	60HM100-5310
KW-334D	60HM100-5310
KW-354-015	60HM100-5354
KW-354-015	60HM100-5354
KW-354-015	60HM100-5354
KW-354-015	60HM100-5354
KW-334D	60HM100-5310
KW-334D	60HM100-5310
KW-334D	60HM100-5310
KW-354-015	60HM100-5354
KW-354-015	60HM100-5354
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KW-364-011	60HM100-5364
KW-364-011	60HM100-5364
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KW-364-011	60HM100-5364
KW-364-011	60HM100-5364
KW-334D	60HM100-5310
KW-334D	60HM100-5310
KW-334D	60HM100-5310
KW-452	60HM100-6452

Add'l Spare Parts Kit (Electric Pilot or Coil Plunger)	
Secondary Kit Part Number	SAP Code
KW-A131	60HM100-A131
KW-A131	60HM100-A131
KW-A131	60HM100-A131
KW-A131	60HM100-A131
KW-A131	60HM100-A131
KW-A131	60HM100-A131
KW-A131	60HM100-A131
KW-A131	60HM100-A131
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KW-A131	60HM100-A131
KW-A131	60HM100-A131
KW-A131	60HM100-A131
KW-A131	60HM100-A131
KW-A131	60HM100-A131
KW-A131	60HM100-A131
KW-A131	60HM100-A131
KW-A131	60HM100-A131













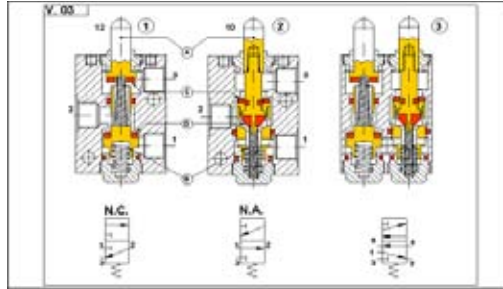




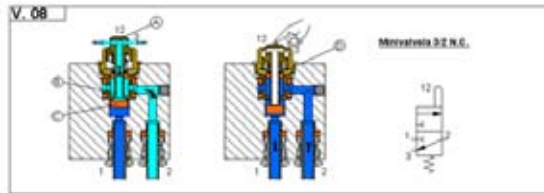
# Valve Construction Guide

## Series, Function, and Spool/Poppet Construction

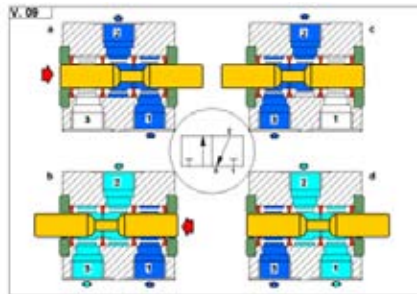
Series 1 - Poppet Construction: 3-way/2-position Normally Closed, 3-way/2-position Normally Open, 5-way/2-position



Series 2 & Logic Functions - Poppet Construction: 3-way/2-position Normally Closed, 3-way/2-position Normally Open, 5-way/3-position

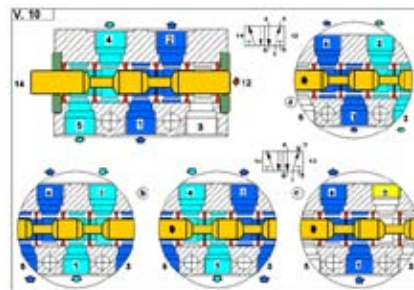


Series 3 - Packed Bore - Spool Construction: 3-way/2-position Normally Closed, 3-way/2-position Normally Open



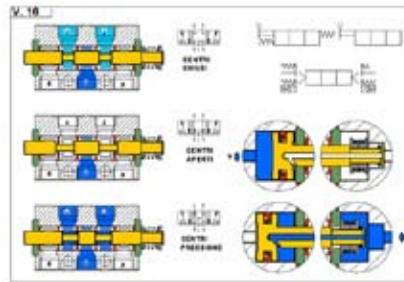
\*\* All Series 3 valves are equipped with flat geometric ring seals in the packed bore construction, (A wider flat edged portion of the seal ring seals against the external packing spacers and valve inner body, while a thinner rounded lip seals against the spool surface). The design offers significantly improved sealing over traditional o-rings or oval rings, especially between differing surface geometries, such as spools and packing glands.

