

Total air systems

Detector types

F.R.L Detector

A detector is used to confirm the cylinder position and the presence of material during control. A variety of TAS detectors are available to detect objects of different shapes and states. Optimum detection is ensured by selecting these devices.

Detector types



Mechanical detection — Mechanical valve

Non-contact detection by air flow

MS Series mechanical valve (compact)

MM Series mechanical valve (medium)

MAVL Series mechanical valve (large)

Interface valve (output: air signal)

Series	Features	Applications	Page
MS Series mechanical valve	Equivalent to electrical micro switch Compact and most commonly used.	Confirmation of cylinder, machine position and manual operation	1464
MM Series mechanical valve	Equivalent to compact/vertical electrical limit switch, great mechanical actuator strength. Actuators, such as rod lever and spring rod lever, etc., not available in the MS Series are now available. (Flow rate is the same as MS)	Confirmation of cylinder, machine, and material position	1478
MAVL Series mechanical valve	Equivalent to vertical electrical limit switch. The flow rate is large, so an $\phi 80$ cylinder can be moved directly.	Confirmation of cylinder, machine, and material position	1490



Medium mechanical valve

MM Series

This medium size 3-way valve for pneumatic control is equivalent to a compact limit switch for electric devices and operates with mechanical detection.

● Port size: Rc1/8, $\phi 4$



Specifications

Descriptions	MM-00		MM-01		MM-10		MM-11	
	Normally closed		Normally closed		Normally open		Normally open	
Working fluid	Compressed air							
Valve structure	Poppet valve							
Min. working pressure MPa	0 (≈ 0 psi, 0 bar)							
Max. working pressure MPa	0.8 (≈ 120 psi, 8 bar)							
Proof pressure MPa	1.2 (≈ 170 psi, 12 bar)							
Port size	Rc1/8	$\phi 4$	Rc1/8	$\phi 4$	Rc1/8	$\phi 4$	Rc1/8	$\phi 4$
Effective cross-sectional area mm ²	2.5	1.6	2.5	1.6	2.5	1.6	2.5	1.6
Ambient temperature °C	5 (41°F) to 60 (140°F)							
Fluid temperature °C	5 (41°F) to 60 (140°F)							

Note: A normally open valve is a custom order product.

How to order



A Pressurization

B Connection port

C Operation actuator

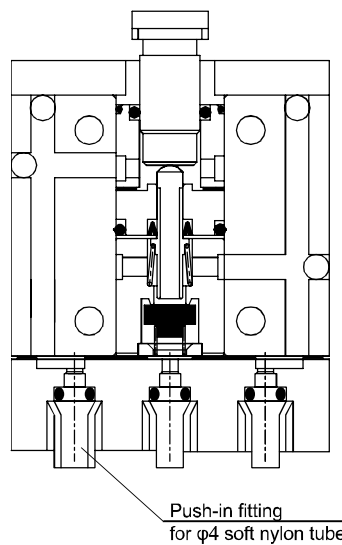
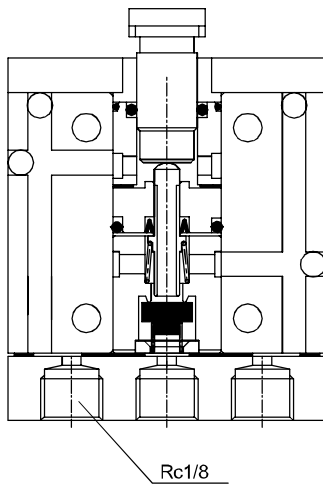
Code	Content
A Pressurization	
0	Normally closed valve
1	Normally open valve (custom order product)
B Connection port	
0	Rc1/8 thread
1	Push-in fitting $\phi 4$
C Operation actuator	
PP	Pin plunger
RA	Roller arm
RAA	Adjusting roller lever
RAB	Roller lever
RAC	Roller lever
RAD	Rod lever
RAE	Wire lever
RAF	Spring rod

Piping connection method

For piping connection, either taper female thread Rc1/8 for a pipe or quick connection for an O.D. $\phi 4$ tube is selected based on the application.

● MM-00

● MM-01



MM-00 is a taper female pipe thread Rc1/8 connection.

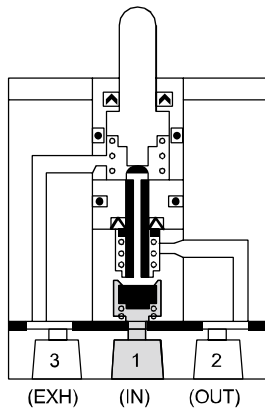
- General purpose connection is possible.
- Larger flow rate than MM-01.

MM-01 is a push-in fitting for O.D. $\phi 4$ soft nylon.

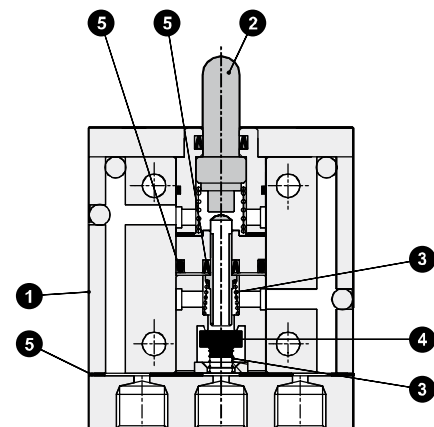
- Connection is made by simply inserting a soft nylon tube, so plumbing time is reduced significantly.
- Connecting bracket is not required. Therefore, there is no need to consider the extra space for a bracket.

Operational explanation drawing

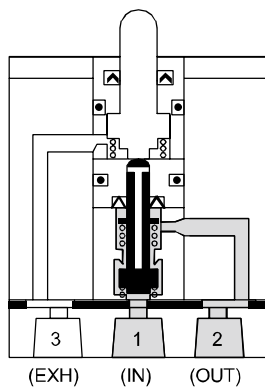
Not operating



Internal structure and parts list



Operating



Note) Pressurization from ports other than the IN (1) port is not possible.

No.	Part	Material
1	Body	Aluminum alloy
2	Spool	Stainless steel
3	Spring	Stainless steel
4	Valve	Nitrile rubber
5	Gasket	Nitrile rubber

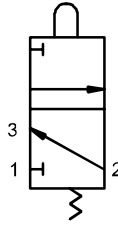
F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FniResistFR
Oil-ProhR
MedPresFR
No Cu/PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/other
Jnt/tube
AirUnt
PresCompn
Mech/ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

- F.R.L
- F (Filtr)
- R (Reg)
- L (Lub)
- PresSW
- Shutoff
- SlowStart
- FlmResistFR
- Oil-ProhR
- MedPresFR
- No Cu/
PTFE FRL
- Outdrs FR
- F.R.L
(Related)
- CompFRL
- LgFRL
- PrecsR
- VacF/R
- Clean FR
- ElecPneuR
- AirBoost
- SpdContr
- SiIncr**
- CheckV/
other
- Jnt/tube
- AirUnt
- PrecsCompn
- Mech/
ElecPresSw
- ContactSW
- AirSens
- PresSW
Cool
- AirFloSens/
Contr
- WaterRtSens
- TotAirSys
(Total Air)**
- TotAirSys
(Gamma)**
- RefrDry
- DesicDry
- HiPolymDry
- MainFiltr
- Dischrg
etc
- Ending

Dimensions: Pin plunger (normally closed valve)



JIS symbol

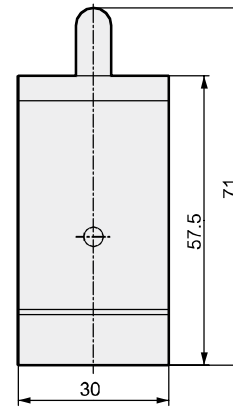
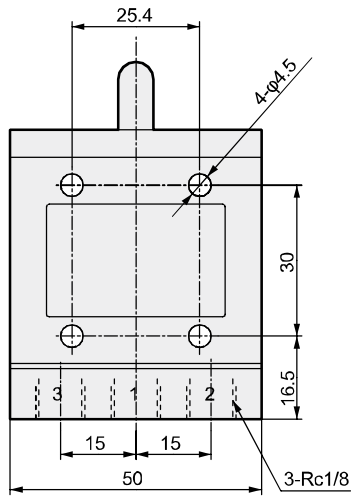


Specifications

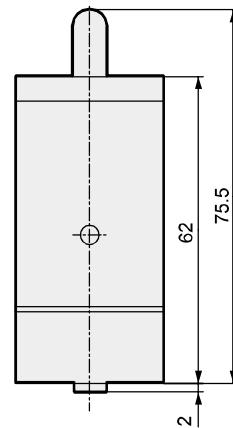
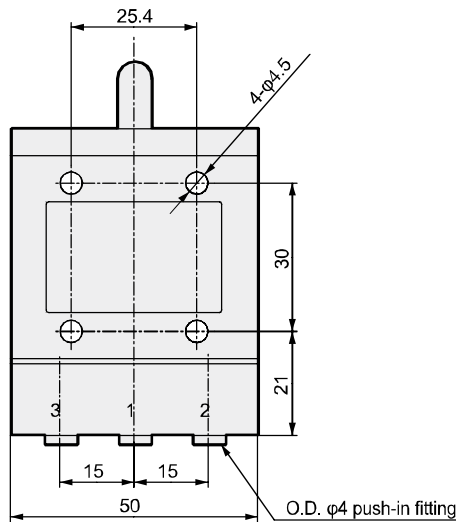
Operation code	MM-00-PP, MM-01-PP
O.F	25.5 N (when pressurized at 0.49 MPa)
P.T	1.2 mm
O.T	1.8 mm
T.T	3 mm

Refer to page 1500 for the actuator operation code.

● MM-00-PP Rc1/8 connection (Weight: 230 g)



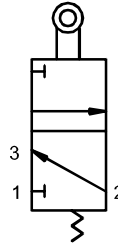
● MM-01-PP Push-in connection (Weight: 260 g)



Dimensions: Roller arm (normally closed valve)



JIS symbol

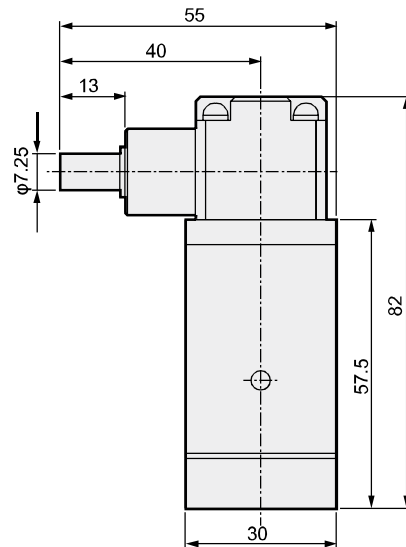
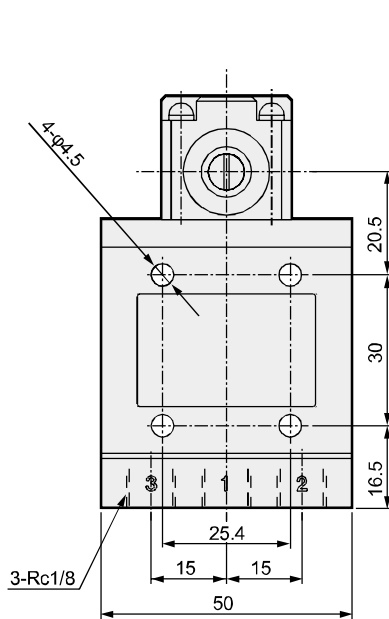


Specifications

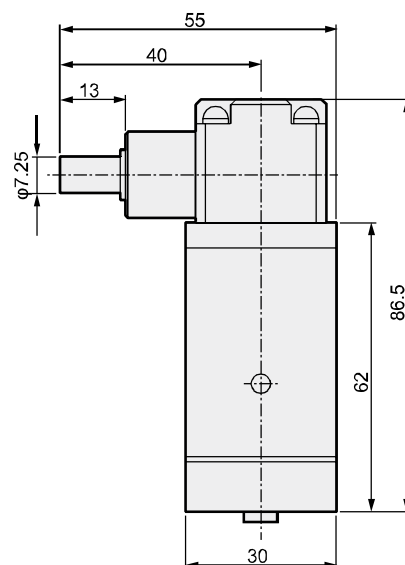
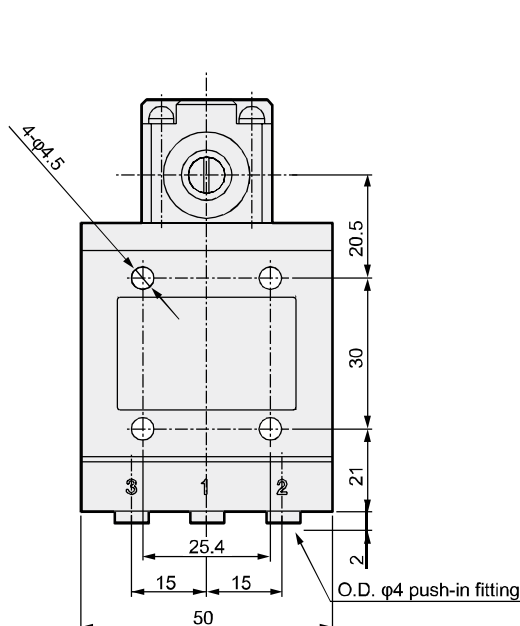
Operation code	MM-00-RA, MM-01-RA
O.F	39.2 N·cm (when pressurized at 0.49 MPa)
P.T	20°
O.T	30°
T.T	50°

Refer to page 1500 for the actuator operation code.

