

3QR negative pressure switching unit

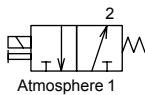
MV3QRA/MV3QRB Series

● Self-reset, self-hold

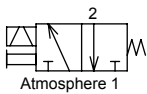


JIS symbol

● 2-position universal
(Self-reset)



(Self-hold)



Unit common specifications

1 MPa = 10 bar

Descriptions	3QR negative pressure switching unit	
	With sensor MV3QR	Without sensor MV3QR*-V1
Manifold station No.	2 to 10 stations	
Working fluid	Low vacuum	
Max. working pressure MPa	0 (≈0 psi, 0 bar)	
Min. working pressure kPa	Low vacuum: -100 (≈-15 psi, -1 bar)	
Proof pressure MPa	1.05 (≈150 psi) (low vacuum: -101 kPa (≈-15 psi))	0.5 (≈73 psi) (low vacuum: -101 kPa (≈-15 psi))
Ambient temperature °C	-5 (23°F) to 50 (122°F) (no freezing)	0 (32°F) to 50 (122°F) (no freezing)
Fluid temperature °C	5 (41°F) to 50 (122°F)	
Vibration/shock resistance m/s ²	50 or less/300 or less	
Atmosphere	Cannot be used in corrosive gas environments	

Solenoid valve specifications 1 MPa = 10 bar

Descriptions	Content
Valve and operation	Direct acting poppet valve
Proof pressure MPa	1.05 (≈150 psi) (low vacuum: -101 kPa (≈-15 psi))
Min. working pressure kPa	-100 (≈-15 psi, -1 bar)
Lubrication	Unavailable *1
Degree of protection	Dust-proof

*1: Lubrication will degrade the performance.

Response time

Model No.		Response time *2 [ms]	
		ON	OFF
MV3QRA11	Self-reset	4±1	1.5±1
MV3QRB11			
MV3QRA12	Self-hold	5 or less	5 or less
MV3QRB12			

*2: Response time is the value for continuous operation under the condition of 0.5 MPa supply pressure at 20°C.

Electrical specifications

Descriptions		Standard specs	Large flow rate specs H
Rated voltage V/DC		24/12	
Energizing rate		Intermittent *1	Continuous
Voltage fluctuation range		±10%	
Starting current A	24 VDC	-	0.13
	12 VDC	-	0.27
Holding current A	24 VDC	0.08	0.10
	12 VDC	0.17	0.20
Power consumption W		2.0	2.4 *2
Thermal class		B	

*1: Limit energizing within 5 minutes and energization ratio to 50% or less. Min. time of excitation for self-holding is 50 ms.

*2: 3.2 W for 20 ms after start.

Flow characteristics

Model No.	Option	Port 2→1		Port 3→2	
		C[dm ³ /(s·bar)]	S (reference value) [mm ²]	C[dm ³ /(s·bar)]	S (reference value) [mm ²]
MV3QRA1	Blank	0.32	1.6	0.30	1.5
	H	0.38	1.9	0.36	1.8
MV3QRB1	Blank	0.34	1.7	0.34	1.7
	H	0.40	2.0	0.40	2.0

Connection circuit diagram

Voltage	Solenoid position	Option	Wiring circuit	Connection
DC	2-position single (Self-reset)	-		Grommet lead wire (blank) No polarity
		With surge suppressor and indicator lamp		C type connector (C2*/C3) D type connector (D2*/D3) No polarity
		Large flow rate with surge suppressor and indicator lamp		C type connector (C2*/C3) D type connector (D2*/D3) Polarized
	2-position single (Self-hold)	With surge suppressor and indicator lamp		C type connector (C2*/C3) D type connector (D2*/D3) Polarized

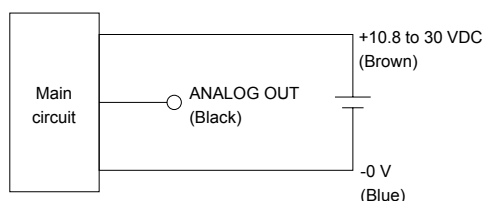
Pressure sensor specification

Descriptions		Analog sensor V1
Service voltage		10.8 to 30 VDC
Current consumption		20 mA or less (24 VDC, no load)
Pressure detection method		Diffused semiconductor pressure switch
Ambient temperature		0 to 50°C
Working pressure		-100kPa (≈-15 psi, -1 bar) to 0kPa (≈0 psi, 0 bar)
Proof pressure		500kPa (≈73 psi, 5 bar)
Degree of protection		Dust-proof
Analog output	Output voltage	1 to 5 V
	Zero point voltage	1±0.1 V
	Linearity	±0.5% F.S. max
	Temp characteristics	±2% F.S. max
	Output current	1 mA max (load resistance 5 kΩ and over)
Connection		Connector
Wire length		1000 mm

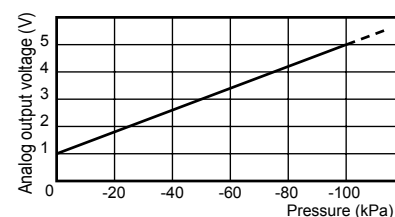
Wiring method for pressure sensor

● Lead wire color and content

Line color	Content
Brown	Power supply (10.8 to 30 VDC)
Black	Analog output (1 to 5 V)
Blue	GND(0 V)



Analog output voltage - pressure characteristics



Weight

Discrete valve

Content	Weight (g)
Self-reset (single solenoid valve)	19
Self-hold (single solenoid valve)	23

Sensor

Content	Weight (g)
Sensor for MV3QR	4.5

Push-in fitting

Model No.	Content	Weight (g)
GMS4-M5-S	φ4 push-in fitting	3
GMS6-M5-S	φ6 push-in fitting	4

