




General

The direct operated solenoid valve is the interface between pneumatic and electronic. In fact, it is actuated by an electrical signal and in turn gives a pneumatic signal directly available for small users or for actuating bigger pneumatic distributors.

A wide range of valves are needed for satisfying various applications. For this need we have available miniature components with very low volume and electrical impute as well as solenoid valves with large flow rate and power for heavy duty operations. These solenoid valves are usually 3/2, normally closed or normally open, but there are available the 2/2, closed or open, for vacuum and others.

Note that the direct operated valves can only be used with bases, individual or multiple with M5 or G 1/8" thread or with connections.

PNEUMAX solenoid valves are  homologated valid for USA and Canada (file n. E206325-VAIU2, VAIU8). As for ordering code please see page 1.26 and 1.27.

Use and maintenance

Maintenance is normally not required for these components therefore the spare parts list is not provided.

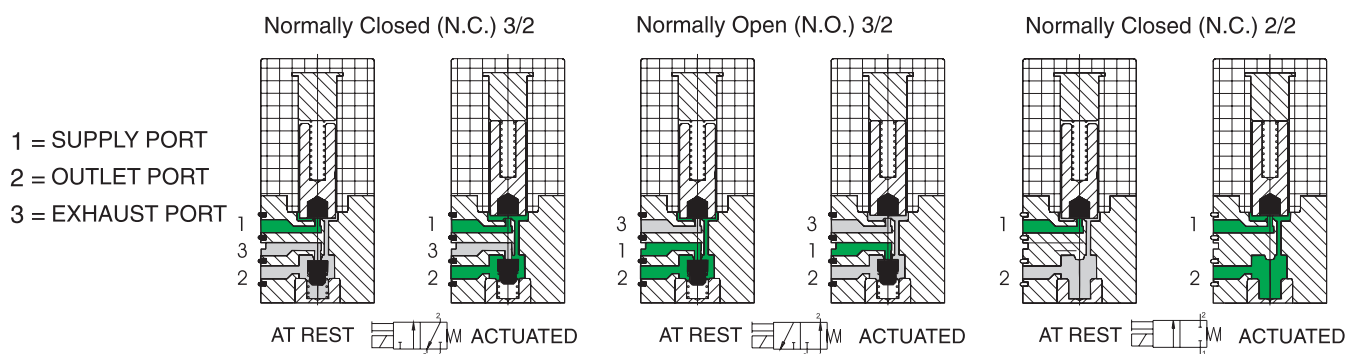
Their construction complexity and low cost do not make repair economically viable. It's easier and more economic to replace the complete valve in case of malfunction.

For proper lubrication use only hydraulic oil class H such as Castrol type MAGNA GC 32.

General

Direct operated solenoid valve differs from other types for its minimum overall dimensions. Its specific design allows single or gang mounting in narrow spaces. Its high switching speed and flow rate make this small valve useful for different applications and suitable also with other fluids than compressed air compatible with constructive material. All versions, equipped with override device, are 3/2 ways N.C. and N.O., 2/2 ways N.C. 12 or 24 Volt D.C. with cables or connector also with led. Make sure that the fastening screws are tightened with maximum torque of 0,25 Nm.

Functional schematics



Construction

Electrical part:

Miniature solenoid consisting of a coil made of copper wire of different sizes depending on the voltage. Insulated according to F class standards and injection-moulded nylon-glass application. All parts forming the cladding, the electrical connections and the pole pieces are protected against corrosion. Electrical connection is via connector or directly with flying leads.

Mechanical part:

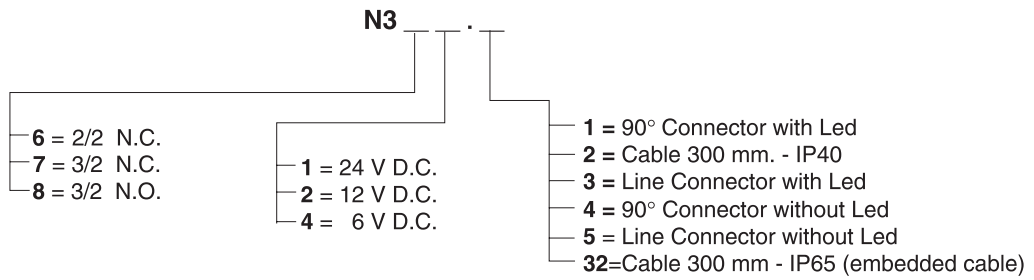
AISI 430F cores, AISI 302 return springs, VITON® seals, thermoplastic polyester body, plug and manual control made of nickel-plated brass. The miniature solenoid valves are mounted on a separate base, multiple base or distributors.

