

# Double durability. (CKD comparison)

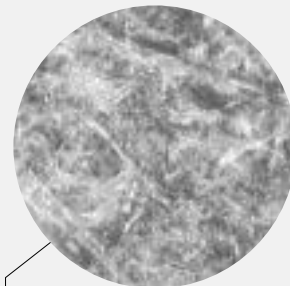
## Magnet type rodless cylinder MRL2 Series.

The life and operation stability of this new magnet rodless cylinder are greatly improved by a new lubrication structure. 25 and 32 mm bore size are now available.

### CKD originally developed Lube-keeping structure upgrades performance!

Textile (lube-keeping structure) impregnated with grease is mounted on the sliding section of the piston and slider, enabling stable long-term lubricant supply and preventing wear. Long life (more than double by CKD comparison) and stable operation are realized.

● Lube keeping structure cross section (x 180 time)



#### Features of lube keeping structure

##### Lubrication supply/absorption function

A capillary tube applies impregnated grease evenly and regularly to the sliding surface, absorbing excess grease. (Note) The scraper type is suitable for directly washing the tube surface with a cleaning solution, etc.

##### Dust wiper function

Dust and wear power from the packing, etc., are collected by the textile to reduce contamination on the sliding section. (The conventional scraper with efficient scraping is also available.)

#### The environmental friendly

A rubber air cushion is provided as an option. Impact noise at the stroke limit is reduced and the factory environment improved.

#### Low sliding table position

This slim design has a low slider height.

#### Direct mounting

(Upper surface, lower surface)

Simplified guide type (2 piston type)

T switch with ample models mounted

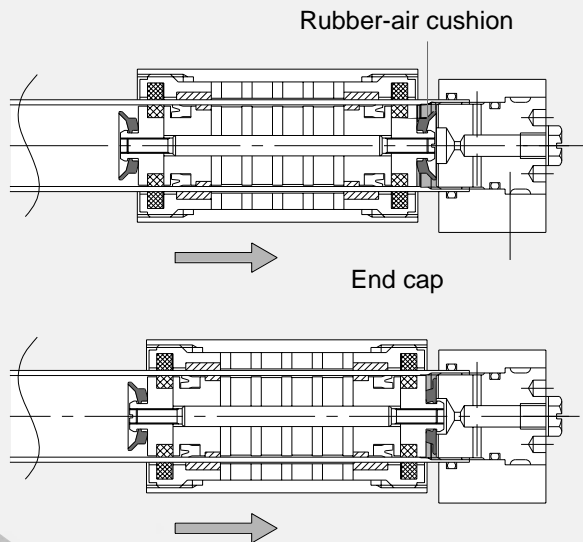
One end porting type available (option)

## MRL2-W Series

- SCP\*2
- CMK2
- CMA2
- SCM
- SCG
- SCA2
- SCS
- CKV2
- CA/OV2
- SSD
- CAT
- MDC2
- MVC
- SMD2
- MSD\*
- FC\*
- STK
- ULK\*
- JSK/M2
- JSG
- JSC3
- USSD
- USC
- JSB3
- LMB
- STG
- STS/L
- LCS
- LCG
- LCM
- LCT
- LCY
- STR2
- UCA2
- HCM
- HCA
- SRL2
- SRG
- SRM
- SRT
- MRL2
- MRG2
- SM-25
- CAC3
- UCAC
- RCC2
- MFC
- SHC
- GLC
- Ending

# SUPER RODLESS CYLINDER MRL2 Series

## ● Explanation of rubber-air cushion mechanism

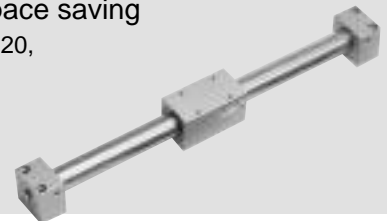


When the piston moves and the rubber air cushion and end cap contact, sealed air space is formed in the shaded section, where air is compressed as the piston moves and energy is absorbed. Energy absorbed by the rubber air cushion's compression strain is also calculated at the stroke end.

