NORGREN®

Incorporating FAS®

FAS 8 mm CHIPSOL
Direct acting solenoid valve

- **2/2, 3/2 NC/NO; Cartridge mounting**
- **Very compact design (ø 8 x 19 mm)**
- **Low power consumption (0,5 W)**
- **Long life up to 100 million cycles**
- **High flow to size ratio**

Technical features

Medium:
Air, oxygen, neutral gases (10% ... 95% humidity, non condensing), 40 µm filtered
Operation:
Direct acting 2-way and 3-way valves
Normally closed and normally opened
Operating pressure:
0 ... 8 bar (0 ... 116 psi)

Mounting:
Cartridge
Size:
8 mm
Orifice:
0,5 ... 1 mm
Response time:
5 ... 10 ms
Response time measured according to ISO 12238
Life expectancy:
≥100 Mio. cycles

Mounting instruction:
The valve must be assembled in its housing with a lubricant that is compatible with the seals.
Max axial force supported by the valve: 75 (N).
Ambient/media temperature:
–10 ... +50°C (+14 ... +122°F)
Air supply must be dry enough to avoid ice formation at temperatures below +2°C (+35°F).

Materials:
Body: PPS
Seat seals: HNBR
Internal parts: stainless steel

Electrical details

Voltage	24 V d.c.
Rating	100% E.D.
Voltage tolerance	± 10%
Power consumption	0,5 W
Electrical insulation	500 V a.c.
Insulation class	F (155°C)

Following options on request

kv
Operating pressure
Medium temperature
Ambient temperature
Power consumption
Body
Seal
Electric connection
Voltage (3, 5, 6 or 12 V d.c.)
Degreased for oxygen use

Pulse width modulation (PWM) control

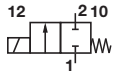
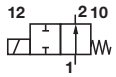
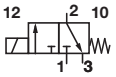
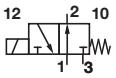
A PWM can be used to control the valve and should be set as follows:

	Definition	Value to be applied
Hit voltage	Voltage used for the valve to commute	Valve nominal voltage
Holding voltage	Voltage applied to the valve after commutation	Set duty cycle to guarantee specified holding voltage. 50% of nominal voltage can be used if no value specified.
Hit time	Maximum time required to ensure full valve commutation	25 ms *1)
PWM frequency		20 kHz

*1) Note: There is no temperature restriction in the case of CHIPSOL

IMI

Technical data – standard models – 24 V d.c.

Symbol	Operation	Function	Orifice	kv factor *2)	Operating pressure (bar)		Seal Material	Drawing No.	Model
	2/2	NC	0,5	0,11	0 ... 8	0 ... 116	HNBR	1	14-211CA00-HH++AYJ
			0,8	0,2	0 ... 5	0 ... 72	HNBR	1	14-211CA01-HH++AYJ
			1	0,3	0 ... 1,5	0 ... 21	HNBR	1	14-211CA010HH++AYJ
	2/2	NO	0,6	0,11	0 ... 8	0 ... 116	HNBR	2	14-221CA060HH++AYJ
			0,7	0,2	0 ... 5	0 ... 72	HNBR	2	14-221CA070HH++AYJ
	3/2	NC	0,5	0,11	0 ... 8	0 ... 116	HNBR	3	14-311CA00-HH++AYJ
			0,8	0,22	0 ... 3	0 ... 43	HNBR	3	14-311CA01-HH++AYJ
			1	0,3	0 ... 0,5	0 ... 7	HNBR	3	14-311CA010HH++AYJ
	3/2	NO	0,6	0,12	0 ... 4	0 ... 58	HNBR	4	14-321CA060HH++AYJ

*2) Cv = 0,07 kv

Accessories

Test manifold with M3 ports, 1 position

Page 4

S141.0387 *3)

Test manifold with M3 ports, multiple channels up to 10 positions

Page 4

Available on request

Barbs mounting interface for Ø 2,5 mm ID tubing (up to 1 bar)

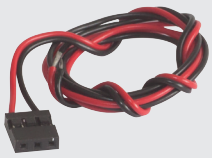
Page 4

S140.0226

*3) Two valve mounting screws are in scope of delivery

Electrical connection

300 mm flying leads mounted with 4 mm (or 2 x 2 mm) pitch SIL socket housing (Harwin M22-3010300)