Technical characteristics

Pneumatic:	Working pressure	0 ÷ 7 bar
	Orifice size	0,7 mm
	Fluid/ambient temperature	-5° +50°C
	Maximum flow rate at 6 bar with Δp 1 bar	14 NI/min
	Exhaust flow	22 NI/min
	Max number of cycles per minute	2.700
	Life	50 Million cycles
Electric:	Voltages	12 ÷ 24 Volt D.C.
	Power	1,3 Watt
	Voltage tolerance	-5% +10%
	Response time when energized	8 ms
	Response time when de-energized	10 ms
	Copper wire isolation class	F (155°C)
	Protec	IP40 - IP65 (with cables, see orderings codes) IP 00 (with connectors)



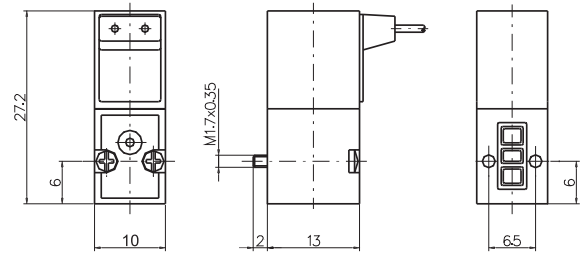
Ordering codes



Miniature solenoid valve with cable



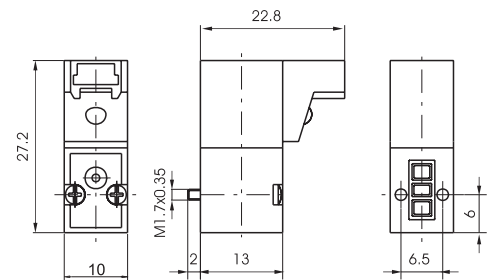
Weight gr. 12



Miniature solenoid valve with 90° connector



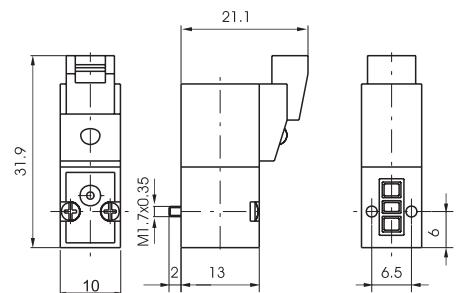
Weight gr. 12



Miniature solenoid valve with line connector



Weight gr. 12



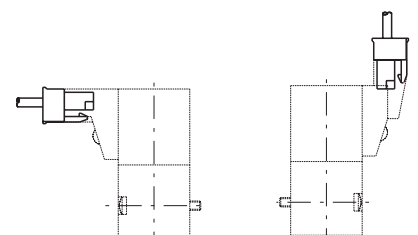
Connector

Ordering codes

- 371 .
- 300 Cable L = 300 mm
 - 600 Cable L = 600 mm
 - 1000 Cable L = 1000 mm



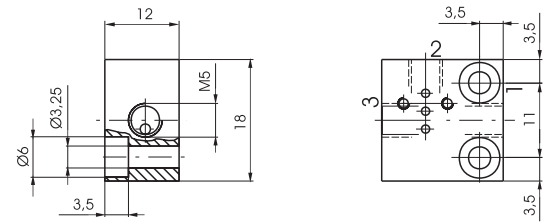
Weigt



Individual base

Ordering code

395.01



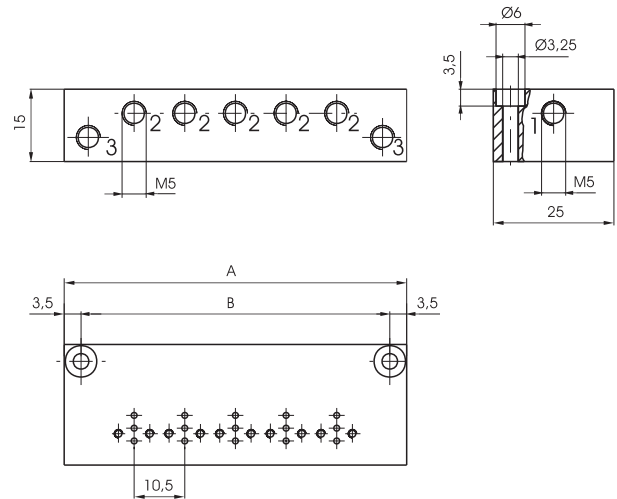
Weight gr. 10

Multiple bases

Ordering code

395 .

N° Places

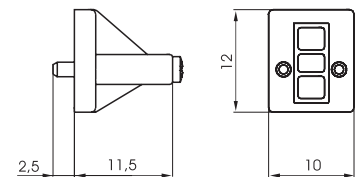


N° Places	02	03	04	05	06	07	08	09	10
A	39.5	50	60.5	71	81.5	92	102.5	113	123.5
B	32.5	43	53.5	64	74.5	85	95.5	106	116.5
Weight (gr.)	43	54	65	76	87	98	109	120	131

Closing plate

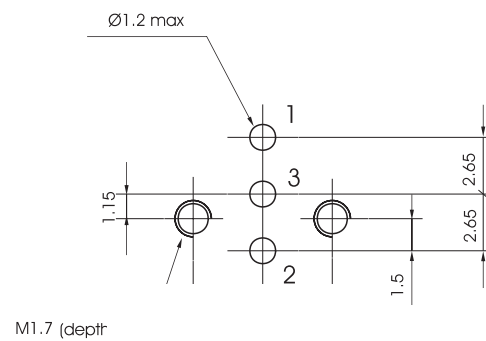
Ordering code

395.00



Weight gr. 5

Interface dimensions



M1.7 (depth)

General

This direct operated solenoid valve has minimum overall dimensions (15 mm wide). Its construction method is same as 10 mm valve, of course.