## Introducing 25 and 32 mm bores.

Basic type  
(Guided type)  
**MRL2**Series

Basic type of space saving  
 $\phi 6$ ,  $\phi 10$ ,  $\phi 16$ ,  $\phi 20$ ,  
 $\phi 25$ ,  $\phi 32$



Simplified guide type  
(1 piston type)  
**MRL2-G**Series

Simplified guide with 1 cylinder and 1 guide  
 $\phi 6$ ,  $\phi 10$ ,  $\phi 16$ ,  $\phi 20$ ,  
 $\phi 25$ ,  $\phi 32$



Simplified guide type  
(2 piston type)  
**MRL2-W**Series

Simplified guide with double thrust provided by 2 cylinders  
 $\phi 6$ ,  $\phi 10$ ,  $\phi 16$ ,  $\phi 20$ ,  
 $\phi 25$ ,  $\phi 32$



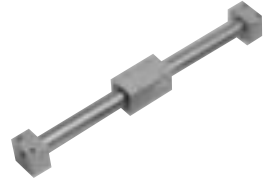
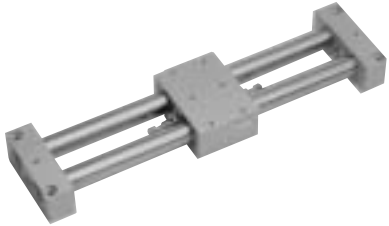
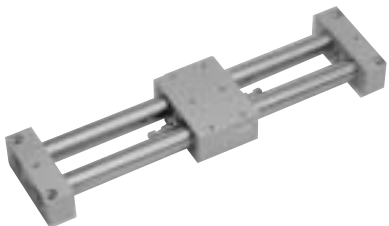
SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
UCA2
HCM
HCA
SRL2
SRG
SRM
SRT
<b>MRL2</b>
MRG2
SM-25
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

Magnet type rodless cylinder  
Rodless type

	Page
Series variation	2172
▲ Safety precautions	2176
Technical data	
Deflection volume of MRL2-G/MRL2-W slider	2196
Rubber-air cushion data	

# MRL2/MRL2-G/MRL2-W Series

## ● Point of selection guide

	Point of selection guide	Recommended models		Features		Page	
Basic type (Guided type)	<ul style="list-style-type: none"> <li>When using a cylinder and an external guide together.</li> <li>When space is limited.</li> </ul>	<b>MRL2</b> $\phi 6, \phi 10, \phi 16, \phi 20, \phi 25, \phi 32$ 		<ul style="list-style-type: none"> <li>Lube keeper enables long service life.</li> <li>Colliding acceleration and colliding noise level are reduced by selecting rubber-air cushion at stroke end.</li> <li>Cylinder can be installed directly.</li> </ul>	Specifications	2178	
					How to order	2180	
					Internal structure and parts list	2182	
					Dimensions	2184	
					Switch installation position dimensional drawing	2192	
					Selection guide	2193	
Simplified guide type	<ul style="list-style-type: none"> <li>When orbit of slider shall be secured.</li> <li>When used for a general transfer.</li> <li>When lifting load is too much.</li> <li>When adjustable stroke is necessary.</li> <li>When impact at stroke end is absorbed by a shock absorber.</li> </ul>	<b>MRL2-G</b> (Simplified guide type 1 piston type) $\phi 6, \phi 10, \phi 16, \phi 20, \phi 25, \phi 32$ 		<ul style="list-style-type: none"> <li>This MRL2 Series twin tube type eliminates necessity to install any guide.</li> <li>Low slide table thin design realizes space saving.</li> <li>The impact at stroke end is absorbed by a type with a shock absorber.</li> <li>Common porting type with switch enables one end piping.</li> </ul>	Specifications	2178	
					How to order	2180	
					Internal structure and parts list	2186	
					Dimensions	2190	
					Switch installation position dimensional drawing	2192	
					Selection guide	2193	
		<ul style="list-style-type: none"> <li>When orbit of slider shall be secured.</li> <li>When used for a general transfer.</li> <li>When lifting load is large and double thrust is necessary.</li> <li>When adjustable stroke is necessary.</li> <li>If shock of stroke end is absorbed by a shock absorber.</li> </ul>	<b>MRL2-W</b> (Simplified guide type 2 piston type) $\phi 6, \phi 10, \phi 16, \phi 20, \phi 25, \phi 32$ 		<ul style="list-style-type: none"> <li>This MRL2 Series twin tube type eliminates necessity to install any guide.</li> <li>This twin piston type generates double thrust of one piston type.</li> <li>This is space saving by a low thin type design of height of a slide table.</li> <li>Shock of stroke end is absorbed by a type with shock absorber.</li> <li>Common porting type with switch enables one end piping.</li> </ul>	Specifications	2178
						How to order	2180
						Internal structure and parts list	2188
						Dimensions	2190
						Switch installation position dimensional drawing	2192
						Selection guide	2193