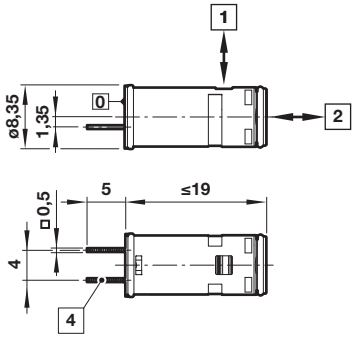


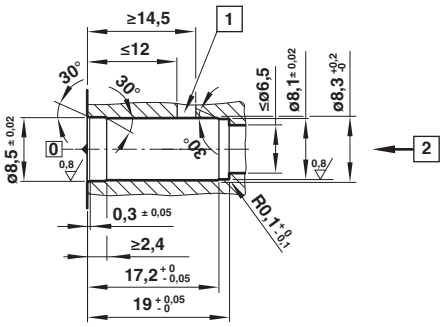
S141.0466

Dimensions

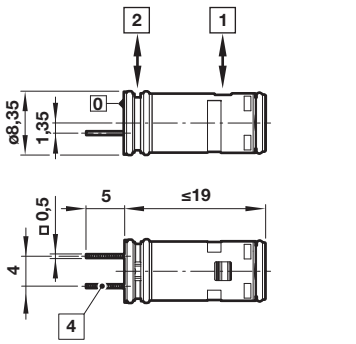
Dimensions in mm
Projection/First angle

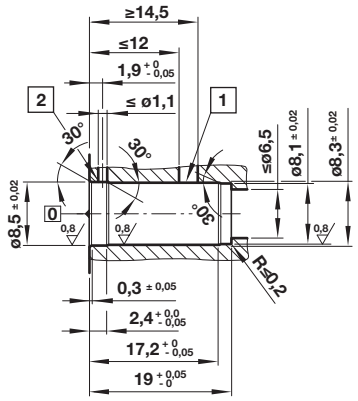
1 CHIPSOL 2/2 NC



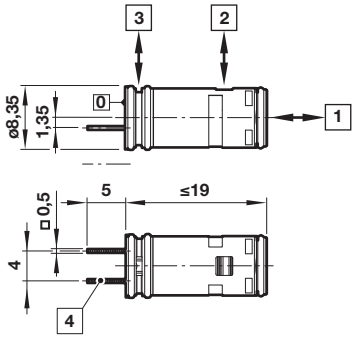


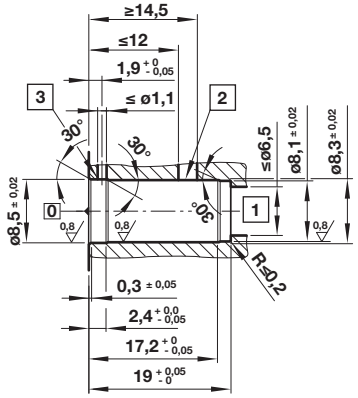
2 CHIPSOL 2/2 NO



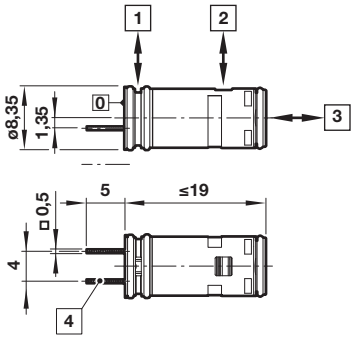


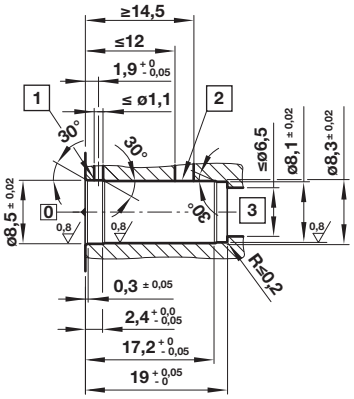
3 CHIPSOL 3/2 - NC





4 CHIPSOL 3/2 - NO



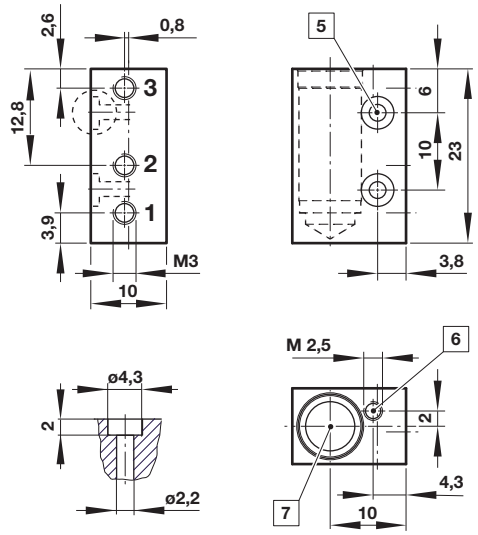


0 Faces to be aligned by retaining means
1 Inlet port
2 Outlet port
3 Exhaust port
4 Do not weld

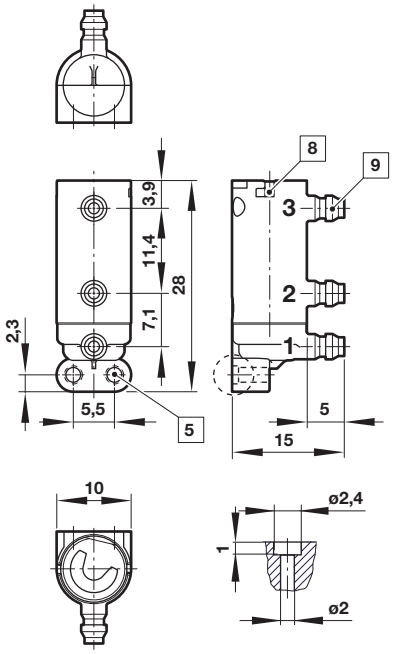
Dimensions

Dimensions in mm
Projection/First angle

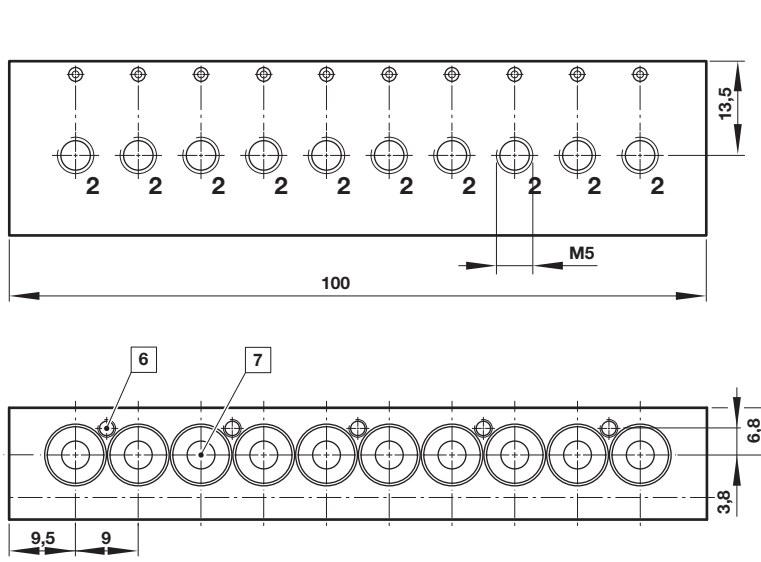
Test manifold, 1 position (Aluminium)



Barbs mounting interface (Plastic, maximum operating pressure 1 bar)



Test manifold, up to 10 positions (Brass)



5 Mounting holes
6 Put in a screw to fix valve position
7 Chipsol mounting hole
8 Clip cover closed CHIPSOL mounting hole
9 Tubing ID 2,5 mm

Warning

These products are intended for use in air, oxygen and neutral gas systems only. Do not use these products where pressures and temperatures can exceed those listed under **»Technical features«**.

Before using these products with fluids other than those specified, for non-industrial applications, life-support systems, or other applications not within published specifications, consult IMI Precision Engineering, Fluid Automation Systems s.a.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes.

The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure.

System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided.

NORGREN®

Incorporating FAS®

FAS 10 mm PICOSOL
Direct acting solenoid valve

- **2/2, 3/2; Manifold mounting**
- **Compact Design**
- **Long life – 100 million cycles**
- **Low power consumption**

Technical features

Medium:
Air, oxygen, neutral gases (10% ... 95% humidity, non condensing), 40 µm filtered
Operation:
Direct acting 2-way and 3-way valves, normally closed and normally opened
Operating pressure:
0 ... 10 bar (0 ... 145 psi)
Details on page 2

Flow:
5 ... 32 l/min at 2 bar (29 psi) at +20°C (+68°F)
Mounting:
Manifold
Orifice:
0,6 ... 2 mm
Response time:
10 ... 15 ms
Response time measured according to ISO 12238

Life expectancy:
≥100 Mio. cycles for 1 W valves
Weight:
10,5 g (0,023 lbs)
Ambient/media temperature:
–10 ... +50°C (+14 ... +122°F)
Air supply must be dry enough to avoid ice formation at temperatures below +2°C (+35°F).

Materials:
Body: PPS
Seat seals: FPM, NBR, EPDM
Internal parts:
Stainless steel, PAA

Electrical details

Voltage	24 V d.c.
Rating	100% E.D.
Voltage tolerance	± 10%
Power consumption	1[W] (3/0,3 W)*
Electrical insulation	1000 V a.c.
Protection class	IP51
Insulation class	F (155°C)

* with optional PWM control

Following options on request

Operating pressure (vacuum)
Medium temperature
Ambient temperature
Response time
Power consumption
Materials
Coils
Protection class
Degreased for oxygen use
Manual override

Embedded electronics options

Integrated pulse width modulation (PWM)
Enhanced opening time repeatability
Larger input voltage tolerances
Improved boosting by plunger movement detection
Improved boosting by plunger movement detection with power adaptation
Faster valve closing
Current control for improved performances over temperature range
Reverse polarity protection
Led signalization

Pulse width modulation (PWM) control

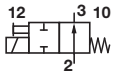
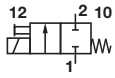
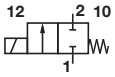
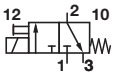
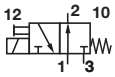
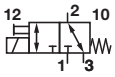
A PWM can be used to control the valve and should be set as follows:

	Definition	Value to be applied
Hit voltage	Voltage used for the valve to commute	Valve nominal voltage
Holding voltage	Voltage applied to the valve after commutation	Set duty cycle to guarantee specified holding voltage. 50% of nominal voltage can be used if no value specified.
Hit time	Maximum time required to ensure full valve commutation	40 ms at T > 20°C *1)
PWM frequency		20 ... 30 kHz

*1) Please contact us for application outside of those conditions.

IMI

Technical data – standard models

Symbol	Operation	Orifice	Operating pressure		kv*2)	Power consumption *3)	Voltage	Manual override *4)	Seal material	Drawing	Model
		(mm)	(bar)	(psi)	(l/min)	(W)	(V d.c.)			No.	
	2/2 NO (3/2 mounting pattern)	0,6	0 ... 10	0 ... 145	0,12	1	24	With	FPM	2	11-221PI060H1+1111+AYV
		1,1	0 ... 4	0 ... 58	0,3	1	24	With	FPM	2	11-221PI011H1+1111+AYR
	2/2 NC (3/2 mounting pattern)	0,6	0 ... 8	0 ... 116	0,12	1	24	With	FPM	2	11-211PI060H1+1111+AYV
		0,8	2 ... 8	29 ... 116	0,19	1	24	With	FPM	2	11-211PI01-H1+1111+AYV
		1,1	0,5 ... 2,1	7,2 ... 30	0,3	1	24	With	FPM	2	11-211PI011H1+1111+AYV
	2/2 NC	0,8	0 ... 8	0 ... 116	0,2	1	24	Without	FPM	1	11-211P601-H1+1311+AYV
		1,2	0 ... 4	0 ... 58	0,39	1	24	Without	FPM	1	11-211P602-H1+1311+AYR
		1,6	0 ... 8	0 ... 116	0,54	4/0,4	24	Without	FPM	1	11-211P603-H1+6311+AXA
	3/2 NC	0,6	0 ... 8	0 ... 116	0,12	1	24	With	FPM	2	11-311PI060H1+1111+AYV
		0,8	2 ... 8	29 ... 116	0,19	1	24	With	FPM	2	11-311PI01-H1+1111+AYV
		1,1	2 ... 8	29 ... 116	0,37	3/0,3	24	With	FPM	2	11-311PI011H1+6111+AZR
		1,3	2 ... 6,5	29 ... 94	0,44	3/0,3	24	With	FPM	2	11-311PI013H1+6111+AZR
	3/2 NO	0,8	0 ... 6	0 ... 87	0,19	1	24	With	FPM	2	11-321PI01-H1+1111+AYV
	3/2 UNI	0,8	0 ... 2	0 ... 29	0,18	1	24	With	FPM	2	11-331PI01-H1+1111+AYV

*2) Cv = 0,07 kv
*3) Power consumption: "boosting power during ca. 50 ms"/ "holding power"
*4) Push only

Accessories

Mounting plate with barbed fittings for 3 mm ØID tubing (up to 2 bar)

