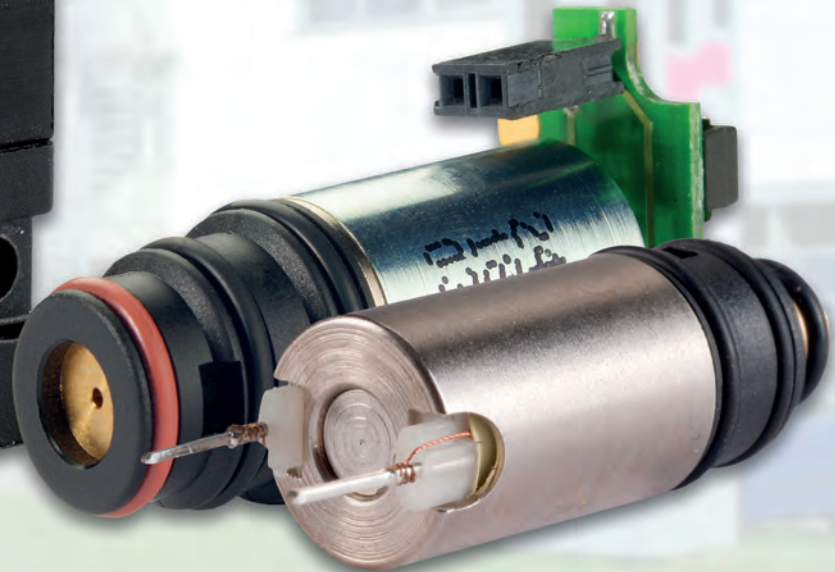






The so-called *Tiny Tubes* are our smallest valves. Besides their small physical dimensions, they feature respectable pneumatic power density and a long life time. Even though they are not part of a modular system, there is a versatile product portfolio of application-specific “plug & play” solutions.

All of the compact valves are micro-calibrated in order to attain constantly high flow rates in the automation industry. Attractive for medical application: *nass magnet* provides a special version of the *Tiny Tubes* for a lubrication-free operation with teflon-coated components.



The type System 3-10 stands for a compact solenoid valve with a width of 10 mm (block assembly is possible). Each variation has an armature diameter of 3 mm, which has been determined as the optimum for this pneumatic class through simulation and practical testing.

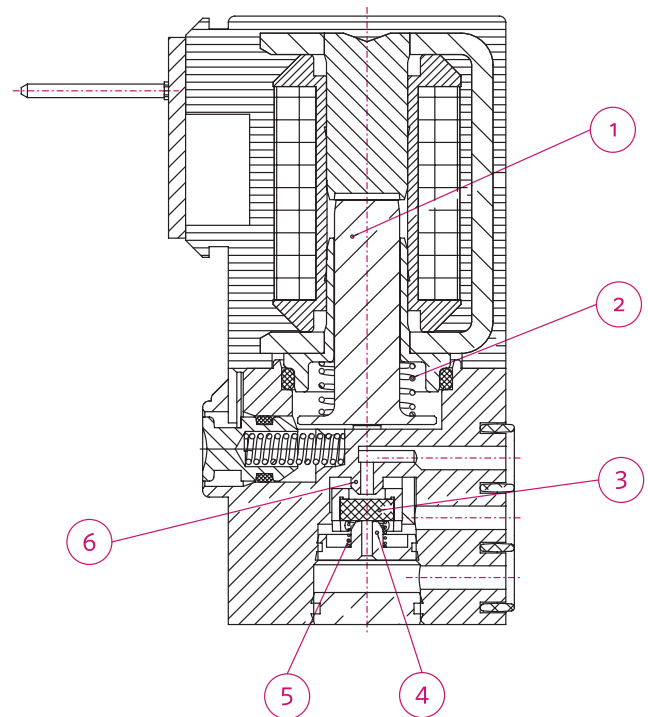
APPLICATION OF SYSTEM 3-10

Usually, the solenoids are used in automation as 3/2 way valves or 2/2 way valves with the switching functions *normally closed (NC)* or *normally open (NO)*. Typical maximum operating pressure and nominal orifice for the 3/2 way model are 10 bar/0.7 mm. This type has been designed for the use with filtered compressed air and inert gases. The use of other substances, especially in medical applications, requires prior agreement with *nass magnet*.

FUNCTION

The plunger¹ of System 3-10 is pressed downwards by the reset spring². The plunger itself does not feature any sealing elements. The plunger movement transfers to the actuator, which is gathering the sealing element³.

In the de-energized state, the reset spring is taking effect on the sealing element through the armature and the actuator. The sealing element is pushed on the lower valve seat⁴. The plunger will move once the solenoid coil is under current. The actuator is now unloaded



and moves upwards, supported by the lower pressure spring⁵.

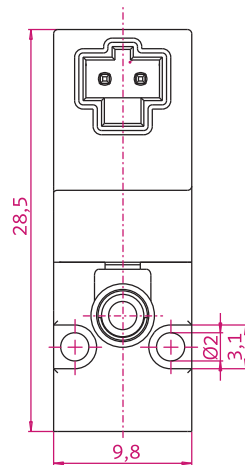
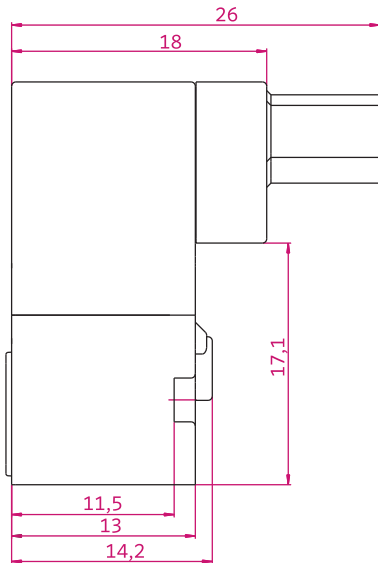
The sealing element exposes the lower valve seat and seals towards the upper valve seat⁶. In a 2/2 way model or for the NO switching function, the valve seats are charged with individual pressures. In this case, a modified spring design is provided by the manufacturer.