Magnet type rodless cylinder  
Rodless type

SCP\*2  
CMK2  
CMA2  
SCM  
SCG  
SCA2  
SCS  
CKV2  
CA/OV2  
SSD  
CAT  
MDC2  
MVC  
SMD2  
MSD\*  
FC\*  
STK  
ULK\*  
JSK/M2  
JSG  
JSC3  
USSD  
USC  
JSB3  
LMB  
STG  
STS/L  
LCS  
LCG  
LCM  
LCT  
LCY  
STR2  
UCA2  
HCM  
HCA  
SRL2  
SRG  
SRM  
SRT  
**MRL2**  
MRG2  
SM-25  
CAC3  
UCAC  
RCC2  
MFC  
SHC  
GLC  
Ending

SCP\*2  
CMK2  
CMA2  
SCM  
SCG  
SCA2  
SCS  
CKV2  
CA/OV2  
SSD  
CAT  
MDC2  
MVC  
SMD2  
MSD\*  
FC\*  
STK  
ULK\*  
JSK/M2  
JSG  
JSC3  
USSD  
USC  
JSB3  
LMB  
STG  
STS/L  
LCS  
LCG  
LCM  
LCT  
LCY  
STR2  
UCA2  
HCM  
HCA  
SRL2  
SRG  
SRM  
SRT  
**MRL2**  
MRG2  
SM-25  
CAC3  
UCAC  
RCC2  
MFC  
SHC  
GLC  
Ending

●: Standard, ◎: Option, ■: Not available

Series	Variation	Model no.	Bore size (mm)	Cushion		Standard stroke length (mm)											Min. stroke length (mm)	Max. stroke length (mm) <small>Note 1</small>	Custom stroke length (Per mm)	Option				Page
				Rubber cushion	Rubber-air cushion	Standard stroke length (mm)		Standard stroke length (mm)							S	R				C	P6			
						50	100	150	200	250	300	350	400	500								600	700	
Basic type (guided type) MRL2 Series	With switch	MRL2	φ 6			●	●										300		◎			●	2178	
		MRL2-L	φ 10			●	●	●	●									500		◎				●
	Fine speed		φ 16			■	●											1000		◎				●
		MRL2-F	φ 20	●	◎			●	●	●	●	●	●	●	●	●	●	1500		◎				●
			φ 25					●	●	●	●	●	●	●	●	●	●	1500		◎				●
			φ 32					●	●	●	●	●	●	●	●	●	●	1500		◎				●
Simplified guide type 1 piston type MRL2-G Series	With switch	MRL2-G	φ 6			●	●										300		◎		◎	●	2178	
		MRL2-GL	φ 10			●	●	●	●									500		◎	◎	◎		●
	Fine speed		φ 16			■	●											1000		◎	◎	◎		●
		MRL2-GF	φ 20	●	◎			●	●	●	●	●	●	●	●	●	●	1500		◎	◎	◎		●
			φ 25					●	●	●	●	●	●	●	●	●	●	1500		◎	◎	◎		●
			φ 32					●	●	●	●	●	●	●	●	●	●	1500		◎	◎	◎		●
Simplified guide type 2 piston type MRL2-W Series	With switch	MRL2-W	φ 6			●	●										300		◎		◎	●	2178	
		MRL2-WL	φ 10			●	●	●	●									500		◎	◎	◎		●
	Fine speed		φ 16			■	●											1000		◎	◎	◎		●
		MRL2-WF	φ 20	●	◎			●	●	●	●	●	●	●	●	●	●	1500		◎	◎	◎		●
			φ 25					●	●	●	●	●	●	●	●	●	●	1500		◎	◎	◎		●
			φ 32					●	●	●	●	●	●	●	●	●	●	1500		◎	◎	◎		●

Note 1: · Max. stroke length with switch 6 mm bore: 200mm, 10 mm bore: 300mm, 16 mm bore: 500mm, 20 to 32 mm bore: 700mm  
 · Fine speed series Maximum stroke length 6 mm bore: 300mm, 10 mm bore: 500mm, 16 to 25 mm bore: 800mm, 32 mm bore: 700mm  
 · Maximum stroke length of common porting type with switch 10 mm bore: 300mm, 16 mm bore: 500mm, 20 to 32 mm bore: 700mm  
 Note 2: · Copper and PTFE free specifications are provided as standard but not provided for a type with a shock absorber and fine speed series.