Page 4

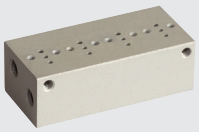
S111.1772

Mounting manifold with M3 threads — 1 position

Page 4

S110.1277

Mounting manifold with M5 threads — 1 ... 8 positions



Page 5

Available on request

Electrical connection

Electrical connector Molex 50-57-9402 with 300 mm flying leads

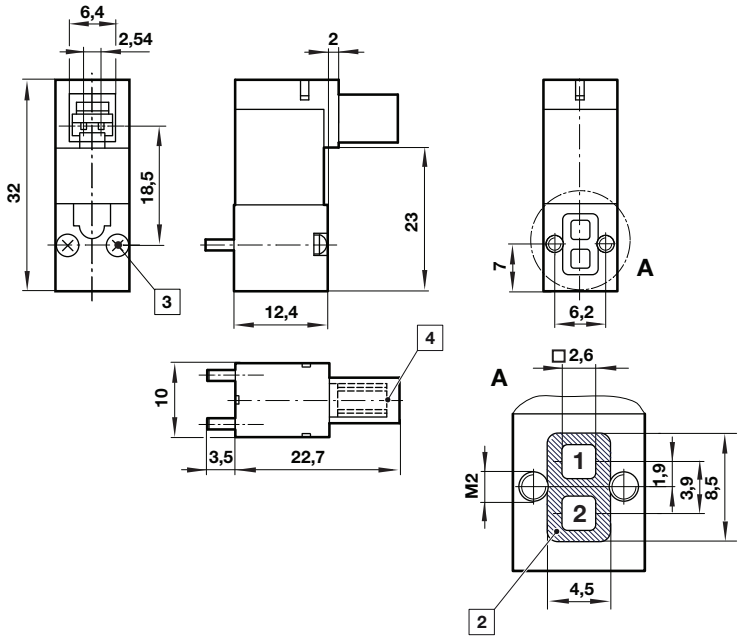
Page 5

S110.1032

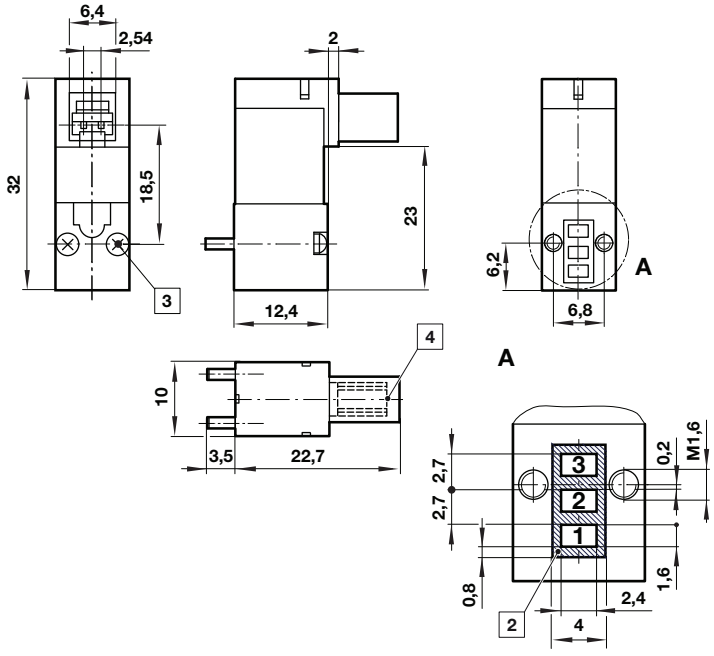
Dimensions

Dimensions in mm
Projection/First angle

1



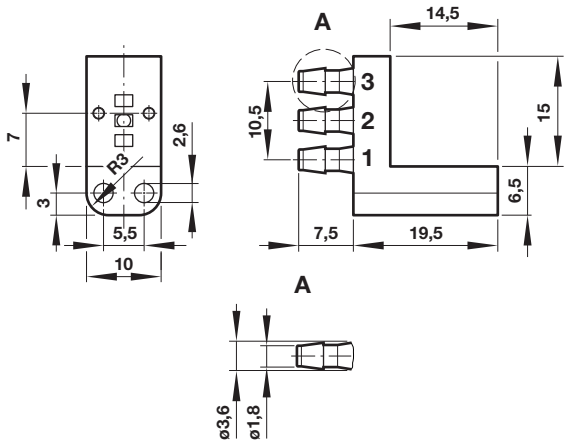
2



1 Manual override, push only
2 Sealing area
3 The recommended mounting screw tightening torque is 0,15 Nm.
4 Connector mates with Molex 50-57-9402

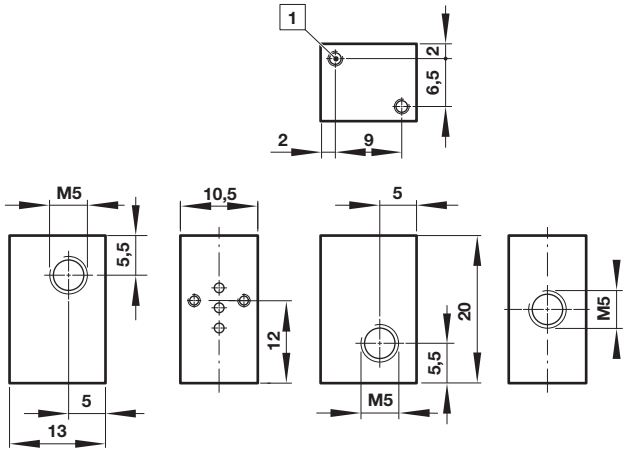
All solenoids are supplied with mounting screws and gasket.

Mounting plate with barbed fittings for 3 mm ØID tubing (up to 2 bar)
Model: S111.1772



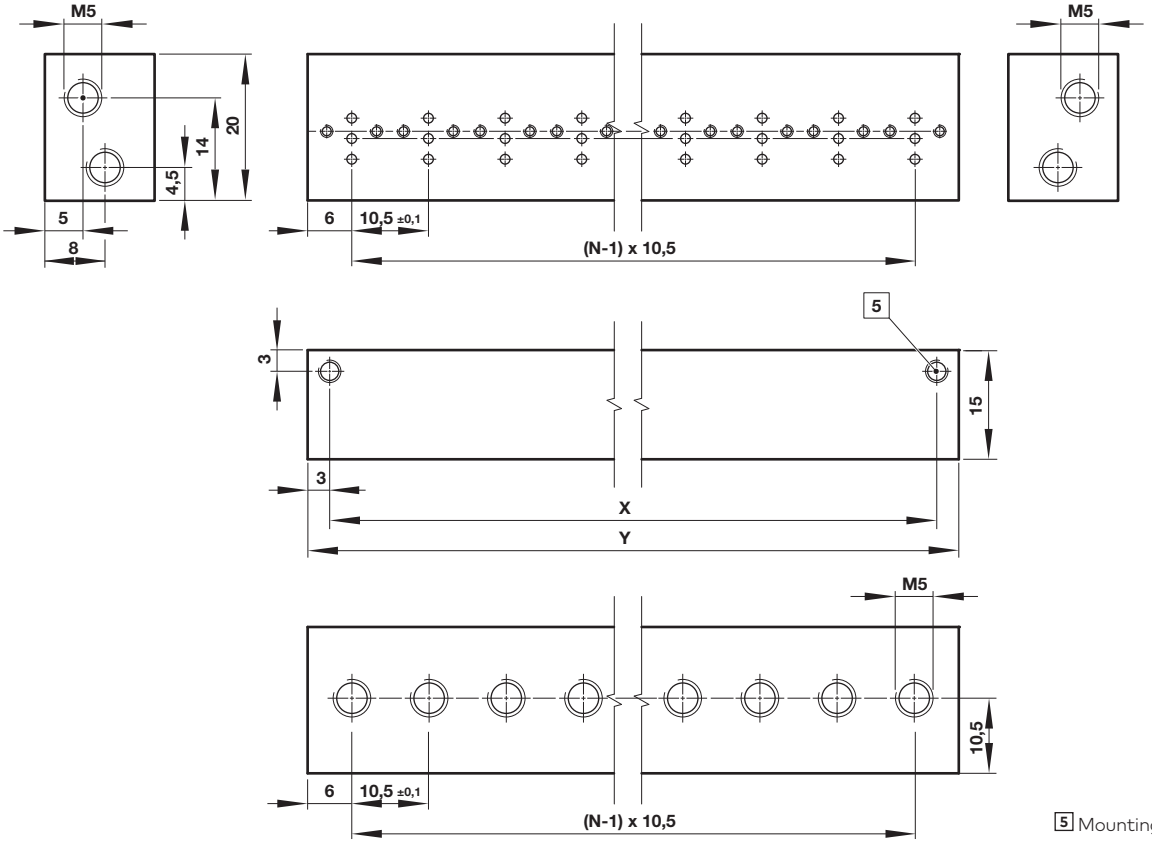
Mounting manifold
Model: S110.1277

Dimensions in mm
Projection/First angle



[1] Mounting thread M2 x 5 deep

Mounting manifold
Model: on request



[5] Mounting thread M3 x 4,5 deep

Valve station	X	Y
2	16,5	22,5
3	27	33
4	37,5	43,5
5	48	54
6	58,5	64,5
7	69	75
8	79,5	85,5

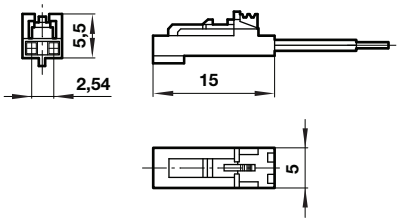
NORGREN

Incorporating FAS

Electrical connector

Model: S110.1032

Dimensions in mm
Projection/First angle



Warning

These products are intended for use in air, oxygen and neutral gas systems only. Do not use these products where pressures and temperatures can exceed those listed under **»Technical features«**.

