Rodless type

SM-25

Shuttle Mover

ø25

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Rodless Type
SRL3
SRG3
SRM3
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MRL2
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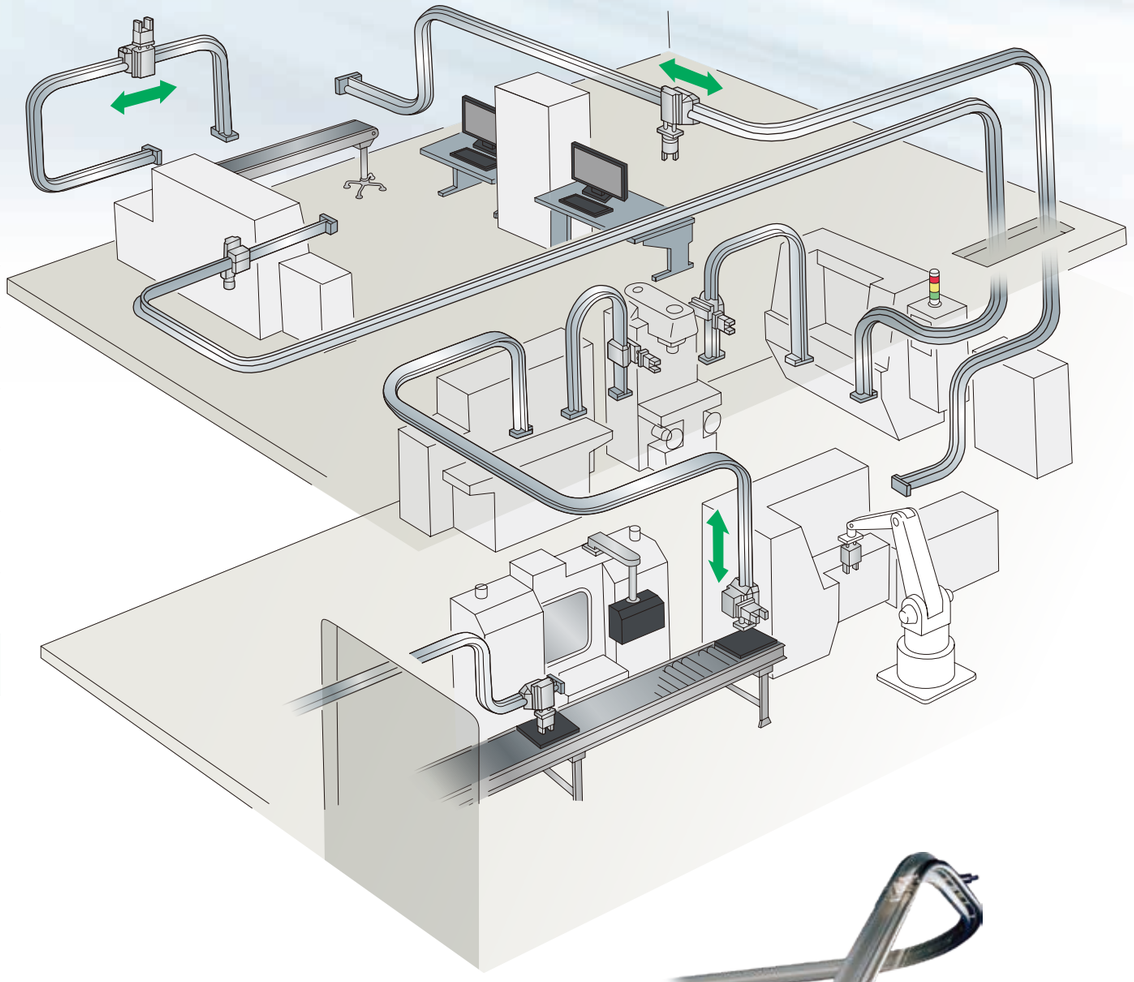
SM-25
Cylinder Switch
Ending

SM-25 Series

Enabled free 3D layout
Air-driven 3D transfer system

Effective use of space **Production efficiency UP**

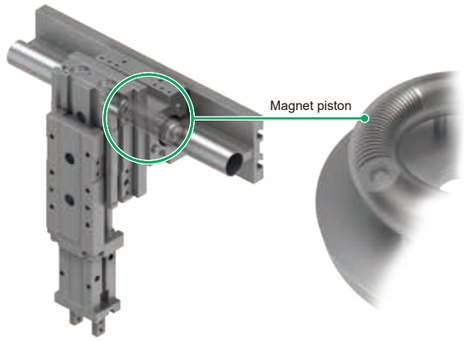


Application Examples

- Connecting between each process
- Removal and supply of parts from processing machine
- Transportation of parts in assembly lines

3D Transfer System Air Driven

A 3D transfer system where a piston with a magnet inside the cylinder tube is moved by air pressure, and the outer carrier is moved by that magnetic force.



O-rings adopted at the connection of each unit

Simple structure makes assembly easy, and there is no air leakage.

Flexible layout possible

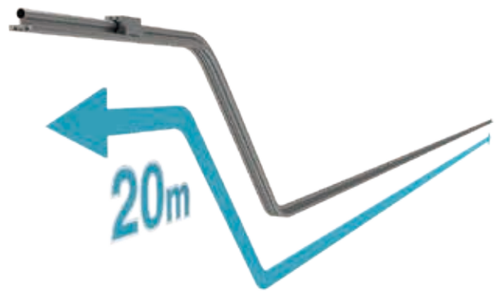
Layout fitted to each factory is possible by combining each unit (horizontal/vertical curve, straight)

Straight unit

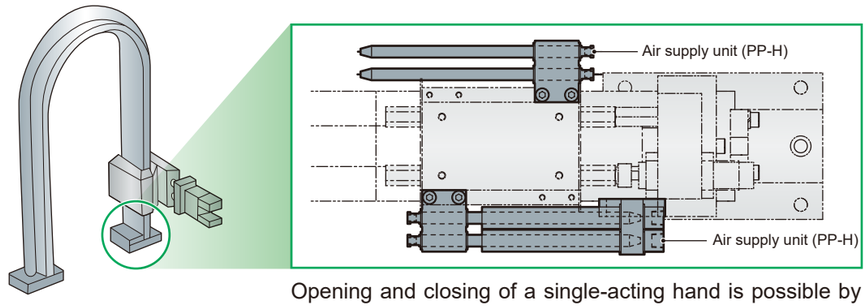
Curve unit 90 degree Horizontal/Vertical

Curve unit 45 degree Horizontal/Vertical

Max Conveyance Distance: Max 20 m



Gripper operation possible at stroke end



Opening and closing of a single-acting hand is possible by attaching air supply units to both ends

SM-25 Series Product System

Type	Bore Size	Magnet holding force	Max Allowable Payload*	Max transfer distance
Standard Type	ø25	120 N	2 kg	20 m
High Load Type	ø25	240 N	4 kg	20 m

*Total load Weight to be mounted

Rodless Type
SRL3
SRG3
SRM3
SRT3
MRL2
MRG2
SM-25
Cylinder Switch
Ending

Shuttle Mover Standard Type / High Load Type

SM-25 Series

Air-driven 3D transfer P&P system enabling free layout

RoHS

Model No. Notation

SM-25 – ST-H 100

1 Model Number

2 Stroke

1 Model Number

Code		Description
Standard Type	High Load Type	
CA	CA-H	Carrier
*1 RE	RE-H	Rail end
*2 ST	ST-H	Straight unit
SC90	SC-H90	Horizontal curve unit 90°
SC45	SC-H45	Horizontal curve unit 45°
VC90-IN	VC-H90-IN	Vertical (in) curve unit 90°
VC45-IN	VC-H45-IN	Vertical (in) curve unit 45°
VC90-OUT	VC-H90-OUT	Vertical (out) curve unit 90°
VC45-OUT	VC-H45-OUT	Vertical (out) curve unit 45°
PP *3	PP-H *4	Air supply unit (2 or 3 nozzles)
*5 PR	PR-H	Air supply unit (4 nozzles)
RJ	RJ-H	Joint

*1: 1 set (2 pieces) includes joint and shock absorber.
*2: Select stroke only for straight units (ST, ST-H).
*3: For 2 nozzles.
1 set includes 2 sets for rail end and 2 sets for carrier.
*4: For 3 nozzles.
1 set includes 2 sets for rail end and 2 sets for carrier.
*5: For 4 nozzles.
1 set includes 2 sets for rail end and 1 set for carrier.
*6: Each rail unit comes with 1 joint.
We recommend Shockless Valve SKH Series for the valve. For details, please refer to "Directional Control Valve (2)" No. RJ-012.