SOLENOID VALVE SYSTEM 3-10

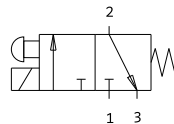
Switching function: 3/2 way (2/2 way on request)
 De-energized state: NC (normally closed), NO (normally open)
 Electrical connection: USC
 Operating voltage: 12 V DC, 24 V DC

General Data

Voltage tolerance $\pm 10\%$
 Ambient temperature $-10\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$
 Relative duty cycle 100 %
 Activation/deactivation period
 according to ISO/CD12238 nominal 5 ms/5 ms
 Insulation class of insulating materials
 according to DIN VDE 0580 F
 Degree of protection according to EN 60529 IP 40 (see type of contact)
 Class of protection III
 Quality of medium according to ISO 8573-1 compressed air class 3, 3, 3
 Mounting position any (preferably plunger in vertical direction)
 Imprint *nass magnet* (customer imprint possible)

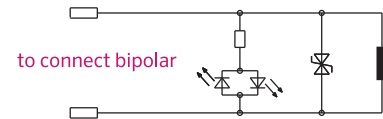


Pneumatic Diagram

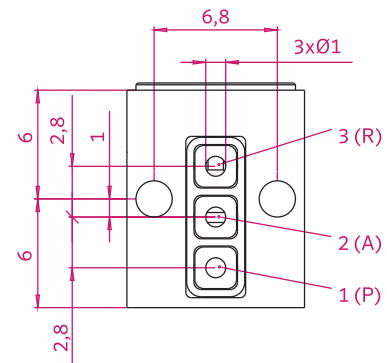


Note: The picture shows the 3/2 way NC type with electric/pneumatic interface on opposite side (OPS).

Circuit Diagram



Pneumatic Interface ISO 15218



Technical Data 3/2 Way Standard Versions with Electrical USC-Connector

Part No.	Nom. Orif. [mm]		NC	NO	Pressure [bar]	Flow Rate [l/min]		Voltage	Rated Power [W]	Circuit		Man. Overr. monostable	Interface Pos.
	inlet	exhaust				1-2	2-3			LED	prot. circ.		
130-070-0091	0,5	0,6	X		1 to 8	7	9	24 V DC	0,6	X	X	X	OPS ¹
130-070-0092	0,5	0,6	X		1 to 8	7	9	12 V DC	0,6	X	X	X	OPS
130-070-0093	0,5	0,6	X		1 to 10	7	9	24 V DC	0,9	X	X	X	OPS
130-070-0094	0,7	0,8	X		1 to 8	10	13	24 V DC	0,9	X	X	X	OPS
130-070-0132	0,7	0,8	X		1 to 8	10	13	24 V DC	0,9	X	X	X	SAS ²
130-070-0133	0,7	0,8	X		1 to 8	10	13	12 V DC	0,9	X	X	X	SAS
130-070-0143	0,6	0,5		X	1 to 8	7	7	24 V DC	0,6	X	X	X	SAS
130-070-0154	0,6	0,5		X	1 to 8	7	7	24 V DC	0,6	X	X	X	OPS

1 OPS: electric/pneumatic interface on opposite side

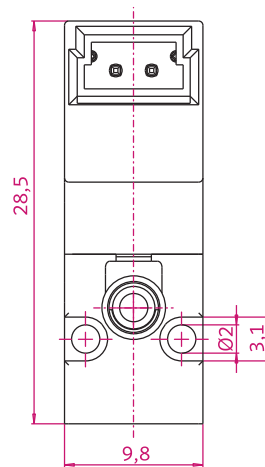
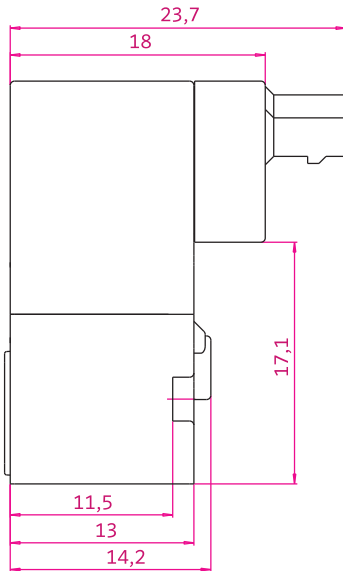
2 SAS: electric/pneumatic interface on the same side

SOLENOID VALVE SYSTEM 3-10

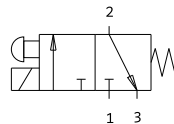
Switching function: 3/2 way (2/2 way on request)
 De-energized state: NC (normally closed), NO (normally open)
 Electrical connection: JPC
 Operating voltage: 6 V DC, 12 V DC, 24 V DC

General Data

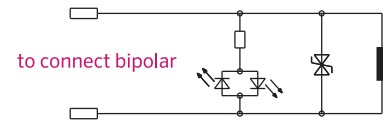
Voltage tolerance ± 10 %
 Ambient temperature - 10 °C to + 50 °C
 Relative duty cycle 100 %
 Activation/deactivation period
 according to ISO/CD12238 nominal 5 ms/5 ms
 Insulation class of insulating materials
 according to DIN VDE 0580 F
 Degree of protection according to EN 60529 IP 40 (see type of contact)
 Class of protection III
 Quality of medium according to ISO 8573-1 compressed air class 3, 3, 3
 Mounting position any (preferably plunger in vertical direction)
 Imprint *nass magnet* (customer imprint possible)



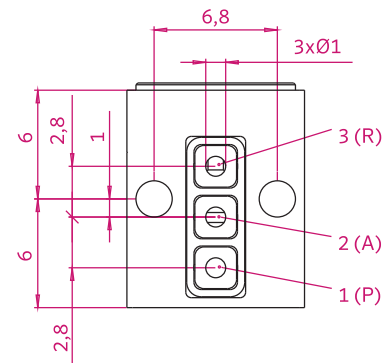
Pneumatic Diagram



Circuit Diagram



Pneumatic Interface ISO 15218



Note: The picture shows the 3/2 way NC type with electric/pneumatic interface on opposite side (OPS).