Before using these products with fluids other than those specified, for non-industrial applications, life-support systems, or other applications not within published specifications, consult IMI Precision Engineering, Fluid Automation Systems s.a.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes.

The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure.

System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided.

NORGREN®

Incorporating FAS®

FAS 15 mm MICROSOL
Direct acting solenoid valve

- **2/2, 3/2; Manifold mounting**
- **Compact design**
- **High flow rate**
- **In excess of 100 – Mio. cycle rate**
- **Up to 3,6 mm orifice**

Technical features

Medium:
Air, oxygen, neutral gases (10% to 95% humidity, non condensing), 40 µm filtered
Operation:
Direct acting 2-way and 3-way valves, normally closed and normally opened
Operating pressure:
see table below page 2
Flow:
6 ... 120 l/min at 2 bar (29 psi) at +20°C (+68°F)

kv factor:
0,15 ... 3 (Cv: 0,01 ... 0,2)
Mounting:
Manifold
Orifice:
2/2 way valves
0,5 ... 3,6 mm (0,02 ... 0,14")
3/2 way valves
0,5 ... 1,5 mm (0,02 ... 0,06")
Response time:
10 ... 15 ms
Response time measured according to ISO 12238

Life expectancy:
≥100 million cycles (except Hit & Hold valves)
Weight:
30 g (0,07 lbs)
Ambient/media temperature:
–10 ... +50°C (+14 ... +122°F)
Air supply must be dry enough to avoid ice formation at temperatures below +2°C (+35°F).

Materials:
Body: PPS, PA
Seat seals: NBR, FPM
Internal parts: Stainless steel, PAA

Electrical details

Voltage	24 V d.c.
Voltage range	–10% ... +15% @ 100% duty cycle
Electrical insulation	1500 V a.c.
Insulation class	F (155°C)
Protection class according to EN 60529	IP51 with connector

Following options on request

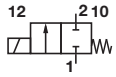
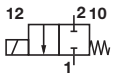
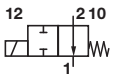
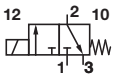
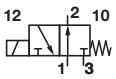
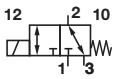
Pneumatic configuration (latching)
Operating pressure (also vacuum)
Materials
Voltage
Pneumatic port allocation
Power consumption
Electrical connections (300 mm flying leads, connector types)
Coil orientation
Protection class

Embedded electronics options

Integrated pulse width modulation (PWM)
Reverse polarity protection
Led signalization

IMI

Technical data – standard models

Symbol	Operation	Orifice	Operating pressure (bar)	Operating pressure (psi)	kv *1)	Voltage *3) (V d.c.)	Power consumption (W)	Seal Material	Drawing No.	Model
	2/2 NC (Flow direction from 1 » 2)	0,5	0 ... 15	0 ... 218	0,15	24	1	NBR	1	01-211P200-H0+13111+AYV
		0,8	0 ... 10	0 ... 145	0,4	24	1	NBR	1	01-211P201-H0+13111+AYV
		1,2	0 ... 10	0 ... 145	0,75	24	2	NBR	1	01-211P202-H0+63111+AYZ
		1,6	0 ... 6	0 ... 87	1,15	24	2	NBR	1	01-211P203-H0+63111+AYZ
		2	0 ... 4	0 ... 58	1,3	24	2	NBR	1	01-211P204-H0+63111+AYZ
	2/2 NC (Flow direction from 2 » 1)	3,6	0 ... 6	0 ... 87	3	24	12/0,5 *2)	NBR	2	01-211P-036H0+63111+AZN
	2/2 NO ECI *4)	0,5	0 ... 16	0 ... 232	0,15	24	2	NBR	1	01-221P200-H0+631A1+AYZ
		1,2	0 ... 10	0 ... 145	0,75	24	2	NBR	1	01-221P202-H0+631A1+AYZ
		2	0 ... 6	0 ... 145	1,4	24	2	NBR	1	01-221P204-H0+631A1+AYZ
	3/2 NC	0,8	0 ... 8	0 ... 116	0,28	24	1	NBR	3	01-311P101-H0+13111+AYV
		1,1	0 ... 10	0 ... 145	0,42	24	2	NBR	3	01-311P1011H0+63111+AYZ
		1,5	0 ... 6	0 ... 87	0,55	24	2	NBR	3	01-311P1015H0+63111+AYZ
	3/2 NO ECI *4)	0,8	0 ... 10	0 ... 145	0,28	24	2	NBR	3	01-321P101-H0+631A1+AYZ
		1,1	0 ... 6	0 ... 87	0,42	24	2	NBR	3	01-321P1011H0+631A1+AYZ
		1,5	0 ... 3	0 ... 102	0,55	24	2	NBR	3	01-321P1015H0+631A1+AYZ
	3/2 UNI	0,7	0 ... 6	0 ... 87	0,24	24	2	NBR	3	01-331P1070H0+63111+AYZ
		1	0 ... 3,5	0 ... 50	0,36	24	2	NBR	3	01-331P1010H0+63111+AYZ
		1,5	0 ... 2	0 ... 29	0,55	24	2	NBR	3	01-331P1015H0+63111+AYZ

*1) Cv - Value in [gal/min] = kv x 0,07; kv for 3/2 Uni valves represents flow value between ports 2 & 3;
kv for 3/2 NC & 3/2 ECI valves represents flow value between ports 1 & 2
*2) Valve equipped with ‚Hit & Hold' power saving electronic
*3) Valve models available with different nominal voltages
*4) ECI - Push type version

Accessories

Mounting plate with M5 thread — 1 position for 2 ways valve up to 2 mm orifice and 3 ways valve

Page 4

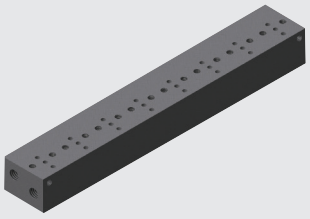
S050.1010

Mounting plate with G1/8 thread — 1 position for 2 ways 3,6 mm orifice

Page 4

S010.2248

M5 ported mounting plate — 2 ... 8 positions



Available on request

Electrical connection

Electrical connector MPM 9,4 mm industry standard (C192) to mate AMP spade 2,8 x 0,5 mm

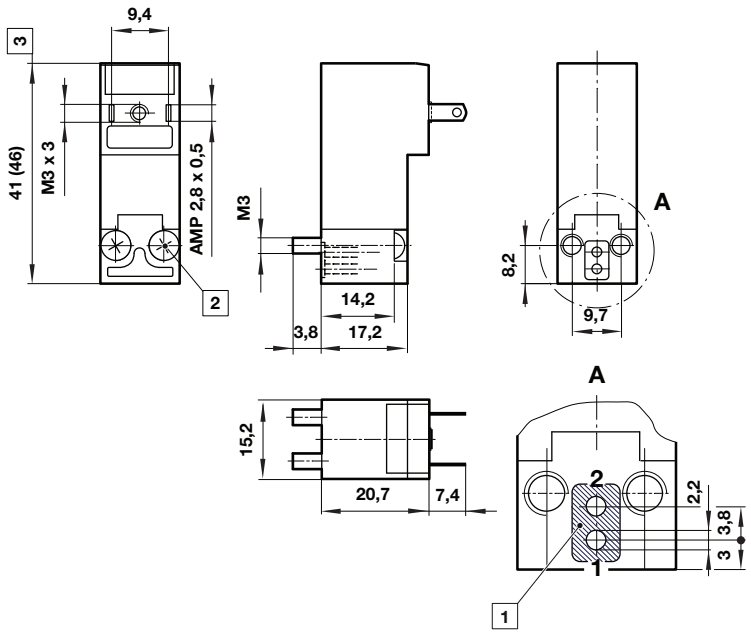
Page 4

N050.1456

Dimensions

Dimensions in mm
Projection/First angle

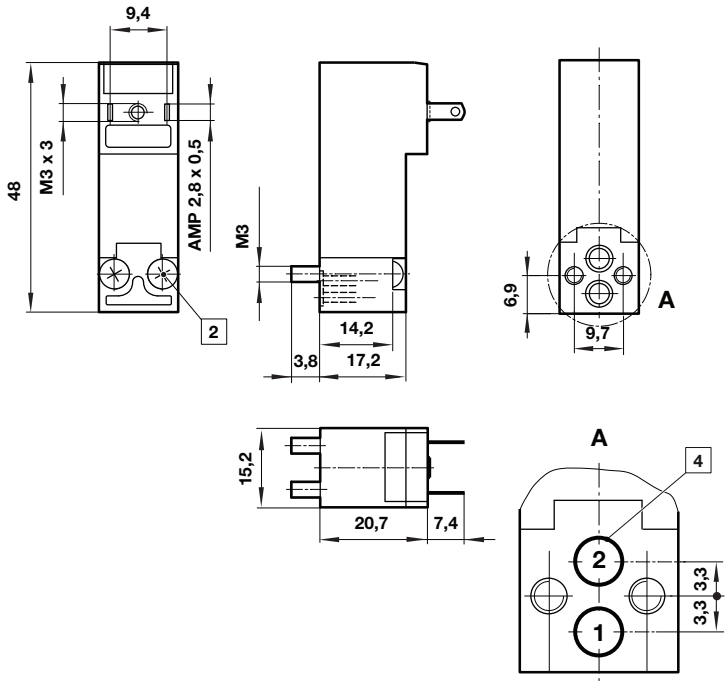
1 2 ways standard



1 Sealing area
2 The recommended mounting screw tightening torque is 0,6 ± 0,1 Nm.
3 Value in ( ) for ECI version

All solenoids are supplied with mounting screws and gasket.