2 Stroke (mm)

Model Number	Stroke	Standard Stroke
ST ST-H	100 to 190	Every 10 mm
	200 to 2000	Every 100 mm

Note: Intermediate strokes are available in 1 mm increments. (Custom Product)

Specifications

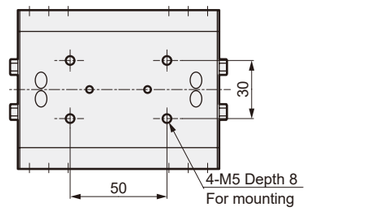
Model No. / Item		Standard Type	High Load Type
Operating Fluid		Compressed Air	
Max Operating Pressure	MPa	0.6	
Min Operating Pressure	MPa	0.3	
Ambient Temperature	°C	5 to 40	
Bore Size	mm	ø25	
Port Size		Rc3/8	
Magnet Holding Force	N	120	240
Max Allowable Load Weight	kg	2 (Total load Weight to be mounted)	4 (Total load Weight to be mounted)
Max Conveyance Distance	m	20	
Stroke End Adjustment Length	mm	±10	
Cushion	Piston	Rubber Cushion	
	Carrier	Shock Absorber	
Lubrication		Not required (Use Turbine Oil Class 1 ISO VG32 if lubricated)	

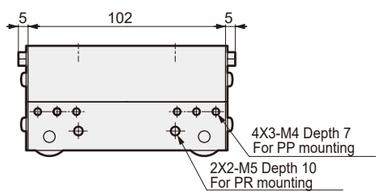
Weight

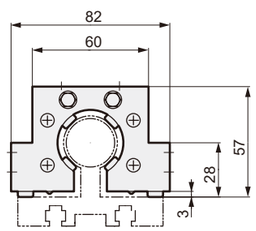
Model No.	Weight (kg)	
	Standard Type	High Load Type
Carrier	1	1.7
Rail end	2 x 2 pcs	3.6 x 2 pcs
Horizontal curve unit 90°	4	4
Horizontal curve unit 45°	2.4	2.4
Vertical (in) curve unit 90°	3	3
Vertical (in) curve unit 45°	1.8	1.8
Vertical (out) curve unit 90°	3	3
Vertical (out) curve unit 45°	1.8	1.8
Air supply unit (2 or 3 nozzles)	0.3 (End mounting part) x 2 pcs 0.2 (Carrier mounting part) x 2 pcs	0.4 (End mounting part) x 2 pcs 0.4 (Carrier mounting part) x 2 pcs
Air supply unit (4 nozzles)	1.6 (End mounting part) x 2 pcs 0.3 (Carrier mounting part) x 1 pc	1.6 (End mounting part) x 2 pcs 0.3 (Carrier mounting part) x 1 pc
Joint	0.3	0.4
Straight unit	0.4 (At 100 stroke) *Add 0.4 per 100mm stroke	0.4 (At 100 stroke) *Add 0.4 per 100mm stroke

Dimensional Drawings

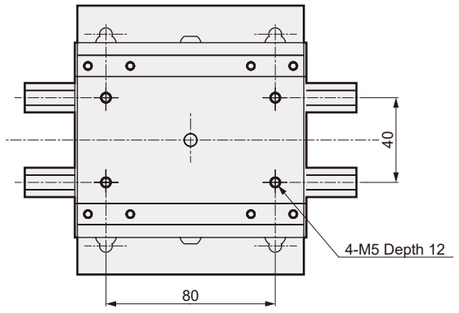
● Carrier (CA)

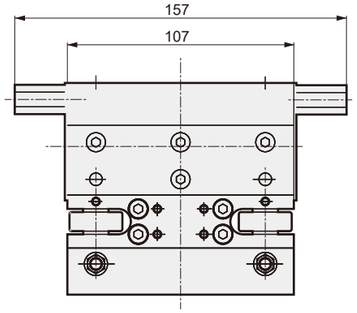


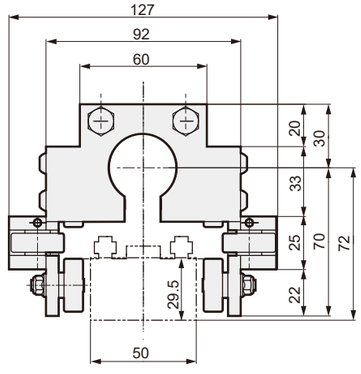




● Carrier/high load (CA-H)

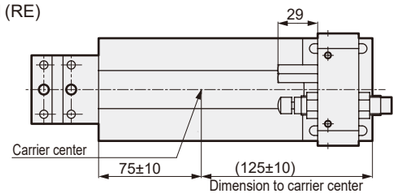


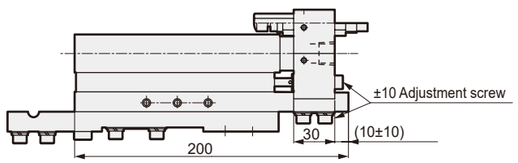


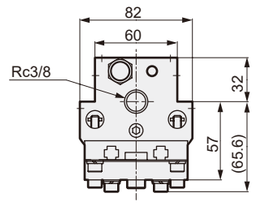


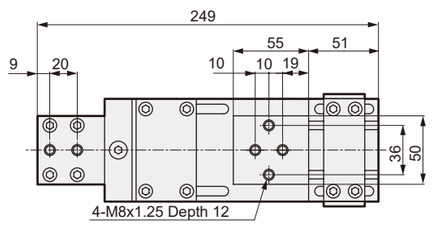
Dimensional Drawings

● Rail end (RE)

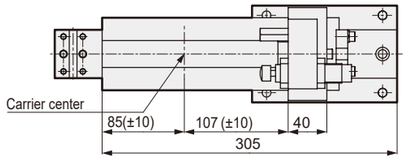


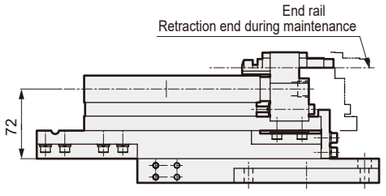


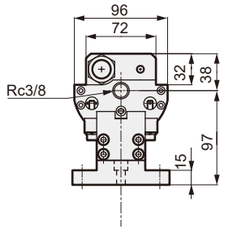


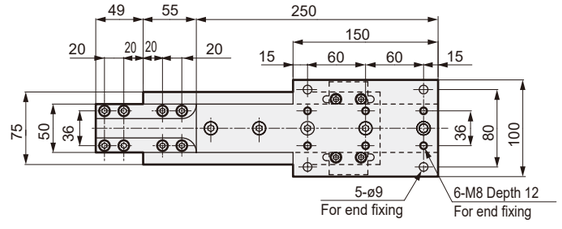


● Rail end/high load (RE-H)



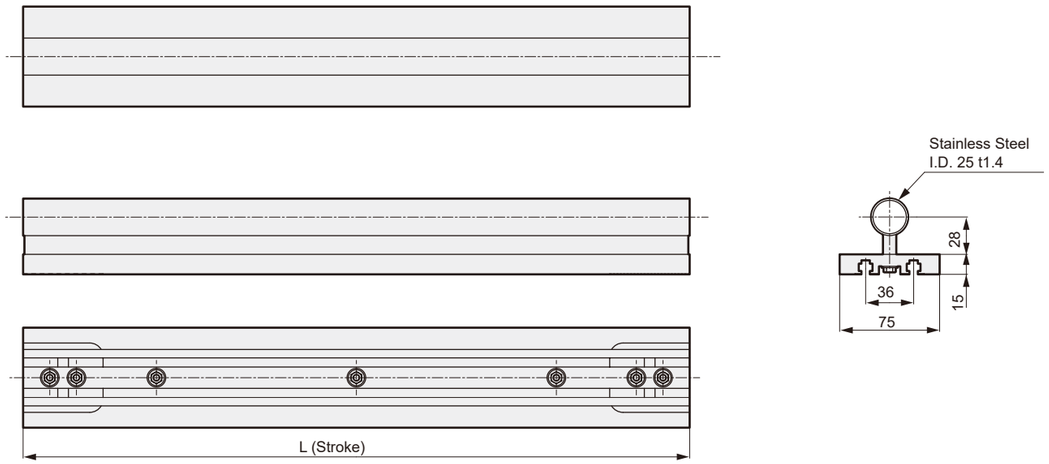






Dimensional Drawings

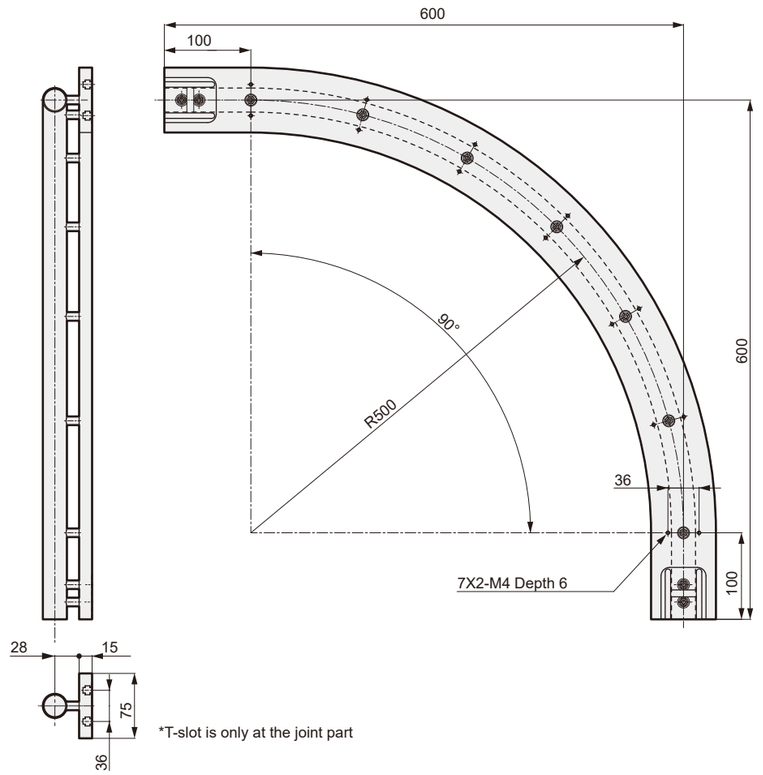
● Straight unit (ST)/high load (ST-H)



Note: Only the joint changes between ST (standard type) and ST-H (high load type). The dimensions of the unit body are the same.

Dimensional Drawings

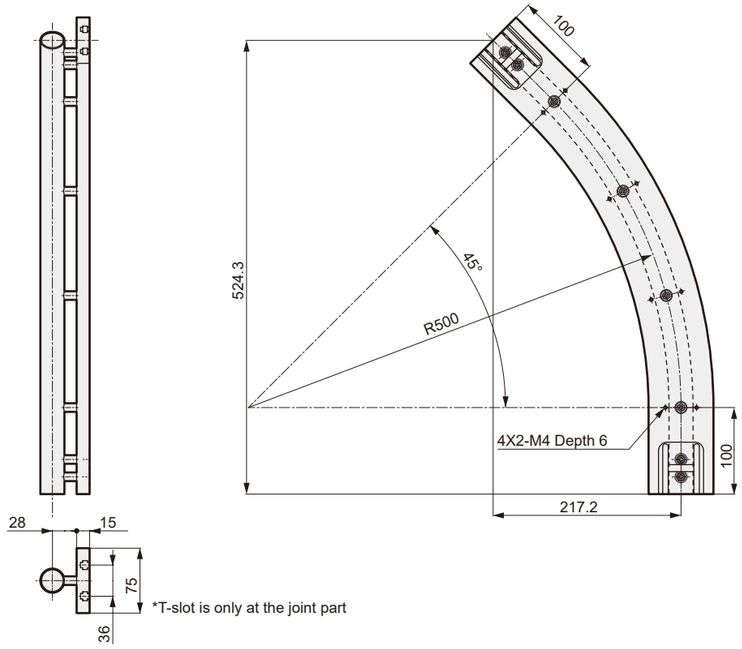
● Lateral curve unit 90° (SC90)/high load (SC-H90)



*T-slot is only at the joint part

Note: Only the joint changes between ST (standard type) and ST-H (high load type). The dimensions of the unit body are the same.

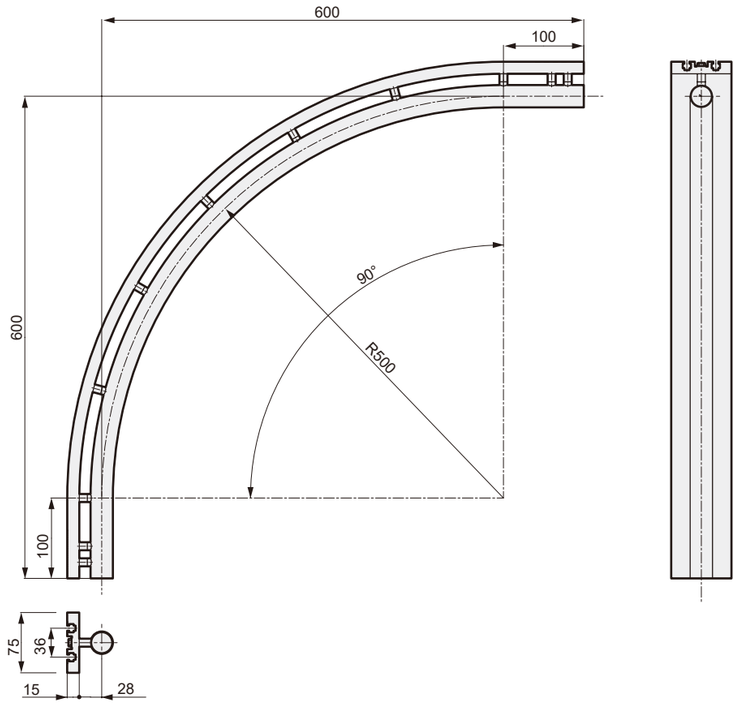
● Lateral curve unit 45° (SC45)/high load (SC-H45)



*T-slot is only at the joint part

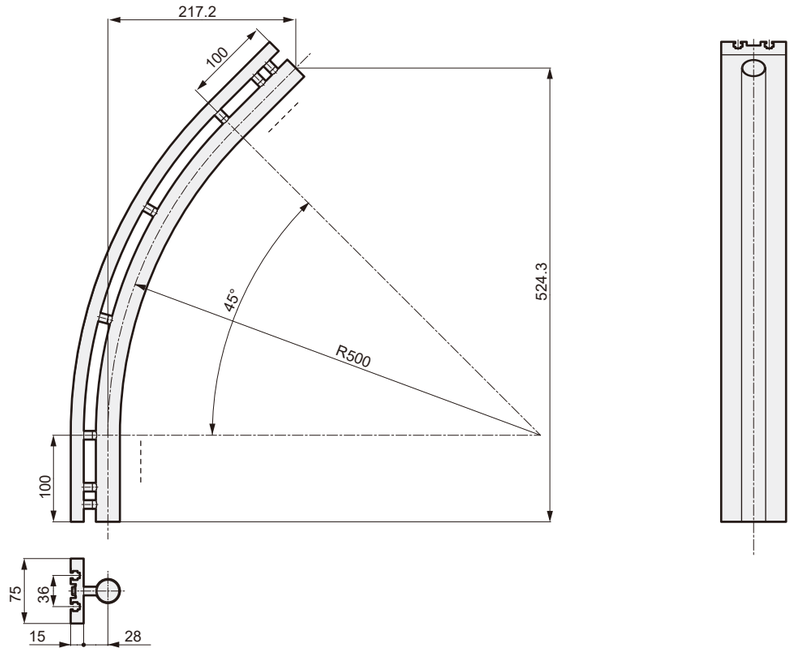
Dimensional Drawings

● Vertical (in) curve unit 90° (VC-90-IN)/high load (VC-H90-IN)



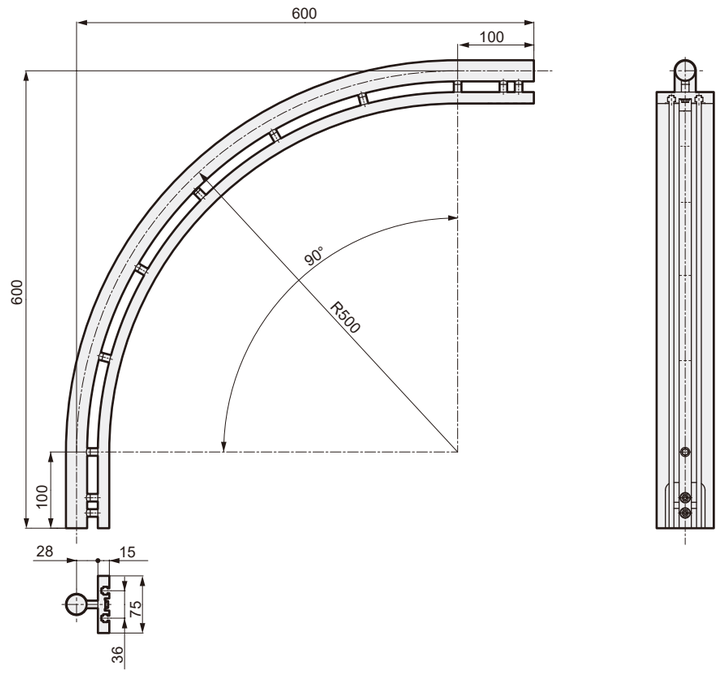
Note: Only the joint changes between ST (standard type) and ST-H (high load type). The dimensions of the unit body are the same.

● Vertical (in) curve unit 45° (VC-45-IN)/high load (VC-H45-IN)



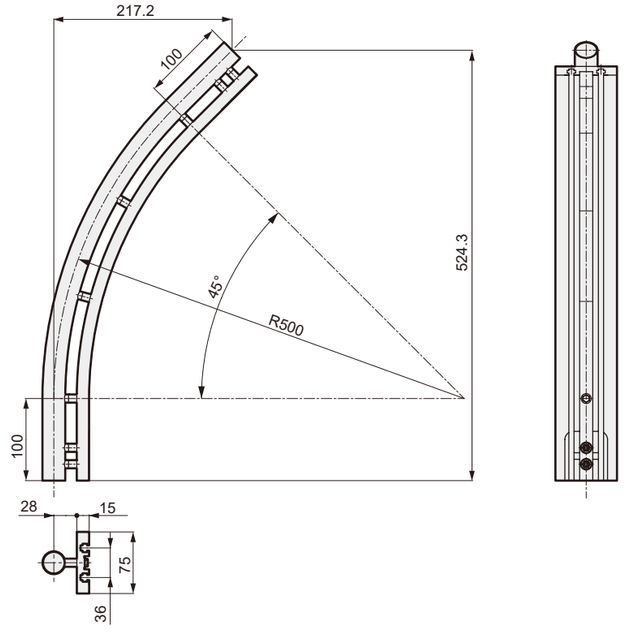
Dimensional Drawings

● Vertical (out) curve unit 90° (VC-90-OUT)/high load (VC-H90-OUT)



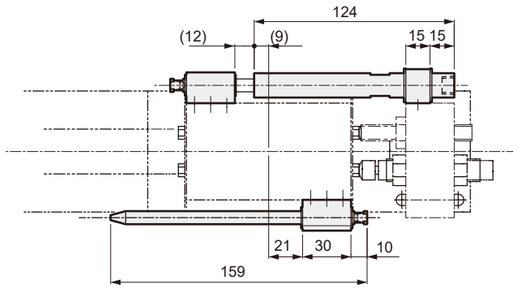
Note: Only the joint changes between ST (standard type) and ST-H (high load type). The dimensions of the unit body are the same.

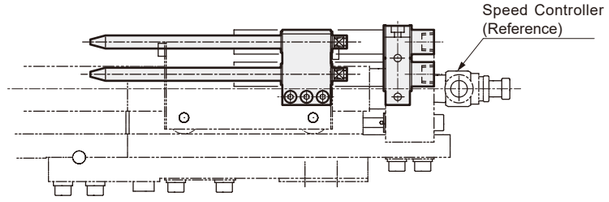
● Vertical (out) curve unit 45° (VC-45-OUT)/high load (VC-H45-OUT)

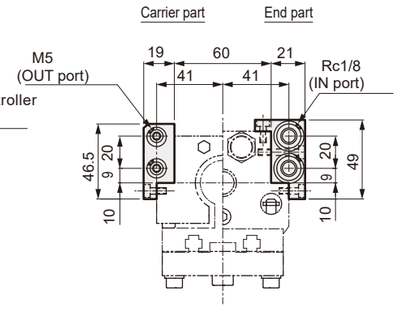


Dimensional Drawings

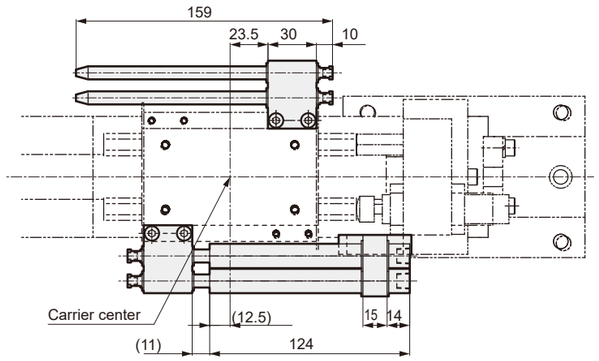
● Air supply unit (PP)

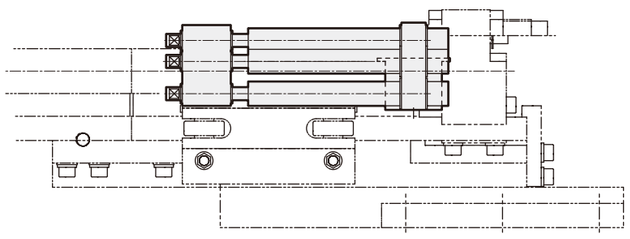


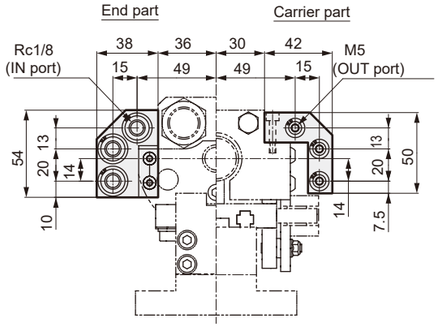




● Air supply unit/high load (PP-H)

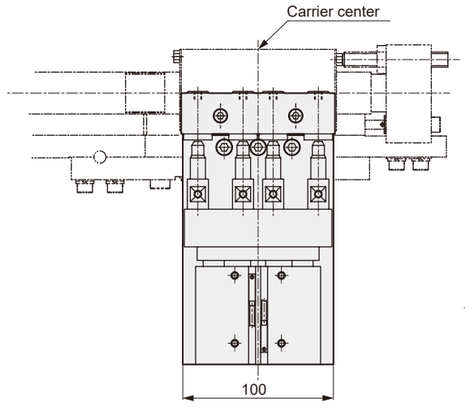


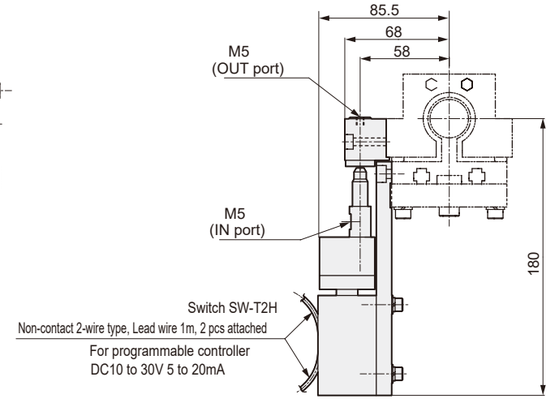




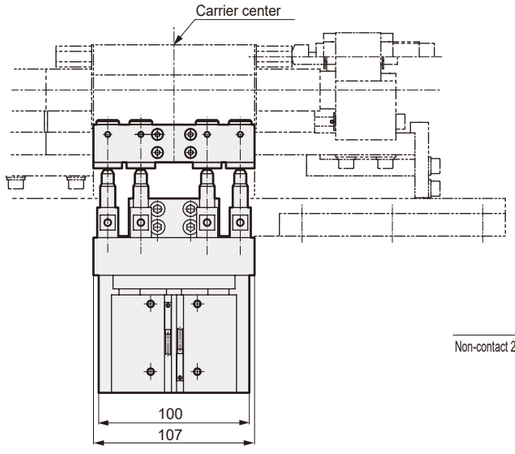
Dimensional Drawings

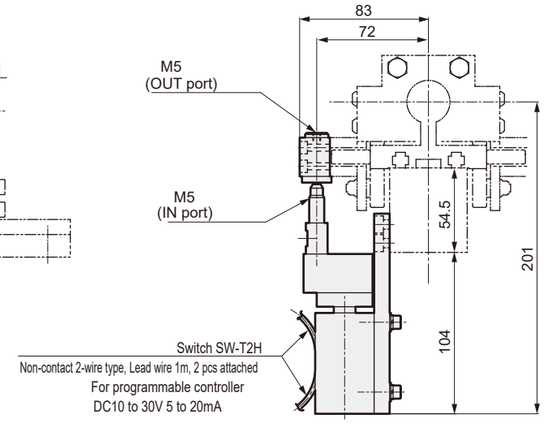
● Air Supply Unit (PR)





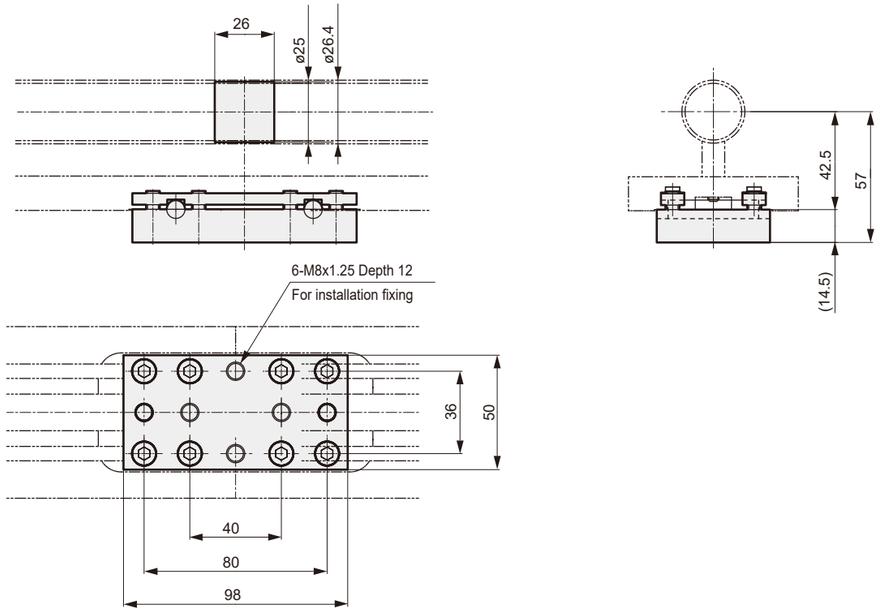
● Air supply unit/high load (PR-H)



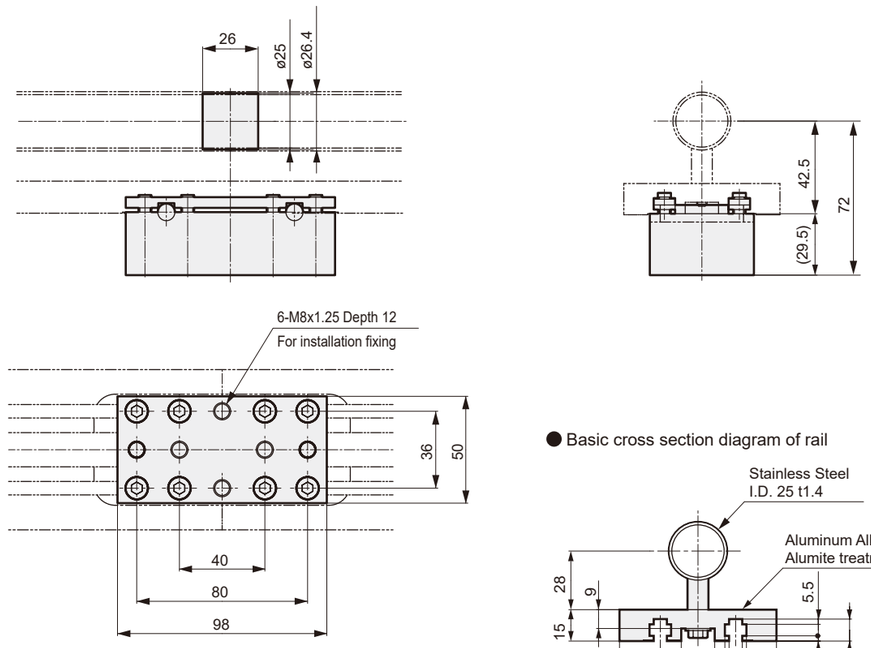


Dimensional Drawings

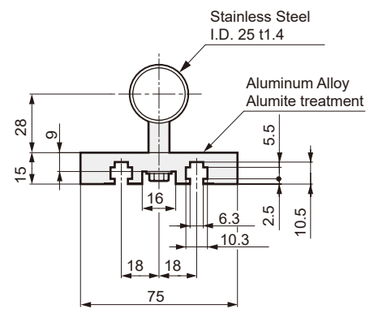
● Fitting (RJ)



● Fitting/high load (RJ-H)



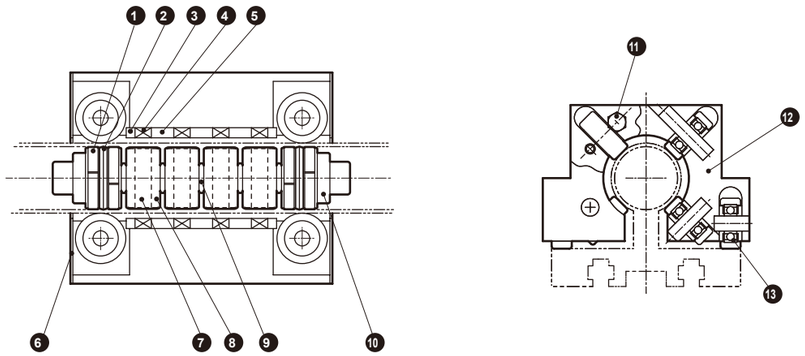
● Basic cross section diagram of rail



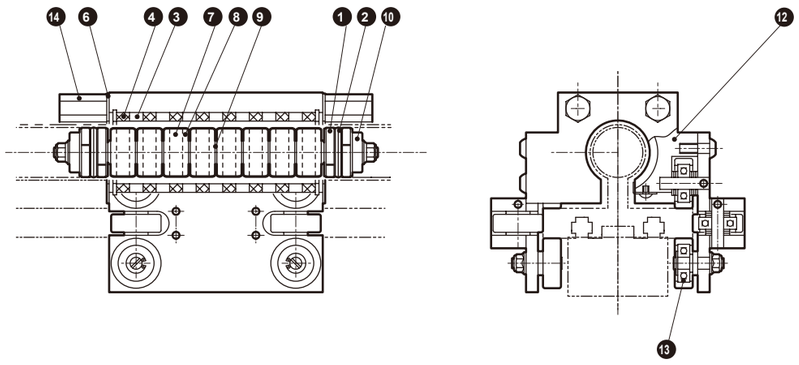
MEMO

Internal Structure and Materials

● Carrier (CA)



● Carrier/high load (CA-H)



No.	Part Name	Material	Remarks	No.	Part Name	Material	Remarks
1	Wear Ring	Polyacetal		8	Inner yoke	Steel	
2	Piston Packing	Nitrile Rubber		9	Flexible shaft	Nylon	
3	Outer external yoke	Steel		10	Piston	Aluminum Alloy	
4	External magnet	Rare earth magnet		11	Stop pin	Steel	
5	Inner external yoke	Steel		12	Housing	Aluminum Alloy	
6	Side Cover	Stainless Steel		13	Roller	Urethane Rubber	
7	Internal magnet	Rare earth magnet		14	Stopper bolt	Steel	

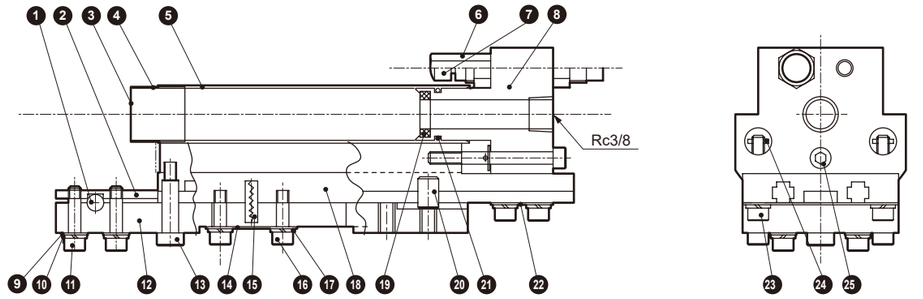
Replacement Parts List

Part Name	Series	Set No.	Replacement Part Number
Piston Set	Standard Type	SM-25-CA-PS	❶❷❼❽❾❿
	High Load Type	SM-25H-CA-PS	
Carrier Set	Standard Type	SM-25-CA-S	❸❹❺❻⓫⓬⓭
	High Load Type	SM-25H-CA-S	❸❹❻⓬⓭⓮
Packing Set (*1)	Standard Type	SM-25-CA-PK	❶❷
	High Load Type		

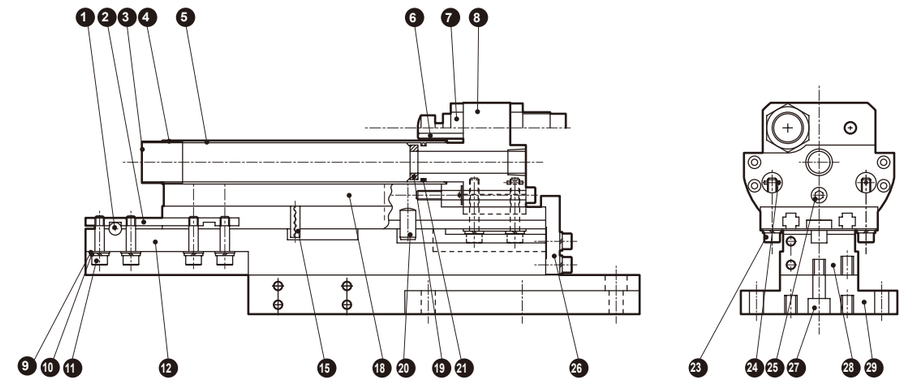
Note: The set contains 4 wear rings and 2 Piston Packings.

Internal Structure and Materials

● Rail end (RE)



● Rail end/high load (RE-H)

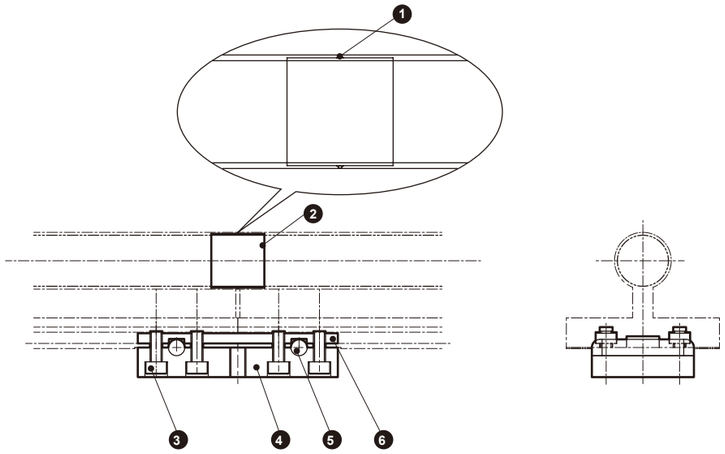


No.	Part Name	Material	Remarks	No.	Part Name	Material	Remarks
1	Positioning pin	Stainless Steel		16	Hexagon Socket Head Cap Screw	Steel	
2	Plate Nut	Steel		17	Spring washer	Steel	
3	Joint sleeve	Stainless Steel		18	End rail	Aluminum Alloy	
4	Tube packing	Nitrile Rubber		19	Cushion Rubber	Synthetic rubber	
5	End pipe	Stainless Steel		20	Pin	Steel	
6	Stopper bolt	Steel		21	O-ring	Nitrile Rubber	
7	Shock absorber (Note)			22	Stopper washer	Stainless Steel	
8	End block	Aluminum Alloy		23	Safety bolt	Steel	
9	Plain Washer	Steel		24	Spring pin	Stainless Steel	
10	Spring washer	Steel		25	Adjust bolt	Steel	
11	Hexagon Socket Head Cap Screw	Steel		26	Holding bracket	Steel	
12	Joint plate	Aluminum Alloy		27	Hexagon Socket Head Cap Screw	Steel	
13	Shoulder bolt	Steel		28	Joint plate	Aluminum Alloy	
14	Fixing washer	Stainless Steel		29	End bracket	Aluminum Alloy	
15	Spring pin	Stainless Steel					

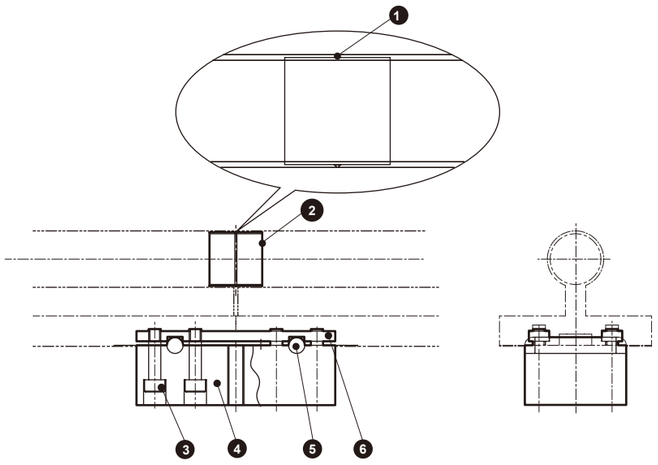
Note: ❼Shock Absorbers Standard NCK-00-2.6-C
High Load Type NCK-00-7-C

Internal Structure and Materials

● Fitting (RJ)



● Fitting/high load (RJ-H)



Part No.	Part Name	Material	Remarks	No.	Part Name	Material	Remarks
1	Tube packing	Nitrile Rubber		4	Joint plate	Aluminum Alloy	
2	Joint sleeve	Stainless Steel		5	Positioning pin	Stainless Steel	
3	Hexagon Socket Head Cap Screw	Steel		6	Connecting nut	Steel	

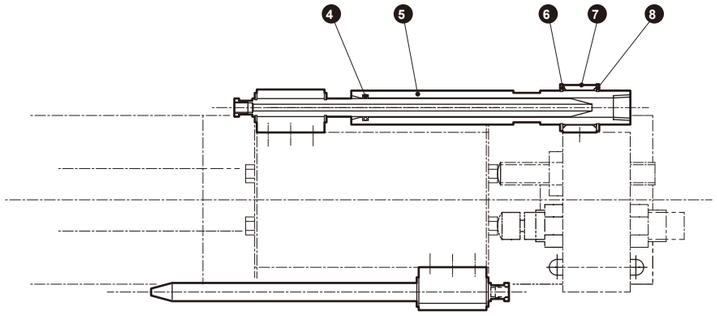
Replacement Parts List

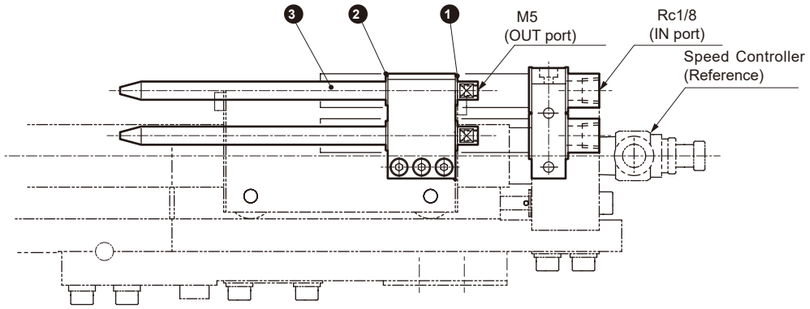
Part Name	Set No.	Replacement Part Number
Gasket Set (Note)	**SM-25-RJ-GS**	❶
Grease (50g)	**SM-25-GR**	-

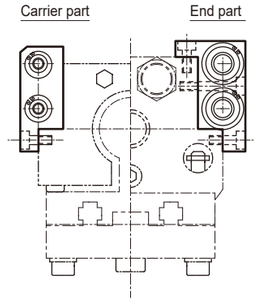
Note: 1 set contains 10 pieces.

Internal Structure and Materials

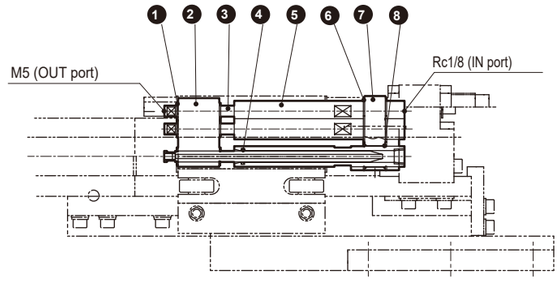
● Air supply unit (PP)

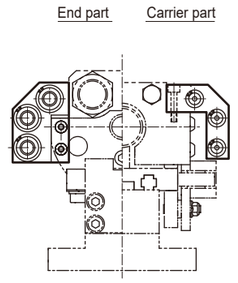






● Air supply unit/high load (PP-H)

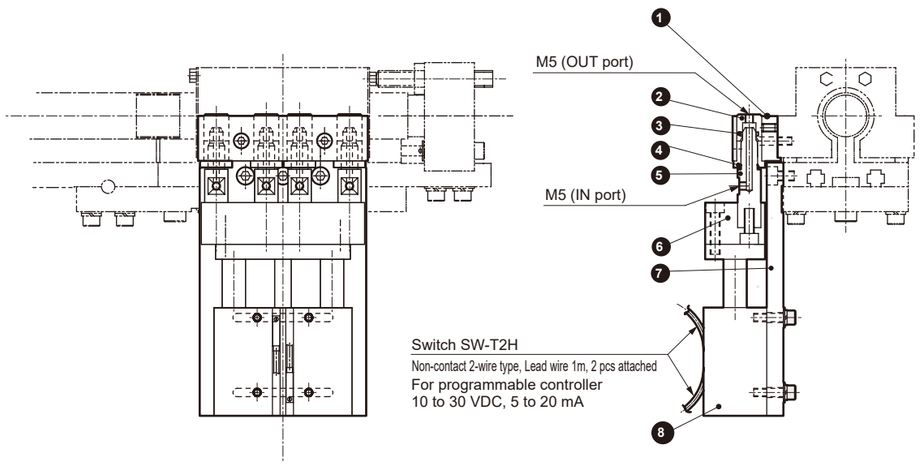




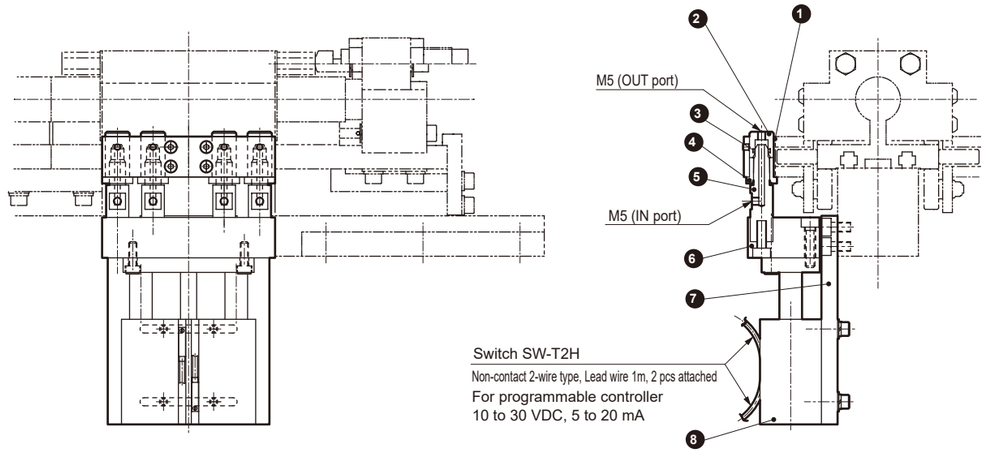
Part No.	Part Name	Material	Remarks	No.	Part Name	Material	Remarks
1	C-type Retaining Ring	Steel		5	Fixed nozzle	Steel	
2	Nozzle holder	Aluminum Alloy		6	C-type Retaining Ring	Steel	
3	Nozzle	Steel		7	Fixed holder	Steel	
4	O-ring	Nitrile Rubber		8	O-ring	Nitrile Rubber	

Internal Structure and Materials

● Air Supply Unit (PR)



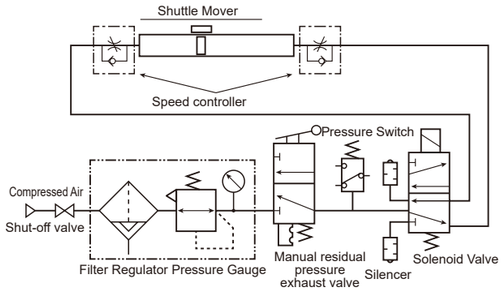
● Air supply unit/high load (PR-H)



No.	Part Name	Material	Remarks	No.	Part Name	Material	Remarks
1	Push holder	Aluminum Alloy		6	Pin holder	Aluminum Alloy	
2	Bush	Copper Alloy		7	Mounting plate	Aluminum Alloy	
3	O-Ring	Nitrile Rubber		8	Air Cylinder	STS-M-20-25 (CKD)	
4	Positioning bush	Steel		9	Switch	SW-T2H (CKD)	
5	Pin	Steel					

MEMO

1 Basic Circuit Diagram



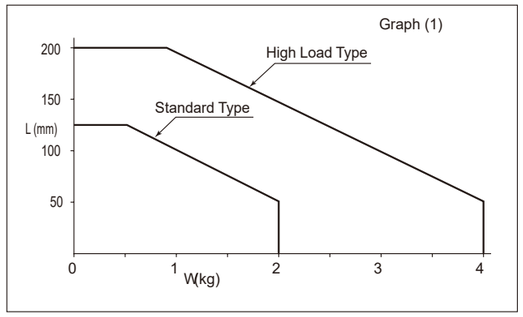
2 Selection Guide

The maximum allowable load Weight varies depending on the overhang amount of the load center of gravity and the average operating speed. Therefore, select so that both Step 1 and Step 2 below are satisfied.

STEP 1 Load Weight and Overhang Amount

*Allowable load Weight varies depending on the overhang amount. Use within the range of the following graph (1).
*Refer to the selection example for the calculation of the overhang amount L.

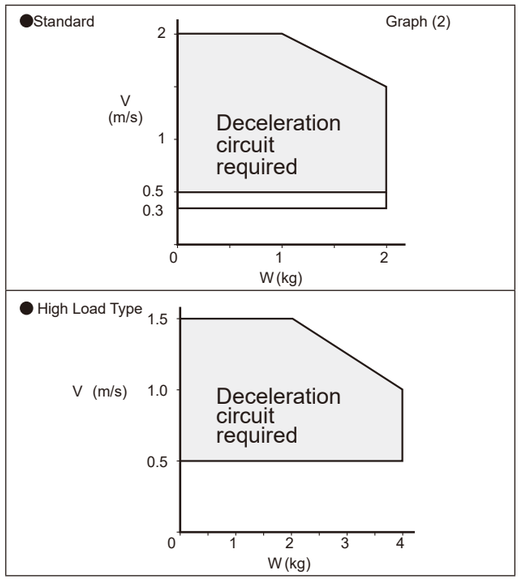
Graph (1)



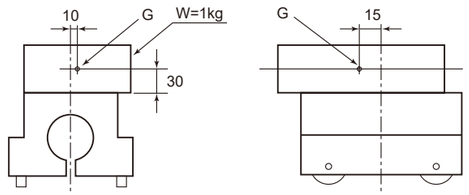
STEP 2 Load Weight and Average Speed

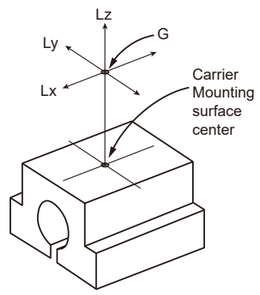
*Usable average speed varies depending on the load Weight. Use within the range of the following graph (2).
*When using at an average speed of 0.5 m/s or more, a deceleration circuit such as a shockless valve (SKH series) is required.
*Refer to the relevant page of the Pneumatic Valve General Catalog for the selection and use of the shockless valve (SKH series).

Graph (2)



Selection Examples





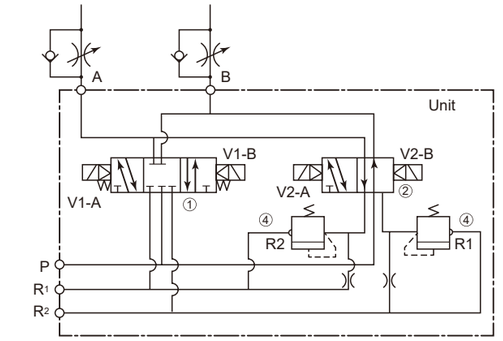
W: Load Weight
G: Load center of gravity
Lx: Deviation of G in X direction
Ly: Deviation of G in Y direction
Lz: Deviation of G in Z direction
L: Overhang amount
L=Lx+Ly+Lz

W=1 kg Ly=10 mm
V=1.5 m/s Lz=30 mm
Lx=15 mm L=15+10+30=55 mm

When used with a load Weight of 1 kg and a speed of 1.5 m/s, from graph (2), if W=1 kg, the speed is up to 2 m/s, so it is within the range. However, a deceleration circuit is required. Regarding the deviation of the center of gravity of the load, from graph (1), if W=1 kg, up to 100 mm is allowable, so L=55 mm center of gravity deviation is within the allowable range.

Example of deceleration circuit diagram

*This is an example using a shockless valve.



	Part Name	Model No.	Qty	Remarks
1	Solenoid Valve	4KB339	1	For high speed
2	Solenoid Valve	4KB329	1	For low speed
3	Manifold block		1	
4	Spacer relief valve	SKH-3SR	1	

Other precautions

(1) When operating a single-acting chuck etc. using the air supply unit (PP), a shuttle valve is required.
(2) Provide a mechanism capable of level adjustment in the vertical direction (use of leveling bolts, etc.) for the installation base, and fix it with anchor bolts, etc. after final adjustment.
(3) Use 2m spacing as a guide for the mounting pitch of legs during installation.
(4) When transferring workpieces between the shuttle mover and your company's equipment (conveyor, etc.), provide a transfer position adjustment mechanism on your company's equipment side.
(5) For other detailed designs, meetings are required, so please consult our sales representative.

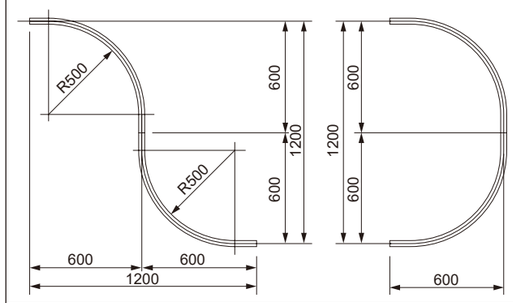
3 Stroke of each unit

Unit Name	Model No.	Stroke (mm)
Rail end	RE	75±10
Straight unit	[Example] ST-100	100
	ST-200	200
	ST-1000	1000
	ST-1015	1015
	ST-2000	2000
Curve Unit 90°	SC90	985
	VC90-IN	
	VC90-OUT	
Curve Unit 45°	SC45	590
	VC45-IN	
	VC45-OUT	

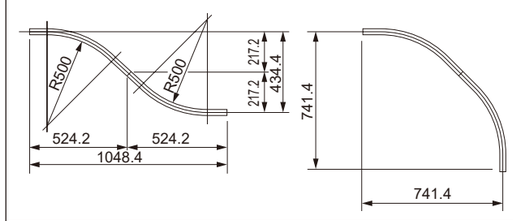
Note: Stroke is the same for standard type and high load type.

4 Minimum combination dimensions of curve units

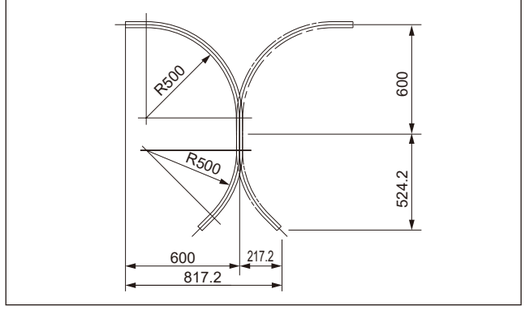
1) 90 degrees and 90 degrees



2) 45 degrees and 45 degrees



3) 90 degrees and 45 degrees



Question & Answer

Regarding Design

Q Can the carrier stop intermediately?

A Intermediate stop is not possible.

Q How much is the air consumption of SM-25?

A It is the same as a general cylinder with I.D. ø25.

Q What speed in m/s should be considered when examining the transfer time?
(When estimating by considering various conditions such as rail combination, load Weight difference, deceleration time, and Operating Pressure)

A Please estimate at 1 m/s.
(Example: For a stroke of 20 m, 20 m ÷ 1 m/s = 20 s, and this time does not include the workpiece loading time.)

Q Is the maximum allowable load Weight the Weight of the workpiece?

A It is the total load Weight mounted on the carrier. Hand chuck and Z-axis cylinder are also included.

Regarding Safety

Q Is a safety cover required?

A Since it runs overhead at high speed and is a joint type air cylinder, be sure to install a cover.

Q What happens if the carrier is not decelerated at the stroke end?
(However, in case of 0.5 m/s or more)

A Since there is a possibility of breaking the shock absorber, be sure to use a deceleration circuit such as a shockless valve (SKH series).

Regarding Maintenance

Q Can the carrier rollers be replaced?

A Special tools are required, so if you contact us, we will overhaul it for a fee.

Q Is lubrication required for the carrier rollers?

A Since a shielded type metal bearing with Urethane Rubber is used, it can be used without lubrication.

Q What should I do if I want to adjust the stroke?

A Adjustment of 10 mm forward and 10 mm backward is possible at the rail end part. Refer to the instruction manual for the adjustment method.

Regarding Electrical Control

Q Is there a reed switch for carrier detection?

A No. Please prepare proximity sensors, photoelectric sensors, or photo sensors.

Q How should the electrical signal for the actuator mounted on the carrier be handled?

A It is not possible because there is no power supply part for the operation check reed switch, etc.

Pneumatic Component

To Use This Product Safely

Be sure to read this before use.

For general cylinder information, see Intro 41, and for cylinder switches, see P. 1512.

Specific Precautions: Shuttle Mover SM Series

Design / Selection

Warning

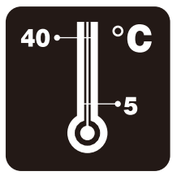
■ These products cannot be used in water, oil, or powder, or in places where the unit will be exposed to cutting fluid, coolant, etc., or cutting chips.

■ Consider safety by always placing an interlock in the control circuit for moving the carrier.

■ It is not possible to fix the carrier and use the rail portion as a mobile unit.

■ Avoid scratching the cylinder tube or rail with a workpiece, etc., that has been dropped by mistake during mounting or removal of a workpiece. It causes malfunction.

■ The most desirable range of the Ambient Temperature for use of the cylinders is 5 to 40°C. If this temperature exceeds 40°C, it may cause damage or malfunction, so do not use it. Also, if it is 5°C or less, moisture in the circuit may freeze and cause damage or malfunction, so please take measures to prevent freezing.



■ Be sure to install a safety cover in cases when this unit will be crossing pathways or working areas of people, or as a measure to prevent collapse and protect the operating region in areas where a human hand can reach inside.

CAUTION

■ Check that the cross-section of the pipe connecting the cylinder and directional control valve has sufficient effective cross-sectional area for attaining specified piston speed.

■ Use an interval of 2 m as a guide for the mounting pitch for the legs.

■ Consider the space described below near the end unit.

- Securing of space necessary for mounting and removing workpieces
- Securing of space for an adjustment of ±10 mm from the stroke end of the carrier
- Securing of space to enable movement when the tube piping to the piping port of the end is adjusted by ±10mm, and space for adjustment of the speed controller
- Securing of space for removal of end rail related components during piston maintenance

For precautions regarding mounting, installation, adjustment, operation, and maintenance, please refer to the CKD Equipment Product Site(https: //www.ckd.co.jp/kiki/en/) → 'model No.' → Instruction Manual.

MEMO

Rodless Type
SRL3
SRG3
SRM3
SRT3
MRL2
MRG2
SM-25
Cylinder Switch
Ending