Technical Data 3/2 Way Standard Versions with Electrical JPC-Connector

Part No.	Nom. Orif. [mm]		NC	NO	Pressure [bar]	Flow Rate [l/min]		Voltage	Rated Power [W]	Circuit		Man. Overr. monostable	Interface Pos.
	inlet	exhaust				1-2	2-3			LED	prot. circ.		
130-070-0096	0,5	0,6	X		1 to 8	7	9	24 V DC	0,6	X	X	X	OPS ¹
130-070-0097	0,5	0,6	X		1 to 8	7	9	6 V DC	0,6	X	X	X	OPS
130-070-0098	0,7	0,8	X		1 to 8	10	13	24 V DC	0,9	X	X	X	OPS
130-070-0100	0,5	0,6	X		1 to 8	7	9	24 V DC	0,6			X	OPS
130-070-0101	0,7	0,8	X		1 to 8	10	13	24 V DC	0,9			X	OPS
130-070-0134	0,7	0,8	X		1 to 8	10	13	24 V DC	0,9	X	X	X	SAS ²
130-070-0155	0,6	0,5		X	1 to 8	7	7	24 V DC	0,6	X	X	X	OPS
130-070-0182	0,7	0,8	X		1 to 8	10	13	12 V DC	0,9	X	X	X	OPS
130-070-0194	0,8	0,7		X	1 to 8	10	13	24 V DC	0,9	X	X	X	OPS

1 OPS: electric/pneumatic interface on opposite side

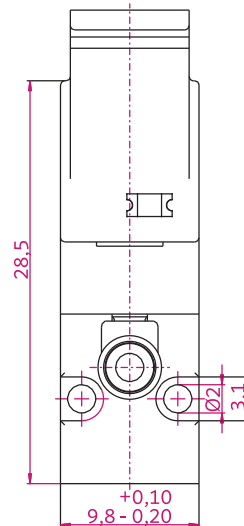
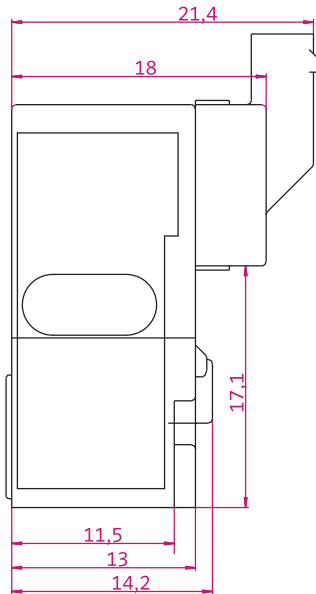
2 SAS: electric/pneumatic interface on the same side

SOLENOID VALVE SYSTEM 3-10

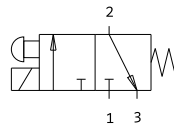
Switching function: 3/2 way (2/2 way on request)
 De-energized state: NC (normally closed), NO (normally open)
 Electrical connection: M
 Operating voltage: 24 V DC

General Data

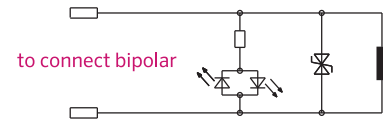
Voltage tolerance ± 10 %
 Ambient temperature - 10 °C to + 50 °C
 Relative duty cycle 100 %
 Activation/deactivation period
 according to ISO/CD12238 nominal 5 ms/5 ms
 Insulation class of insulating materials
 according to DIN VDE 0580 F
 Degree of protection according to EN 60529 IP 40 (see type of contact)
 Class of protection III
 Quality of medium according to ISO 8573-1 compressed air class 3, 3, 3
 Mounting position any (preferably plunger in vertical direction)
 Imprint *nass magnet* (customer imprint possible)



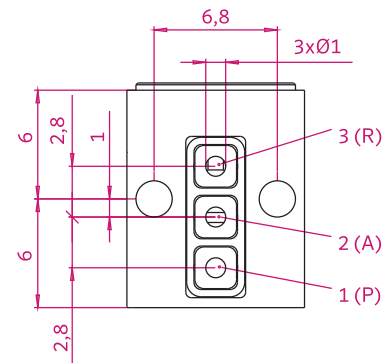
Pneumatic Diagram



Circuit Diagram



Pneumatic Interface ISO 15218



Note: The picture shows the 3/2 way NC type with electric/pneumatic interface on opposite side (OPS).

Technical Data 3/2 Way Standard Versions with Electrical M-Connector

Part No.	Nom. Orif. [mm]		NC	NO	Pressure [bar]	Flow Rate [l/min]		Voltage	Rated Power [W]	Circuit		Man. Overr. monostable	Interface Pos.
	inlet	exhaust				1-2	2-3			LED	prot. circ.		
130-070-0125	0,7	0,8	X		1 bis 8	10	13	24 V DC	0,9	X	X	X	OPS ¹