It is suitable to be single or gang mounted or as electro-operator for larger air flow distributors.

Can be utilized with compressed air and other fluids compatible with material used to build the solenoid valve.

The available versions, all equipped with manual override, are 3 ways, normally closed and normally open with DC and AC 50/60 Hz.

It's possible to install the N.O. valve on N.C. interface by using the registered reverse system included in the valve body.

The electrical connection is made with cables (300 mm.), FASTON or with connector.

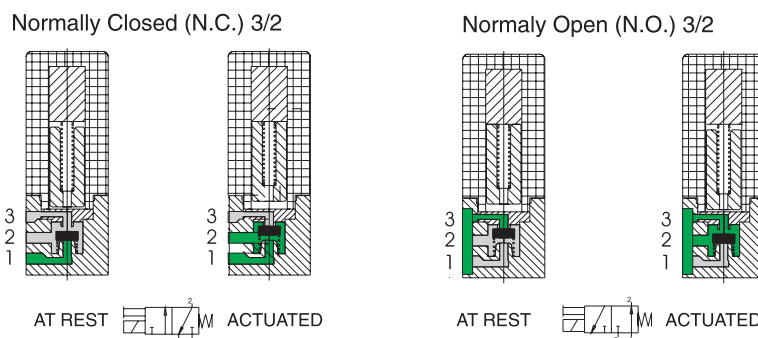
This type of miniature solenoid valve is interchangeable with most of the same products available on the market.

Coil be can also positioned at 180° to get the electrical connection located on the opposite side than override.

Make sure that the fastening screws are tightened with maximum torque of 0,75 Nm.

Functional schematics

- 1 = SUPPLY PORT
2 = OUTLET PORT
3 = EXHAUST PORT



Construction characteristics:

Electrical part: Miniature solenoid consisting of a coil made of copper wire of different diameters depending on voltage, isolated according to "F" class standard, with injection-moulded nylon-glass application. All parts forming the cladding, the electrical connections and the pole pieces are protected against corrosion.

Mechanical part: AISI 430F cores, AISI 302 return springs, VITON® seals, thermoplastic polyester body.

Technical characteristics

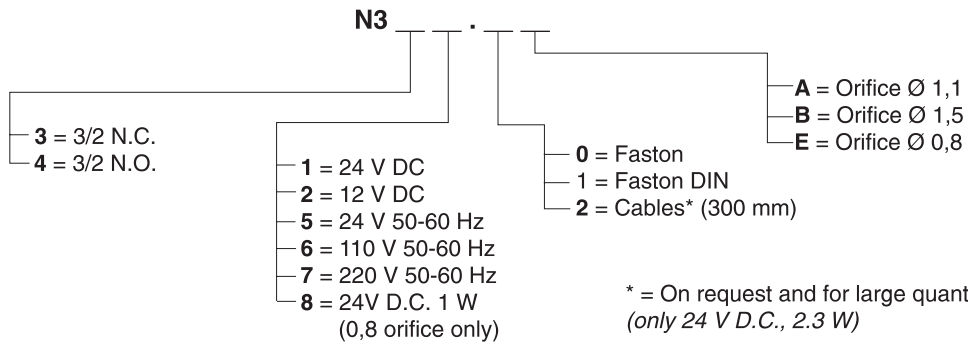
Pneumatic

Nominal diameter	0,8 mm	1,1 mm	1,5 mm (only D.C.)
Maximum flow rate at 6 bar with Δp 1 bar	20 NI/min	30 NI/min	50 NI/min
Working pressure for N.C.	0 to 10 bar		0 to 7 bar
Working pressure for N.O.	/	0 to 8 bar	0 to 5 bar
Temperature	-5° +50°C		

Electrical

Voltage D.C.	24 V DC	12-24 V DC	
Voltage A.C.	/	24-110-220 Volt 50/60 Hz	/
Power	1 Watt	2,3 Watt	
	/	2,8 VA (at starting) 2,5 VA (at speed)	/
Voltage tolerance	-5% +10%		
Response time	10÷12 ms		
Isolating class	F (155°C)		
Protection degree	IP65 (with cables) IP65 (with connectors) IP00 (with faston)		
Life expectancy	with standard working conditions		