SCP\*2  
CMK2  
CMA2  
SCM  
SCG  
SCA2  
SCS  
CKV2  
CA/OV2  
SSD  
CAT  
MDC2  
MVC  
SMD2  
MSD\*  
FC\*  
STK  
ULK\*  
JSK/M2  
JSG  
JSC3  
USSD  
USC  
JSB3  
LMB  
STG  
STS/L  
LCS  
LCG  
LCM  
LCT  
LCY  
STR2  
UCA2  
HCM  
HCA  
SRL2  
SRG  
SRM  
SRT  
MRL2  
MRG2  
SM-25  
CAC3  
UCAC  
RCC2  
MFC  
SHC  
GLC  
Ending

SCP\*2  
CMK2  
CMA2  
SCM  
SCG  
SCA2  
SCS  
CKV2  
CA/OV2  
SSD  
CAT  
MDC2  
MVC  
SMD2  
MSD\*  
FC\*  
STK  
ULK\*  
JSK/M2  
JSG  
JSC3  
USSD  
USC  
JSB3  
LMB  
STG  
STS/L  
LCS  
LCG  
LCM  
LCT  
LCY  
STR2  
UCA2  
HCM  
HCA  
SRL2  
SRG  
SRM  
SRT  
MRL2  
MRG2  
SM-25  
CAC3  
UCAC  
RCC2  
MFC  
SHC  
GLC  
Ending

Magnet type rodless cylinder  
Rodless type

## Variation and option selection table

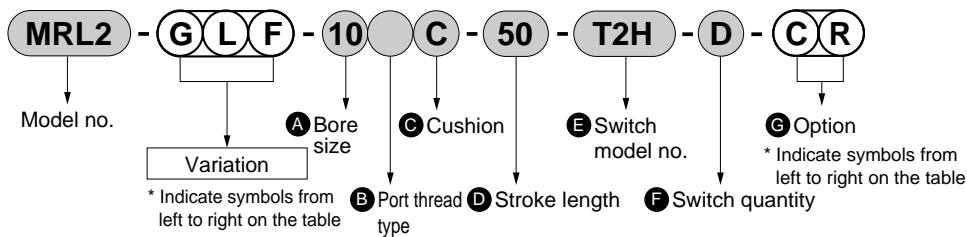
- : Standard
- ◎ : Option
- : Available (custom order)
- △ : Available depending on condition (consult with CKD)
- X : Not available

Code	Code	Variation					Port thread		Cushion	Option			
		Double acting basic type	Twin 1 pistons	Twin 2 pistons	With cylinder switch	Fine speed type	NPT (φ 25, φ 32)	G (φ 25, φ 32)	Rubber-air cushioned	With shock absorber	With scraper	With switch common porting	Clean room specifications (low particle occurrence)
	Symbol	No	G	W	L	F	N	G	C	C	S	R	P72
USC	Double acting basic type	Blank					○	○	◎	x	◎	x	◎
JSB3	Twin 1 pistons	G		x	◎	◎	○	○	◎	◎	◎	◎	◎
LMB	Twin 2 pistons	W			◎	◎	○	○	◎	◎	◎	◎	◎
STG	With cylinder switch	L			◎	◎	○	○	◎	◎	Note 3	◎	◎
STS/L	Fine speed type	F				◎	◎	◎	Note 1	x	x	x	◎
LCS	NPT (φ 25, φ 32)	N					x	○	○	○	○	○	○
LCG	G (φ 25, φ 32)	G						○	○	○	○	○	○
LCM	Rubber-air cushioned	C							◎	◎	◎	◎	◎
LCT	With shock absorber	C								◎	◎	x	◎
LCY	With scraper	S									◎	Note 4	◎
STR2	With switch common porting	R										◎	◎
UCA2	Clean room specifications (low particle occurrence)	P72											◎
HCM	Cylinder switch	Listed on Ending	◎	◎	◎	◎	○	○	◎	◎	◎	◎	◎

### Cautions

- Note 1: The fine speed performance at the shock absorber application is not guaranteed.
- Note 2: Refer to the "Clean Component System (No. CB-033SA)" for details on the clean specifications P72.
- Note 3: When selecting the common piping type with "R" switch, always select the type with switch "L" in combination.
- Note 4: The clean specifications P72 are all equipped with a scraper, so the symbol "S" is not required.