- MM-00-RA Rc1/8 connection (Weight: 290 g)



- MM-01-RA Push-in connection (Weight: 330 g)



F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FmResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PresCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

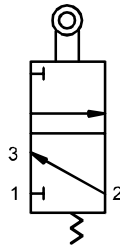


F.R.L Dimensions: Adjusting roller lever (normally closed valve)

- F (Filtr)
- R (Reg)
- L (Lub)
- PresSW
- Shutoff
- SlowStart
- FlmResistFR
- Oil-ProhR
- MedPresFR
- No Cu/ PTFE FRL
- Outdrs FR
- F.R.L (Related)
- CompFRL
- LgFRL
- PrecsR
- VacF/R
- Clean FR
- ElecPneuR
- AirBoost
- SpdContr
- Silncr
- CheckV/ other
- Jnt/tube
- AirUnt
- PrecsCompn
- Mech/ ElecPresSw
- ContactSW
- AirSens
- PresSW Cool
- AirFloSens/ Contr
- WaterRtSens
- TotAirSys (Total Air)
- TotAirSys (Gamma)
- RefrDry
- DesicDry
- HiPolymDry
- MainFiltr
- Dischrg etc
- Ending



JIS symbol

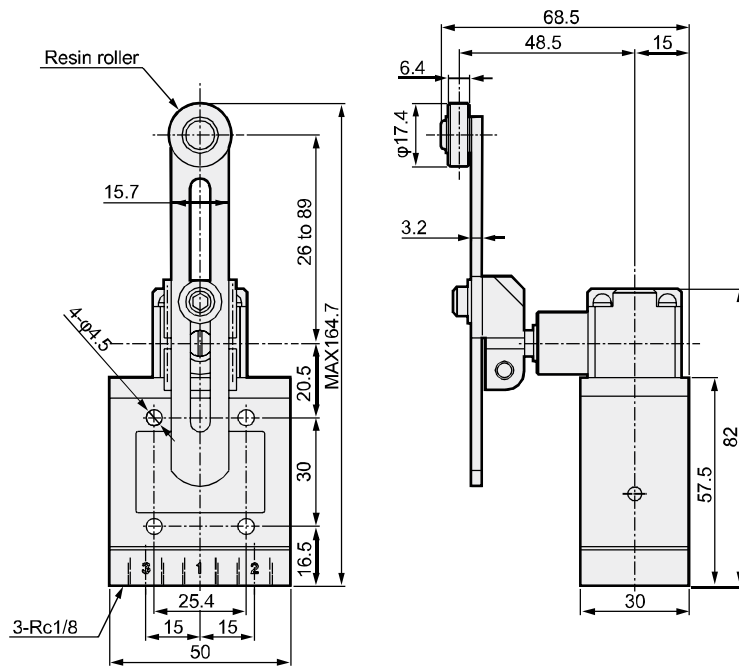


Specifications

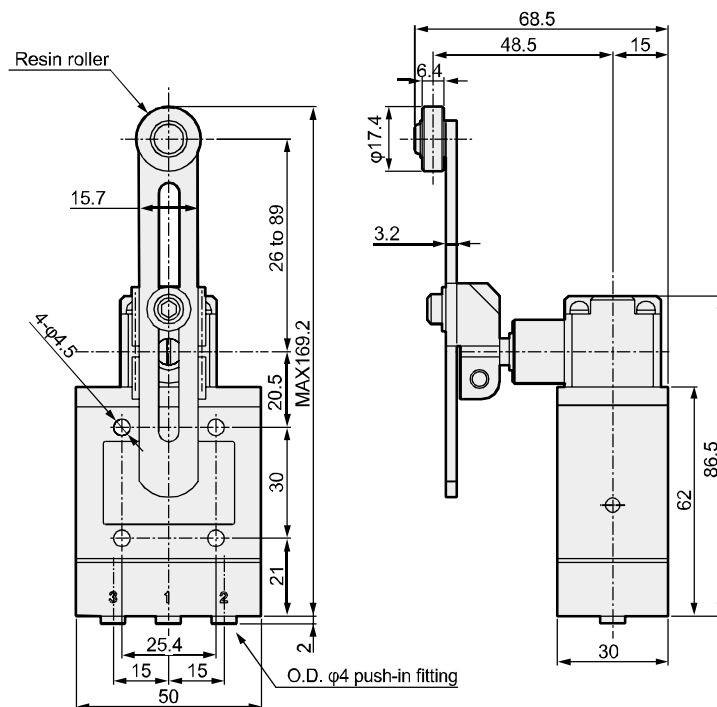
Operation code	MM-00-RAA, MM-01-RAA
O.F	4.5 N (when pressurized at 0.49 MPa)
P.T	20°
O.T	30°
T.T	50°

Refer to page 1500 for the actuator operation code.

● MM-00-RAA Rc1/8 connection (Weight: 350 g)



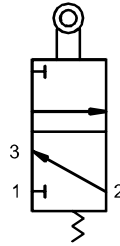
● MM-01-RAA Push-in connection (Weight: 380 g)



Dimensions: Roller lever (normally closed valve)



JIS symbol



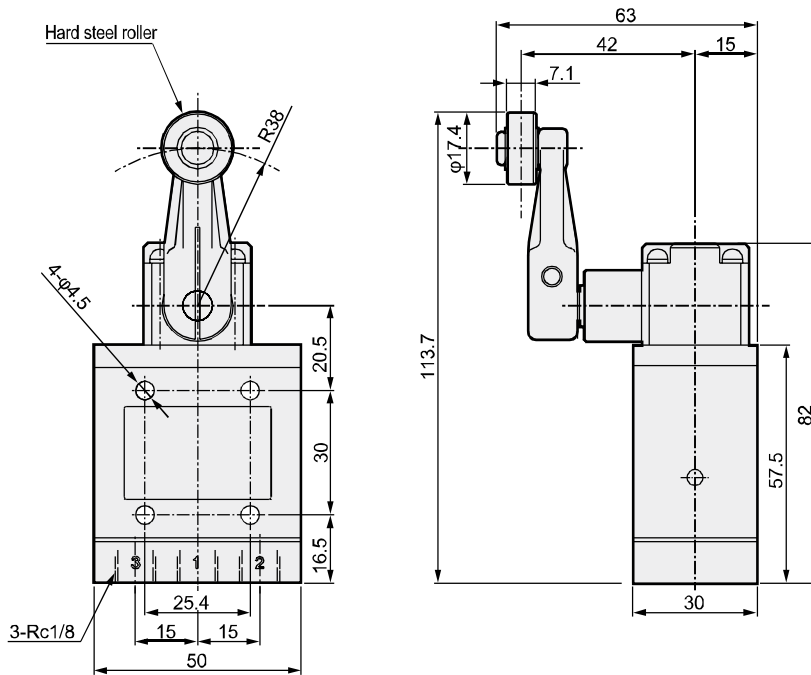
Specifications

Operation code	MM-00-RAB,MM-01-RAB
O.F	9.8 N (when pressurized at 0.49 MPa)
P.T	20°
O.T	30°
T.T	50°

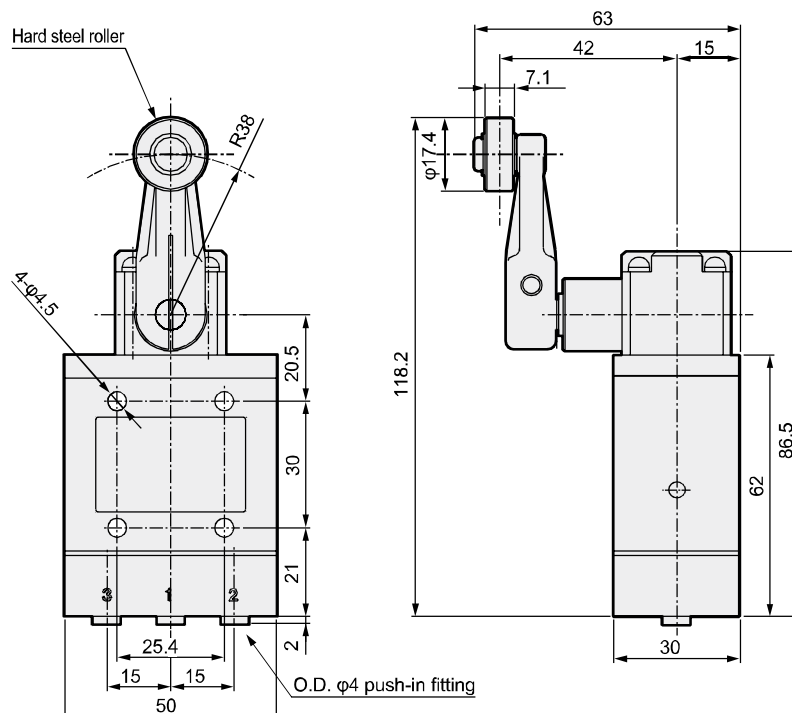
Refer to page 1500 for the actuator operation code.

* The arm fixing method differs from the RAC.

- MM-00-RAB Rc1/8 connection (Weight: 320 g)



- MM-01-RAB Push-in connection (Weight: 350 g)



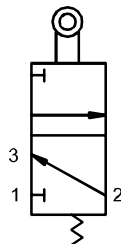
F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FmResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PresCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterPtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

- F.R.L
- F (Filtr)
- R (Reg)
- L (Lub)
- PresSW
- Shutoff
- SlowStart
- FlmResistFR
- Oil-ProhR
- MedPresFR
- No Cu/PTFE FRL
- Outdrs FR
- F.R.L (Related)
- CompFRL
- LgFRL
- PrecsR
- VacF/R
- Clean FR
- ElecPneuR
- AirBoost
- SpdContr
- Silncr
- CheckV/other
- Jnt/tube
- AirUnt
- PrecsCompn
- Mech/ElecPresSw
- ContactSW
- AirSens
- PresSW Cool
- AirFloSens/Contr
- WaterRtSens
- TotAirSys (Total Air)
- TotAirSys (Gamma)
- RefrDry
- DesicDry
- HiPolymDry
- MainFiltr
- Dischrg etc
- Ending

Dimensions: Roller lever (normally closed valve)



JIS symbol



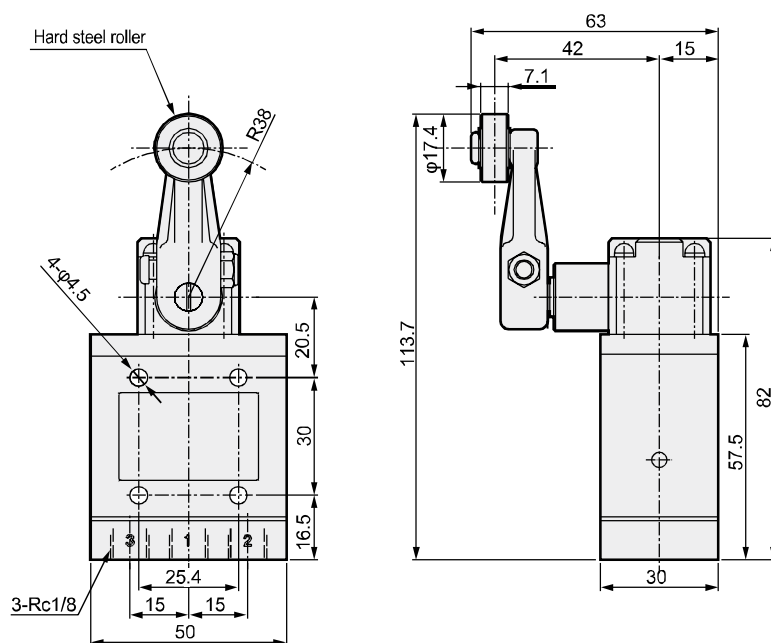
Specifications

Operation code	MM-00-RAC, MM-01-RAC
O.F	9.8 N (when pressurized at 0.49 MPa)
P.T	20°
O.T	30°
T.T	50°