Ordering code

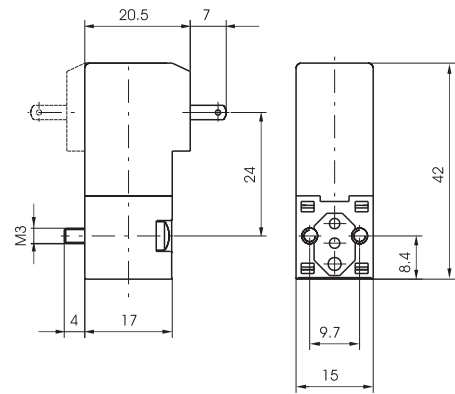


See previous page for available versions

With Faston



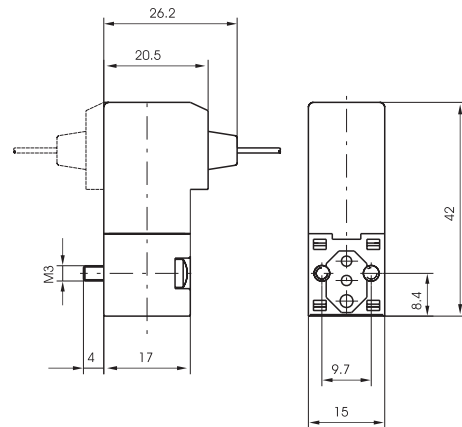
Weight gr. 36



With cables



Weight gr. 38

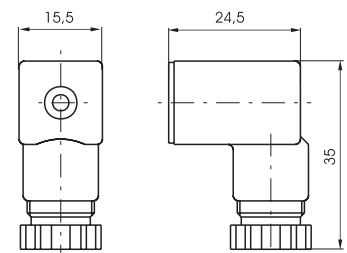


Connector

Ordering code

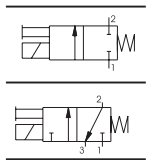
- 315.11.00 Standard
- 315.11.0_L Led
 - 1 = 24 V D.C./A.C.
 - 2 = 110 V 50/60 Hz
 - 3 = 220 V 50/60 Hz
- 315.12.00 for faston DIN
- 315.12.0_L for faston DIN with Led
 - 1 = 24 V D.C./A.C.
 - 2 = 110 V 50/60 Hz
 - 3 = 220 V 50/60 Hz

Weight



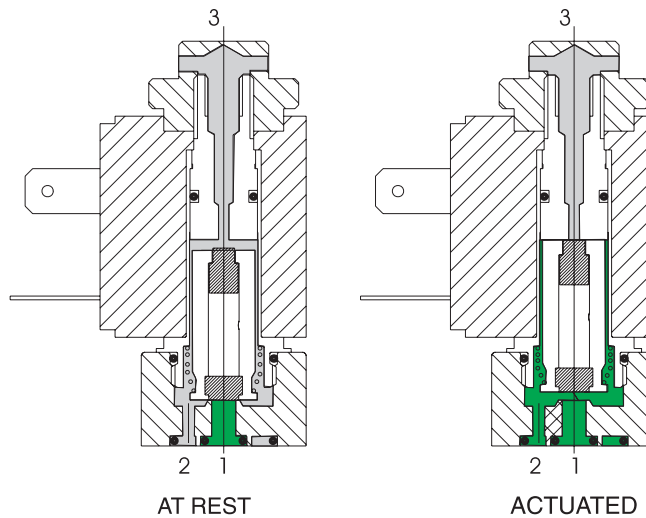
Functional schematics

2

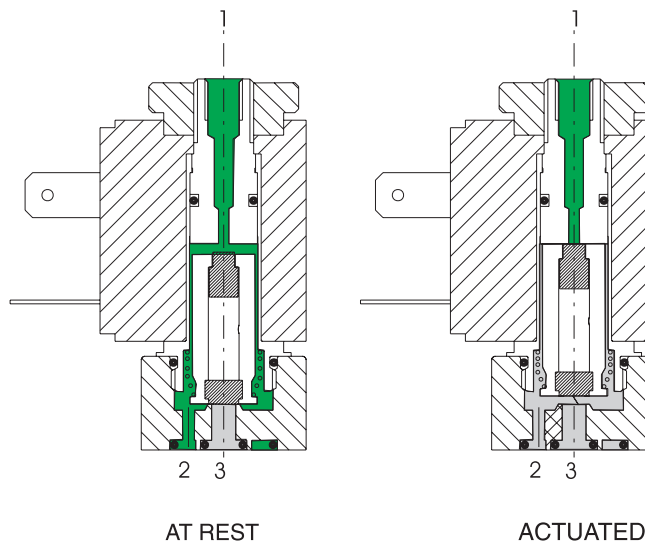


- 1 = INLET PORT
- 2 = OUTLET PORT
- 3 = EXHAUST PORT
(Plugged if 2/2)

Normally Closed (N.C.) 3/2 o 2/2



Normally Open (N.O.) 3/2 o 2/2



Construction characteristics

Electrical parts: Solenoids: the solenoid consist of coils having different diameter copper wire windings insulated according standards "H"; they are encased in a nylon-glass compound. All parts are corrosion resistant.