### <Example of model number>



Model no.: Magnet type rodless cylinder

- Variation : Simplified guide 1 piston with switch fine speed types
- **A** Bore size :  $\phi$  10mm
- **B** Port thread type : Rc thread
- **C** Cushion : Rubber-air cushion
- **D** Stroke length : 50mm
- **E** Switch model no. : Proximity T2H switch, lead wire 1m
- **F** Switch quantity : Two
- **G** Option : With shock absorber common porting type

SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
UCA2
HCM
HCA
<b>SRL2</b>
<b>SRG</b>
<b>SRM</b>
<b>SRT</b>
<b>MRL2</b>
<b>MRG2</b>
<b>SM-25</b>
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

Magnet type rodless cylinder  
Rodless type



# Safety precautions

Always read this section before starting use.

Refer to Intro 71 for general precautions of the cylinder, and to Intro 78 for general precautions of the cylinder switch.

## Magnet type rodless cylinder MRL2 Series

### Design & Selection

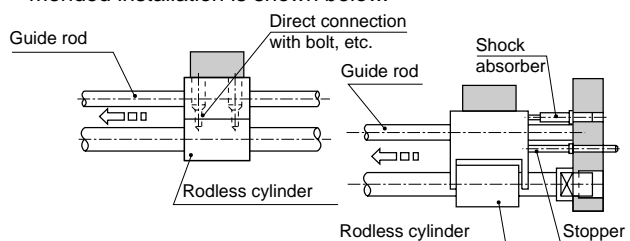
#### 1. Common

#### CAUTION

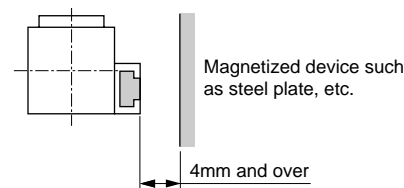
- Check clearance between the end plate and slider. Avoid catching fingers or hands while the cylinder is moving.
- Do not apply a load exceeding that allowed given in selection material to the cylinder.
- Do not use with the slider fixed. Use the cylinder with the end plate fixed. Do not use with the slider fixed.
- When using the basic combined guide with a switch, set the slider rotation angle to within 1° when fixing the guide.
- Install so the slider moves at the minimum working pressure for the entire process. If the cylinder installation surface is not flat, minimum working pressure rises due to twisting in the guide section, and may cause bearings to wear early. Install the slider so it operates at minimum working pressure. The installation surface should be very flat, but if it cannot be confirmed, adjust with a shim, etc.
- Do not scratch or dent the periphery of the cylinder tube. Lube-keeping structure, scraper, or slider wear ring may be damaged and result in operation faults.
- Pay attention to slider rotation for basic type MRL2. Connect with an external shaft or consider using the MRL2-G or MRL2-W.
- Do not use a deviating slider. If the slider deviates due to external force exceeding the magnet holding force, return it to the correct position by pushing it to the stroke limit manually.

#### Do not apply a misalignment load to the slider.

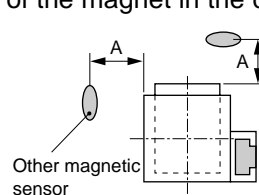
If the load and cylinder are directly installed, it will not be possible to absorb the core deviation of each shaft. This will be the same as when a lateral load is applied, and an operation fault could result (Left drawing below). Consider connecting so misalignment and cylinder deflection may be absorbed. Recommended installation is shown below.



- The cylinder may malfunction if a magnetic substance, such as a steel plate, is nearby. Move the magnetic substance to at least 4 mm from the cylinder.



- When using cylinders next to each other, or when using another magnetic sensor nearby, separate the magnetic sensor from the slider surface by the distance below to prevent faults caused by the leakage field of the magnet in the cylinder.



Port size	A (mm)
φ 6	10
φ 10	20
φ 16	20
φ 20	37
φ 25	50
φ 32	80

When less than dimension A, faults may be prevented by placing a magnetic object (2 mm or thicker steel plate) between the sensor and slider.

#### 2. Fine speed type MRL2-F

- Use by oil-free. Lubrication may change characteristics.
- Install a speed control valve close to a cylinder. Speed may be unstable if assembled away from the cylinder. Use the SC-M3/M5, SC3W, SCD-M3/M5, or SC3WU Series speed control valve.