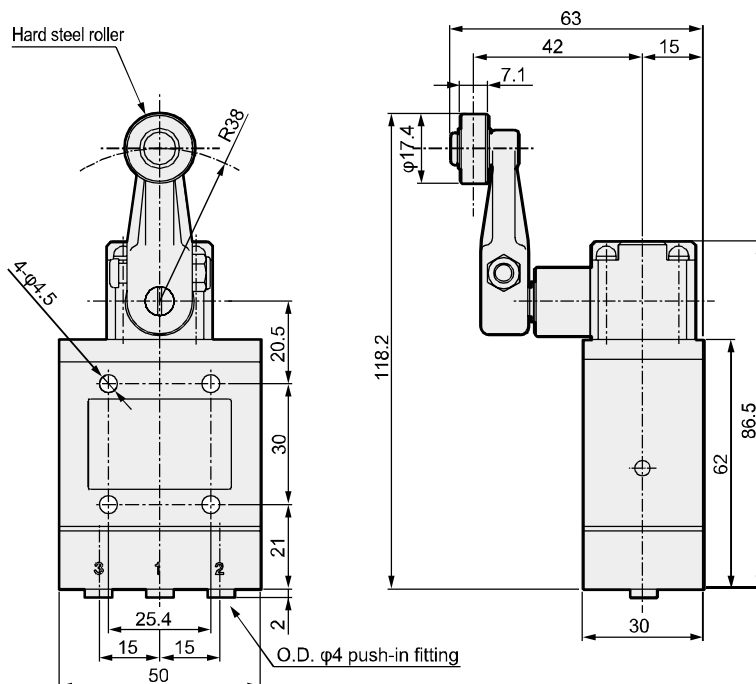
Refer to page 1500 for the actuator operation code.

* The arm fixing method differs from the RAB.

● MM-00-RAC Rc1/8 connection (Weight: 320 g)



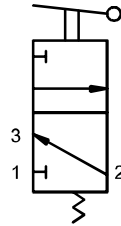
● MM-01-RAC Push-in connection (Weight: 350 g)



Dimensions: Rod lever (normally closed valve)



JIS symbol

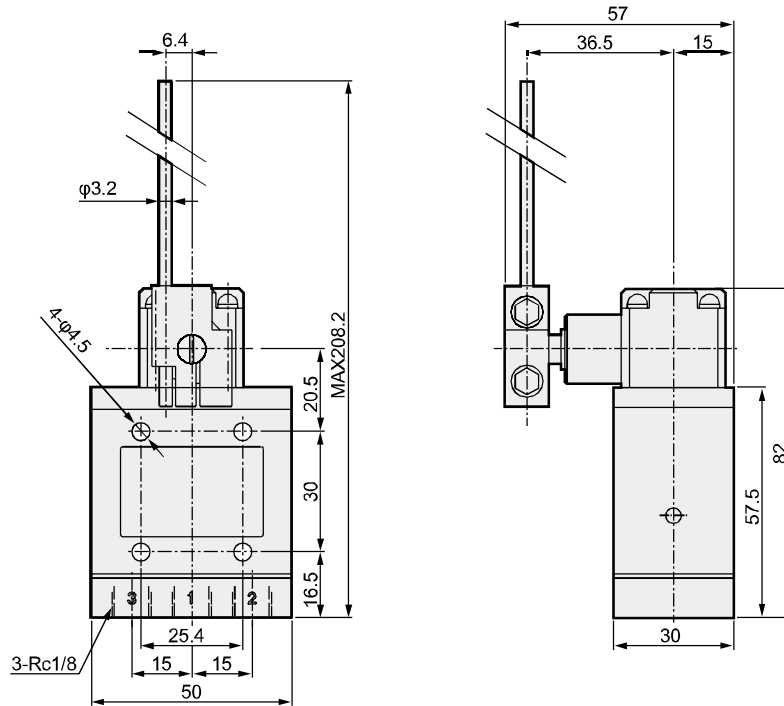


Specifications

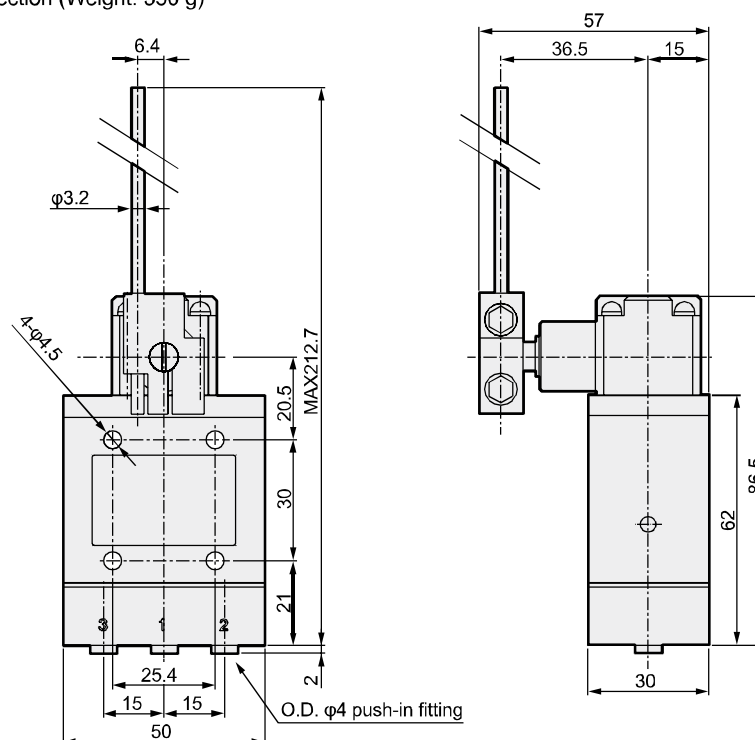
Operation code	MM-00-RAD,MM-01-RAD
O.F	2.8 N (when pressurized at 0.49 MPa)
P.T	20°
O.T	30°
T.T	50°

Refer to page 1500 for the actuator operation code.

- MM-00-RAD Rc1/8 connection (Weight: 320 g)



- MM-01-RAD Push-in connection (Weight: 350 g)



F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FmResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PresCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

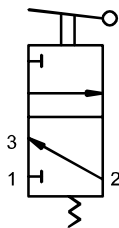


- F.R.L
- F (Filtr)
- R (Reg)
- L (Lub)
- PresSW
- Shutoff
- SlowStart
- FlmResistFR
- Oil-ProhrR
- MedPresFR
- No Cu/
PTFE FRL
- Outdrs FR
- F.R.L
(Related)
- CompFRL
- LgFRL
- PrecsR
- VacF/R
- Clean FR
- ElecPneuR
- AirBoost
- SpdContr
- Silncr**
- CheckV/
other
- Jnt/tube
- AirUnt
- PrecsCompn
- Mech/
ElecPresSw
- ContactSW
- AirSens
- PresSW
Cool
- AirFloSens/
Contr
- WaterRtSens
- TotAirSys
(Total Air)**
- TotAirSys
(Gamma)**
- RefrDry
- DesicDry
- HiPolymDry
- MainFiltr
- Dischrg
etc
- Ending

Dimensions: Wire lever (normally closed valve)



JIS symbol

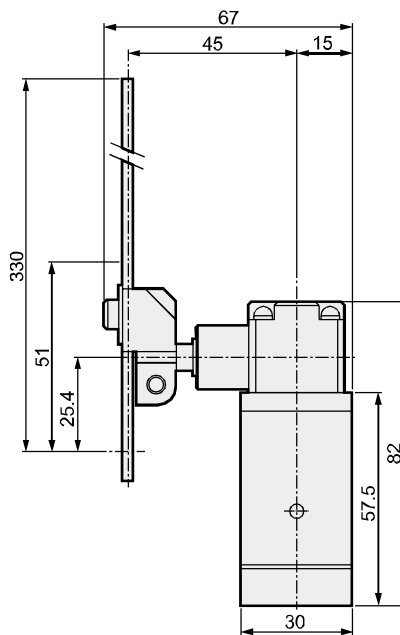
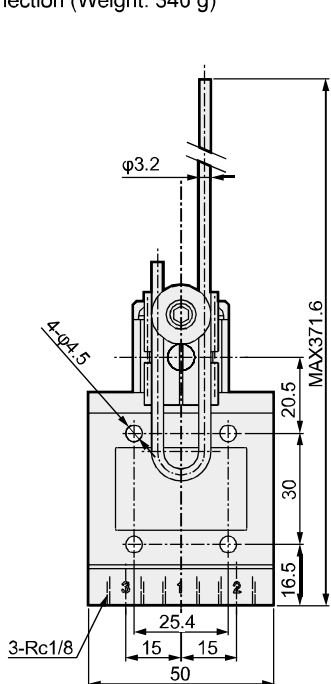


Specifications

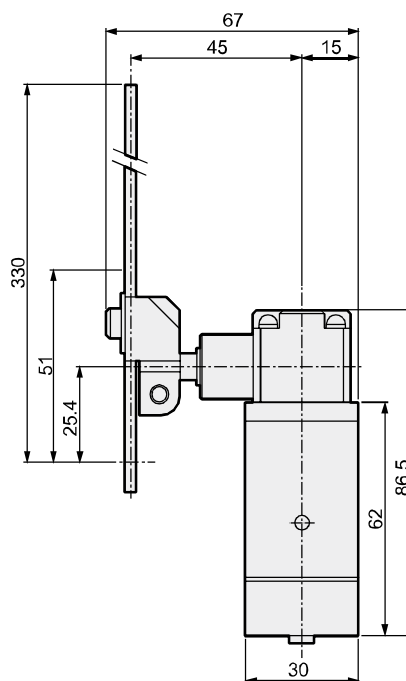
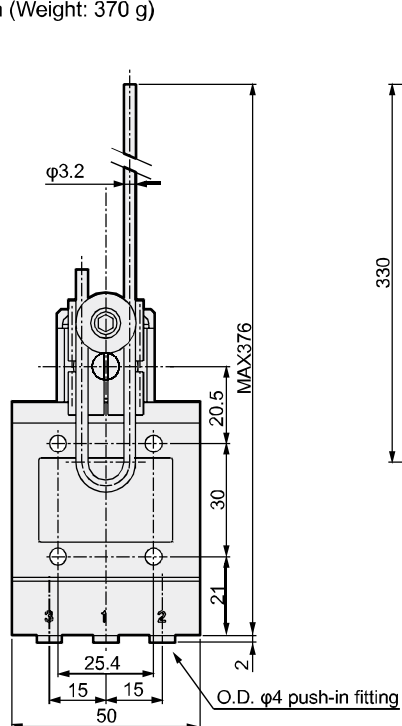
Operation code	MM-00-RAE,MM-01-RAE
O.F	1.3 N (when pressurized at 0.49 MPa)
P.T	20°
O.T	30°
T.T	50°

Refer to page 1500 for the actuator operation code.