1 OPS: electric/pneumatic interface on opposite side



Electrical connection: USC
Operating voltage: 12 V DC,
24 V DC



Electrical connection: JPC
Operating voltage: 6 V DC,
12 V DC, 24 V DC



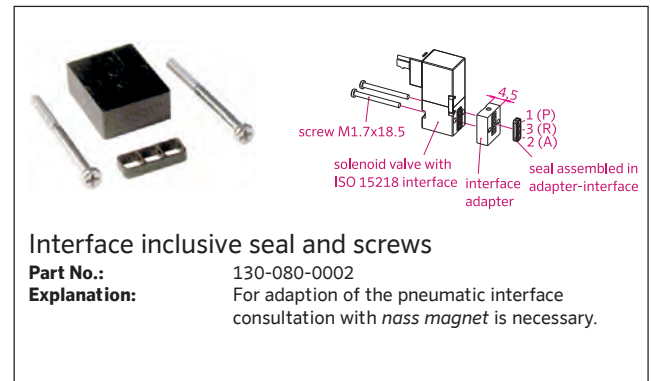
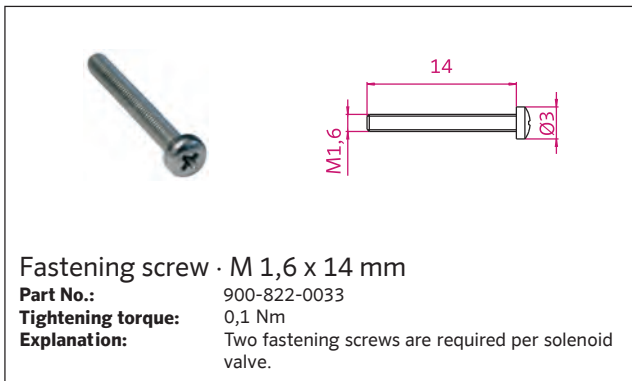
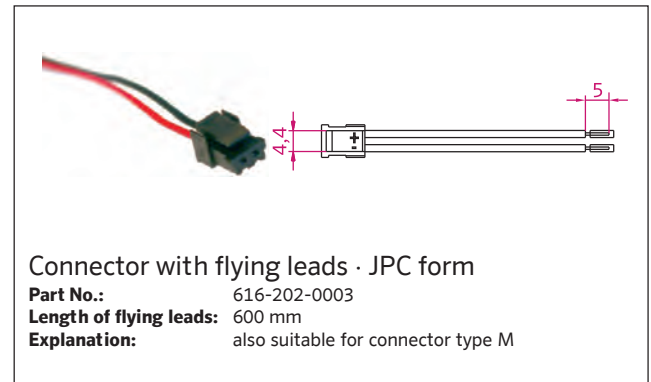
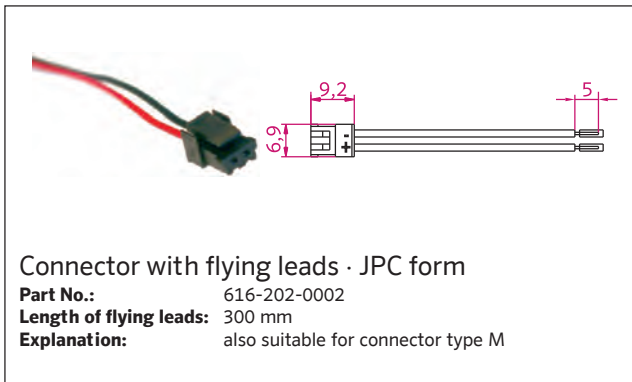
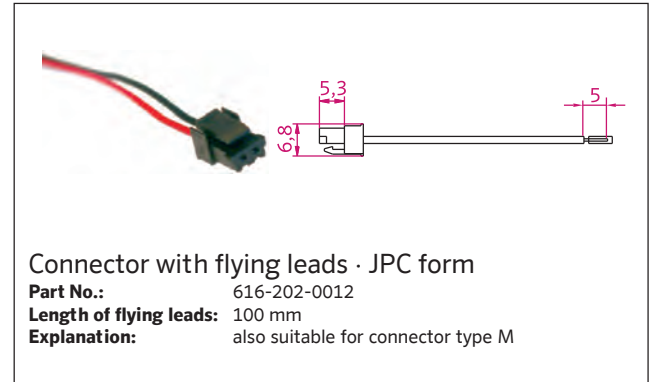
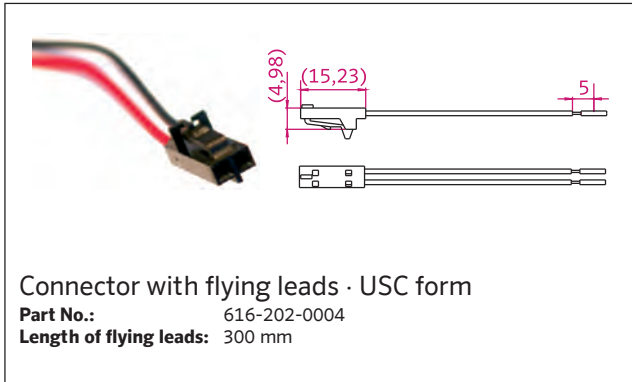
Electrical connection: M
Operating voltage: 24 V DC

SPECIAL REMARKS

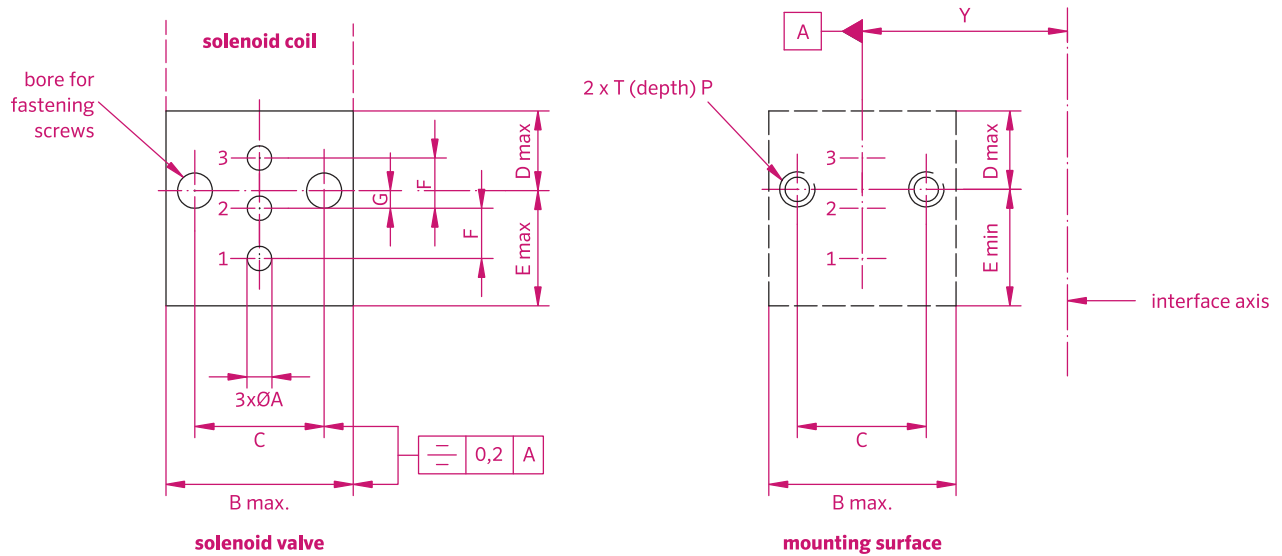
System 3-10 is designed in compliance with VDE 0580. The alignment of the valves on manifolds without lateral gaps is permitted without any restriction of the operating conditions. A general life-

time of the products cannot be specified, as it is decisively influenced by ambient and operating conditions. Optionally, the solenoid valves can be designed for a lifetime of up to 400 million cycles.

nass magnet will be glad to assist you and to develop individual concepts for specifically required applications.



PNEUMATIC CONNECTION OF SOLENOID VALVE SYSTEM 3-10 ACCORDING TO ISO 15218



Sizes [mm]

A min:	1,0
A max:	1,2
B min:	10,0
B max:	10,5
$C \pm 0,1$:	6,8
D min:	3,8
D max:	4,0
E min:	6,2
E max:	6,4
$F \pm 0,1$:	2,8
$G \pm 0,1$:	1,0
T:	M 1,6
P min:	3,0
Y min:	11,0

The type System 6-15 stands for a compact solenoid valve with a width of 15 mm (block assembly is possible). Each variation has an armature diameter of 6 mm, which has been determined as the optimum for this pneumatic class through simulation and practical testing.