Manifold base

	2 stations	3 stations	4 stations	5 stations	6 stations	7 stations	8 stations	9 stations	10 stations
Weight g	26	34	42	50	58	66	74	82	90

Vacuum filter (attachment)

Model No.	Content	Weight (g)
VSFJ-44	φ4 vacuum filter	1.5
VSFJ-66	φ6 vacuum filter	2.5

■ Weight calculation of negative pressure switching unit

(Single valve unit weight + sensor weight + push-in fitting weight + vacuum filter weight) × Station No. + manifold base

(Example) When attaching self-reset, quadruple manifold with pressure sensor, φ4 fitting screw or φ4 vacuum filter afterwards

(19+4.5+3+1.5) × 4+50=162 g

4GA/B
M4GA/B
MN4GA/B
4GA/B (mastr)
4GD/E
M4GD/E
MN4GD/E
4GA4/B4
MN3E
MN4E
W4GA/B2
W4GB4
4TB
4L2-4/LMF0
MN3S0
MN4S0
4SA/B0
4KA/B
4KA/B (mastr)
4F
4F (mastr)
PV5G
GMF
PV5
GMF
PV5S-0
3QR
3QB
MV3QR
3MA/B0
3PA/B
P/M/B
NP/NAP/NVP
4F*0EX
4F*0E
HMV
HSV
2QV
3QV
SKH
PCD
Silencer
TotAirSys (Total Air)
TotAirSys (Gamma)
Ending

MV3QRA/MV3QRB Series

How to order

MV3QRA1 **1** **0** - **M5** - **C2** **H** - **10** - **3** - **V1**

A Model No.

H Pressure sensor

B Solenoid position

C Port size

D Solenoid valve electric wire system

E Flow rate size

F Station No.

G Solenoid valve voltage

A Model No.

Manifold for negative pressure

Body piping Sub-plate piping

Code	Content	MV3QRA1	MV3QRB1
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B Solenoid position			
1	2-position single (self-reset)	●	●
2	2-position single (self-hold) *1	●	●
8	Mix manifold *2	●	●

C Port size			
M5	M5	●	●
GS4	φ4 push-in fitting	●	●
GS6	φ6 push-in fitting	●	●
GS4F	φ4 push-in fitting (vacuum filter attached)	●	●
GS6F	φ6 push-in fitting (vacuum filter attached)	●	●

D Solenoid valve electric wire system			
Blank	Grommet lead wire (300 mm) *3	●	●
C2	C type connector (300 mm) with surge suppressor/indicator lamp	●	●
C20	C type connector (500 mm) with surge suppressor/indicator lamp	●	●
C21	C type connector (1000 mm) with surge suppressor/indicator lamp	●	●
C22	C type connector (2000 mm) with surge suppressor/indicator lamp	●	●
C3	C type connector (no lead) with surge suppressor/indicator lamp	●	●
D2	D type connector (300 mm) with surge suppressor/indicator lamp	●	●
D20	D type connector (500 mm) with surge suppressor/indicator lamp	●	●
D21	D type connector (1000 mm) with surge suppressor/indicator lamp	●	●
D22	D type connector (2000 mm) with surge suppressor/indicator lamp	●	●
D3	D type connector (no lead) with surge suppressor/indicator lamp	●	●

E Flow rate size			
Blank	Standard	●	●
H	Large flow rate	●	●

F Station No.			
2 to 10	2 stations to 10 stations	●	●

G Solenoid valve voltage			
3	24 VDC	●	●
4	12 VDC	●	●

H Pressure sensor			
Blank	None	●	●
V1	Analog negative pressure sensor equipped	●	●

! Precautions for model No. selection

*1: For "2", 2-position single solenoid (self-hold) for **B** solenoid position, "H" for **E** flow rate and "4" for **G** voltage are not selectable.

*2: Combination with a masking plate.

Combination of A and B types is not available. Solenoid positions "1" and "2" cannot be mixed.

*3: For connection with the grommet lead wire (300 mm), "2", 2-position single solenoid (self-hold) for **B** solenoid position, and "H", large flow rate for **E** flow rate are not selectable.

[Example of model No.]

MV3QRA110-GS4-C2-7-3-V1

- A** Model : MV3QRA1 (Body piping)
- B** Solenoid position : 2-position single
- C** Port size : φ4 push-in fitting
- D** Solenoid valve electric wire system : Lead wire 300 mm
With surge suppressor and indicator lamp
- E** Flow rate size : Standard 2 W
- F** Station No. : 7 stations
- G** Solenoid valve voltage : 24 VDC
- H** Pressure sensor : Analog negative pressure sensor equipped

How to order masking plate kit

3QR1 - MP - KIT

* Gasket/mounting screw attached

Ozone-proof specifications

Conforms to low-concentration ozone specifications as standard.

Specifications for rechargeable battery

Conforms to CKD P4 Series equivalent specifications as standard.