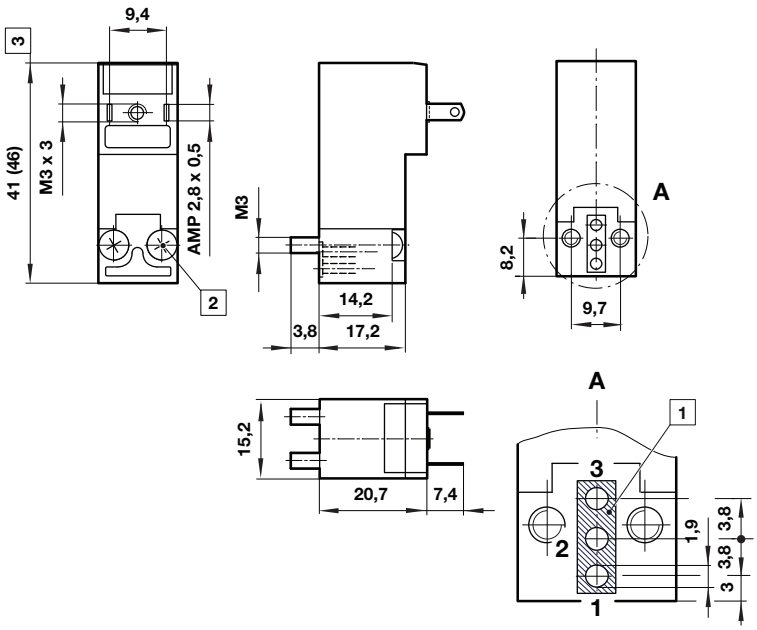
2 2 ways 3,6 mm orifice



Dimensions

Dimensions in mm
Projection/First angle

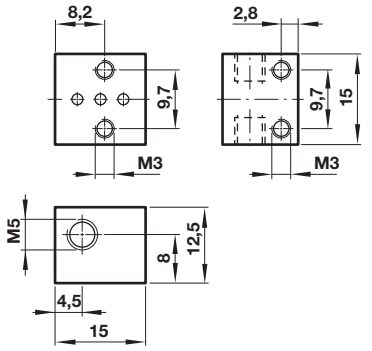
(3) 3 ways standard



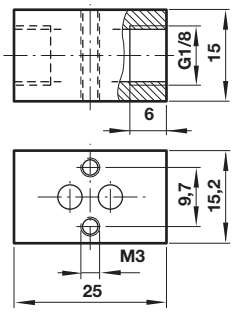
1 Sealing area
2 The recommended mounting screw tightening torque is 0,6 ± 0,1 Nm.
3 Value in ( ) for ECI version
4 'O' Rings Ø 4 x 1

All solenoids are supplied with mounting screws and gasket or 'O' Rings.

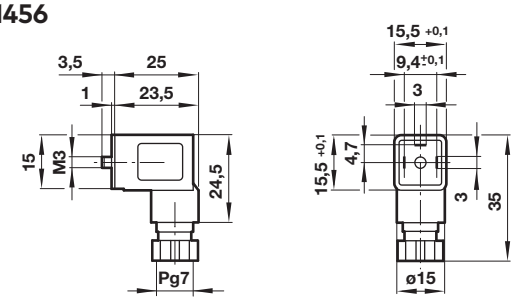
Mounting plate
Model: S050.1010
(Aluminium)



Mounting plate
Model: S010.2248
(Aluminium)



Electrical connector
Model: N050.1456



Warning

These products are intended for use in air, oxygen and neutral gas systems only. Do not use these products where pressures and temperatures can exceed those listed under **»Technical features«**.

Before using these products with fluids other than those specified, for non-industrial applications, life-support systems, or other applications not within published specifications, consult IMI Precision Engineering, Fluid Automation Systems s.a.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes.

The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure.

System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided.

NORGREN®

Incorporating FAS®

FAS 22 mm MINISOL
Direct acting solenoid valve

- **2/2, 3/2**
- **Compact design**
- **Long life - in excess of 25 Mio. cycles**
- **High cycle rate of up to 2000 cycles per minute**
- **Up to 2,4 mm orifice (kv 2,00)**

Technical features

Medium:
Air, neutral gases and liquids
Operation:
Direct acting 2-way and 3-way valves, normally closed and normally opened, bi-directional
Operating pressure:
0 ... 40 bar (0 ... 580 psi) maximum
Flow (kv factor):
0,5 ... 2,0 (Cv: 0,03 ... 0,14)

Mounting:
Inline
Orifice:
1,0 .... 2,4 mm (0,04 ... 0,09")
Port size:
G1/8
Response time:
8 ... 15 ms
Response time measured according to ISO 12238

Life time:
25 million cycles
Temperature:
Ambient:
–15 ... +50°C (+5 ... +122°F)
Media:
–15 ... +130°C (+5 ... +266°F)
Air supply must be dry enough to avoid ice formation at temperatures below +2°C (+35°F).

Materials:
Body: Stainless steel, brass
Seal: NBR, FPM, EDPM

Electrical details

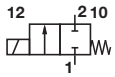
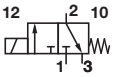
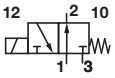
Voltage tolerances	–10% ... +15%
Duty cycle	100% E.D.
Insulation class	F (155°C)
Protection class according to EN 60529	IP65 with connector
Electrical connection	Interface according to DIN EN 175301-803, Form B
Coil orientation	Rotable 360°
Coil mounting	M8 x 0,75 mm nut

Following options on request

Alternative configuration for manifold mounting
Pneumatic connection
Voltage
Power consumption
Operating pressure (also vacuum)
Materials
Electrical connections (type of connector & coil orientation)
Coil

IMI

Technical data – standard models, G1/8

Symbol	Function	Orifice	Operating pressure		kv *1)	Voltage	Power consumption	Material		Model
		(mm)	(bar)	(psi)	(l/min)	(V d.c.)	(W)	Body	Seal	
	2/2 NC	1,0	0 ... 40		0,50	24	3,8	Brass	NBR	09-211-101020+AQF
	2/2 NC	1,2	0 ... 25		0,65	24	3,8	Brass	NBR	09-211-102-20+AQF
	2/2 NC	1,6	0 ... 11		1,20	24	3,8	Brass	NBR	09-211-103-20+AQF
	2/2 NC	2,0	0 ... 8		1,60	24	3,8	Brass	NBR	09-211-104-20+AQF
	2/2 NC	2,4	0 ... 6		2,00	24	3,8	Brass	NBR	09-211-105-20+AQF
	2/2 NC	2,4	760 ... 10^{-3} TORR		2,00	24	3,8	Brass	NBR	09-211-105-20 ELC VME+AQF
	3/2 NC	1,0	0 ... 10		0,5	24	3,8	Brass	NBR	09-311-101020+AQF
	3/2 NC	1,2	0 ... 7		0,65	24	3,8	Brass	NBR	09-311-102-20+AQF
	3/2 NC	1,6	0 ... 5		1	24	3,8	Brass	NBR	09-311-103-20+AQF
	3/2 NO	1,6	0 ... 5		0,7	24	3,8	Brass	NBR	09-321-103-20+AQF