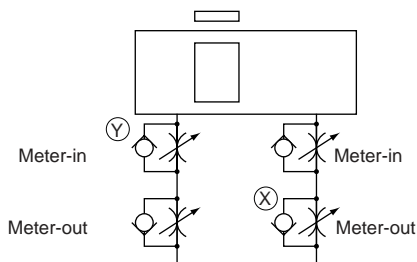


■ Generally, the higher air pressure, and the smaller load result in the more stable operation. Keep the load factor at 50% or less.

■ Do not apply lateral load to the slider.  
Install the cylinder to avoid the sliding guide to be twisted. The presence of load or resistance variation may result in unstable operations. Large differential between static friction and dynamic friction of guide results in unstable operation.

■ Avoid use with vibration.  
The product will be adversely affected by vibration and operation will be unstable.

■ Stable speed control is achieved with a meter-out circuit.  
● Add a meter-in circuit to increase the smoothness when starting.

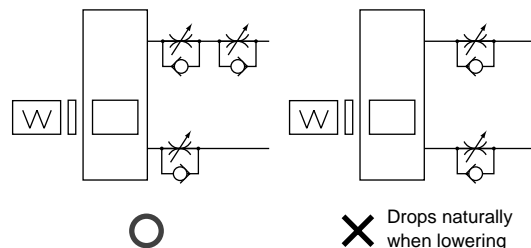


Speed adjustment method at movement of clockwise

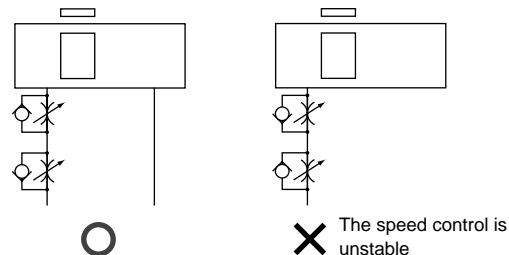
1. Adjust the speed with the (X) speed controller
2. Restrict the (Y) speed controller until the movement is smooth when starting
3. Reconfirm the speed

(Note 1) This circuit restricts the intake side, so it may take some time for movement to start. Carefully consider the changes according to the adjusted restriction when using.

(Note 2) When installed vertically, the unit will drop naturally if the meter-in circuit is used. Use the meter-out circuit in this case.



(Note 3) Connect the flow control valve in parallel with the following circuit.



## Installation & Adjustment

### CAUTION

■ The CKD shock absorber is treated as a consumable. Replace the shock absorber if energy absorption performance drops or if movement is no longer smooth.

## During Use & Maintenance

### WARNING

■ A magnetic force of integrated magnet is powerful. Do not disassemble the product.

■ For port sizes  $\phi 16$  or less, the cushion rigidity could change over time and cause the stroke at the low pressure setting to differ slightly from the standard value. Carry out run-in operation by moving several times or by reciprocating with a high supply pressure, etc.

SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
UCA2
HCM
HCA
SRL2
SRG
SRM
SRT
MRL2
MRG2
SM-25
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

Magnet type rodless cylinder  
Rodless type



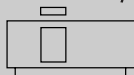


Magnet type rodless cylinder

- Basic type (guided type) **MRL2-(F)** Series
- Simplified guide type, 1 piston type **MRL2-G(F)** Series
- Simplified guide type, 2 piston type **MRL2-W(F)** Series

● Bore size:  $\phi 6$ ,  $\phi 10$ ,  $\phi 16$ ,  $\phi 20$ ,  $\phi 25$ ,  $\phi 32$

JIS symbol



## Specifications

Descriptions		MRL2 (L,F) , MRL2-G (L,F) , MRL2-W (L,F)					
Bore size	mm	$\phi 6$	$\phi 10$	$\phi 16$	$\phi 20$	$\phi 25$	$\phi 32$
Actuation		Double acting					
Working fluid		Compressed air					
Max. working pressure	MPa	0.7					
Min. working pressure	MPa	0.3 (Note 1)			0.2		
Withstanding pressure	MPa	1.05					
Ambient temperature	°C	-10 to 60 (fine speed type: 5 to 60) (no freezing)					
Port size		M5			Rc1/8		
Stroke tolerance	mm	+ 1.5 0 (to 1000)			+ 2.0 0 (to 1500)		
Working piston speed	mm/s	50 to 500 (fine speed type: 1 to 200)					
Cushion		Rubber cushion					
Lubrication		Not required (when lubricating, use turbine oil ISO VG32) but not for fine speed type.					
Magnet holding force (Note 2)	N	19	63	166	294	350	574
Adjustable stroke range (single) (Note 3)	mm	3	4	6	8.5	10	10

Note 1: For MRL2-G-6-C (shock absorber), the value is 0.4.