Mechanical parts: Nickel plated brass tube nitrile viton seals stainless steel plunger (AISI 430F), stainless steel adjusted springs, viton poppet seals, tropicalized zinc alloy interface plate, nickered brass manual override, nickel steel coil lock nut, zinc steel mounting screw.

To be usable, the solenoids and microsolenoids have to be attached either to a base or directly to the distributor's operators by means of connectors M5 or G 1/8". These solenoids are available in all voltages and frequencies used in the world. The following are the technical characteristics of the solenoid.

Technical characteristics

Pneumatic	Working pressure	0 ÷ 10 bar	
	Orifice size	1,3 mm	(0,9 mm for 2 W)
	Maximum fluid temperature	50°C	
	Maximum ambient temperature	50°C	
	Maximum flow rate at 6 bar with Δp 1 bar	53 NI/min	(20NI/min. for 2 W)
	Cycles/minute	700	
	Fluids	Air-vacuum-inert gases	
	Lubrication	non required	
	Life	45 to 50 million cycles	
Electrical	Power consumption inrush - D.C.	-	
	Power consumption inrush - A.C	9 VA	
	Power consumption holding - D.C	5 W	(2 W)
	Power consumption holding - A.C	6 VA	
	Operating voltage tolerance	±10%	
	Response time opening	8 ms	
	Response time closing	6 ms	
	Insulation of the copper wire	H	
	Insulation of the coil	F	
	Connector protection	IP 65	
	Cable protection	DIN 43650 INDUSTRIAL FORM	

The response time were determined using standard procedure ISO 12238.

Maintenance and replacement parts

Maintenance practices for these valves are similar to those already detailed for other products- replacement of the plunger or poppet is not advisable since the new replacement would not provide the best fit with the rest of the already used valve.

Special care should be taken that no dirt is accumulated between the working surface of fixed core and the plunger which would result in vibrations and overheating of the solenoid. In the case of microsolenoid it must be assured that the alternate current coil is not charged when the mechanical part is not mounted to avoid destruction of the coil.

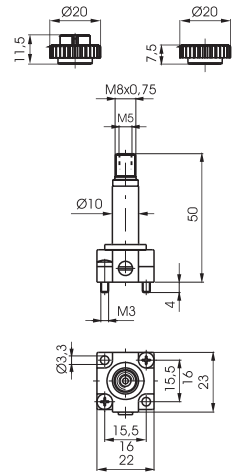
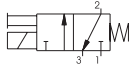
The electrical connections have to be perfect, especially where low currents are used (12-24 V).

Oxidation of contacts between the connector and the coil can lead to intermittent malfunctions which are difficult to trace. Oxidation of contacts due to humidity or corrosive atmosphere are one of the most common causes of false alarms. Clean the contacts with appropriate spray.

Mechanical actuator for Normally Closed (N.C.) miniature solenoid valve

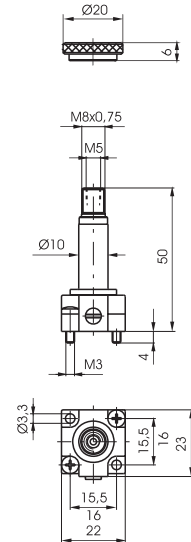
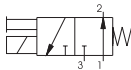
Ordering code

- M 2** Normally Closed (N.C.)
- M 2P** Normally Closed (N.C.) threaded lock nut
- M 2/9** Normally Closed 2 W 24 V D.C.