*1) Cv - Value in [gal/min] = kv x 0,07

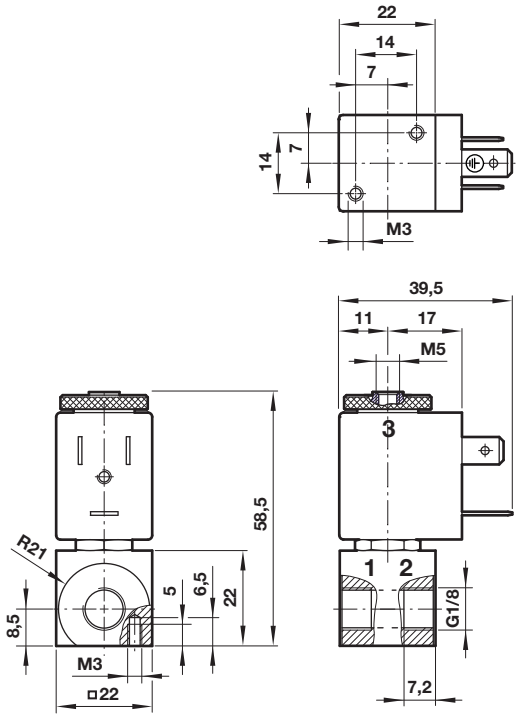
Accessories

22 mm Industrial standard
2-pole + PE

N060.1075

Dimensions

Dimensions in mm
Projection/First angle



Port identification

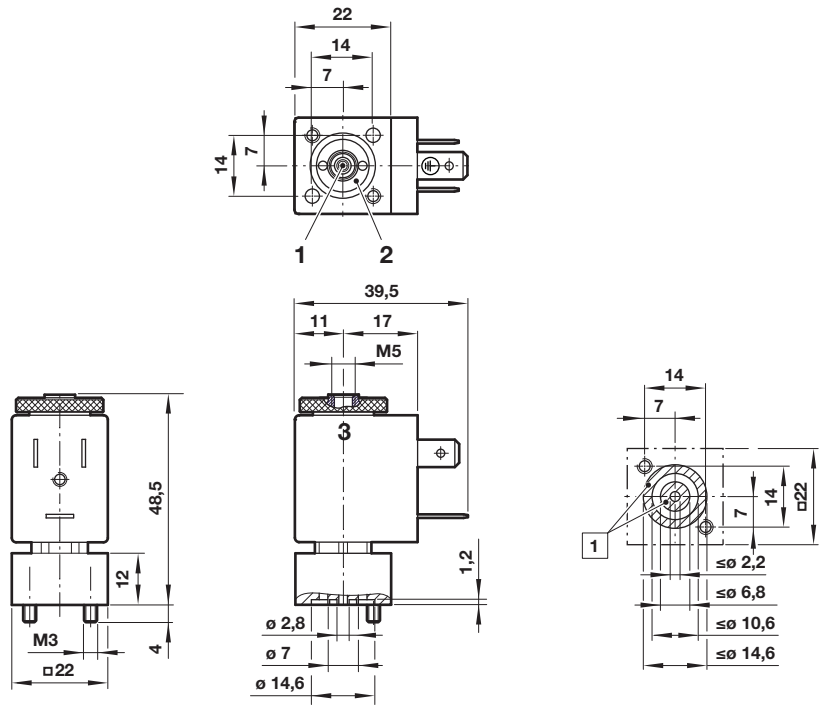
	Ports 1	2	3
2/2 NC	A	P	–
3/2 NC	P	A	R
3/2 NO	R	A	P

P = Inlet; A = Outlet; R = Exhaust
Please refer to marking on the valve body for flow direction or port identification.

All solenoids are supplied with mounting screws and gasket.

MINISOL 2/2 NC, 3/2 NC or 3/2 NO for manifold mounting on request

Dimensions in mm
Projection/First angle



Port identification

	Ports 1	2	3
2/2 NC	A	P	–
3/2 NC	P	A	R
3/2 NO	R	A	P

P = Inlet; A = Outlet; R = Exhaust
Please refer to marking on the valve body for flow direction or port identification.

[1] Sealing area

All solenoids are supplied with mounting screws and gasket.

Warning

These products are intended for use in air, neutral gas and liquid systems only. Do not use these products where pressures and temperatures can exceed those listed under **»Technical features«**.

Before using these products with fluids other than those specified, for non-industrial applications, life-support systems, or other applications not within published specifications, consult IMI Precision Engineering, Fluid Automation Systems s.a.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes.

The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure.

System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided.

- 2/2, 3/2; Manifold mounting
- Compact design
- Easy integration
- Long life - in excess of 25 Mio. cycles
- Up to 2000 cycles per minute
- Up to 1,8 mm orifice

Technical features

Medium:
Air, neutral gases and liquids
Operation:
Direct acting 2-way and 3-way valves, normally closed and normally opened, universal, with manual override
Operating pressure:
0 ...15 bar
Flow (kv factor):
0,6 ... 1,0 (Cv: 0.04 ... 0.06)

Mounting:
Flange mount
Orifice:
1,2 .... 1,8 mm (0.05 ... 0.07")
Response time:
8 ... 15 ms
Response time measured according to ISO 12238
Life time:
25 million cycles

Ambient/media temperature:
-15 ... +50 °C (+5 ... +122°F)
Air supply must be dry enough to avoid ice formation at temperatures below +2 °C (+35°F).

Materials:
Body: brass, PA
Seal: NBR, FPM, EDPM

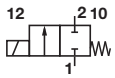
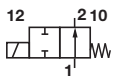
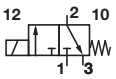
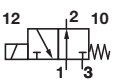
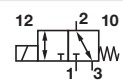
Electrical details

Voltage tolerances:	-10 % ... +15 %
Duty cycle	100% ED
Insulation class:	F (155 °C)
Protection class according to EN 60529:	IP 65 with connector
Electrical connection	Interface according to DIN EN 175301-803, Form B
Coil orientation	Rotable 360°
Coil mounting	M8 x 0.75 mm nut

Following options on request

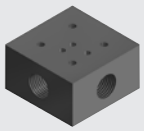
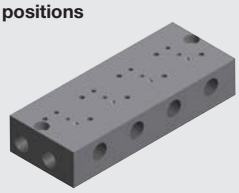
Pneumatic configuration
Voltage
Operating pressure (also vacuum)
Materials
Power consumption
Electrical connections (type of connector & coil orientation)

Technical data - standard models

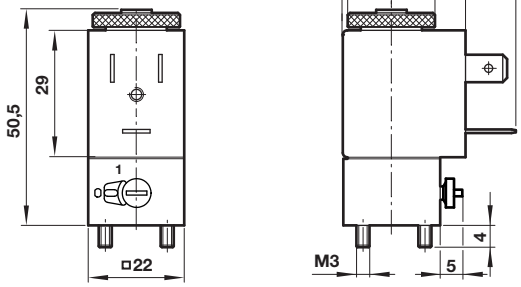
Symbol	Function	Orifice (mm)	Operating pressure (bar)	(psi)	kv *1) (l/min)	Voltage (V d.c.)	Power consumption (W)	Material Body	Seal	Model
	2/2 NC	1,2	0 ... 15	0 ... 217	0,60	24	3,8	PA	NBR	09-211I-02-30+AQF
	2/2 NC	1,6	0 ... 10	0 ... 145	0,80	24	3,8	PA	NBR	09-211I-03-30+AQF
	2/2 NC	1,8	0 ... 8	0 ... 116	1,00	24	3,8	PA	NBR	09-211I-01830+AQF
	2/2 NO	1,8	0 ... 12	0 ... 174	0,75	24	3,8	PA	NBR	09-221I-01830+AQF
	3/2 NC	1,2	0 ... 15	0 ... 217	0,60	24	3,8	PA	NBR	09-311I-02-30+AQF
	3/2 NC	1,4	0 ... 12	0 ... 174	0,70	24	3,8	PA	NBR	09-311I-01430+AQF
	3/2 NC	1,6	0 ... 10	0 ... 145	0,80	24	3,8	PA	NBR	09-311I-03-30+AQF
	3/2 NC	1,8	0 ... 8	0 ... 116	1,00	24	3,8	PA	NBR	09-311I-01830+AQF
	3/2 NO	1,2	0 ... 10	0 ... 145	0,60	24	3,8	PA	NBR	09-321I-02-30+AQF
	3/2 NO	1,4	0 ... 7	0 ... 101	0,75	24	3,8	PA	NBR	09-321I-01430+AQF
	3/2 NO	1,8	0 ... 6	0 ... 87	0,85	24	3,8	PA	NBR	09-321I-01830+AQF
	3/2 NC	1,2	0 ... 8	0 ... 116	0,60	24	3,8	PA	NBR	09-331I-02-30+AQF
	3/2 NC	1,8	0 ... 4	0 ... 58	0,85	24	3,8	PA	NBR	09-331I-01830+AQF

*1) Cv - Value in [gal/min] = kv x 0.07

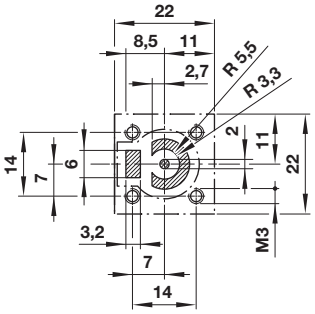
Accessories

G1/8 ported mounting plate - 1 position for 3/2 ways valve	G1/8 ported mounting plate - 2 ... 8 positions	22 mm Industrial standard 2-pole + PE
		