Solenoid valve connection method

● 3QRA11/3QRB11

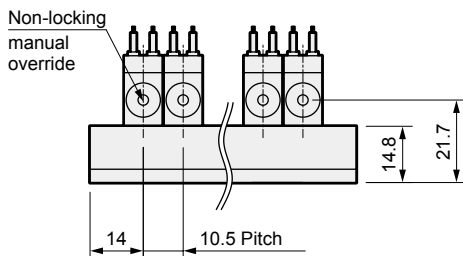
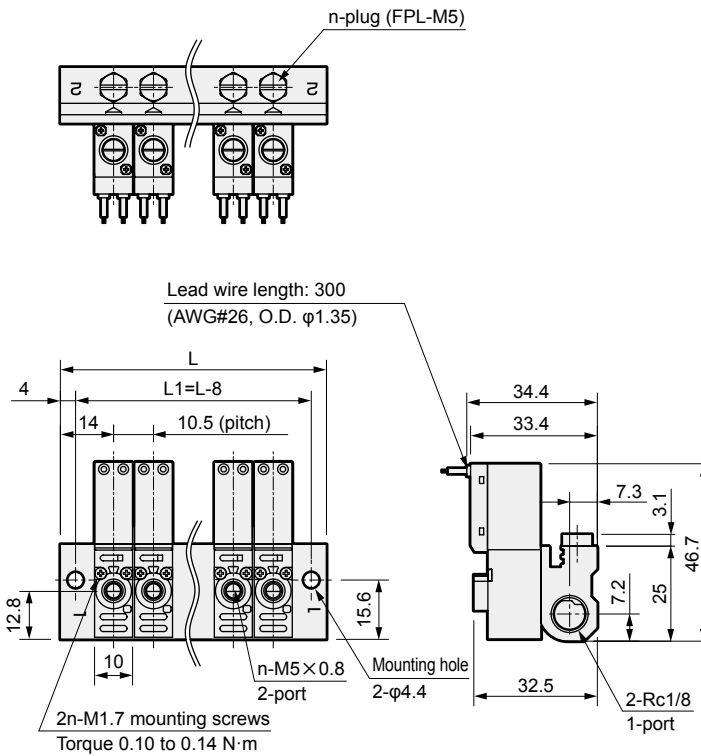
Blank	Grommet lead wire	C2	C type connector, with lead, with surge suppressor/indicator lamp	C3	C type connector, no lead, with surge suppressor/indicator lamp	D2	D type connector, with lead, with surge suppressor/indicator lamp	D3	D type connector, no lead, with surge suppressor/indicator lamp
	Lead wire 300 mm	Lead wire length C2 : 300 mm C20 : 500 mm C21 : 1000 mm C22 : 2000 mm			Lead wire length D2 : 300 mm D20 : 500 mm D21 : 1000 mm D22 : 2000 mm				

● 3QRA12/3QRB12

C2	C type connector, with lead, with surge suppressor/indicator lamp	C3	C type connector, no lead, with surge suppressor/indicator lamp	D2	D type connector, with lead, with surge suppressor/indicator lamp	D3	D type connector, no lead, with surge suppressor/indicator lamp
Lead wire length C2 : 300 mm C20 : 500 mm C21 : 1000 mm C22 : 2000 mm			Lead wire length D2 : 300 mm D20 : 500 mm D21 : 1000 mm D22 : 2000 mm				

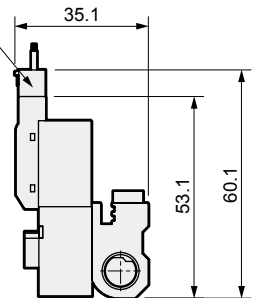
Dimensions (MV3QRA110-M5)

· 2-position single (self-reset): grommet lead wire



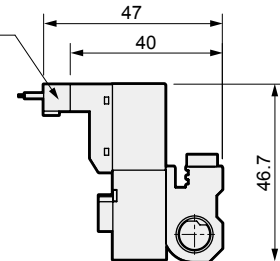
· C type connector (C2/C2*/C3)

Lead wire (AWG#26, O.D. φ1.35)
Length 300 to 2000 mm
(C2/C2*/C3)

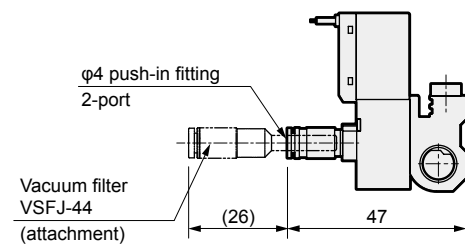


· D type connector (D2/D2*/D3)

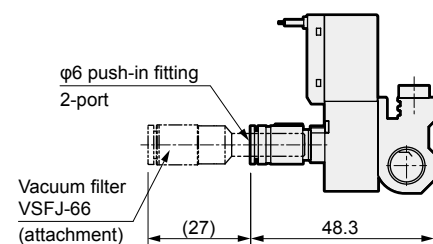
Lead wire (AWG#26, O.D. φ1.35)
Length 300 to 2000 mm
(D2/D2*/D3)



· φ4 push-in fitting (GS4/GS4F)



· φ6 push-in fitting (GS6/GS6F)



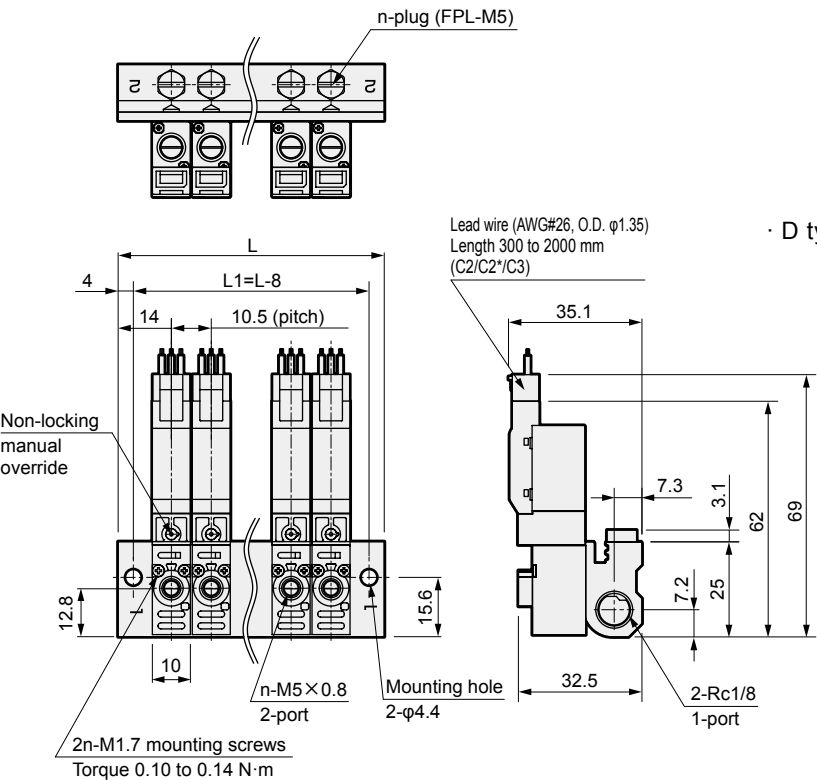
Station No.	2	3	4	5	6	7	8	9	10
L	38.5	49.0	59.5	70.0	80.5	91.0	101.5	112.0	122.5
L1	30.5	41.0	51.5	62.0	72.5	83.0	93.5	104.0	114.5