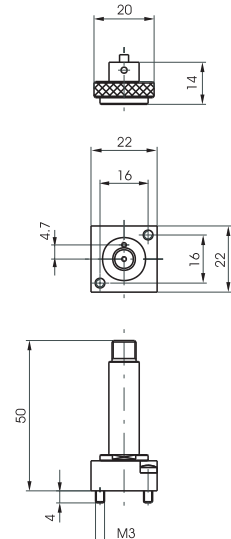
Weight gr. 51

- M 2/1** Normally Open (N.O.) air feeding through fix flunger



Weight gr. 48

- MM 7** Normally Open (N.O.) air feeding through base



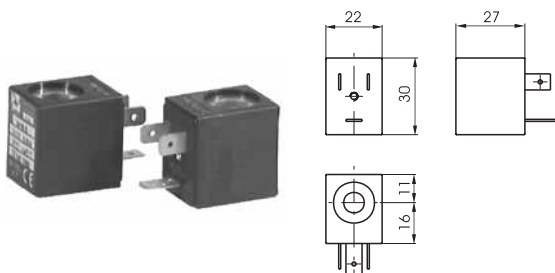
ght gr. 46

Coil suitable for MM7 are listed on page 1.18





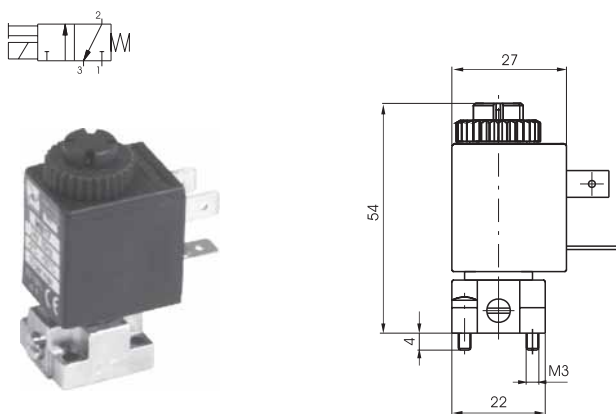
Coil



* Use only with M2/9

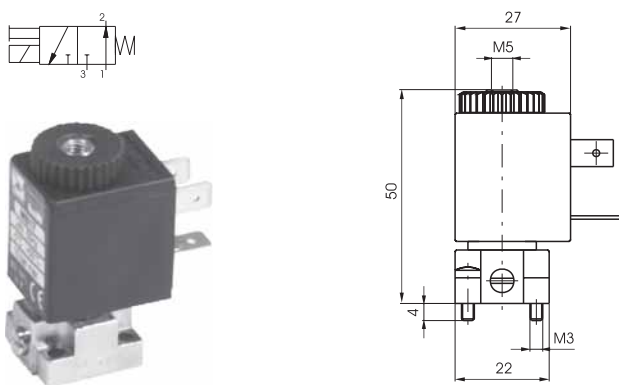
Ordering code	Available voltages	
MB 4 MB 5 MB 6 MB 9*	12 D.C. 24 D.C. 48 D.C. 24 D.C. (2 Watt)	Direct current
MB 17 MB 21 MB 22 MB 24	24/50 48/50 110/50 220/50	Alternating current 50 Hz
MB 37 MB 39 MB 41	24/60 110/60 220/60	Alternating current 60 Hz
MB 56 MB 57 MB 58	24/50-60 110/50-60 220/50-60	Alternating current 50/60 Hz

Miniature solenoid valve Normally Closed (N.C.)



Ordering code	Available voltages Miniature solenoid valve N.C.	
M 2.4 M 2.5 M 2.6 M 2.9	12 DC 24 DC 48 DC 24 DC (2 Watt)	Direct current
M 2.17 M 2.21 M 2.22 M 2.24	24/50 48/50 110/50 220/50	Alternating current 50 Hz
M 2.37 M 2.39 M 2.41	24/60 110/60 220/60	Alternating current 60 Hz
M 2.56 M 2.57 M 2.58	24/50-60 110/50-60 220/50-60	Alternating current 50/60 Hz

Miniature solenoid valve Normally Open (N.O.)

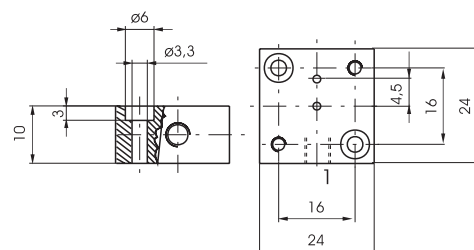
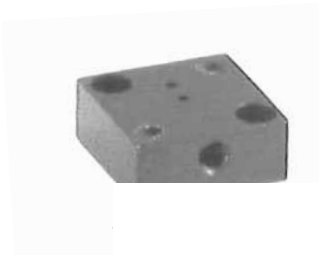


Ordering code	Available voltages Miniature solenoid valve N.O.	
M 2/1.4 M 2/1.5 M 2/1.6 M 2/1.9	12 DC 24 DC 48 DC 24 DC (2 Watt)	Direct current
M 2/1.17 M 2/1.21 M 2/1.22 M 2/1.24	24/50 48/50 110/50 220/50	Alternating current 50 Hz
M 2/1.37 M 2/1.39 M 2/1.41	24/60 110/60 220/60	Alternating current 60 Hz
M 2/1.56 M 2/1.57 M 2/1.58	24/50-60 110/50-60 220/50-60	Alternating current 50/60 Hz

External feeding base

Ordering code

305.10.05



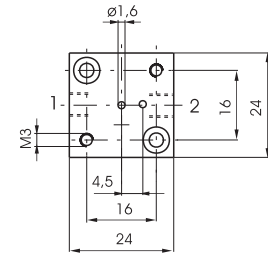
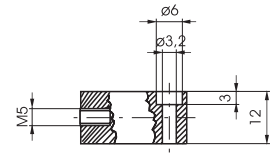
Individual base



In line ports - thread M5

1 = INLET PORT (N.C.)
2 = OUTLET PORT

With a N.O. miniature solenoid valve
1 = EXHAUST
2 = OUTLET PORT



Ordering code

305.00.00

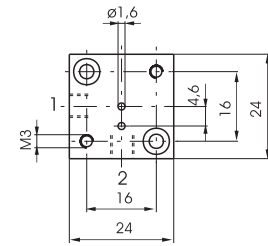
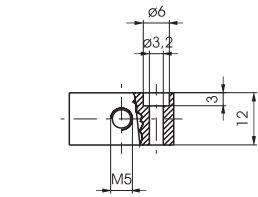
Weight gr. 56

90° Port - thread M5



1 = INLET PORT (N.C.)
2 = OUTLET PORT (N.C.)