Series 3 - Packed Bore - Spool Construction: 5-way/2-position

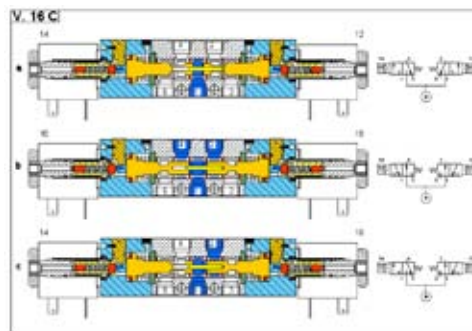


\*\* All Series 3 valves are equipped with flat geometric ring seals in the packed bore construction, (A wider flat edged portion of the seal ring seals against the external packing spacers and valve inner body, while a thinner rounded lip seals against the spool surface). The design offers significantly improved sealing over traditional o-rings or oval rings, especially between differing surface geometries, such as spools and packing glands.

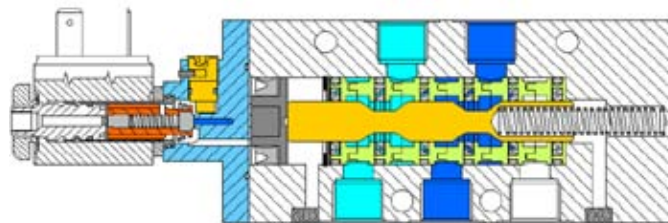
Series 3 - Packed Bore - Spool Construction:  
5-way/3-position (Center Closed, Center Open/  
Exhausting, Pressure Center)



Series 3 - Packed Bore - Spool Construction: Dual  
3-way/2-position (NC/NC, NO/NO, NC/NO )

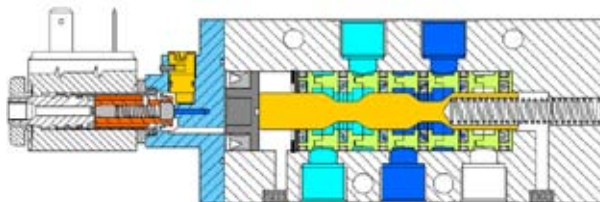


Series 4 - Packed Bore - Spool Construction: Dual  
5-way/2-position (general design)



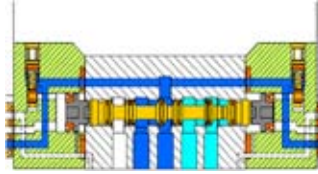
\*\* All Series 4 valves are equipped with dual seals in the packed bore construction, (O-rings around external packing glands, and dual lip "airzet" seals around the spool body for improved performance in both vacuum and more rigorous media sealing situations).

Series 4 - Packed Bore - Spool Construction: Dual  
5-way/2-position (general design)



\*\* All Series 4 valves are equipped with dual seals in the packed bore construction, (O-rings around external packing glands, and dual lip "airzet" seals around the spool body for improved performance in both vacuum and more rigorous media sealing situations).

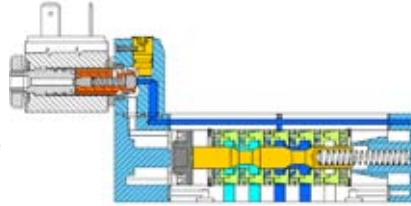
Series 7 (ISO 15407-1 Standard)- Packed Spool Construction, Manifold Assembly



5-way / 2-position, 5-way / 3-position - Center Closed, Center Open/Exhausting, & Pressure Center

\*\* All Series 7 valves offer a balanced packed-spool design. This design permits a customized seal geometry to be fitted onto the spool directly. Benefits are less vulnerability to "varnishing" and/or contamination due to smaller seal contact area with the valve bore. Maintenance is reduced due to less parts and labor required to repair, while providing increased seal life and leak-free performance.