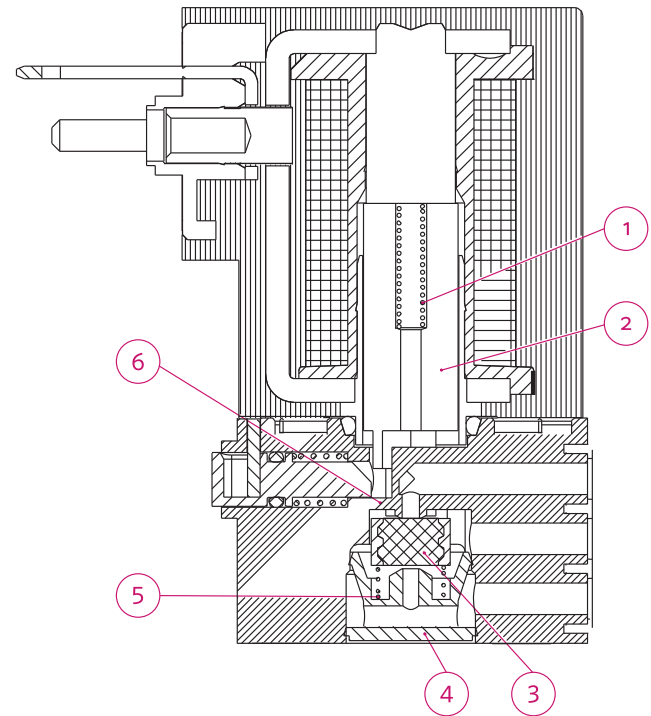
APPLICATION OF SYSTEM 6-15

Usually, the solenoids are used in automation as 3/2 way valves or 2/2 way valves with the switching functions *normally closed (NC)* or *normally open (NO)*. Typical maximum operating pressure and nominal orifice for the 3/2 way model are 10 bar/1.2 mm. This type has been designed for the use with filtered compressed air and inert gases. The use of other substances, especially in medical applications, requires prior agreement with *nass magnet*.

FUNCTION

The plunger¹ of System 6-15 is pressed downwards by the reset spring². The plunger itself does not feature any sealing elements. The plunger movement transfers to the actuator, which is gathering the sealing element³.

In the de-energized state, the reset spring is taking effect on the sealing element through the armature and the actuator. The sealing element is pushed on the lower valve seat⁴. The plunger will move once the solenoid coil is under current. The actuator is now being



unloaded and moves upwards, supported by the lower pressure spring⁵.

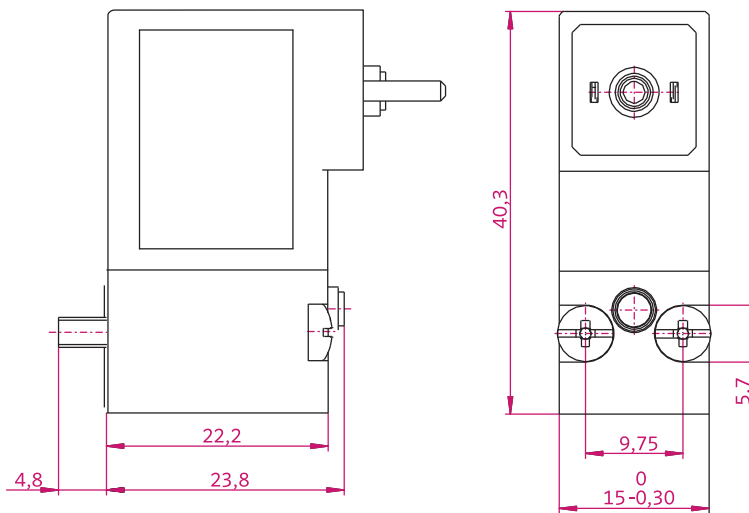
The sealing element exposes the lower valve seat and seals towards the upper valve seat⁶. In a 2/2 way model or for the NO switch function, the valve seats are charged with individual pressures. In this case, a modified spring design is provided by the manufacturer.

SOLENOID VALVE SYSTEM 6-15

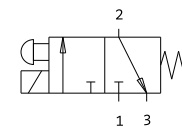
Switching function:	3/2 way (2/2 way on request)
De-energized state:	NC (normally closed), NO (normally open)
Electrical connection:	form C - EN 175301-803-C
Operating voltage:	24 V DC
Sealing material:	sealing element HNBR, gasket NBR

General Data

Voltage tolerance	± 10 %
Ambient temperature	- 10 °C to + 50 °C
Relative duty cycle	100 %
Activation/deactivation period according to ISO/CD12238	nominal 8 ms/6 ms
Insulation class of insulating materials according to DIN VDE 0580	F
Degree of protection according to EN 60529	IP 65
Class of protection	I/III, je nach Operating voltage
Quality of medium according to ISO 8573-1	compressed air class 3, 3, 3
Mounting position	any (preferably plunger in vertical direction)
Imprint	nass magnet (customer imprint possible)



Pneumatic Diagram
Pneumatic connection according to ISO 15218



Note: The picture shows the 3/2 way NC type with electric/pneumatic interface on opposite side (OPS) with a 2-pole connector form C.

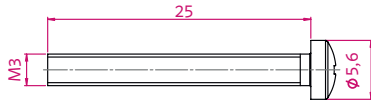
Technical Data 3/2 Way Standard Versions

Part No.	Nom. Orif. [mm]		NC	NO	Pressure [bar]	Flow Rate [l/min]		Voltage	Rated Power [W]	Man. Overr. monostable	Interface Pos.	Degree of Prot.
	inlet	exhaust				1-2	2-3					
131-070-0017	0,6	0,7	X		1 to 10	10	12	24 V DC	0,4	X	OPS ¹	I
131-070-0018	1,0	1,1	X		1 to 10	25	35	24 V DC	1,2	X	OPS	I
131-070-0019	1,2	1,3	X		1 to 10	35	45	24 V DC	1,8	X	OPS	I
131-070-0008	0,6	0,7	X		1 to 10	10	12	24 V DC	0,4	X	OPS	III
131-070-0009	1,0	1,1	X		1 to 10	25	35	24 V DC	1,2	X	OPS	III
131-070-0011	1,2	1,3	X		1 to 10	35	45	24 V DC	1,8	X	OPS	III

Available on request:

- 2/2 way and NO versions;
- two-core wire;
- electric/pneumatic interface on the same side (SAS);
- alternative operating voltages such as 24 V AC/115 V AC/230 V AC;
- alternative sealing materials;
- alternative manual operation modes such as bistable/latching;
- UL-/ATEX-certification

1 OPS: electric/pneumatic interface on opposite side

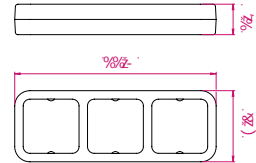


Fastening screw · M3 x 25 mm

Part No.: 900-822-0049

Tightening torque: 0,4 Nm

Explanation: Two fastening screws are required per solenoid valve.