With a N.O. miniature solenoid valve
1 = EXHAUST
2 = OUTLET PORT



Ordering code

305.90.00

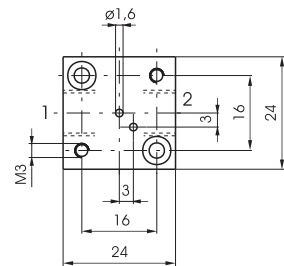
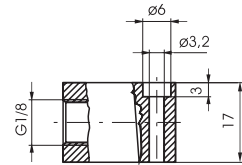
Weight gr. 56

In line ports - thread G 1/8"



1 = INLET PORT (N.C.)
2 = OUTLET PORT (N.C.)

With a N.O. miniature solenoid valve
1 = EXHAUST
2 = OUTLET PORT



Ordering code

305.00.18

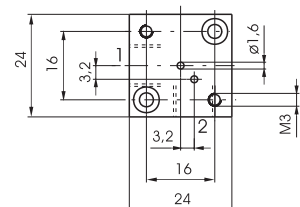
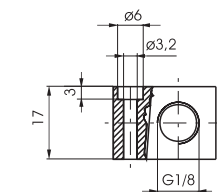
Weight gr. 75

90° Port - thread G 1/8"



1 = INLET PORT (N.C.)
2 = OUTLET PORT (N.C.)

With a N.O. miniature solenoid valve
1 = EXHAUST
2 = OUTLET PORT



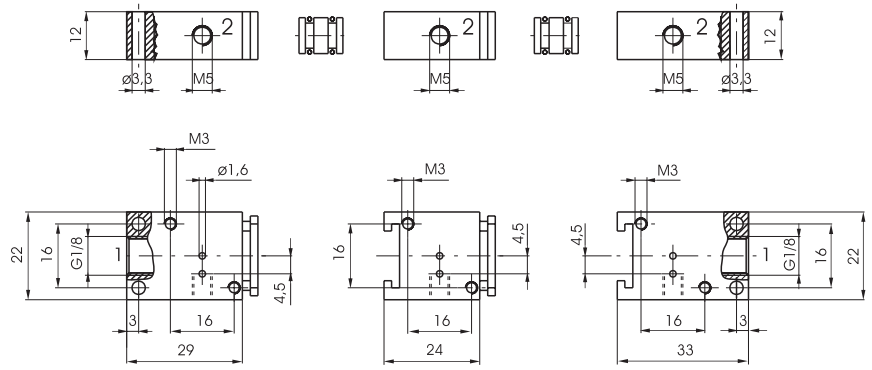
Ordering code

305.90.18

Weight gr



Modular bases for series mounting



Ordering code

Initial base
305.05.00
 Weight gr. 57

Intermediate base
305.06.00
 Weight gr. 44

Last base
305.07.00
 Weight gr. 53

Bored spacer
305.05.01
 Weight gr. 3

Solid spacer
305.05.02
 Weight gr. 4

Initial base

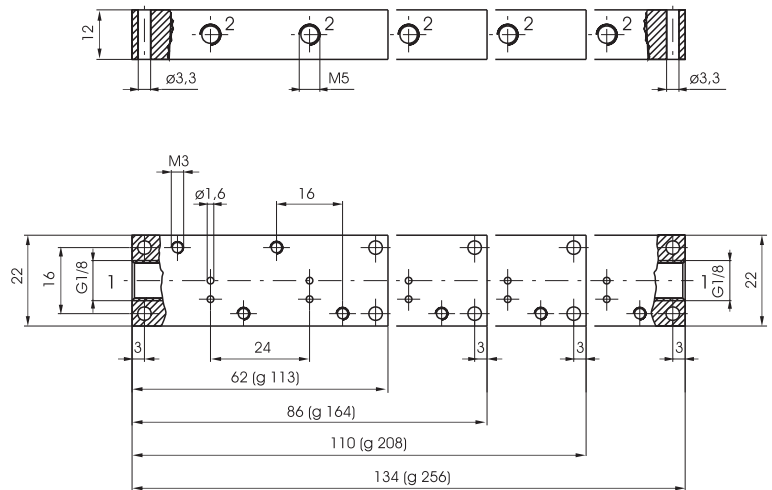
Intermediate base

Last base



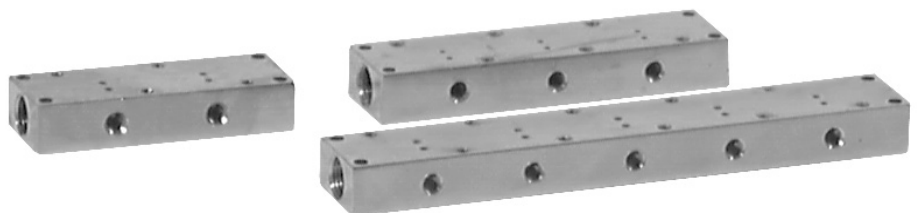
2

Multiple integral bases for series mounting

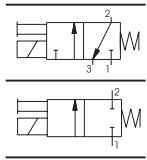


Ordering code

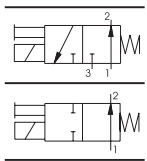
- 305.08.02** 2 positions
- 305.08.03** 3 positions
- 305.08.04** 4 positions
- 305.08.05** 5 positions