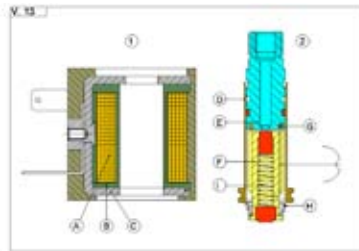
Series 9 (ISO 5599/1 Standard)- Packed-Bore Spool Construction, Manifold Assembly



5/2 - way/position, 5/3 Center Closed & Centers Open / Exhausting

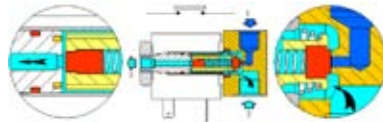
\*\* All Series 9 valves are equipped with dual seals in the packed bore construction, (O-rings around external packing glands, and dual lip "airzet" seals around the spool body for improved performance in both vacuum and more rigorous media sealing situations).

Series A and Series 600 Kits - comprised of coil plunger, (or solenoid armature), and plunger o-rings.



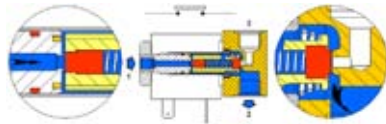
Basic Series A/U or 600 coil plunger, (armature assembly)

Series A / Series 6 - Directly Operated Solenoid valve with M5 (10-32 UNF), 1/8" ports, or 4mm OD (5/32" OD tube)



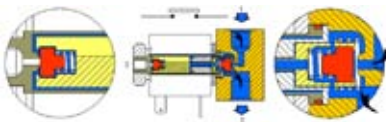
3-way/ 2-position Normally Closed, (shown with coil De-Energized)

Series A / Series 6 - Directly Operated Solenoid valve with M5 (10-32 UNF), 1/8" ports, or 4mm OD (5/32" OD tube)



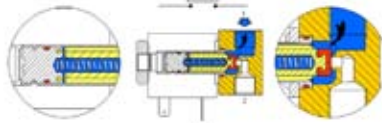
3-way/ 2-position Normally Open, Reverse Ported (shown with coil De-Energized)

Series A / Series 6 - Directly Operated Solenoid valve with M5 (10-32 UNF), 1/8" ports, or 4mm OD (5/32" OD tube)



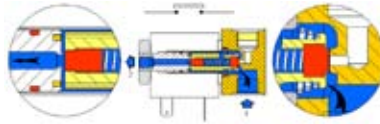
3-way/ 2-position Normally Open, Manifold or Stand-Alone w/ Common Inlet (shown with coil De-Energized)

Series A / Series 6 - Directly Operated Solenoid valve with M5 (10-32 UNF), 1/8" ports, or 4mm OD (5/32" OD tube)



2-way/2-position Normally Closed, (shown with coil De-Energized)

Series A / Series 6 - Directly Operated Solenoid valve with M5 (10-32 UNF), 1/8" ports, or 4mm OD (5/32" OD tube)



2-way/2-position Normally Open, (shown with coil De-Energized)

Series E - Packed Spool Construction, Manifold Assembly



5-way/2-position, 5-way/3-position - Center Closed, Center Open/Exhausting, & Pressure Center

\*\* All Series E valves offer a balanced packed-spool design. This design permits a customized seal geometry to be fitted onto the spool directly. Benefits are less vulnerability to "varnishing" and/or contamination due to smaller seal contact area with the valve bore. Maintenance is reduced due to less parts and labor required to repair, while providing increased seal life and leak-free performance.

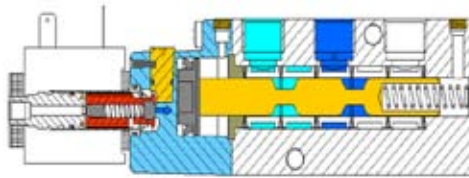
Series E - Packed Spool Construction, In-line Assembly



5-way/2-position, 5-way/3-position - Center Closed, Center Open/Exhausting, & Pressure Center

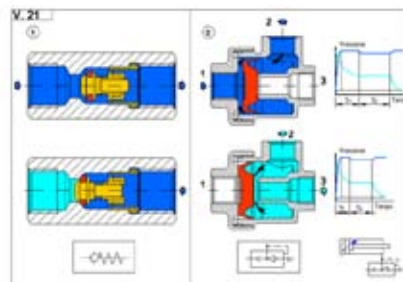
Series NA (NAMUR Interface)- Packed-Bore Spool Construction

3-way/2-position Normally Closed, 3-way/2-position Normally Open, 5/2, 5/3 Center Closed, 5/3 Center Open/Exhausting, 5/3 Pressure Center



\*\* All Series NA-NAMUR valves are equipped with flat geometric ring seals in the packed bore construction, (A wider flat edged portion of the seal ring seals against the external packing spacers and valve inner body, while a thinner rounded lip seals against the spool surface). The design offers significantly improved sealing over traditional o-rings or oval rings, especially between differing surface geometries, such as spools and packing glands.