● MM-00-RAE Rc1/8 connection (Weight: 340 g)



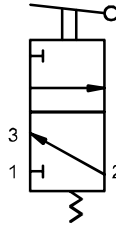
● MM-01-RAE Push-in connection (Weight: 370 g)



Dimensions: Spring rod (normally closed valve)



JIS symbol

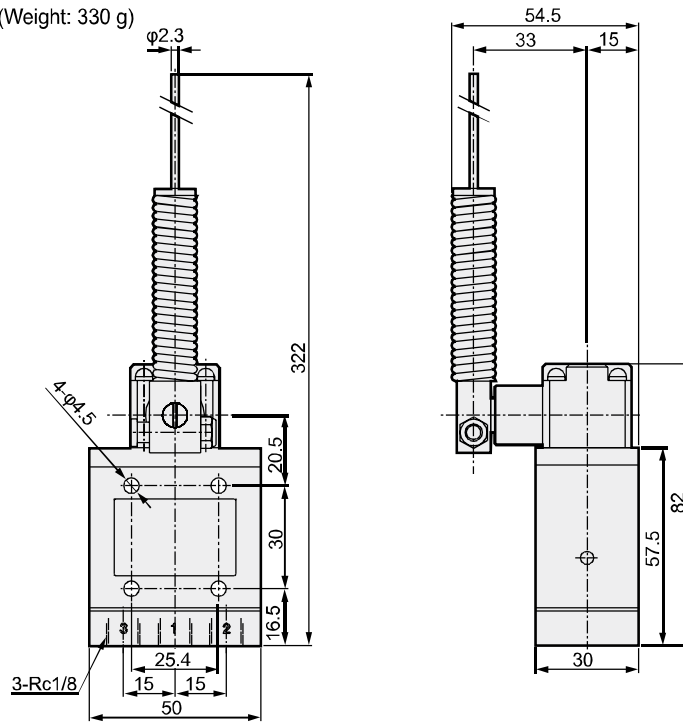


Specifications

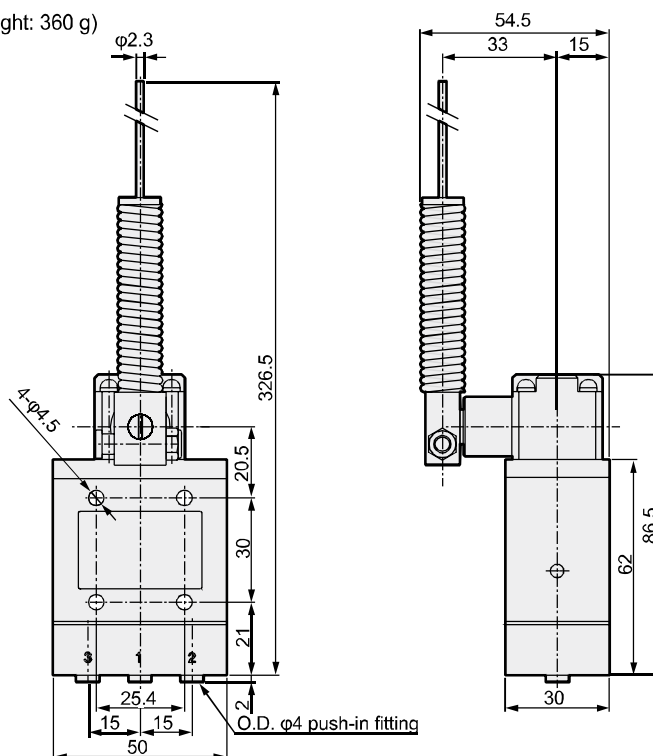
Operation code	MM-00-RAF,MM-01-RAF
O.F	1.5 N (when pressurized at 0.49 MPa)
P.T	30°
O.T	20°
T.T	50°

Refer to page 1500 for the actuator operation code.

- MM-00-RAF Rc1/8 connection (Weight: 330 g)



- MM-01-RAF Push-in connection (Weight: 360 g)



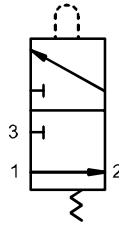
F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FmResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PresCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

- F.R.L
- F (Filtr)
- R (Reg)
- L (Lub)
- PresSW
- Shutoff
- SlowStart
- FmResistFR
- Oil-ProhR
- MedPresFR
- No Cu/
PTFE FRL
- Outdrs FR
- F.R.L
(Related)
- CompFRL
- LgFRL
- PrecsR
- VacF/R
- Clean FR
- ElecPneuR
- AirBoost
- SpdContr
- Silncr**
- CheckV/
other
- Jnt/tube
- AirUnt
- PrecsCompn
- Mech/
ElecPresSw
- ContactSW
- AirSens
- PresSW
Cool
- AirFloSens/
Contr
- WaterRtSens
- TotAirSys
(Total Air)**
- TotAirSys
(Gamma)**
- RefrDry
- DesicDry
- HiPolymDry
- MainFiltr
- Dischrg
etc
- Ending

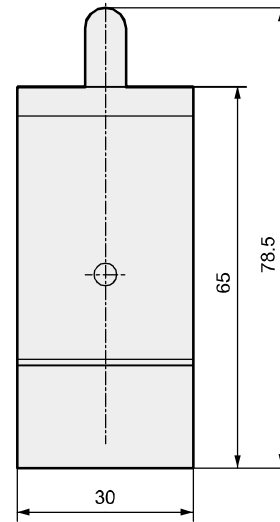
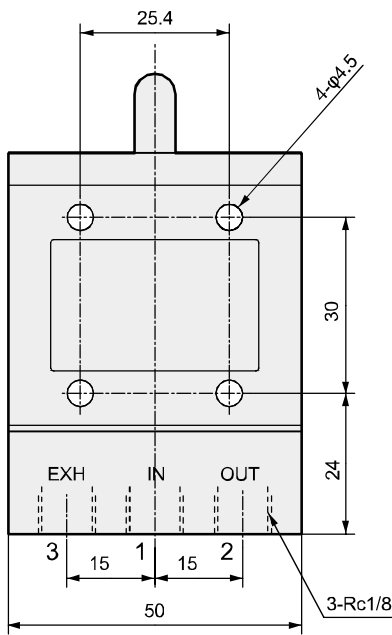
Dimensions: Normally open valve



JIS symbol



● MM-10-□ Rc1/8 connection
This drawing shows the MM-10-PP



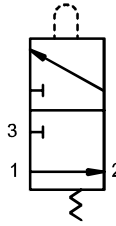
Weight

Model No.	Weight g
MM-10-PP	270
MM-10-RA	330
MM-10-RAA	390
MM-10-RAB	360
MM-10-RAC	360
MM-10-RAD	360
MM-10-RAE	380
MM-10-RAF	370

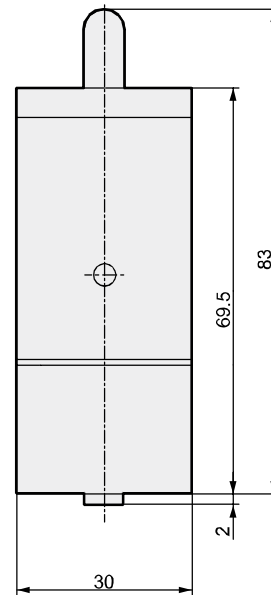
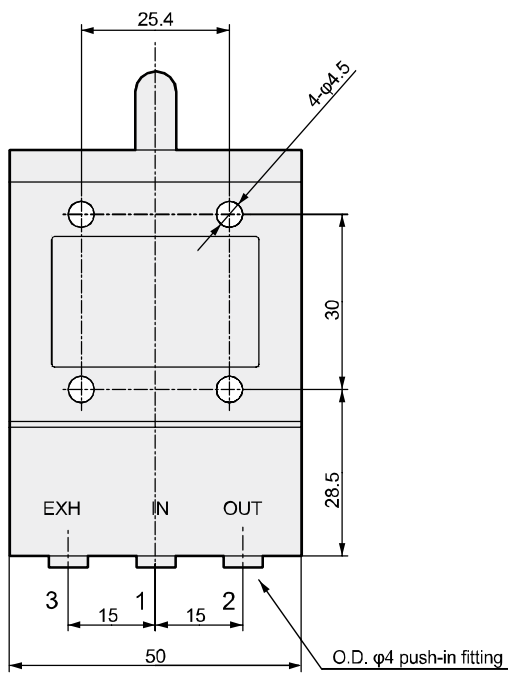
Dimensions: Normally open valve



JIS symbol



- MM-11-□ Quick connection
This drawing shows the MM-11-PP.



Weight

Model No.	Weight g
MM-11-PP	300
MM-11-RA	360
MM-11-RAA	420
MM-11-RAB	390
MM-11-RAC	390
MM-11-RAD	390
MM-11-RAE	410
MM-11-RAF	400

F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FlnResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PresCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending



Safety Precautions

Be sure to read this section before use.

Refer to Intro Page 63 for precautions for general pneumatic components.

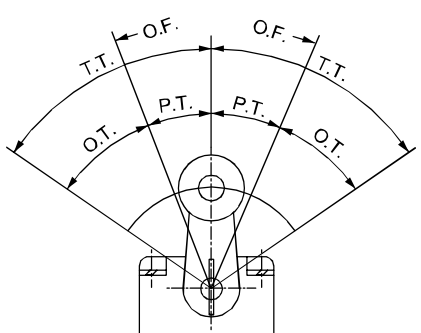
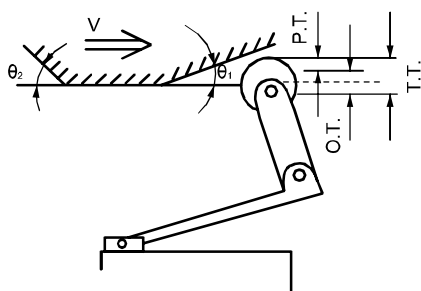
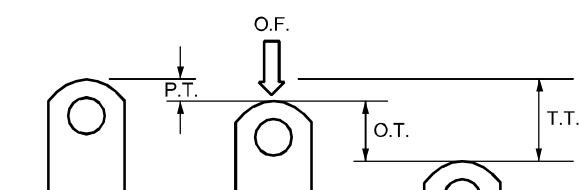
- F.R.L
- F (Filtr)
- R (Reg)
- L (Lub)
- PresSW
- Shutoff
- SlowStart
- FlmResistFR
- Oil-ProhR
- MedPresFR
- No Cu/ PTFE FRL
- Outdrs FR
- F.R.L (Related)
- CompFRL
- LgFRL
- PrecsR
- VacF/R
- Clean FR
- ElecPneuR
- AirBoost
- SpdContr
- Silncr
- CheckV/ other
- Jnt/tube
- AirUnt
- PrecsCompn
- Mech/ ElecPresSw
- ContactSW
- AirSens
- PresSW Cool
- AirFloSens/ Contr
- WaterRtSens
- TotAirSys (Total Air)
- TotAirSys (Gamma)
- RefrDry
- DesicDry
- HiPolymDry
- MainFiltr
- Dischrg etc
- Ending

Mounting, installation and adjustment

CAUTION

- Do not move the component more than the total movement (T.T.).
- Actuator operation codes used in the catalog are shown below.

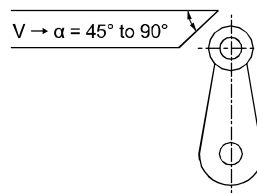
Code	Explanation
O.F.	Necessary force for operation
P.T.	Action before valve open
O.T.	Action after valve open
T.T.	Total movement



■ Dog

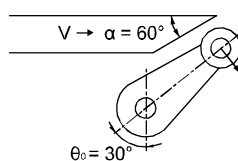
- Set the dog angle θ to 45 degree or less.
- If the dog speed is high, set θ to a small value.
- The dog operation position and depth should be designed to "P.T. + O.T./2".
- Design the cam and dog so that the lever returns gradually.

(1) $V \leq 0.2$ m/s



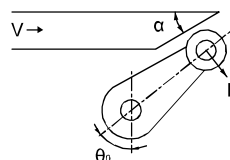
α	$V_{max}(m/s)$
90°	0.05°
75°	0.07°
60°	0.1°
45°	0.2°

(2) $V \leq 0.1$ m/s



Set the arm parallel to the dog's cut face so that the force is applied at a right angle to the arm. Generally, $\alpha = 60^\circ$ and $\theta = 30^\circ$ are desirable for dog design and arm design.

(3) $V \leq 2$ m/s



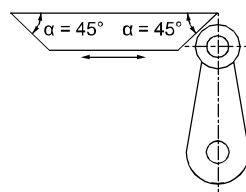
V_{max} (max. speed) increases when the angle is reduced. The arm always should be set parallel to the dog's cut face.

$\alpha = 90 - \theta$	$V_{max}(m/s)$
40°	0.7°
35°	0.9°
30°	1.3°
25°	2.0°

(4) When the dog is exceeded

($V \leq 0.2$ m/s)

Set the arm perpendicularly so that $\alpha = 45^\circ$.
 $V \leq 0.2$ m/s is preferred.



- Do not use the mechanical valve body as a mechanical stopper.

- Do not apply excessive force when operating the toggle switch (MS-*/-TG).



Compact mechanical valve

MS Series

This compact 3-way valve for pneumatic control is equivalent to a micro switch for electric devices and operates with mechanical detection or manual operation.

● Port size: Rc1/8, $\phi 4$

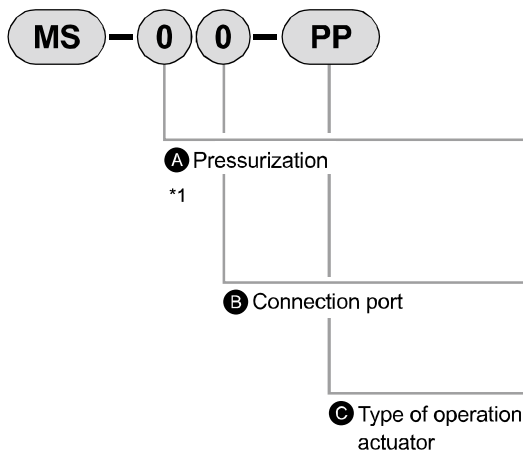


Common specifications

Descriptions	MS-00	MS-01	MS-10	MS-11
	Normally closed	Normally closed	Normally open	Normally open
Working fluid	Compressed air			
Valve structure	Poppet valve			
Min. working pressure MPa	0 (≈ 0 psi, 0 bar)			
Max. working pressure MPa	0.8 (≈ 120 psi, 8 bar)			
Proof pressure MPa	1.2 (≈ 170 psi, 12 bar)			
Port size	Rc1/8	$\phi 4$	Rc1/8	$\phi 4$
Effective cross-sectional area mm ²	2.5	1.6	2.5	1.6
Ambient temperature °C	5 (41°F) to 60 (140°F)			
Fluid temperature °C	5 (41°F) to 60 (140°F)			

Note: A normally open valve is a custom order product.

How to order

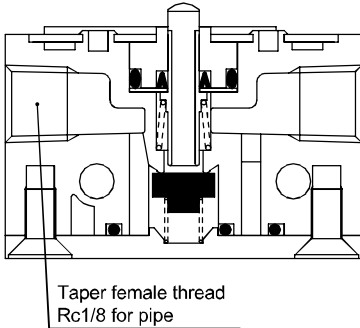


Code	Content
A Pressurization	
0	Normally closed valve
1	Normally open valve (custom order product)
4	4-way valve
B Connection port	
0	Rc1/8 thread
1	Push-in fitting $\phi 4$
C Type of operation actuator	
PP	Pin plunger
RL	Roller lever
RLOW	One way roller lever
RP	Roller plunger
SP	Straight plunger
TG	Toggle switch
PB1-*1	Pushbutton valve
ESP-*2	Mushroom valve
SE1	Select valve
SE2	Select valve (2-station type)
*1 For push button type color code (PB1)	
Blank	Black, green, and red are contained. Make a selection depending on the color to be used.
Y	Yellow
*2 For mushroom color code (ESP)	
B	Black
G	Green
R	Red
Y	Yellow

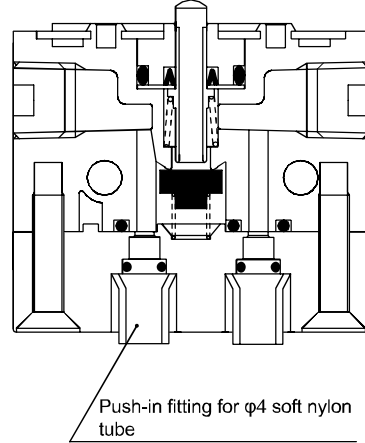
Piping connection method

For piping connection, either taper female thread Rc1/8 connection for a pipe or quick connection for an O.D. φ4 tube is selected based on the application.

● MS-00-□ taper female thread
Rc1/8 for pipe



● MS-01-□
push-in fitting for O.D. φ4 soft nylon



MS-00 is a taper female pipe thread Rc1/8 connection.

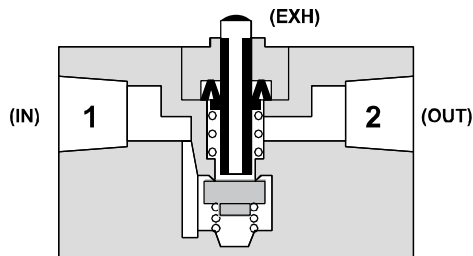
- General purpose connection is possible.
- Larger flow rate than MS-01.

MS-01 is a push-in fitting for O.D. φ4 soft nylon.

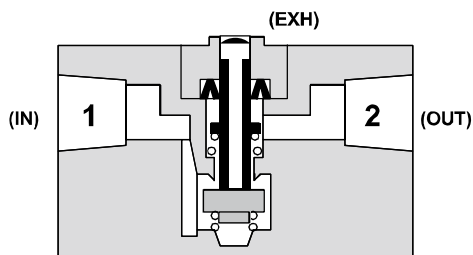
- Connection is made by simply inserting a soft nylon tube, so plumbing time is reduced significantly.
- Connecting bracket is not required. Therefore, there is no need to consider the extra space for a bracket.

Operational explanation drawing

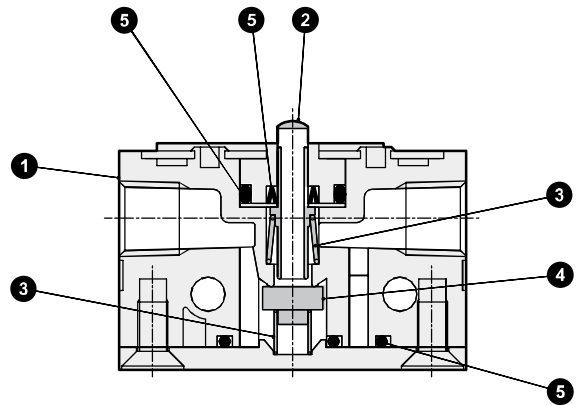
Not operating



Operating



Internal structure and parts list



No.	Part	Material
1	Body	Zinc alloy
2	Spool	Stainless steel
3	Spring	Stainless steel
4	Valve	Nitrile rubber
5	Gasket	Nitrile rubber

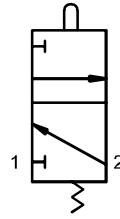
Note) Pressurization in the reverse direction (pressurized from Port 2) is not possible.

F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FlnResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
OutdirS FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PresCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending



Dimensions: Pin plunger (normally closed valve)

JIS symbol



Specifications

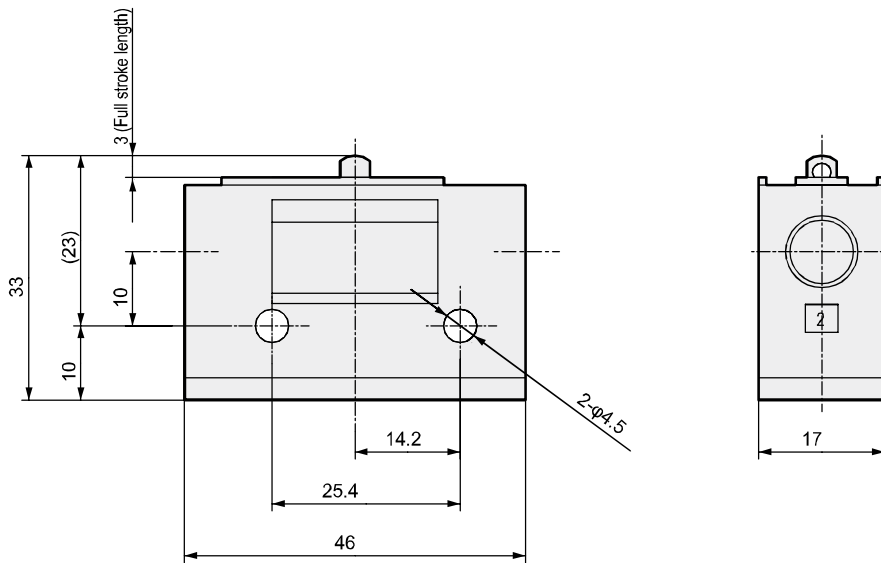
Operation code	MS-00-PP,MS-01-PP
O.F	10.8 N (when pressurized at 0.49 MPa)
P.T	1.2 mm
O.T	1.8 mm
T.T	3 mm

Note: Use within 3 mm operation.

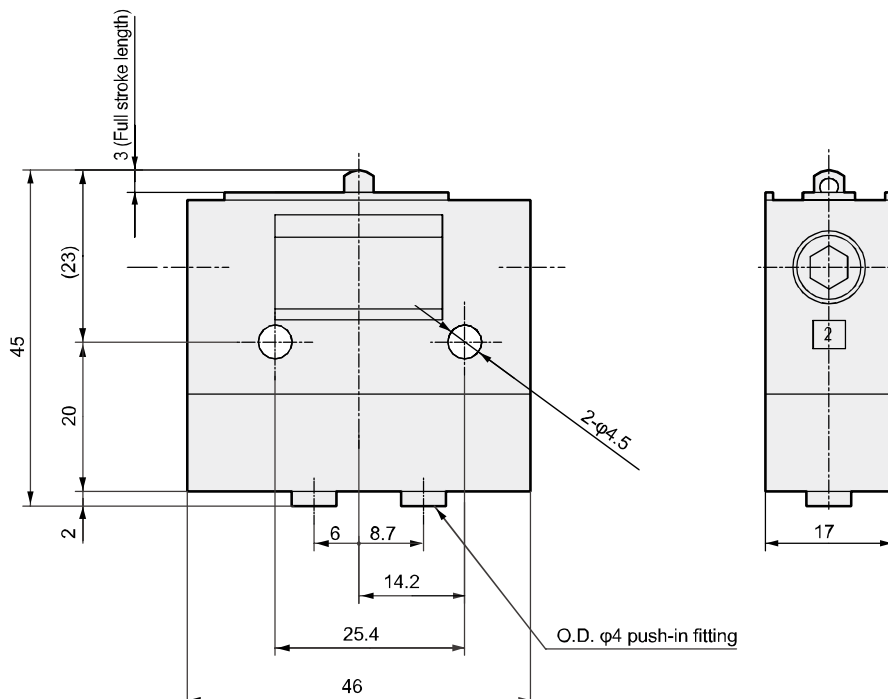
(If operated 3 mm and over repeatedly, the product may be damaged.)

Refer to page 1500 for the actuator operation code.

● MS-00-PP Rc1/8 connection (Weight: 110 g)



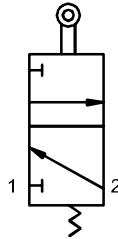
● MS-01-PP Push-in connection (Weight: 160 g)



Dimensions: Roller lever (normally closed valve)



JIS symbol

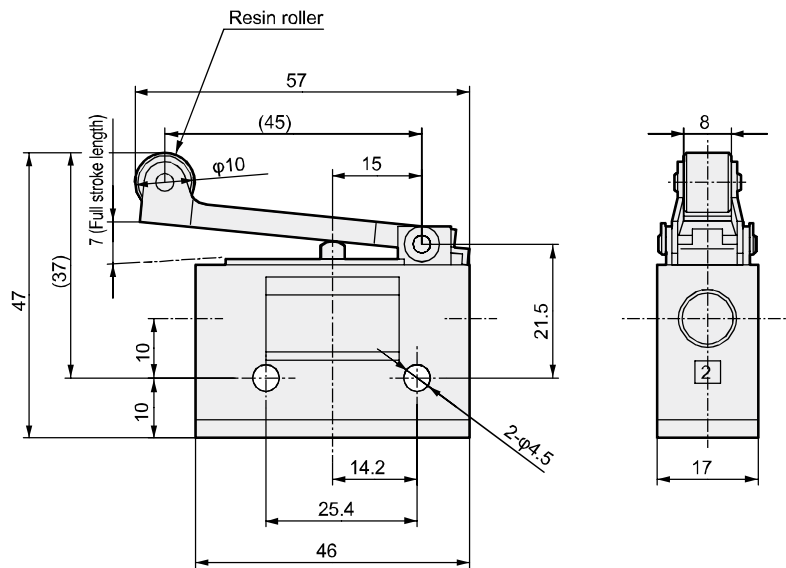


Specifications

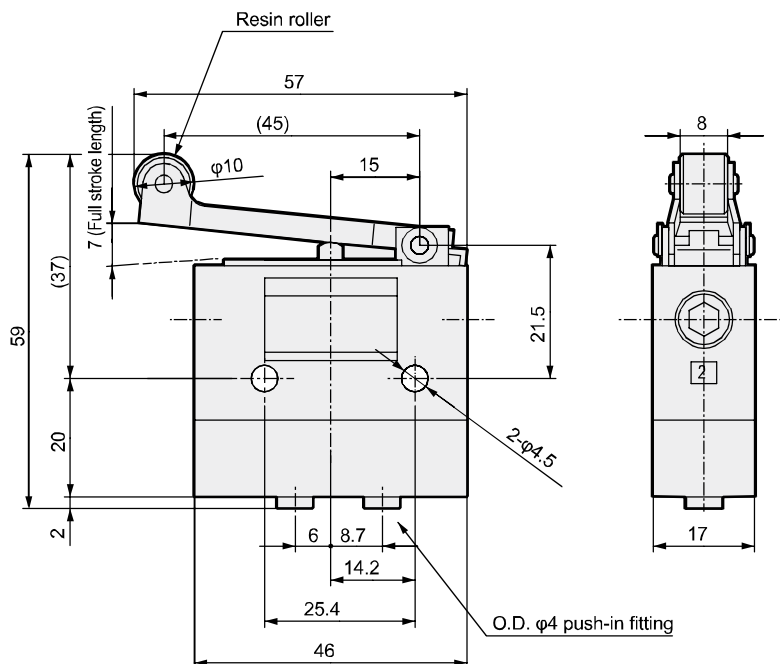
Operation code	MS-00-RL,MS-01-RL
O.F	3.5 N (when pressurized at 0.49 MPa)
P.T	4.1 mm
O.T	2.9 mm
T.T	7 mm

Refer to page 1500 for the actuator operation code.