Form seal

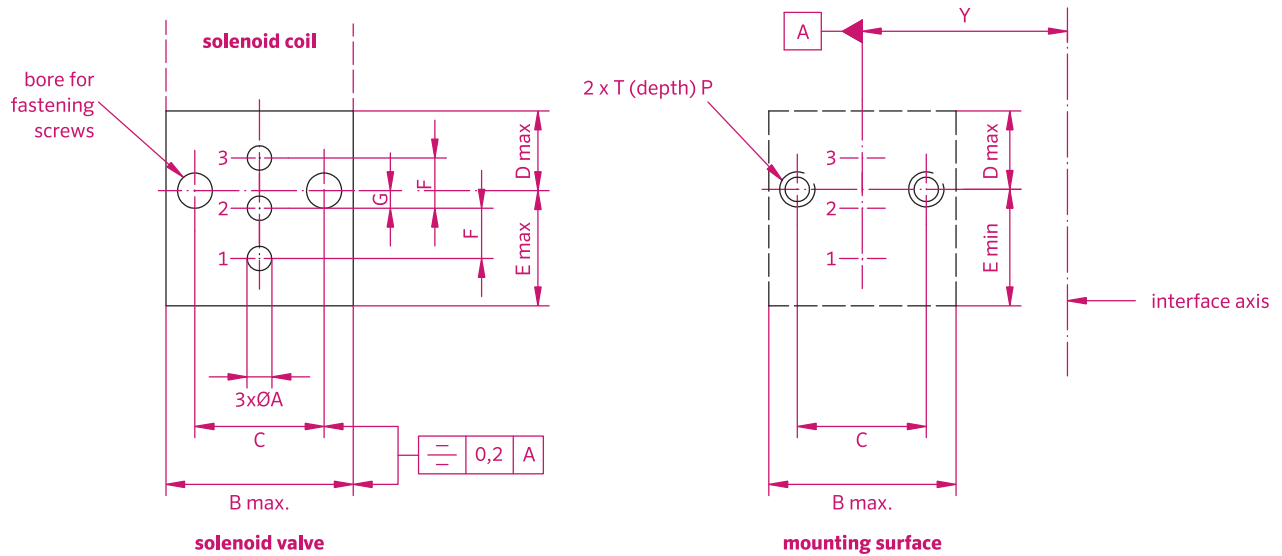
Part No.:

131-723-0008

Explanation:

Included in delivery of the solenoid valve; available as spare part.

PNEUMATIC CONNECTION OF SOLENOID VALVE SYSTEM 6-15 ACCORDING TO ISO 15218



Sizes [mm]

A min:	1,6
A max:	2,0
B min:	15,0
B max:	16,0
C ± 0,1:	9,7
D min:	6,0
D max:	6,3
E min:	9,0
E max:	9,3
F ± 0,1:	3,8
G ± 0,1:	1,4
T:	M 3,0
P min:	3,8
Y min:	17,0

The type Cartridge 13 (C 13) stands for a compact, cylindric valve cartridge with a diameter of 13 mm. This allows for block assembly on a 15 mm grid. Therefore, C 13 satisfies the power characteristics of the solenoid valve type 6-15.

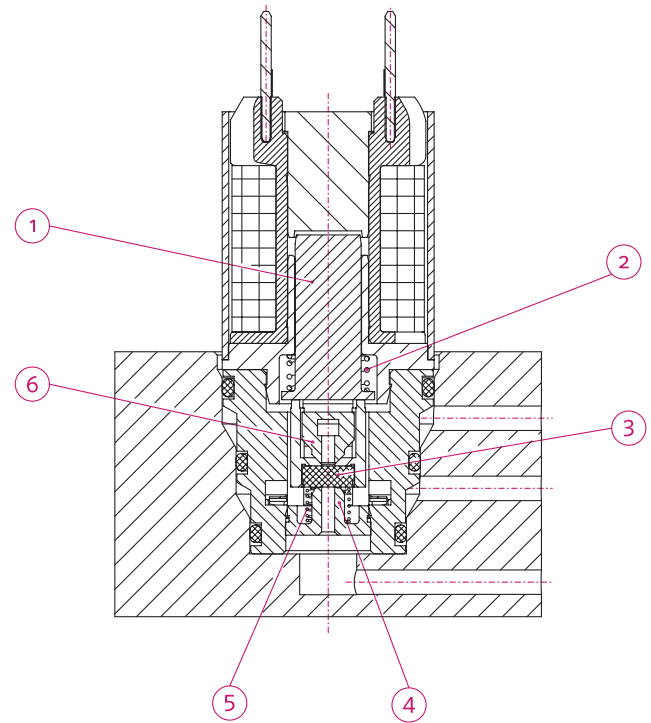
APPLICATION OF CARTRIDGE 13

Usually, valve cartridges are used in automation as 3/2 way valves or 2/2 way valves with the switching functions *normally closed (NC)* or *normally open (NO)*. Typical maximum operating pressure and nominal orifice for the 3/2 way model are 13 bar/1.1 mm. This type has been designed for the use with filtered compressed air and inert gases. The use of other substances, especially in medical applications, requires prior agreement with *nass magnet*.

FUNCTION

The plunger¹ of C 13 is being pushed into the extreme position by the reset spring². The plunger itself does not feature any sealing elements. The plunger movement transfers to the actuator, which is gathering the sealing element³.

In a de-energized state, the reset spring is taking effect on the sealing insert through the plunger and the actuator. The sealing element is pushed on the lower valve seat⁴. The plunger will move once the solenoid coil is under current. The actuator is now unloaded and



Note: The shown cavity is to illustrate the customer's pneumatic interface and is not included in the scope of delivery of C 13.

moves upwards, supported by the lower pressure spring⁵.

The seal element exposes the lower valve seat and seals towards the upper valve seat⁶. The 2/2 way model does not require a modified spring. It can be derived from the 3/2 way model by closing the aspiration channel in the customer-provided cavity.