Series VNR, SCS & VSC Valves - Poppet Design Check, Shuttle, and Quick-Exhaust Valves



# Pneumatic Symbols

<b>DIRECTLY OPERATED SOLENOID VALVES MONOSTABLE</b>	
	3/2 N.C. mechanical spring return
	3/2 N.C. mechanical spring return with manual override
	3/2 N.O. mechanical spring return
	3/2 N.O. mechanical spring return with manual override
	2/2 N.C. mechanical spring return
	2/2 N.C. mechanical spring return with manual override
	2/2 N.O. mechanical spring return
	2/2 N.O. mechanical spring return with manual override
	3/2 N.C. mechanical spring return quick exhaust

<b>ELECTRO-PNEUMATICALLY OPERATED VALVES MONOSTABLE</b>	
	3/2 N.C. mechanical spring return with manual override
	2/2 N.C. mechanical spring return with manual override
	3/2 N.O. mechanical spring return with manual override
	2/2 N.O. mechanical spring return with manual override
	3/2 N.C. pneumatic spring return with manual override
	2/2 N.C. pneumatic spring return with manual override
	3/2 N.O. pneumatic spring return with manual override

	2/2 N.O. pneumatic spring return with manual override
	5/2 mechanical spring return with manual override
	5/2 pneumatic spring return with manual override
	5/3 centers closed, electropneumatic return with manual override
	5/3 centers open, electropneumatic return with manual override
	5/3 pressure center, electropneumatic return with manual override

<b>ELECTRO-PNEUMATICALLY OPERATED VALVES BISTABLE</b>	
	3/2 with manual override
	2/2 with manual override
	electropneumatic return, 5/2 bistable, with manual override

<b>PNEUMATICALLY OPERATED VALVES - MONOSTABLE</b>	
	3/2 N.C. mechanical spring return
	3/2 N.A. mechanical spring return
	2/2 N.C. mechanical spring return
	2/2 N.A. mechanical spring return
	3/2 N.C. pneumatic return
	5/2 monostable mechanical spring return
	5/2 pneumatic return
	5/3 centers closed pneumatic return

	5/3 centers open pneumatic return
	5/3 pressure centers pneumatic return

<b>PNEUMATICALLY OPERATED VALVES - BISTABLE</b>	
	3/2
	2/2
	3/2 differential pneum. return
	2/2 differential pneum. return
	2/2 differential pneum. return
	5/2
	5/2 differential pneum. return

<b>MANUALLY OPERATED VALVES MONOSTABLE</b>	
	3/2 N.C. button operated mechanical spring return
	3/2 N.O. button operated mechanical spring return
	2/2 N.C. button operated mechanical spring return
	2/2 N.O. button operated mechanical spring return
	5/2 button operated mechanical spring return
	3/2 N.C. lever operated mechanical spring return
	3/2 N.O. lever operated mechanical spring return
	2/2 N.C. lever operated mechanical spring return



	2/2 N.O. lever operated mechanical spring return
	5/2 lever operated mechanical spring return
	5/3 centers closed, lever operated mechanical spring return
	5/3 centers open, lever operated mechanical spring return
	5/3 pressure center, lever operated mechanical spring return
	3/2 N.C. pedal operated mechanical spring return
	5/2 pedal operated mechanical spring return

MANUALLY OPERATED VALVES BISTABLE	
	3/2 push-pull button operated
	2/2 push-pull button operated
	5/2 push-pull button operated
	3/2 lever operated
	2/2 lever operated
	5/2 lever operated
	5/3 centers closed lever operated
	5/3 centers open lever operated
	5/3 pressure centers lever operated
	5/2 pedal operated
	5/2
	3/2