Note 2: The values of simplified guide type, two piston type (W) is double.

Note 3: For MRL2 (basic type), adjustable stroke is not available.

## Stroke length

Bore size (mm)	Standard stroke length (mm)	Max. stroke length (mm)	Max. stroke length of type with switch (mm)	Max. stroke length of common porting with switch (mm)	Max. stroke length of fine speed type (mm)	Min. stroke length (mm)
$\phi 6$	50, 100, 150, 200	300	200	-	300	1
$\phi 10$	50, 100, 150, 200, 250, 300	500	300	300	500	
$\phi 16$	100, 150, 200, 250, 300, 400, 500	1000	500	500	800	
$\phi 20$	200, 250, 300, 350, 400, 500, 600, 700	1500	700	700	800	
$\phi 25$	200, 250, 300, 350, 400, 500, 600, 700	1500	700	700	800	
$\phi 32$	200, 250, 300, 350, 400, 500, 600, 700	1500	700	700	700	

■ Custom stroke length is available per 1mm increment.

## T type switch quantity and min. stroke length (mm)

Switch quantity	1				2				3				4			
	T*V	T*H	T*Y*V	T*Y*H	T*V	T*H	T*Y*V	T*Y*H	T*V	T*H	T*Y*V	T*Y*H	T*V	T*H	T*Y*V	T*Y*H
Bore size (mm)																
$\phi 6$ or equivalent	5	5	5	5	20	50	40	70	40	85	71	115	60	120	101	160
$\phi 10$ or equivalent	5	5	5	5	20	50	40	70	40	85	71	115	60	120	101	160
$\phi 16$ or equivalent	5	5	5	5	20	50	40	70	40	85	71	115	60	120	101	160
$\phi 20$ or equivalent	5	5	5	5	20	50	40	70	40	85	71	115	60	120	101	160
$\phi 25$ or equivalent	5	5	5	5	20	50	40	70	40	85	71	115	60	120	101	160
$\phi 32$ or equivalent	5	5	5	5	20	50	40	70	40	85	71	115	60	120	101	160

### Switch specifications

- 1 color/2 color indicator

Descriptions	Proximity 2 wire			Proximity 3 wire		
	T1H/T1V	T2H/T2V	T2YH/T2YV	T3H/T3V	T3PH/T3PV (Custom order)	T3YH/T3YV
Applications	Programmable controller, relay, small solenoid valve		Programmable controller	Programmable controller, relay		
Output method	-			NPN output	PNP output	NPN output
Power voltage	-			10 to 28 VDC		
Load voltage	85 to 265 VAC	10 to 30 VDC		30 VDC or less		
Load current	5 to 100mA	5 to 20mA (Note 1)		100mA or less		50mA or less
Light	LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Green LED (ON lighting)	Red/green LED (ON lighting)
Leakage current	1mA or less with 100 VAC 2mA or less with 200 VAC	1mA or less		10 μA or less		

- With preventive maintenance output

Descriptions	Proximity 3 wire	Proximity 4 wire	Proximity 3 wire	Proximity 4 wire
	T2YFH/V	T3YFH/V	T2YMH/V	T3YMH/V
Applications	Programmable controller	Programmable controller	Programmable controller	Programmable controller
Output method	NPN output			
Light	Installation position adjustment	Red/green LED (ON lighting)		
	Preventive maintenance output	-	Yellow LED (ON lighting)	
Regular	Power voltage	-	10 to 28 VDC	-
	Load voltage	10 to 30 VDC	30 VDC or less	10 to 30 VDC
	Load current	5 to 20mA	50mA or less	5 to 20mA
	Leakage current	1mA or less	10 μA or less	1.2mA or less
Preventive maintenance output	Load voltage	30 VDC or less		
	Load current	20mA or less	50mA or less	5 to 20mA or less
	Leakage current	10 μA or less		

Note 1: Refer to Ending 1 for other switch specifications.