SOLENOID VALVE CARTRIDGE 13

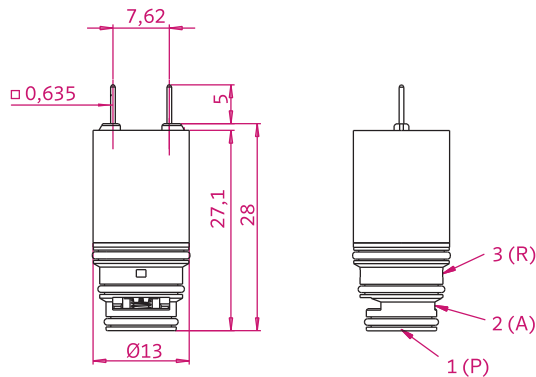
Switching function: 3/2 way, 2/2 way
 De-energized state: NC (normally closed), NO (normally open)
 Operating voltage: 6 V DC, 12 V DC, 24 V DC
 Sealing material: sealing element NBR

General Data

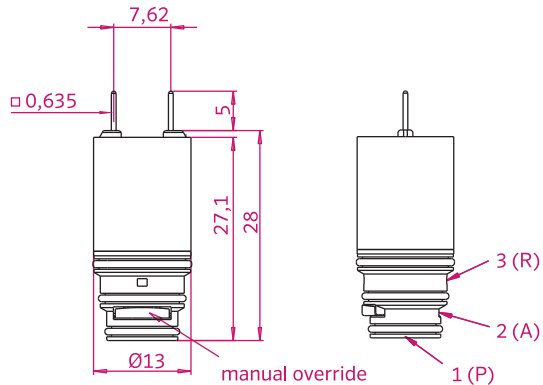
Voltage tolerance ± 10 %
 Ambient temperature - 10 °C to + 50 °C (+ 70 °C with accessoires possible)
 Relative duty cycle 100 %
 Activation/deactivation period
 according to ISO/CD12238 nominal 5 ms/6 ms
 Insulation class of insulating materials
 according to DIN VDE 0580 F
 Degree of protection according to EN 60529 IP 00
 High voltage test according to VDE 0580 500 V
 Class of protection III
 Quality of medium according to ISO 8573-1 compressed air class 3, 3, 3
 Mounting position any (preferably plunger in vertical direction)



Without manual override



Monostable manual override



Note: The picture shows the 3/2 way NC type without optional electronics. The NO version features an inverted order from 1 (P) to 3 (R).

Technical Data 3/2 Way Standard Versions

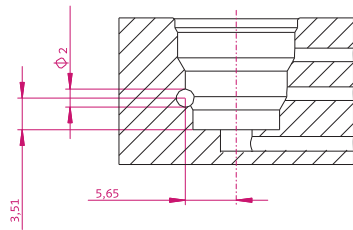
Part No.	Switching function	Nominal Orifice [mm]		Pressure [bar]	Flow Rate [l/min]		Voltage	Rated Power [W]	Manual Override monostable
		inlet	exhaust		1-2	2-3			
121-070-0037	NC	0,8	0,8	1 to 10	15	17	6 V DC	0,8	
121-070-0002	NC	0,8	0,8	1 to 10	15	17	12 V DC	0,8	
121-070-0004	NC	0,8	0,8	1 to 13	15	17	12 V DC	1,0	
121-070-0021	NC	1,1	1,2	1 to 8	24	27	12 V DC	1,2	
121-070-0001	NC	0,8	0,8	1 to 10	15	17	24 V DC	0,8	
121-070-0005	NO	0,8	0,8	1 to 8	15	17	24 V DC	0,8	
121-070-0006	NC	0,8	0,8	1 to 10	15	17	24 V DC	0,8	X

Available on request (amongst others):

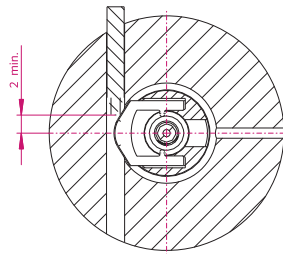
- electronic protective circuit;
- PWM power reduction;
- increased ambient temperature;
- increased voltage tolerances;
- individual voltages.

PNEUMATIC CONNECTION OF SOLENOID VALVE CARTRIDGE 13

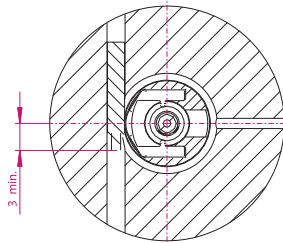
Interface for manual override



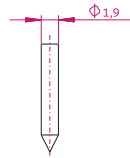
Inactive



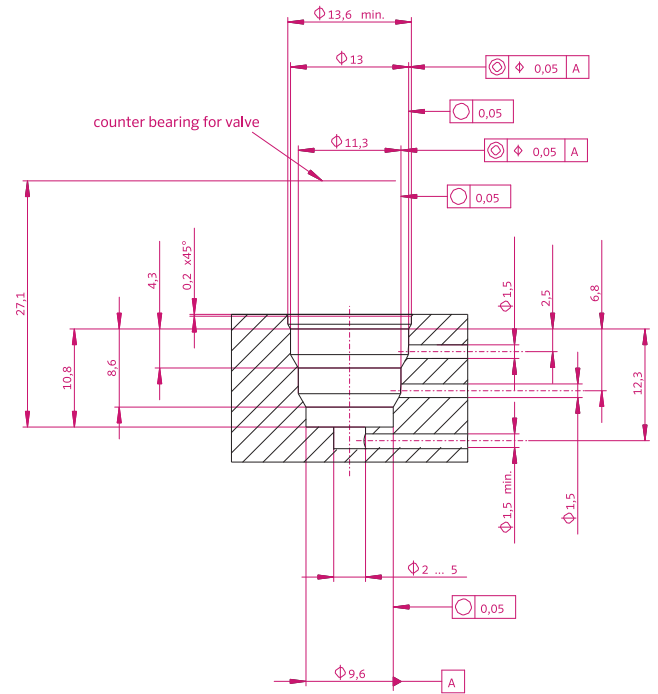
Active



Actuating pin



Pneumatic interface



The type Cartridge 9 (C 9) identifies a high-compact, cylindric valve cartridge with a diameter of 9,5 mm. This allows for block assembly on a 12 mm grid.