S090.3146	Available on request	N060.1075

Valve



Manifold fitting



Dimensions shown in mm
Projection/First angle

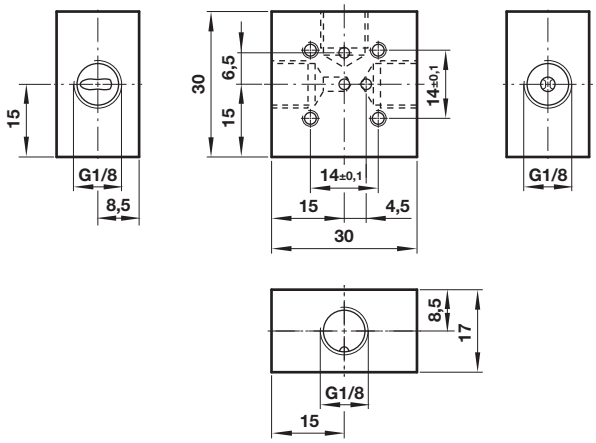
Port identification for

	Ports 1	2	3
2/2 NC	A	P	–
2/2 NO	P	–	A
3/2 NC	A	P	R
3/2 NO	A	R	P
3/2 UNI (SEL)	P	A_1	A_2
3/2 UNI (MIX)	A	P_1	P_2

P, P_1, P_2 = Inlet; A, A_1, A_2 = Outlet; R = Exhaust
Please refer to marking on the valve body for flow direction or port identification.

All solenoids are supplied with mounting screws and gasket.

Mounting plate



Warning

These products are intended for use in air, neutral gas and liquid systems only. Do not use these products where pressures and temperatures can exceed those listed under **»Technical features«**.

Before using these products with fluids other than those specified, for non-industrial applications, life-support systems, or other applications not within published specifications, consult IMI FAS.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes.

The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure.
System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided.

- 2/2, 3/2; Manifold mounting
- Compact design
- High flow rate
- High cycle rate of up to 1200 cycles per minute
- Up to kv 14 (orifice 8 mm)

Technical features

Medium:
Air, neutral gases and liquids
Operation:
Direct acting 2-way and 3-way valves, normally closed and normally opened, latching
Operating pressure:
0 ... 100 bar (0 ... 1450 psi)
Flow kv factor:
0,15 ... 14 (Cv: 0.01 ... 1)

Mounting:
G1/4 others on request
Orifice:
2/2: 0,5 .... 8 mm (0.02 ... 0.31")
3/2: 0,8 .... 3 mm (0.02 ... 0.12")
Port size:
G1/4, G1/8, M5, CNOMO
Response time:
10 ... 15 ms
Response time measured according to ISO 12238

Ambient/media temperature:
Ambient:
-15 ... +50 °C (+5 ... +122°F)
Media:
-15 ... +140 °C (+5 ... +284°F)
Air supply must be dry enough to avoid ice formation at temperatures below +2 °C (+35°F).

Materials:
Body in contact with media: Stainless steel, brass, PA
Seal in contact with media: NBR, FPM, EDPM

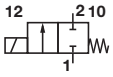
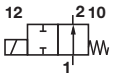
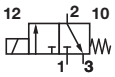
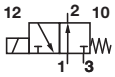
Electrical details

Voltage:	24 V d.c.
Voltage tolerances:	-10 % ... +15 %
Electrical insulation:	2000 V a.c.
Power consumption (nominal at 20°C)	10 W
Insulation class:	H (180 °C)
Duty cycle:	100% ED
Protection class according to EN 60529:	IP 65 with connector
Electrical connection	Interface according to DIN EN 175301-803, Form A
Coil orientation	Rotable 360°
Coil mounting	M8 x 0,75 mm nut

Following options on request

Mounting (See on request alternative pneumatic connections)
Flow rate, orifice size, kv
Materials
Pneumatic connection
Override
Operating pressure (On request incl. vacuum (10-3 torr)
Voltage
Power consumption
Electrical connection

Technical data - standard models, G1/4

Symbol	Port size	Function	Orifice	Operating pressure (bar)	(psi)	kv *1) (l/min)	Voltage (V d.c.)	Power consumption (W)	Seal/Body Material	Drawing No.	Model
	G1/4	2/2 NC	0,5	0 ... 100	0 ... 1450	0.15	24	10	NBR/Brass	1	04-211-200-20+ACC
	G1/4	2/2 NC	0,8	0 ... 60	0 ... 870	0.40	24	10	NBR/Brass	1	04-211-201-20+ACC
	G1/4	2/2 NC	1,2	0 ... 50	0 ... 725	0.80	24	10	NBR/Brass	1	04-211-202-20+ACC
	G1/4	2/2 NC	1,6	0 ... 25	0 ... 362	1.60	24	10	NBR/Brass	1	04-211-203-20+ACC
	G1/4	2/2 NC	2,0	0 ... 20	0 ... 290	2.30	24	10	NBR/Brass	1	04-211-204-20+ACC
	G1/4	2/2 NC	2,4	0 ... 15	0 ... 217	3.00	24	10	NBR/Brass	1	04-211-205-20+ACC
	G1/4	2/2 NC	3,0	0 ... 10	0 ... 145	4.20	24	10	NBR/Brass	1	04-211-206-20+ACC
	G1/4	2/2 NC (latching)	3,0	0 ... 6	0 ... 87	4.00	24	10	NBR/Brass	1	04-241-206-20+AFX
	G1/4	2/2 NC	4,0	0 ... 3	0 ... 43	7.00	24	10	NBR/Brass	1	04-211-207-20+ACC
	G1/4	2/2 NC	5,0	0 ... 2	0 ... 29	9.00	24	10	NBR/Brass	1	04-211-208-20+ACC
	G1/4	2/2 NC	6,0	0 ... 1.5	0 ... 21	10.00	24	10	NBR/Brass	1	04-211-209-20+ACC
	G1/4	2/2 NC	8,0	0 ... 0.6	0 ... 8.7	14.00	24	10	NBR/Brass	1	04-211-210-20+ACC
	G1/4	2/2 NO	0,8	0 ... 40	0 ... 520	0.40	24	10	NBR/Brass	1	04-221-201-20+ACC
	G1/4	2/2 NO	1,6	0 ... 30	0 ... 425	1.40	24	10	NBR/Brass	1	04-221-203-20+ACC
	G1/4	2/2 NO	2,4	0 ... 13	0 ... 188	2.60	24	10	NBR/Brass	1	04-221-205-20+ACC
	G1/4	2/2 NO	3,0	0 ... 7	0 ... 101	3.20	24	10	NBR/Brass	1	04-221-206-20+ACC
	G1/4	3/2 NC	0,8	0 ... 23	0 ... 333	0.40	24	10	NBR/Brass	1	04-311-201-20+ACC
	G1/4	3/2 NC	1,2	0 ... 17	0 ... 246	0.80	24	10	NBR/Brass	1	04-311-202-20+ACC
	G1/4	3/2 NC	1,6	0 ... 14	0 ... 203	1.40	24	10	NBR/Brass	1	04-311-203-20+ACC
	G1/4	3/2 NC	2,0	0 ... 10	0 ... 145	2.20	24	10	NBR/Brass	1	04-311-204-20+ACC
	G1/4	3/2 NC	2,4	0 ... 8	0 ... 116	2.80	24	10	NBR/Brass	1	04-311-205-20+ACC
	G1/4	3/2 NC	3,0	0 ... 5.5	0 ... 79	4.00	24	10	NBR/Brass	1	04-311-206-20+ACC
	G1/4	3/2 NC (latching)	3,0	0 ... 5.5	0 ... 79	4.00	24	10	NBR/Brass	1	04-341-206-20+AFX
	G1/4	3/2 NO	0,8	0 ... 25	0 ... 362	0.40	24	10	NBR/Brass	1	04-321-201-20+ACC
	G1/4	3/2 NO	1,6	0 ... 6	0 ... 87	1.20	24	10	NBR/Brass	1	04-321-203-20+ACC
	G1/4	3/2 NO	2,4	0 ... 3	0 ... 43	2.00	24	10	NBR/Brass	1	04-321-205-20+ACC
	G1/4	3/2 NO	3,0	0 ... 2.5	0 ... 36	2.80	24	10	NBR/Brass	1	04-321-206-20+ACC

*1) Cv - Value in [gal/min] = kv x 0.07; kv for 3/2 way valves represents flow value between ports 2 and 3