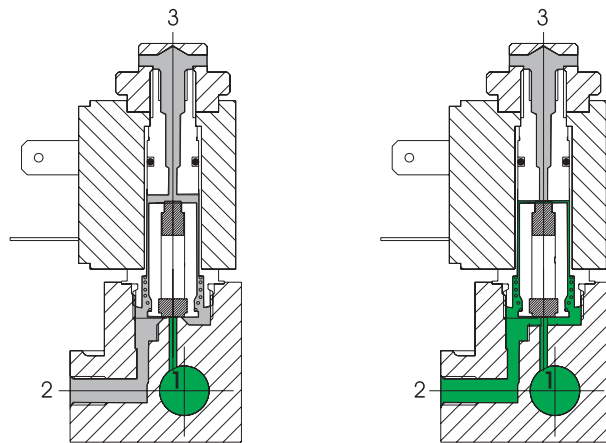
Functional schematic



- 1 = INLET PORT
- 2 = OUTLET PORT
- 3 = EXHAUST PORT
(Plugged if 2/2)



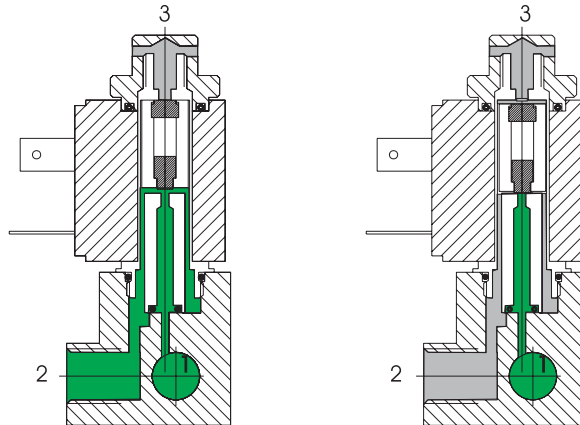
Normally Closed (N.C.) 3/2 or 2/2



AT REST

ACTUATED

Normally Open (N.O.) 3/2 or 2/2



AT REST

ACTUATED

Construction characteristics

Electrical parts: Solenoids: the solenoid consist of coils having different diameter copper wire windings insulated according standards "H"; they are encased in a nylon-glass compount. All parts are corrosion resistant.

Mechanical parts: Nickel plated brass tube nitrile (NBR) stainless steel plunger (AISI 430F), stainless steel adjusted springs, viton poppet seals, tropicalized zinc alloy interface plate, nickeled brass manual override, nickel steel coil lock nut, zinc steel mounting screws. Electrical connectors are standard.



Technical characteristics

Pneumatic	Working pressure	0 ÷ 10 bar	
	Orifice size	1,3 mm	(1,1 mm for 2 W)
	Maximum fluid temperature	50°C	
	Maximum ambient temperature	50°C	
	Maximum flow rate at 6 bar with $\Delta p = 1$	53 NI/min	(35 NI/min. for 2 W)
	Cycles/minute	700	
	Fluids	Air-Vacuum-Inert gases	
	Lubrication	Non needed	
	Life	40 ÷ 50 million cycles	
Electrical	Power consumption inrush - D.C	-	
	Power consumption inrush - A.C	9 VA	
	Power consumption holding - D.C	5 W	(2 W)
	Power consumption holding - A.C	6 VA	
	Operating voltage tolerance	$\pm 10\%$	
	Response time opening	8 ms	
	Response time closing	6 ms	
	Insulation of the copper wire	H	
	Insulation of the coil	F	
	Connector protection	IP 65	
	Cable protection	DIN 43650 INDUSTRIAL FORM	

The response times were determined using standard procedure ISO 12238.

Maintenance and replacement parts

Maintenance practices for these valves are similar to those already detailed for other products - replacement of the plunger or poppet is not advisable since the new replacement would not provide the best fit with the rest of the already used valve.

Special care should be taken that no dirt is accumulated between the working surface of fixed core and the plunger which would result in vibrations and overheating of the solenoid. In the case of microsolenoid it must be assured that the alternate current coil is not charged when the mechanical part is not mounted to avoid destruction of the coil.

The electrical connections have to be perfect, especially where low currents are used (12-24 V). Oxidation of contacts between the connector and the coil can lead to intermittent malfunctions which are difficult to trace. Oxidation of contacts due to humidity or corrosive atmosphere are one of the most common causes of false alarms. Clean the contacts with appropriate spray.