4GA/B
M4GA/B
MN4GA/B
4GA/B (mastr)
4GD/E
M4GD/E
MN4GD/E
4GA4/B4
MN3E
MN4E
W4GA/B2
W4GB4
4TB
4L2-4/LMF0
MN3S0
MN4S0
4SA/B0
4KA/B
4KA/B (mastr)
4F
4F (mastr)
PV5G
GMF
PV5
GMF
PV5S-0
3QR
3QB
MV3QR
3MA/B0
3PA/B
P/M/B
NP/NAP/NVP
4F*0EX
4F*0E
HMV
HSV
2QV
3QV
SKH
PCD
Silencer
TotAirSys (Total Air)
TotAirSys (Gamma)
Ending

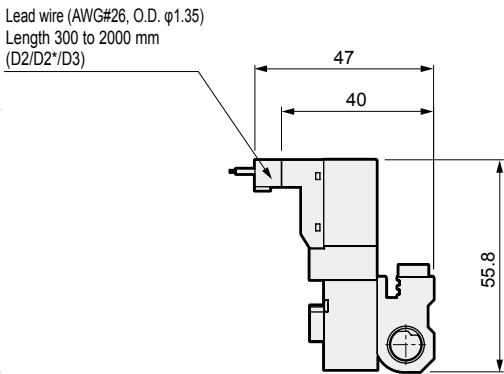
MV3QRA/MV3QRB Series

Dimensions (MV3QRA120-M5)

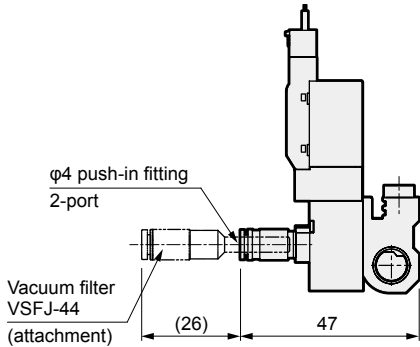
· 2-position single (self-hold): C type connector (C2/C2*/C3)



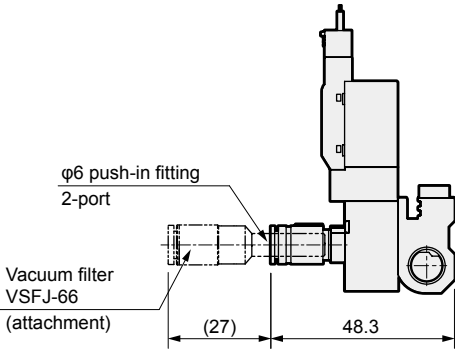
· D type connector (D2/D2*/D3)



· φ4 push-in fitting (GS4/GS4F)



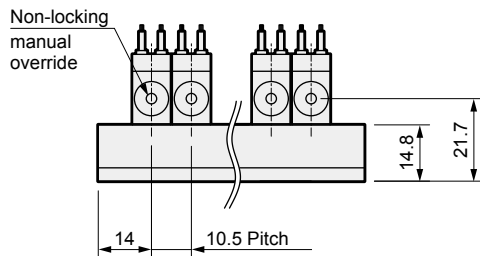
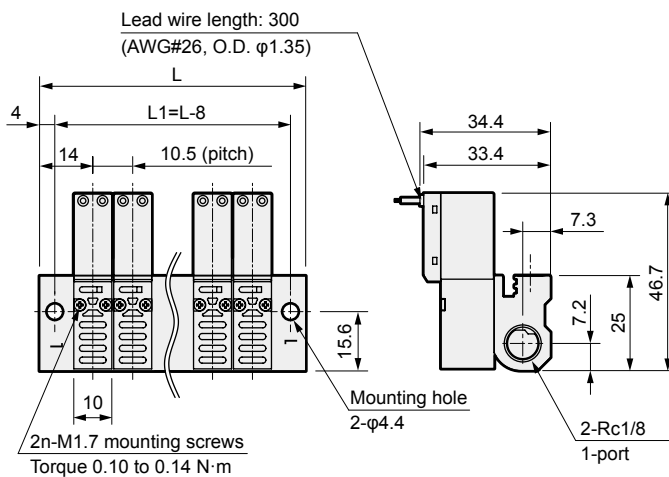
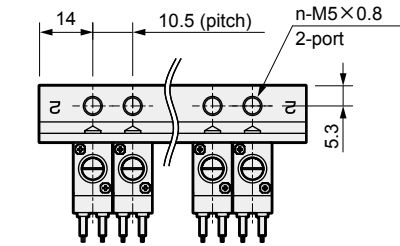
· φ6 push-in fitting (GS6/GS6F)



Station No.	2	3	4	5	6	7	8	9	10
L	38.5	49.0	59.5	70.0	80.5	91.0	101.5	112.0	122.5
L1	30.5	41.0	51.5	62.0	72.5	83.0	93.5	104.0	114.5

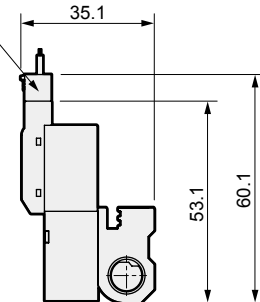
Dimensions (MV3QRB110-M5)

· 2-position single (self-reset): grommet lead wire



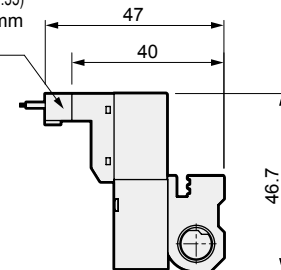
· C type connector (C2/C2*/C3)

Lead wire (AWG#26, O.D. φ1.35)
Length 300 to 2000 mm
(C2/C2*/C3)

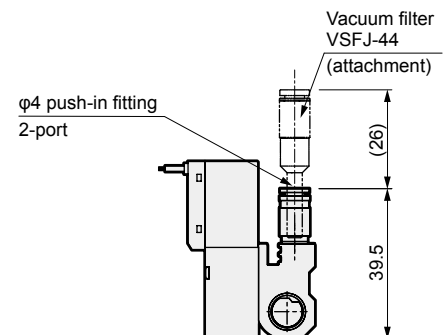


· D type connector (D2/D2*/D3)

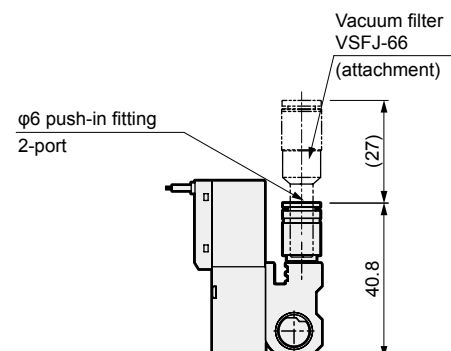
Lead wire (AWG#26, O.D. φ1.35)
Length 300 to 2000 mm
(D2/D2*/D3)



· φ4 push-in fitting (GS4/GS4F)



· φ6 push-in fitting (GS6/GS6F)



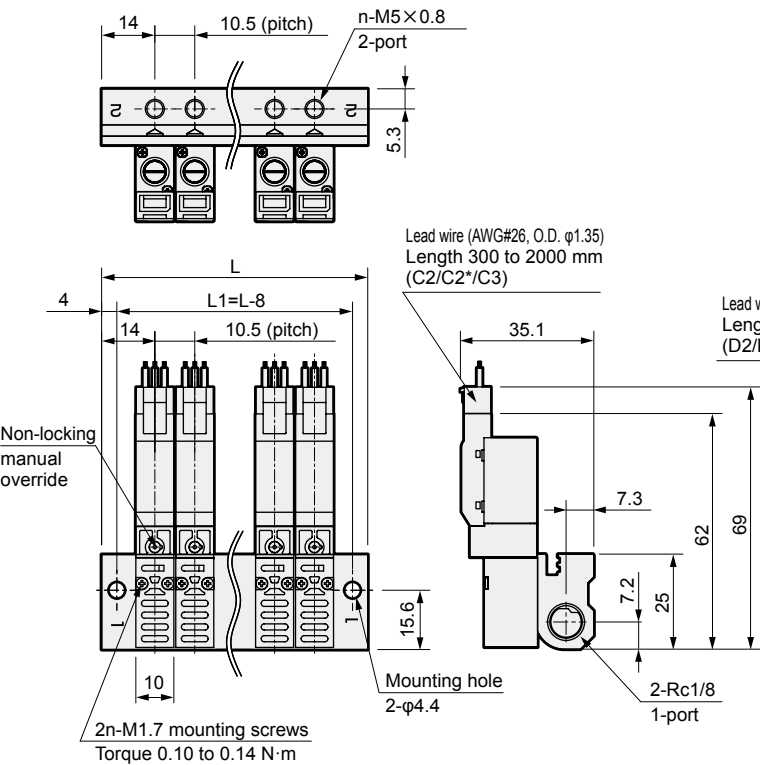
Station No.	2	3	4	5	6	7	8	9	10
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L1	30.5	41.0	51.5	62.0	72.5	83.0	93.5	104.0	114.5

4GA/B
M4GA/B
MN4GA/B
4GA/B (mastr)
4GD/E
M4GD/E
MN4GD/E
4GA4/B4
MN3E
MN4E
W4GA/B2
W4GB4
4TB
4L2-4/ LMF0
MN3S0
MN4S0
4SA/B0
4KA/B
4KA/B (mastr)
4F
4F (mastr)
PV5G
GMF
PV5
GMF
PV5S-0
3QR
3QB
MV3QR
3MA/B0
3PA/B
P/M/B
NP/NAP/ NVP
4F*0EX
4F*0E
HMV
HSV
2QV
3QV
SKH
PCD
Silencer
TotAirSys (Total Air)
TotAirSys (Gamma)
Ending

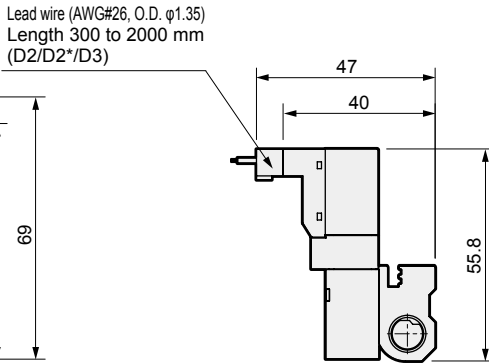
MV3QRA/MV3QRB Series

Dimensions (MV3QRB120-M5)

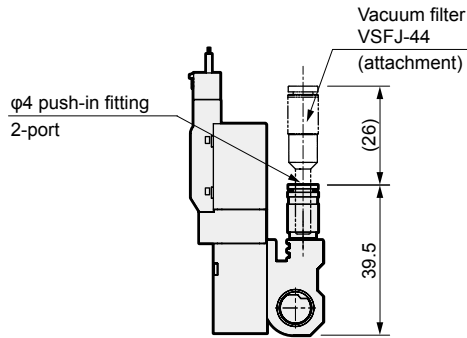
· 2-position single (self-hold): C type connector (C2/C2*/C3)



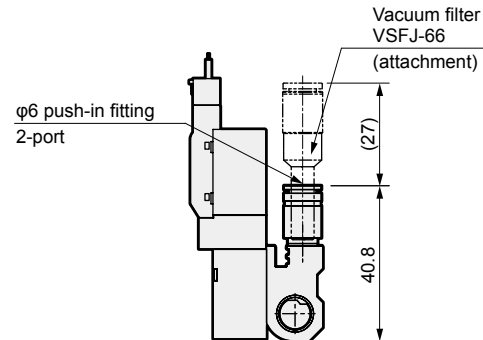
· D type connector (D2/D2*/D3)



· φ4 push-in fitting (GS4/GS4F)



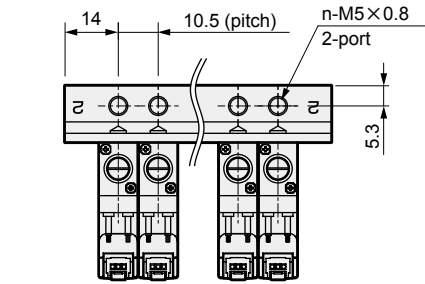
· φ6 push-in fitting (GS6/GS6F)



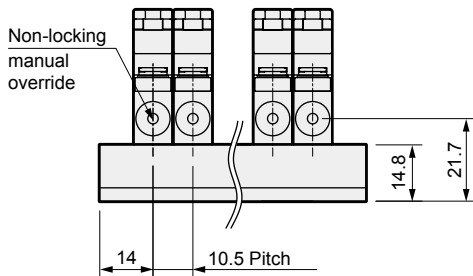
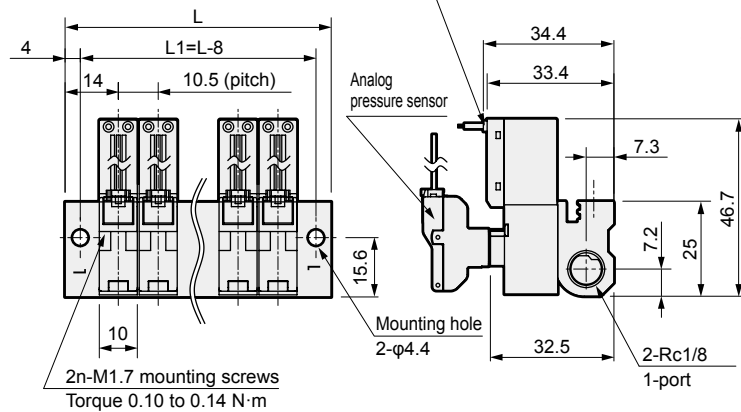
Station No.	2	3	4	5	6	7	8	9	10
L	38.5	49.0	59.5	70.0	80.5	91.0	101.5	112.0	122.5
L1	30.5	41.0	51.5	62.0	72.5	83.0	93.5	104.0	114.5

Dimensions (MV3QRA110-M5-V1) sensor equipped

· 2-position single (self-reset): grommet lead wire



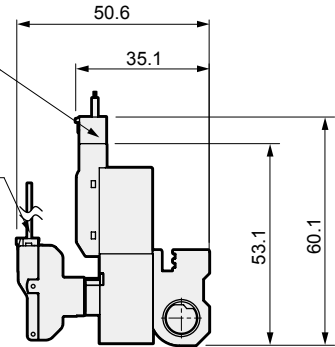
Lead wire length: 300
(AWG#26, O.D. $\phi 1.35$)



· C type connector (C2/C2*/C3)

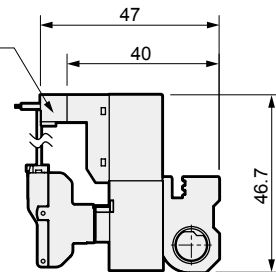
Lead wire (AWG#26, O.D. $\phi 1.35$)
Length 300 to 2000 mm
(C2/C2*/C3)

Lead wire (AWG#28, O.D. $\phi 1.18$)
Length 1000mm

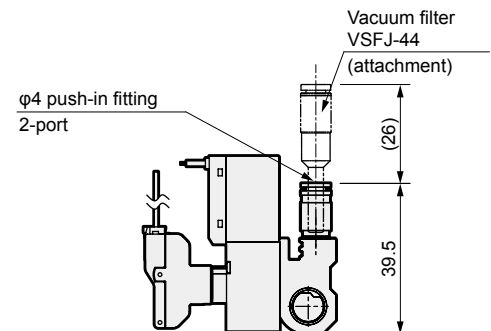


· D type connector (D2/D2*/D3)

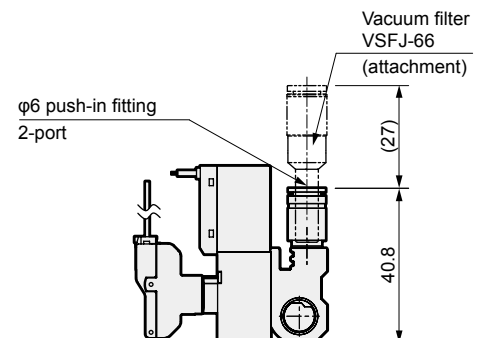
Lead wire (AWG#26, O.D. $\phi 1.35$)
Length 300 to 2000 mm
(D2/D2*/D3)



· $\phi 4$ push-in fitting (GS4/GS4F)



· $\phi 6$ push-in fitting (GS6/GS6F)



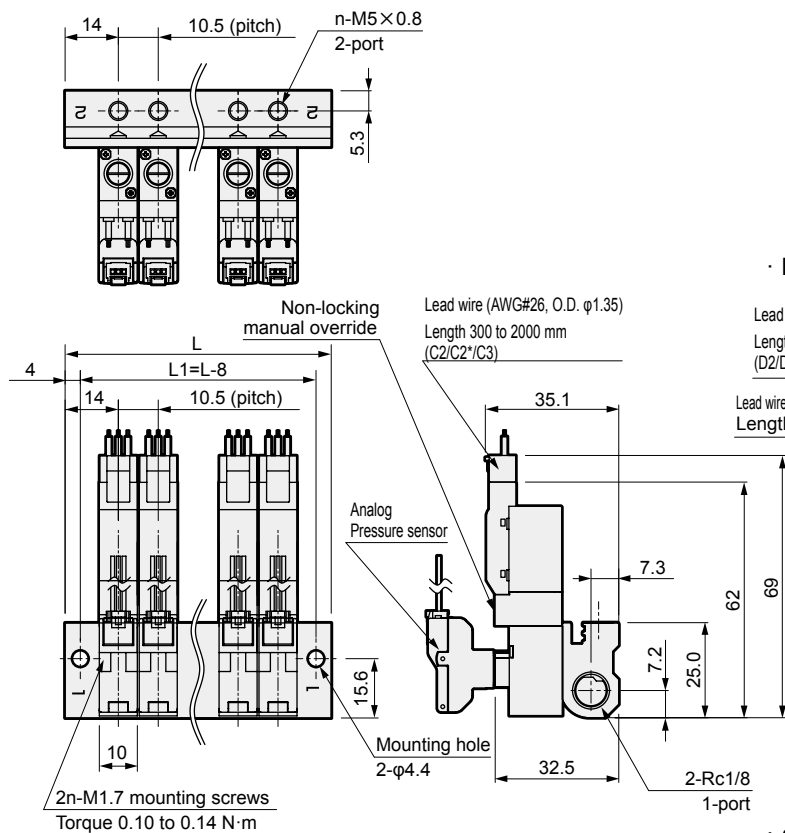
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L1	30.5	41.0	51.5	62.0	72.5	83.0	93.5	104.0	114.5

4GA/B
M4GA/B
MN4GA/B
4GA/B (mastr)
4GD/E
M4GD/E
MN4GD/E
4GA4/B4
MN3E
MN4E
W4GA/B2
W4GB4
4TB
4L2-4/ LMF0
MN3S0
MN4S0
4SA/B0
4KA/B
4KA/B (mastr)
4F
4F (mastr)
PV5G
GMF
PV5
GMF
PV5S-0
3QR
3QB
MV3QR
3MA/B0
3PA/B
P/M/B
NP/NAP/ NVP
4F*0EX
4F*0E
HMV
HSV
2QV
3QV
SKH
PCD
Silencer
TotAirSys (Total Air)
TotAirSys (Gamma)
Ending

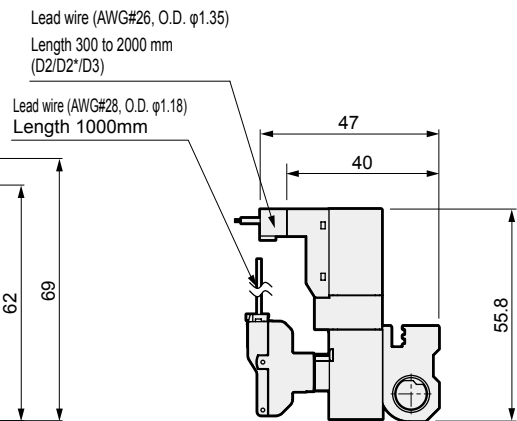
MV3QRA/MV3QRB Series

Dimensions (MV3QRB120-M5-V1) sensor equipped

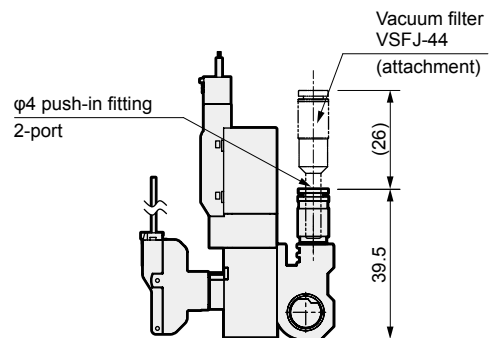
· 2-position single (self-hold): C type connector (C2/C2*/C3)



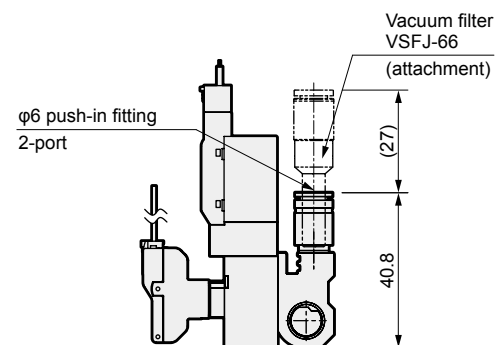
· D type connector (D2/D2*/D3)



· φ4 push-in fitting (GS4/GS4F)



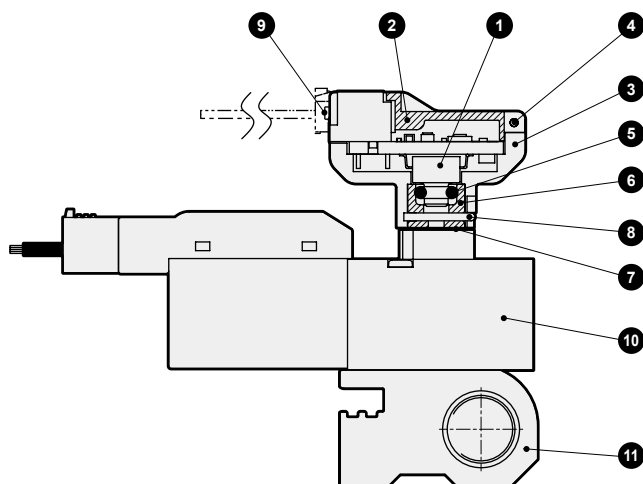
· φ6 push-in fitting (GS6/GS6F)



Station No.	2	3	4	5	6	7	8	9	10
L	38.5	49.0	59.5	70.0	80.5	91.0	101.5	112.0	122.5
L1	30.5	41.0	51.5	62.0	72.5	83.0	93.5	104.0	114.5

Internal structure and parts list

● Sensor equipped solenoid valve manifold



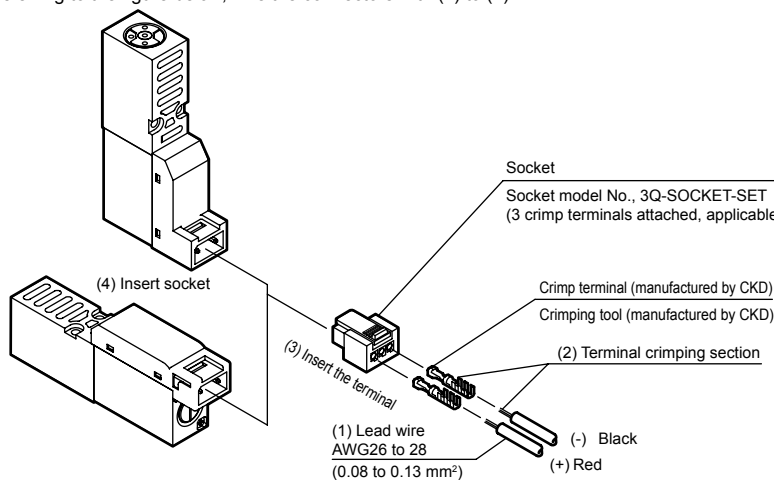
No.	Part name	Material
1	Pressure sensor	(Diffusion semiconductor strain gauge)
2	Cover	Resin
3	Body	Resin
4	Roll pin	Stainless steel
5	O-ring	Fluoro rubber
6	Sensor adaptor	Aluminum alloy
7	Gasket	Nitrile rubber/steel
8	Fixing pin	Stainless steel
9	Connector socket assembly	-
10	Solenoid valve	*1
11	Manifold base	Aluminum alloy

*1 Refer to direct acting 3-port valve 3QRA1/3QRB1 Series (page 1505) for internal structure and operating principle of the equipped solenoid valve.

Solenoid valve C type/D type connector connection

● 2-position single (self-reset)

Referring to the figure below, wire the connectors with (1) to (4).



[Procedure]

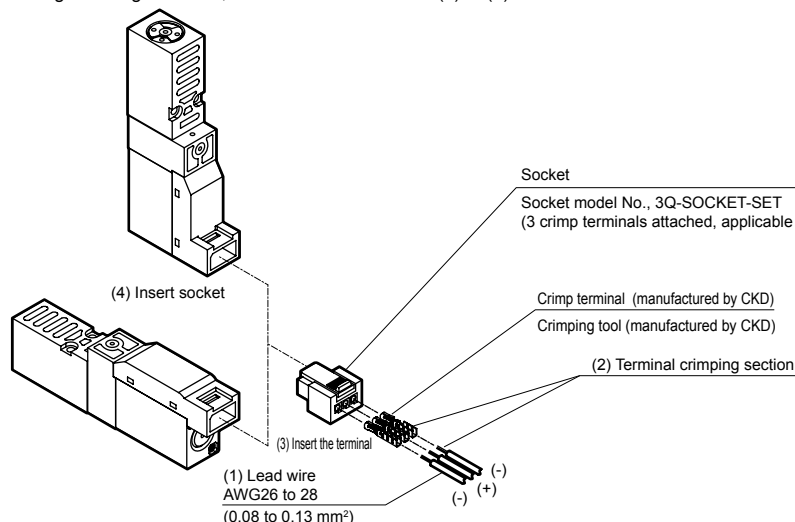
- (1) Peel the sheath at the end of the lead wire by 2 to 3 mm.
- (2) Crimp the lead wire with a dedicated tool.
- (3) Insert the terminal into holes at both ends of the socket.
(Note) Check the orientation for insertion.
- (4) Insert the socket into the solenoid valve connector section.

* For details of crimp terminals and crimping tools, Contact CKD separately.

Note: Pay attention to the polarity of $\oplus \ominus$ for the optional H (Large flow rate) specification. An incorrect polarity will not result in a short-circuit, but the valve will not operate.

● 2-position single (self-hold)

Referring to the figure below, wire the connectors with (1) to (4).



[Procedure]

- (1) Peel the sheath at the end of the lead wire by 2 to 3 mm.
- (2) Crimp the lead wire with a dedicated tool.
- (3) Insert the terminal into holes at both ends of the socket.
(Note) Check the orientation for insertion.
- (4) Insert the socket into the solenoid valve connector section.

* For details of crimp terminals and crimping tools, contact CKD.

Note: Use caution with polarity of $\oplus \ominus$. An incorrect polarity will not result in a short-circuit, but the valve will not operate.