Accessories

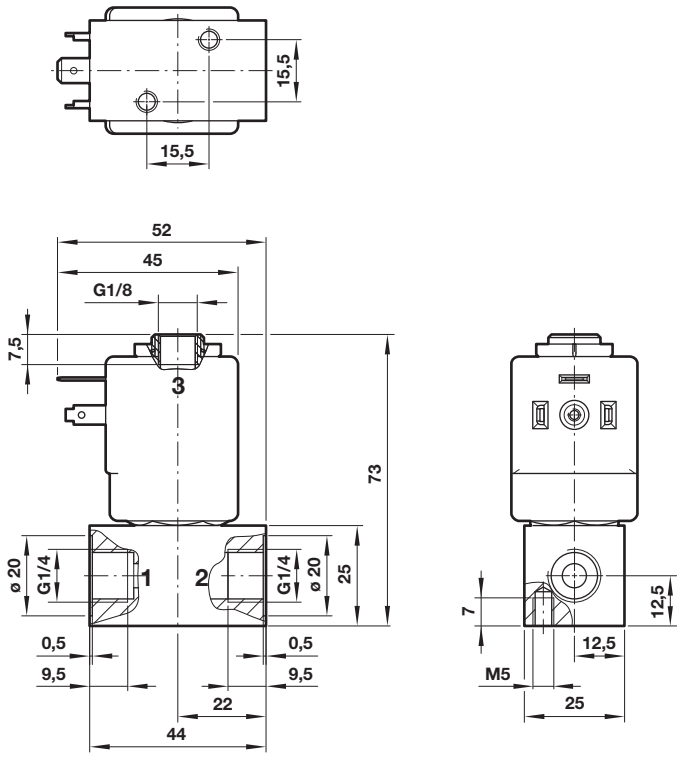
Electrical connector
DIN EN 175301-803, Form A

N040.1001

Dimensions

Dimensions shown in mm
Projection/First angle

1

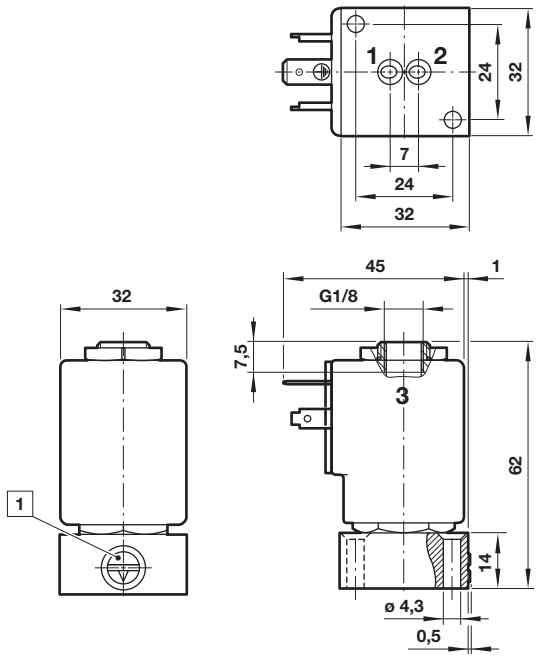


Port identification for BACOSOL, BACOSOL V-type, BACOSOL VL-type and BACOSOL CNOMO-type

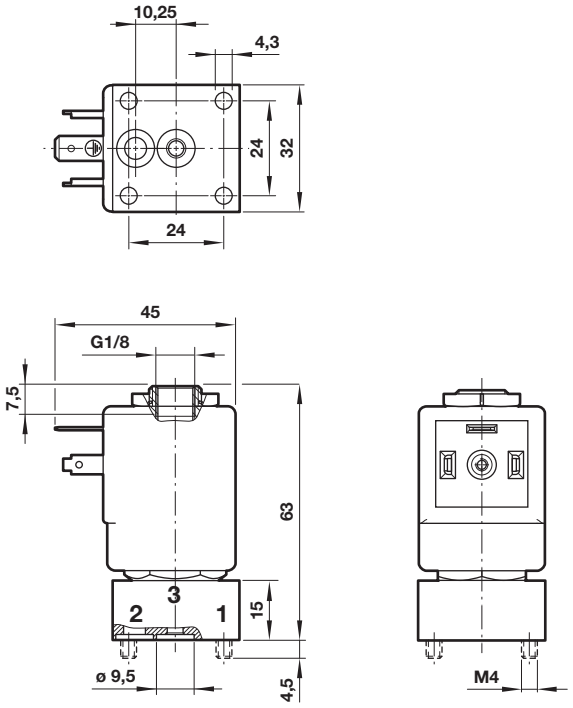
	Ports 1	2	3
2/2 NC	A	P	–
2/2 NC latching	A	P	–
2/2 NO	–	P	A
3/2 NC	P	A	R
3/2 NC latching	P	A	R
3/2 NO	R	A	P

P = Inlet; A = Outlet; R = Exhaust
Please refer to marking on the valve body for flow direction or port identification.

Alternative pneumatic connections on request
V-Type connection
(available for 2/2 and 3/2 valves)



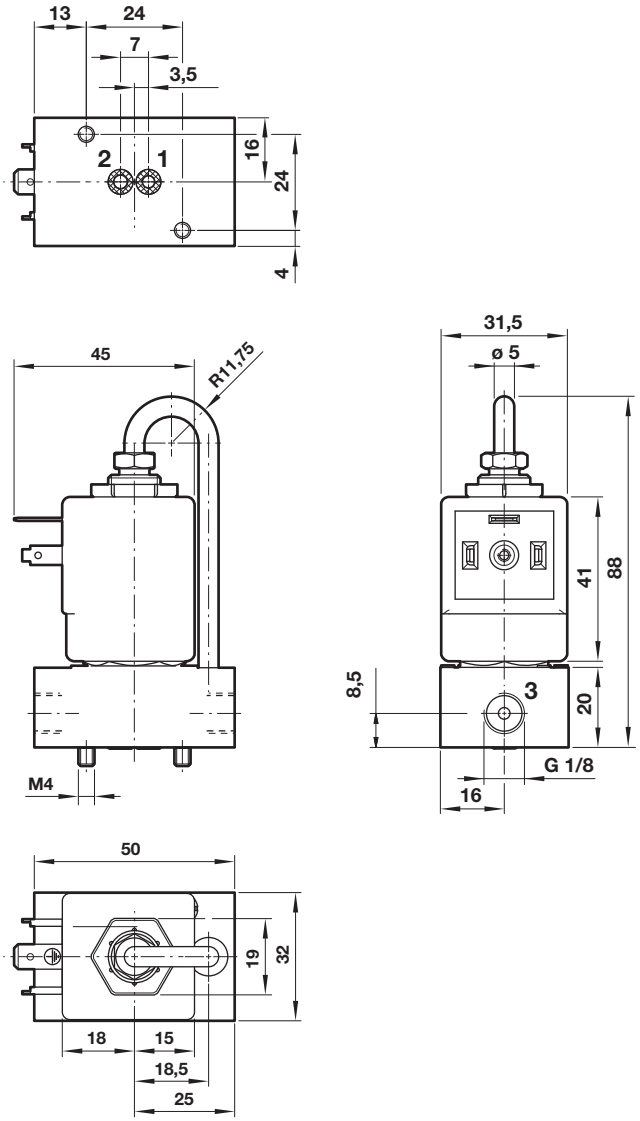
VL-Type connection
(available for 3/2 NC valves only)



1 Manual override

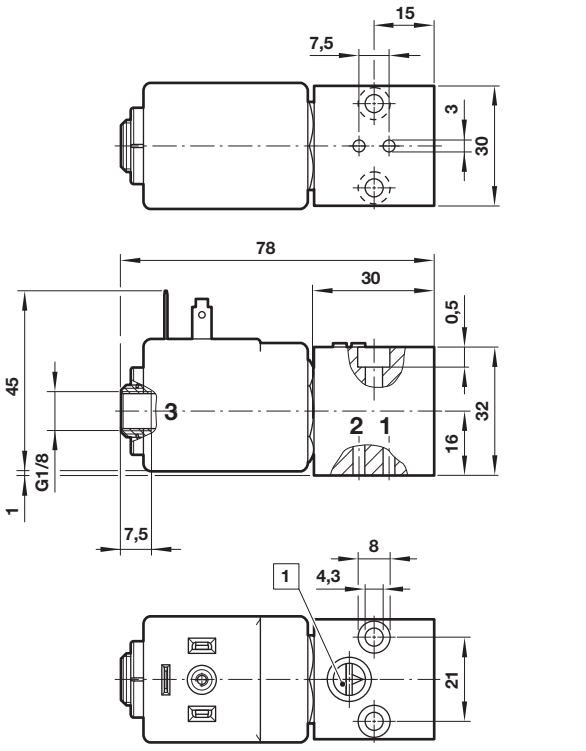
All valves are supplied with mounting screws and gasket.

VR-Type connection (available for 3/2 NO valves)



CNOMO-Type connection (available for 2/2 NC & 3/2 NC valves)

Dimensions shown in mm
Projection/First angle



1 Manual override

Port identification for BACOSOL VR-type

	Ports 1	2	3
3/2 NO	P	A	R

P = Inlet; A = Outlet; R = Exhaust

Warning

These products are intended for use in air, neutral gas and liquid systems only. Do not use these products where pressures and temperatures can exceed those listed under **»Technical features«**.

Before using these products with fluids other than those specified, for non-industrial applications, life-support systems, or other applications not within published specifications, consult IMI FAS.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes.

The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure.
System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided.