Safety Precautions

Be sure to read this section before use.
Refer to Intro Page 73 for general information of the cylinder, and to Intro Page 80 for general information of the cylinder switch.

Product-specific cautions: Magnet rodless cylinder MRL2 Series

Design/selection

1. Common

⚠ CAUTION

■ Be careful of the gap between the end plate and the slider.
Be careful when operating the cylinder as getting a hand or finger caught in the unit may lead to injury.

■ Do not apply a load to the cylinder that is greater than or equal to the allowable load listed in the selection guide.

■ Do not use the product with the slider fixed.
Use the cylinder with the end plate fixed. Avoid use of the product with the slider fixed.

■ When fixing the basic type with switch with the guide, configure the rotational angle of the slider to be less than or equal to ± 1°.

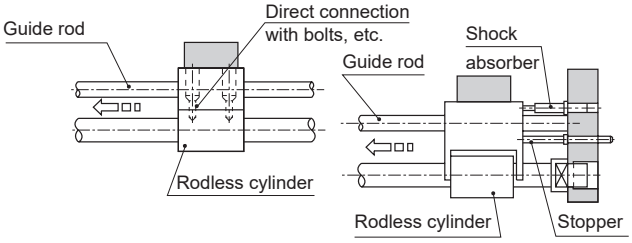
■ Mount so that the slider functions with the min. working pressure value of all processes.
When the flatness of the surface for cylinder installation is poor, the min. working pressure will rise due to guide unit torsion and cause early wear of the bearing section. For this reason, mount the unit so that the slider functions with the min. working pressure value of all processes. Although mounting mating surfaces should be highly flat, adjust with shims when this cannot be confirmed.

■ Be careful to avoid scratching or denting the outer peripheral surface of the cylinder tube.
This will cause damage to the lube keeping structure, scraper, and slider wear ring and may lead to defective operation.

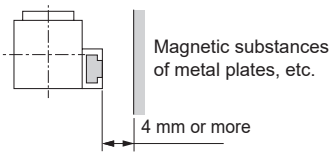
■ With the basic type MRL2, be careful of slider rotation.
Either connect with an external bearing or consider the use of MRL2-G or MRL2-W.

■ Do not use the product in a state where the slider is displaced.
When the slider has become displaced due to external force that is greater than or equal to the magnetic holding force, manually push the stroke end back to its original position.

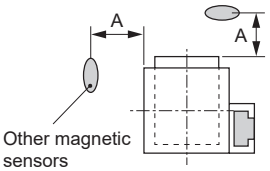
■ Do not apply an eccentric load to the slider.
When the load and cylinder are direct mounted, their respective shaft center eccentricities cannot be absorbed, and lateral load applies, leading to misoperation (figure below left). Use with consideration for a connection method which enables absorption of this eccentricity and the self-weight deflection of the cylinder. The figure below right shows recommended mounting.



■ The cylinder switch may malfunction if there is a magnetic substance such as a metal plate installed adjacently. Check that a distance of 4 mm is provided from the switch surface.



■ When using cylinders adjacent with each other or when using other magnetic sensors nearby, in order to prevent malfunctioning due to the leaked magnetic field of the cylinder embedded magnet, make sure that the distance from the surface of the slider to the other magnetic sensors is separated by at least the values listed below.



Bore size	A(mm)
ø6	10
ø10	20
ø16	20
ø20	37
ø25	50
ø32	80

When this distance is dimension A or less, malfunctions can be prevented by placing a magnetic substance (steel plate with thickness of 2 mm or more) between the slider and the others.

■ When using in a dusty environment, it is recommended to select the type with scraper (option S).

2. Rubber-air cushioned MRL2-*C

■ Note that, structurally, the stroke end position cannot be retained if air supply is cut off.
When detecting the stroke end by switch, set the switch position with pneumatic pressure applied, as otherwise the position may be out of the detection range.

3. Fine speed MRL2-F

■ Use without lubrication.
Applying lubrication may cause changes in characteristics.

■ Assemble the speed controller near the cylinder.
When installed far from the cylinder, the speed becomes unstable. Use the SC-M3/M5-F, SC3W, SCD-M3/M5 or SC3U Series speed controller.

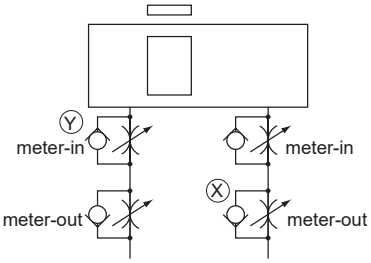
■ In general, the speed is stabler at higher air pressure and lower load factor.
Use at a 50% or less load factor.

■ Do not apply a lateral load to the slider.
Also install the sliding guide so that it is not twisted.
When the load or the resistance fluctuates, operation becomes unstable. With a large difference between static friction and kinematic friction of the guide, operation becomes unstable.

■ Avoid using this product where vibration is present.
The product will be adversely affected by vibration and operation will become unstable.

■ Stable speed control is achieved with a meter-out circuit.

● To make the operation even smoother at the start, add a meter-in circuit.

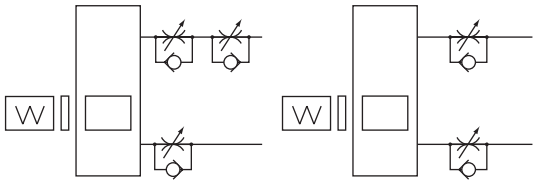


Adjustment method for speed when moving to the right

1. Adjust speed with Ⓧ speed controller
2. Narrow with Ⓨ speed controller until operation at start becomes smooth
3. Check the speed again.

(*1) As this circuit narrows the intake side, a small amount of time is required until it starts to operate. (This will vary depending on narrowing adjustment.) Take this into consideration before use.

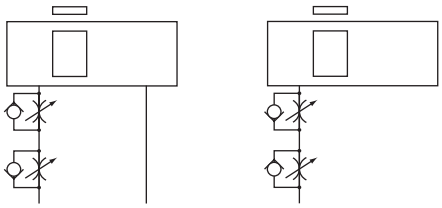
(*2) For vertical mounting, combine the cylinder with a meter-out circuit, as it will fall under its own weight when a meter-in circuit is used.



OK

✕ Falls under its own weight when lowering

(*3) Use the circuit shown in the figure below for the serial connection of the speed controllers.



OK

✕ Speed control is unstable

Mounting, installation and adjustment

1. Common

⚠CAUTION

■ CKD's shock absorber is a repair part. Replace it when the energy absorption performance has degraded or the operation is not smooth.

2. Fine speed MRL2-*F

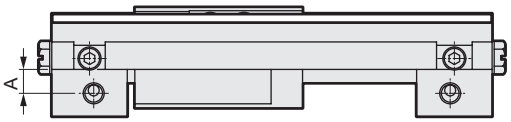
⚠CAUTION

■ Avoid using in environments with water vapor or high humidity or in alkaline atmospheres.

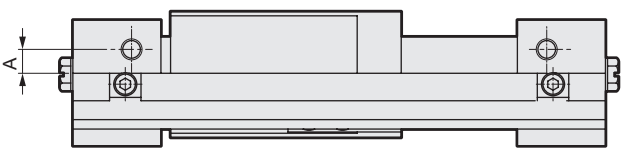
■ As compatible piping fittings are limited when with switch, refer to the table below to select the fitting.

· With switch

[ø10]

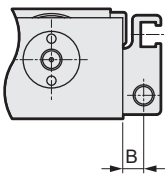


[ø16 to ø32]

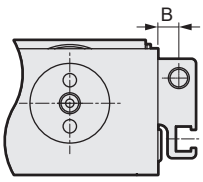


· Common piping with switch

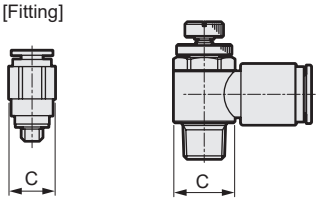
[ø10]



[ø16 to ø32]



[Fitting]



Item	Port size	Port position dimensions		Applicable fittings	Fitting O.D.
Bore size (mm)		A	B		øC
ø6	M5	-		SC3W-M5-4, SC3W-M5-6 SC3U-M5-4, SC3U-M5-6 GWS6-M5-S, GWS4-M5 etc.	ø11 or less
ø10		5.5	5		
ø16		5.5	5		
ø20		5.5	5		
ø25	Rc1/8	7.5	7.5	SC3W-6-4/6/8 GWS4-6, GWS6-6, GWS8-6 etc.	ø15 or less
ø32		7.5	7.5		

Note: A and B indicate the distance to the nearest interference part to the respective ports. The - means that there is no interference.
ø6 has no A dimension because the side surface port is on the opposite side from the switch rail.
(There is no interference with the switch rail.)
It also has no B dimension (port) because common piping with switch is not possible.

Use/maintenance

1. Common

⚠ WARNING

- The magnetic strength of the embedded magnet is powerful. Do not disassemble.
- With bore size of ø16 or less, because of changes in the cushion rigidity when left for long periods, the stroke may become slightly shorter than the standard value at the low pressure setting. Perform a trial run, such as operating several times and performing back-and-forth operation at high supply pressure.

2. Rubber-air cushioned MRL2-*C

⚠ CAUTION

- Do not rapidly discharge air from the cylinder after performing low speed operation outside the catalog specifications range. (Example: Removing piping or coupler, etc.)
  Otherwise the rubber air cushion may fall. Note that the possibility of occurrence of this may increase especially when the air pressure is high.