- MS-00-RL Rc1/8 connection (Weight: 120 g)



- MS-01-RL Push-in connection (Weight: 170 g)

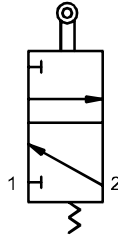


F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FmResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PresCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

Dimensions: Roller plunger (normally closed valve)



JIS symbol

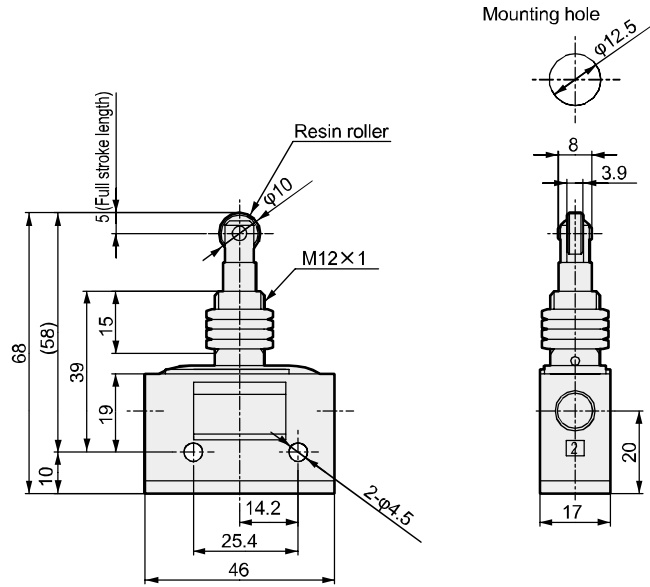


Specifications

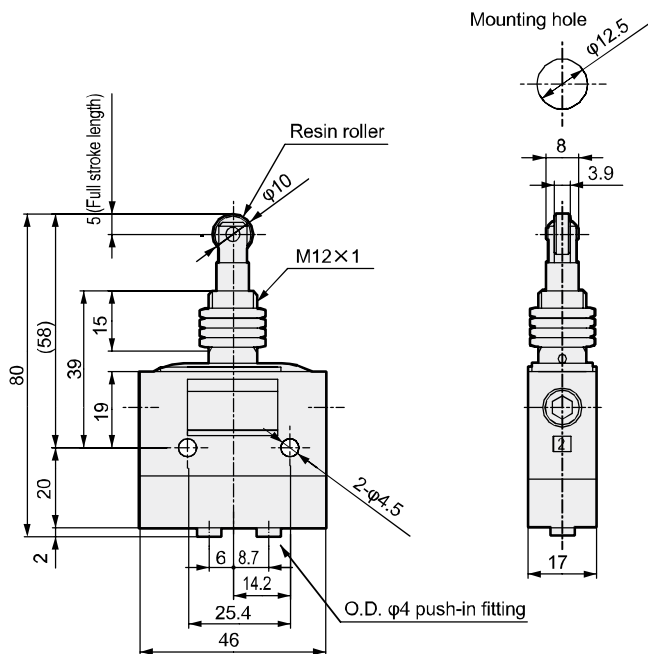
Operation code	MS-00-RP,MS-01-RP
O.F	10.8 N (when pressurized at 0.49 MPa)
P.T	1.3 mm
O.T	3.7 mm
T.T	5 mm

Refer to page 1500 for the actuator operation code.
 * If a roller is used while pushed and rotated, the roller section is worn away quickly, and the product may malfunction.

● MS-00-RP Rc1/8 connection (Weight: 140 g)



● MS-01-RP Push-in connection (Weight: 190 g)



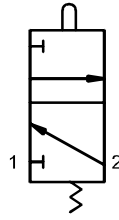
F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FlnResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PresCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending



F.R.L Dimensions: Straight plunger (normally closed valve)

- F (Filtr)
- R (Reg)
- L (Lub)
- PresSW
- Shutoff
- SlowStart
- FlmResistFR
- Oil-ProhR
- MedPresFR
- No Cu/PTFE FRL
- Outdrs FR
- F.R.L (Related)
- CompFRL
- LgFRL
- PrecsR
- VacF/R
- Clean FR
- ElecPneuR
- AirBoost
- SpdContr
- SiIncr
- CheckV/other
- Jnt/tube
- AirUnt
- PrecsCompn
- Mech/ElecPresSw
- ContactSW
- AirSens
- PresSW Cool
- AirFloSens/Contr
- WaterRtSens
- TotAirSys (Total Air)
- TotAirSys (Gamma)
- RefrDry
- DesicDry
- HiPolymDry
- MainFiltr
- Dischrg etc
- Ending

JIS symbol

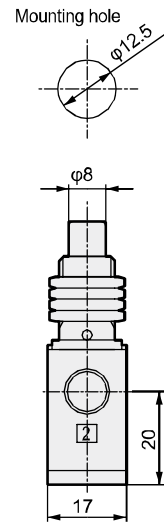
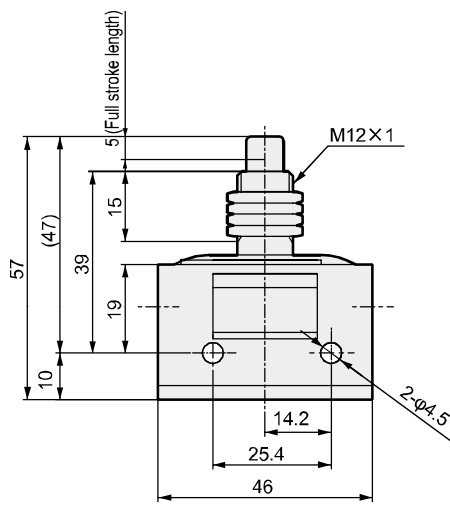


Specifications

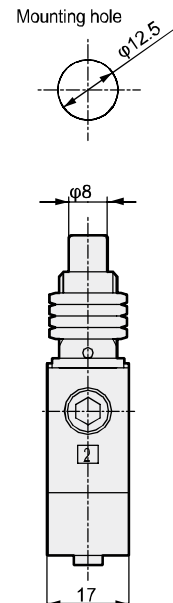
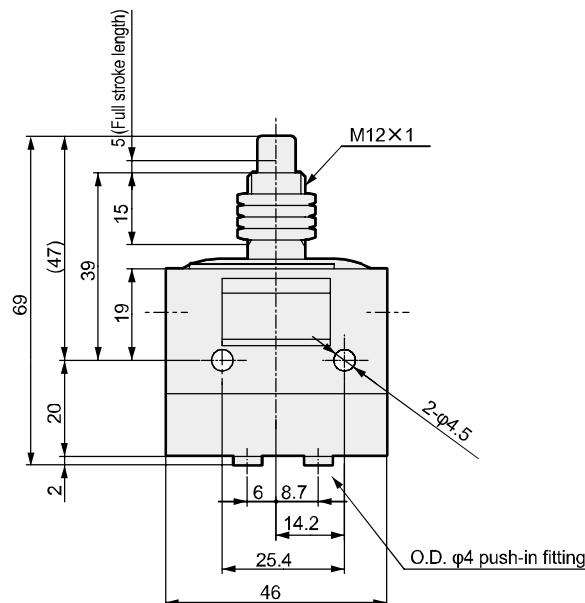
Operation code	MS-00-SP, MS-01-SP
O.F	10.8 N (when pressurized at 0.49 MPa)
P.T	1.3 mm
O.T	3.7 mm
T.T	5 mm

Refer to page 1500 for the actuator operation code.

● MS-00-SP Rc1/8 connection (Weight: 140 g)



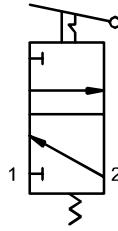
● MS-01-SP Push-in connection (Weight: 190 g)



Dimensions: Toggle switch (normally closed valve)



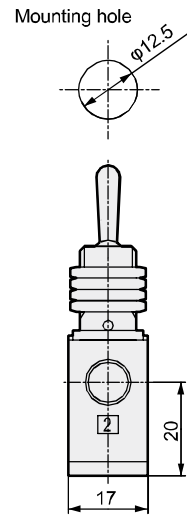
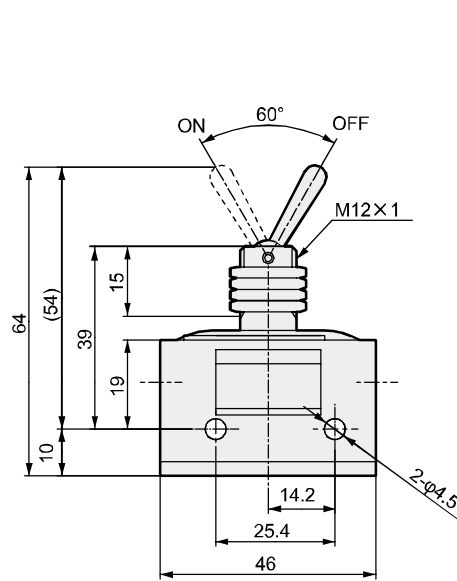
JIS symbol



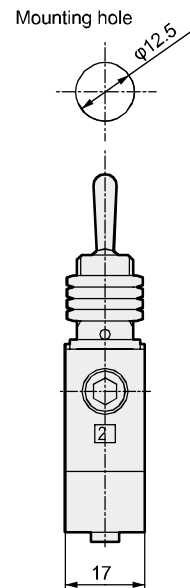
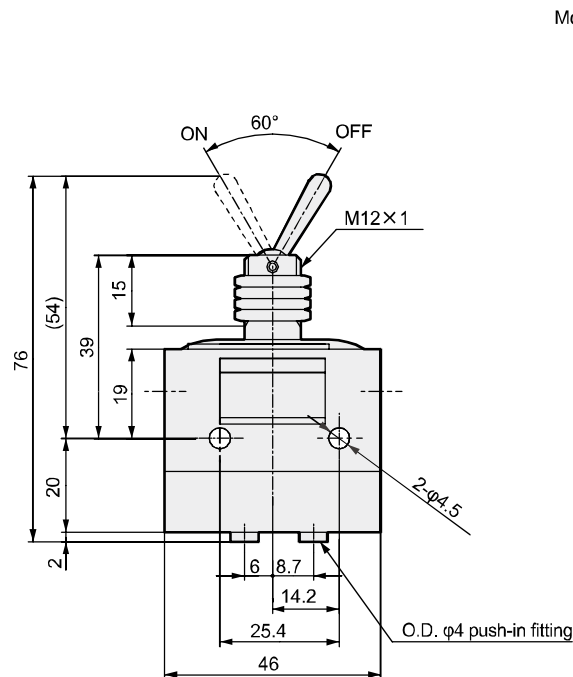
Specifications

Descriptions	MS-00-TG,MS-01-TG
Operating angle	60°

- MS-00-TG Rc1/8 connection (Weight: 140 g)



- MS-01-TG Push-in connection (Weight: 190 g)



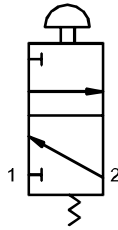
F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FhiResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PresCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

F.R.L Dimensions: Pushbutton valve (normally closed valve)



- F (Filtr)
- R (Reg)
- L (Lub)
- PresSW
- Shutoff
- SlowStart
- FmResistFR
- Oil-ProhR
- MedPresFR
- No Cu/PTFE FRL
- Outdrs FR
- F.R.L (Related)
- CompFRL
- LgFRL
- PrecsR
- VacF/R
- Clean FR
- ElecPneuR
- AirBoost
- SpdContr
- Silncr
- CheckV/other
- Jnt/tube
- AirUnt
- PrecsCompn
- Mech/ElecPresSw
- ContactSW
- AirSens
- PresSW Cool
- AirFloSens/Contr
- WaterRtSens
- TotAirSys (Total Air)
- TotAirSys (Gamma)
- RefrDry
- DesicDry
- HiPolymDry
- MainFiltr
- Dischrg etc
- Ending

JIS symbol



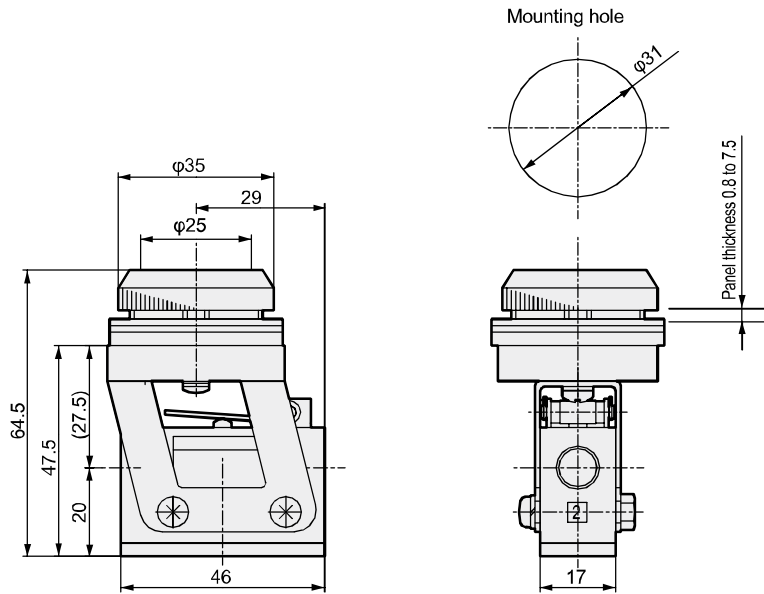
Pushbutton color

Code	Color
Blank	Red
	Green
	Black
Y	Yellow

(Note) 3 types of color chips (R: red, G: green, B: black) are contained. Make a selection depending on the color to be used.

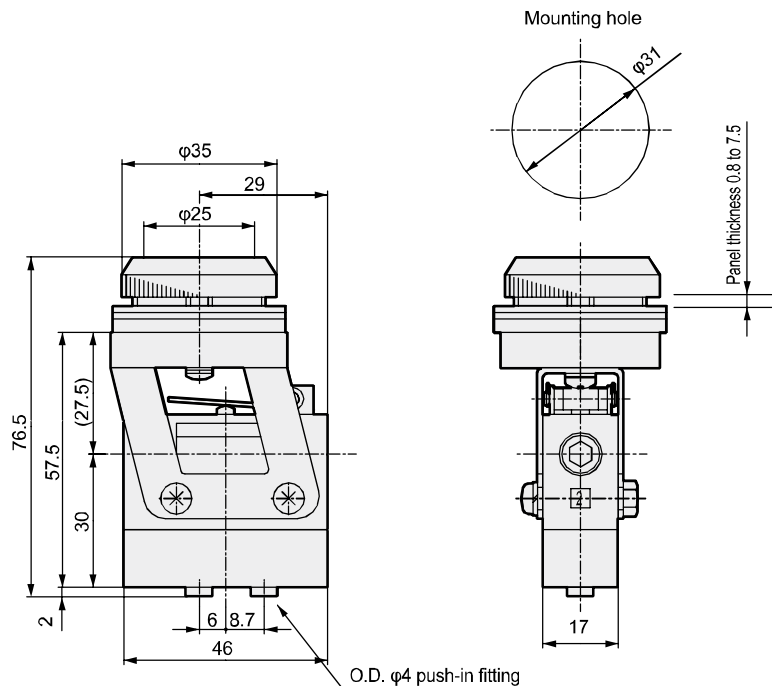
● MS-00-PB1* Rc1/8 connection (Weight: 180 g)

(* mark indicates pushbutton color.)



● MS-01-PB1* Push-in connection (Weight: 230 g)

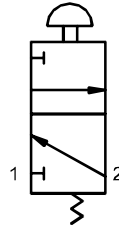
(* mark indicates pushbutton color.)



Dimensions: Mushroom valve (normally closed valve)



JIS symbol

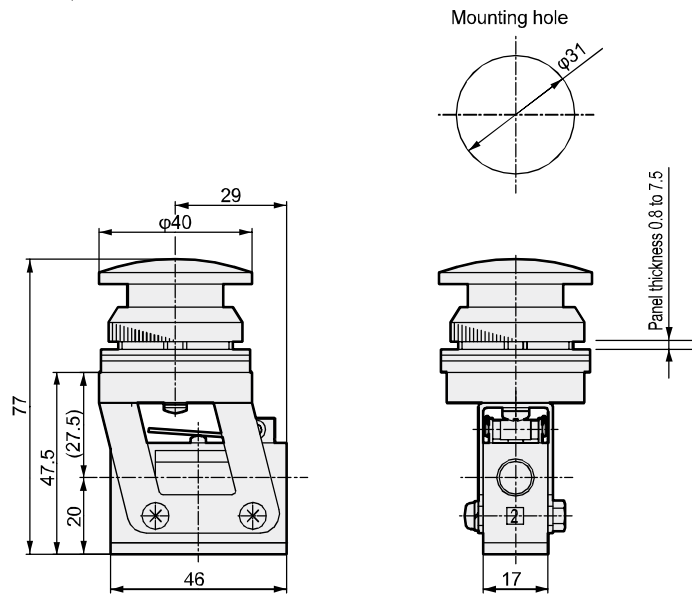


Pushbutton color

Code	Color
R	Red
G	Green
B	Black
Y	Yellow

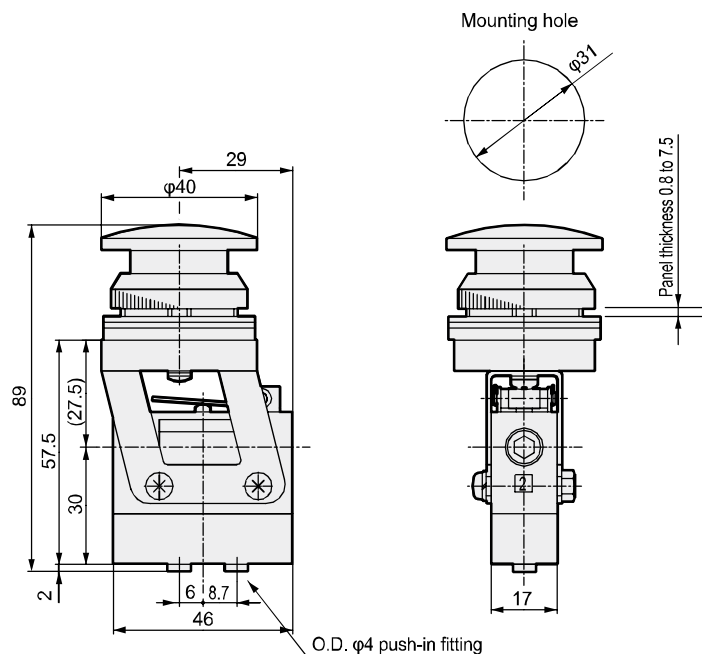
- MS-00-ESP-* Rc1/8 connection (Weight: 180 g)

(* mark indicates pushbutton color.)



- MS-01-ESP-* Push-in connection (Weight: 230 g)

(* mark indicates pushbutton color.)



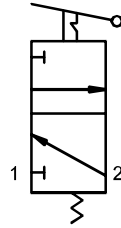
- F.R.L
- F (Filtr)
- R (Reg)
- L (Lub)
- PresSW
- Shutoff
- SlowStart
- FhiResistFR
- Oil-ProhR
- MedPresFR
- No Cu/ PTFE FRL
- Outdrs FR
- F.R.L (Related)
- CompFRL
- LgFRL
- PrecsR
- VacF/R
- Clean FR
- ElecPneuR
- AirBoost
- SpdContr
- Silncr
- CheckV/ other
- Jnt/tube
- AirUnt
- PresCompn
- Mech/ ElecPresSw
- ContactSW
- AirSens
- PresSW Cool
- AirFloSens/ Contr
- WaterRtSens
- TotAirSys (Total Air)
- TotAirSys (Gamma)
- RefrDry
- DesicDry
- HiPolymDry
- MainFiltr
- Dischrg etc
- Ending



F.R.L Dimensions: Select valve (normally closed valve)



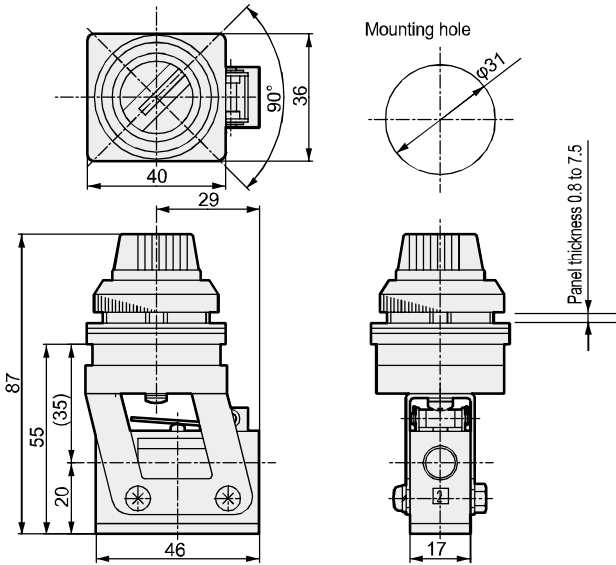
JIS symbol



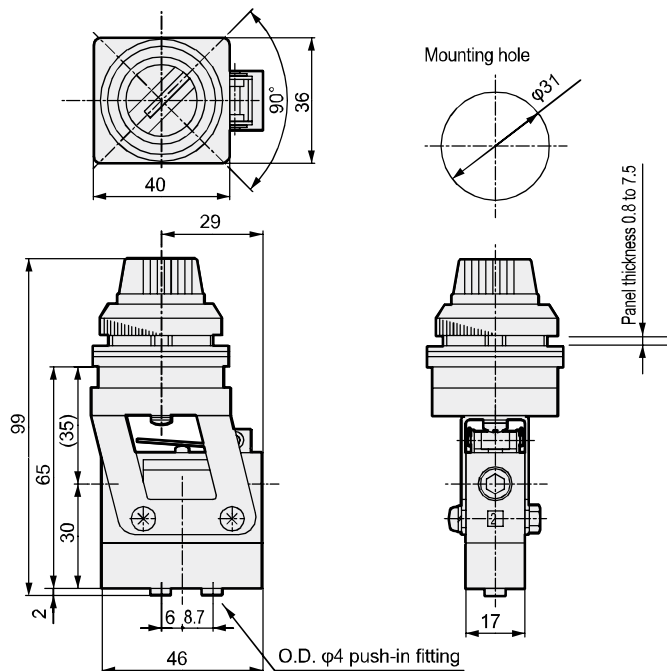
Specifications

Descriptions	MS-00-SE1,MS-01-SE1
Operating angle	90°
Knob color	Black

● MS-00-SE1 Rc1/8 connection (Weight: 190 g)



● MS-01-SE1 Push-in connection (Weight: 240 g)

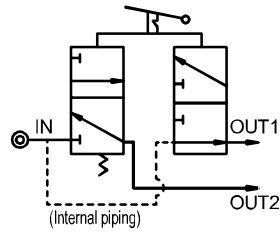


- F.R.L
- F (Filtr)
- R (Reg)
- L (Lub)
- PresSW
- Shutoff
- SlowStart
- FmResistFR
- Oil-ProhR
- MedPresFR
- No Cu/PTFE FRL
- Outdrs FR
- F.R.L (Related)
- CompFRL
- LgFRL
- PrecsR
- VacF/R
- Clean FR
- ElecPneuR
- AirBoost
- SpdContr
- Silncr
- CheckV/other
- Jnt/tube
- AirUnt
- PrecsCompn
- Mech/ElecPresSw
- ContactSW
- AirSens
- PresSW Cool
- AirFloSens/Contr
- WaterRtSens
- TotAirSys (Total Air)
- TotAirSys (Gamma)
- RefrDry
- DesicDry
- HiPolymDry
- MainFiltr
- Dischrg etc
- Ending

Dimensions: Select valve (2 stations) 4-way valve



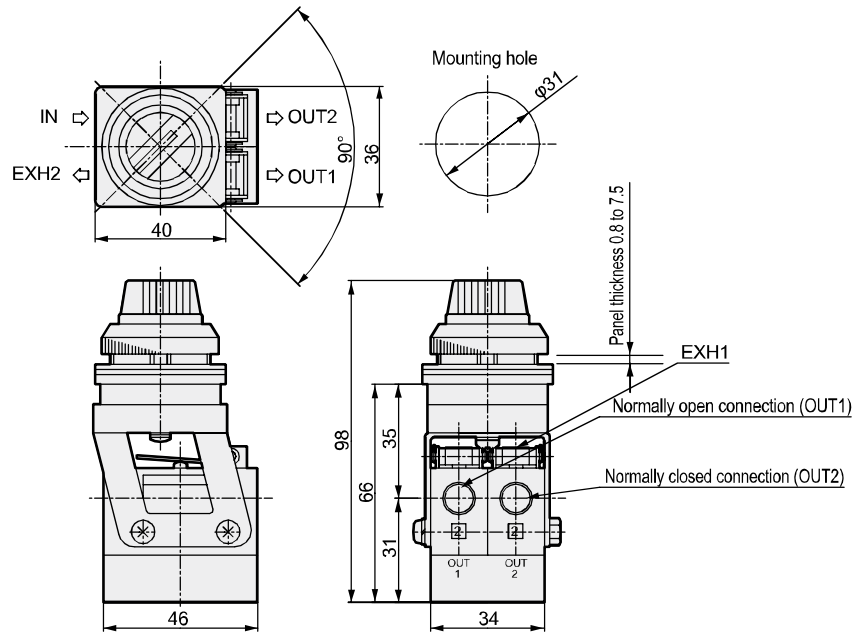
JIS symbol



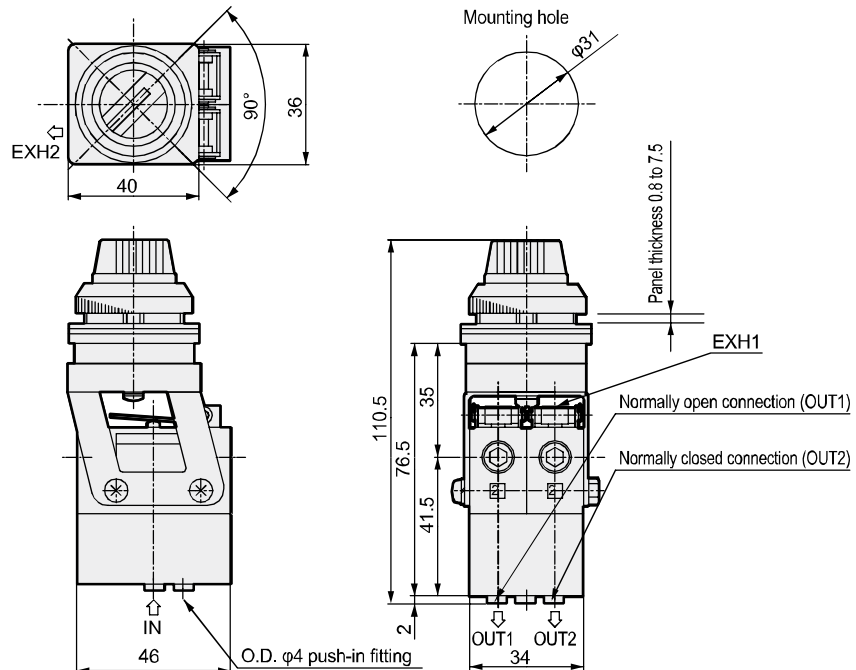
Specifications

Descriptions	MS-40-SE2, MS-41-SE2
Operating angle	90°
Knob color	Black

- MS-40-SE2 Rc1/8 connection (Weight: 350 g)



- MS-41-SE2 Push-in connection (Weight: 430 g)



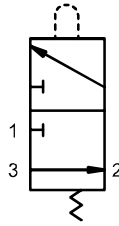
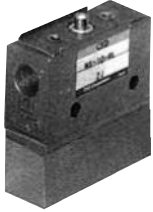
F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FhiResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PresCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

- F.R.L
- F (Filtr)
- R (Reg)
- L (Lub)
- PresSW
- Shutoff
- SlowStart
- FmResistFR
- Oil-ProhR
- MedPresFR
- No Cu/
PTFE FRL
- Outdrs FR
- F.R.L
(Related)
- CompFRL
- LgFRL
- PrecsR
- VacF/R
- Clean FR
- ElecPneuR
- AirBoost
- SpdContr
- Silncr**
- CheckV/
other
- Jnt/tube
- AirUnt
- PrecsCompn
- Mech/
ElecPresSw
- ContactSW
- AirSens
- PresSW
Cool
- AirFloSens/
Contr
- WaterRtSens
- TotAirSys
(Total Air)**
- TotAirSys
(Gamma)**
- RefrDry
- DesicDry
- HiPolymDry
- MainFiltr
- Dischrg
etc
- Ending

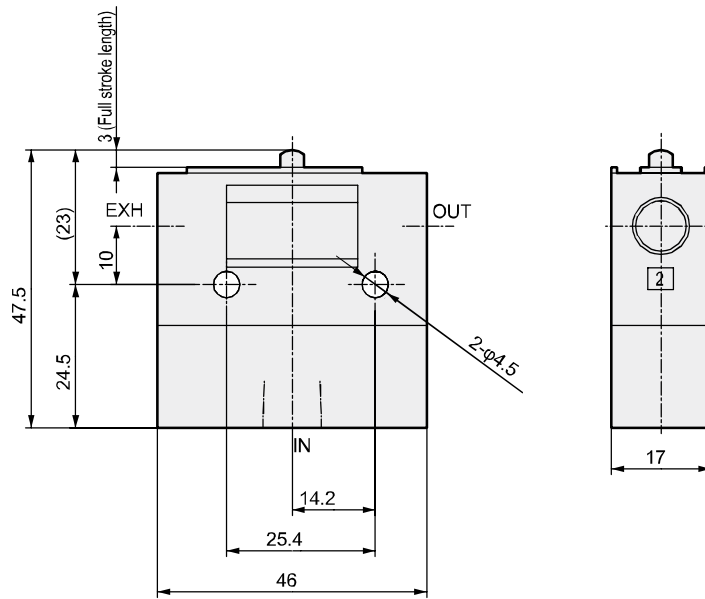
Dimensions: Normally open valve



JIS symbol



● MS-10- □ Rc1/8 connection
This drawing shows the MS-10-PP.



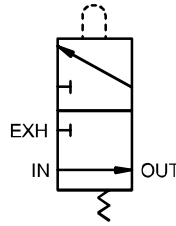
Weight

Model No.	Weight g
MS-10-PP	140
MS-10-RL	150
MS-10-RL0W	160
MS-10-RP	170
MS-10-SP	170
MS-10-TG	170
MS-10-PB1	210
MS-10-ESP	210
MS-10-SE1	220

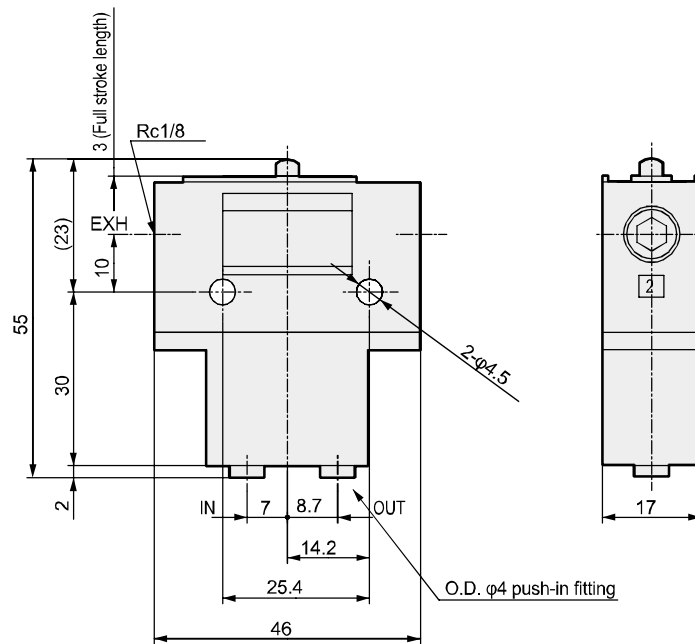
Dimensions: Normally open valve



JIS symbol



- MS-11-□ Quick connection
This drawing shows the MS-11-PP.



Weight

Model No.	Weight g
MS-11-PP	140
MS-11-RL	150
MS-11-RLOW	160
MS-11-RP	170
MS-11-SP	170
MS-11-TG	170
MS-11-PB1	210
MS-11-ESP	210
MS-11-SE1	220

F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FhiResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdirs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PresCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterPtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending



Safety Precautions

Be sure to read this section before use.

Refer to Intro Page 63 for precautions for general pneumatic components.

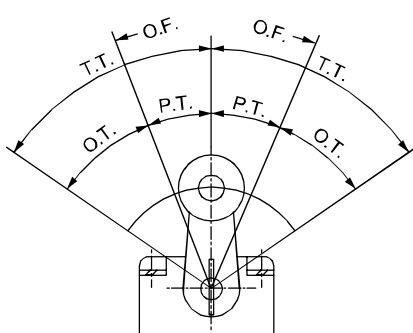
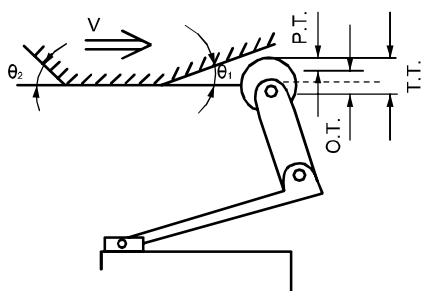
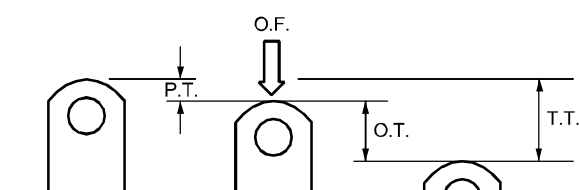
- F.R.L
- F (Filtr)
- R (Reg)
- L (Lub)
- PresSW
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- Oil-ProhR
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- CompFRL
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- PrecsR
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- AirBoost
- SpdContr
- Silncr
- CheckV/ other
- Jnt/tube
- AirUnt
- PrecsCompn
- Mech/ ElecPresSw
- ContactSW
- AirSens
- PresSW Cool
- AirFloSens/ Contr
- WaterRtSens
- TotAirSys (Total Air)
- TotAirSys (Gamma)
- RefrDry
- DesicDry
- HiPolymDry
- MainFiltr
- Dischrg etc
- Ending

Mounting, installation and adjustment

CAUTION

- Do not move the component more than the total movement (T.T.).
- Actuator operation codes used in the catalog are shown below.

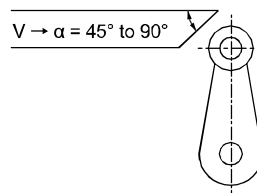
Code	Explanation
O.F.	Necessary force for operation
P.T.	Action before valve open
O.T.	Action after valve open
T.T.	Total movement



■ Dog

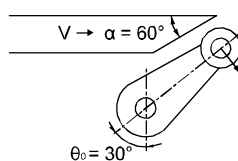
- Set the dog angle θ to 45 degree or less.
- If the dog speed is high, set θ to a small value.
- The dog operation position and depth should be designed to "P.T. + O.T./2".
- Design the cam and dog so that the lever returns gradually.

(1) $V \leq 0.2$ m/s



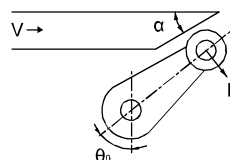
α	$V_{max}(m/s)$
90°	0.05°
75°	0.07°
60°	0.1°
45°	0.2°

(2) $V \leq 0.1$ m/s



Set the arm parallel to the dog's cut face so that the force is applied at a right angle to the arm. Generally, $\alpha = 60^\circ$ and $\theta = 30^\circ$ are desirable for dog design and arm design.

(3) $V \leq 2$ m/s



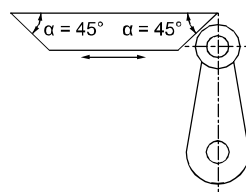
V_{max} (max. speed) increases when the angle is reduced. The arm always should be set parallel to the dog's cut face.

$\alpha = 90 - \theta$	$V_{max}(m/s)$
40°	0.7°
35°	0.9°
30°	1.3°
25°	2.0°

(4) When the dog is exceeded

($V \leq 0.2$ m/s)

Set the arm perpendicularly so that $\alpha = 45^\circ$.
 $V \leq 0.2$ m/s is preferred.



- Do not use the mechanical valve body as a mechanical stopper.

- Do not apply excessive force when operating the toggle switch (MS-*/-TG).