MECHANICALLY OPERATED VALVES - MONOSTABLE	
	3/2 N.C. plunger operated mechanical spring return
	3/2 N.O. plunger operated mechanical spring return
	5/2 plunger operated mechanical spring return
	3/2 N.C. roller operated mechanical spring return
	3/2 N.O. roller operated mechanical spring return
	5/2 roller operated mechanical spring return
	3/2 N.C. roller operated unidirectional mechanical spring return
	3/2 N.O. roller operated unidirectional mechanical spring return
	5/2 roller operated unidirectional mechanical spring return

MANUAL/MECHANICALLY OPERATED SENSITIVE	
	3/2 N.O. lever operated mechanical spring return
	3/2 N.C. lever operated mechanical spring return
	5/2 lever operated mechanical spring return
	5/2 lever operated mechanical spring return
	5/2 lever operated mechanical spring return

MANUAL/MECHANICALLY OPERATED SENSITIVE VALV. BISTABLE	
	5/2 plunger operated, plunger return
	5/2 roller operated plunger return

LOGIC VALVES	
	"AND" pneumatic symbol
	"AND" logical symbol
	"OR" pneumatic symbol
	"OR" logical symbol
	"NOT" pneumatic symbol
	"NOT" logical symbol
	"YES" pneumatic symbol
	"YES" logical symbol
	"memory" pneumatic symbol
	"memory" logical symbol

AUTOMATIC VALVES, FLOW REGULATORS AND SILENCERS	
	non return valves
	Quick exhaust valves
	directional flow control valve
	unidirectional blocking valves VBU
	bidirectional blocking valves VBO
	unidirectional flow control valve
	silencer

AIR PREPARATION	
	filter with standard drain
	pressure regulator relieving
	pressure regulator relieving and pressure gauge
	lubricator
	lockable isolation valve manually operated
	lockable isolation valve electropneumatically operated
	lockable isolation valve pneumatically operated
	soft start valve pneumatically operated
	soft start valve electropneumatically operated

CYLINDERS - SINGLE ACTING	
	single-acting cylinder front spring
	single-acting cylinder front spring magnetic
	single-acting cylinder rear spring
	single-acting cylinder rear spring magnetic
	single-acting cylinder through-rod
	single-acting cylinder through-rod

CYLINDERS DOUBLE-ACTING	
	double-acting cylinder non adjustable cushioning
	double-acting cylinder non adjustable cushioning magnetic
	double-acting cylinder adjustable cushioning
	double-acting cylinder adjustable cushioning magnetic
	double-acting cylinder through-rod non adjustable cushioning
	double-acting cylinder magnetic, through rod non adjustable cushioning
	double-acting cylinder through-rod adjustable cushioning
	double-acting cylinder through-rod magnetic, adjustable cushioning
	rodless cylinder double-acting magnetic, adjustable cushioning

ROTARY CYLINDERS	
	rotary cylinders double-acting

PRESSURE SWITCHES, INDICATOR AND AMPLIFIER	
	N.C. pressure switch
	N.O. pressure switch
	pressure switch changeover contact
	pressure indicator
	3/2 N.C. pneumatic amplifier

COUPLINGS	

VALVES	
	monostable manual override
	bistable manual override



# Marketing Materials



Group Profile Brochure  
93-4900-0GB006



Pneumatics  
Division Brochure  
93-1500-0GB010



North American Cylinder  
& Actuator Catalog Ed. 8.4  
93-0511-USA001



North American Fittings  
& Flow Control Valves  
Catalog  
93-0507-USA001



North American  
Valve Catalog  
93-0513-USA002



North American  
FRL Catalog  
93-0513-USA001



Metric Master Catalog  
93-0511-0GB001



Short Form  
Metric Master Catalog\*  
93-1009-0GB016



Series 60/61 ISO  
Cylinder Brochure  
93-1005-USA003



NPTF Fittings Poster  
93-5000-USA001



Wall Chart Fittings Poster  
2011 CCC-USA NPTF  
93-5000-USA002



BSP Fittings Poster  
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NPTF Fittings Bin Labels  
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Metric Fittings Bin Labels  
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Pro-Fit Fittings Brochure  
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Super-Rapid Compact Fittings  
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Trade Show Panel  
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MX3-1"-NPTF FRL Demo Display  
94-5010-0124



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