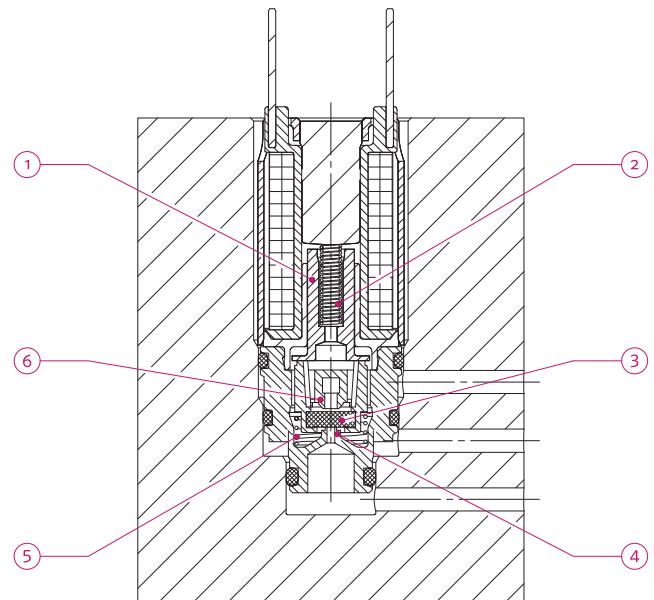
APPLICATION OF CARTRIDGE 9

Usually, valve cartridges are used in automation as 3/2 way valves or 2/2 way valves with the switching functions *normally closed (NC)* or *normally open (NO)*. Typical maximum operating pressure and nominal orifice for the 3/2 way model are 10 bar/0.5 mm. This type has been designed for the use with filtered compressed air and inert gases. The use of other substances, especially in medical applications, requires prior agreement with *nass magnet*.

FUNCTION

The plunger¹ of Cartridge 9 is pushed into the extreme position by the reset spring². The plunger itself does not feature any sealing elements. The plunger movement transfers to the actuator, which is gathering the sealing element³.

In a de-energized state, the reset spring is taking effect on the sealing element through the plunger and the actuator. The sealing element is pushed on the lower valve seat⁴. The plunger will move once the sole-



Note: The shown cavity is to illustrate the customer's pneumatic interface and is not included in the scope of delivery of of C 9.

noid coil is under current. The actuator is now being unloaded and moves upwards, supported by the lower pressure spring⁵.

The sealing element exposes the lower valve seat and seals towards the upper valve seat⁶.

SOLENOID VALVE CARTRIDGE 9

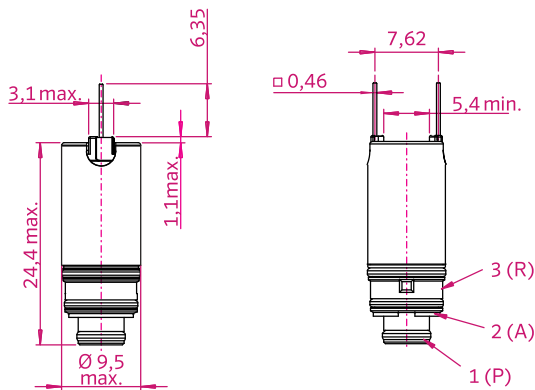
Switching function: 3/2 way, 2/2 way
 De-energized state: NC (normally closed), NO (normally open)
 Operating voltage: 24 V DC
 Sealing material: sealing element NBR

General Data

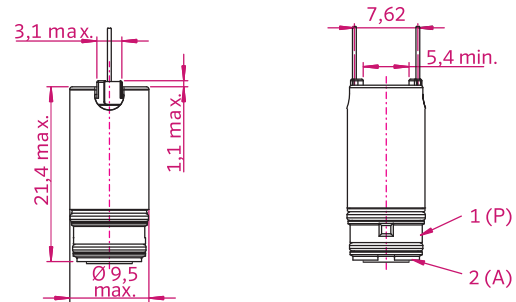
Voltage tolerance ± 10 %
 Ambient temperature - 10 °C to + 40 °C (+ 50 °C with accessoires possible)
 Relative duty cycle 100 %
 Activation/deactivation period
 according to ISO/CD12238 nominal 6 ms/6 ms
 Insulation class of insulating materials
 according to DIN VDE 0580 Y
 Degree of protection according to EN 60529 IP 00
 High voltage test according to VDE 0580 500 V
 Quality of medium according to ISO 8573-1 compressed air class 2, 3, 3
 Mounting position any (preferably plunger in vertical direction)



3/2 way NC (normally closed)



2/2 way NO (normally open)



Technical Data Standard Versions

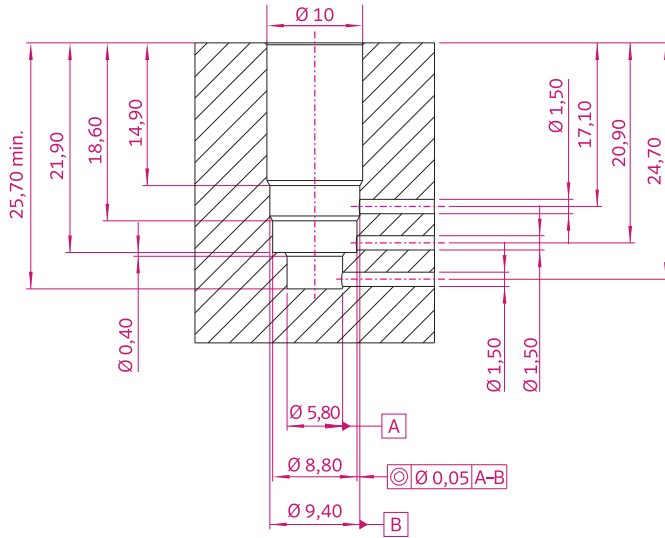
Part No.	Switching function	Nominal Orifice [mm]		Pressure [bar]	Flow Rate [l/min]		Rated Power [W]
		inlet	exhaust		1-2	2-3	
120-070-0001	3/2 way NC	0,5	0,8	5,0 to 10	10	17	1,0
120-070-0002	2/2 way NO	0,5	0,8	2,8 to 4,6	17		1,0

Available on request (amongst others):

- electronic protective circuit;
- PWM power reduction;
- increased ambient temperature;
- increased voltage change;
- modified pressure tolerances;
- individual voltages.

PNEUMATIC CONNECTION OF SOLENOID VALVE CARTRIDGE 9

3/2 way NC (normally closed)



2/2 way NO (normally open)