Note 2: Maximum load current above: 20mA at 25 °C. The current will be lower than 20mA if ambient temperature around switch is higher than 25 °C. (5 to 10mA when 60 °C)

### Cylinder weight

Unit (g)

Model no.	Without switch		With switch		Common porting type with switch	
	Product weight when stroke length = 0mm	Additional weight per S = 100mm	Product weight when stroke length = 0mm	Additional weight per S = 100mm	Product weight when stroke length = 0mm	Additional weight per S = 100mm
MRL2-6	73	13	103	39	-	-
MRL2-10	143	28	169	48	-	-
MRL2-16	278	43	313	63	-	-
MRL2-20	542	85	587	105	-	-
MRL2-25	954	98	1017	128	-	-
MRL2-32	1230	195	1301	225	-	-
MRL2-G-6	193	28	223	54	-	-
MRL2-G-10	368	53	394	73	411	94
MRL2-G-16	635	85	670	105	691	126
MRL2-G-20	1197	155	1242	175	1269	196
MRL2-G-25	1852	196	1915	226	1997	289
MRL2-G-32	2297	390	2368	420	2455	483
MRL2-W-6	203	28	233	54	-	-
MRL2-W-10	398	53	424	73	441	94
MRL2-W-16	710	85	745	105	766	126
MRL2-W-20	1367	155	1412	175	1439	196
MRL2-W-25	2206	196	2269	226	2351	289
MRL2-W-32	2859	390	2930	420	3017	483

Note: The switch weight is not included in the product weight of the switch type and common piping type with switch.

### Clean room specifications

(Catalog No. CB-033SA)

- Dust preventive structure for inside the clean room

MRL2 - \* - ..... - P72

MRL2 - \* - ..... - P52

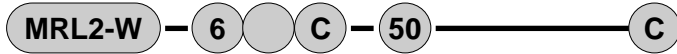
SCP\*2  
CMK2  
CMA2  
SCM  
SCG  
SCA2  
SCS  
CKV2  
CA/OV2  
SSD  
CAT  
MDC2  
MVC  
SMD2  
MSD\*  
FC\*  
STK  
ULK\*  
JSK/M2  
JSG  
JSC3  
USSD  
USC  
JSB3  
LMB  
STG  
STS/L  
LCS  
LCG  
LCM  
LCT  
LCY  
STR2  
UCA2  
HCM  
HCA  
SRL2  
SRG  
SRM  
SRT  
MRL2  
MRG2  
SM-25  
CAC3  
UCAC  
RCC2  
MFC  
SHC  
GLC  
Ending

Magnet type rodless cylinder  
Rodless type

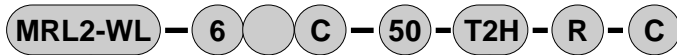
# MRL2/MRL2-W Series

## How to order

Without switch



With switch



**A** Model no.

**B** Bore size

**C** Port thread type  
Note 1

**D** Cushion  
Note 2

**E** Stroke length  
Note 3

**F** Switch model no.  
\* indicates lead wire length.  
Note 5

**G** Switch quantity

**H** Option  
Note 6



### Note on model no. selection

Note 1: The following piping threads are available for the rubber cushion (no symbol) type.  
NPT thread: NN, G thread: GN

Note 2: When "C" rubber and air cushioned, for MRL2-G and W, adjustable stroke by moving stopper may affect that rubber-air cushion does not function.

Note 3: Refer to the table below for the max. stroke length of the type with a switch.

Note 4: Refer to page 2178 for maximum stroke length of fine speed type.

Note 5: Switches other than F switch model no. are available. (Custom order) Refer to Ending 1 for the details.

**Note 6: For "R" common porting type with switch, select a model with switch (MRL2\*L).**

Bore size (mm)	Max. stroke length of type with switch (mm)
φ 6	200
φ 10	300
φ 16	500
φ 20	700
φ 25	700
φ 32	700

<Example of model number>

**MRL2-WL-10-50-T2H-R-C**

Model: Rodless cylinder

- A** Model no. : Simplified guide type 2 piston type
- B** Bore size : φ10mm
- C** Port thread type : Rc thread
- D** Cushion : Rubber cushion
- E** Stroke length : 50mm
- F** Switch model no. : Proximity switch T2H
- G** Switch quantity : One on R side
- H** Option : With shock absorber

Symbol	Descriptions	
<b>A Model no.</b>	<b>Model no.</b>	
<b>Basic type</b>	<b>MRL2</b>	Without switch
	<b>MRL2-L</b>	With switch
	<b>MRL2-F</b>	Fine speed type
	<b>MRL2-LF</b>	Fine speed type with switch
<b>Simplified guide type 1 piston type</b>	<b>MRL2-G</b>	Without switch
	<b>MRL2-GL</b>	With switch
	<b>MRL2-GF</b>	Fine speed type
<b>Simplified guide type 2 piston type</b>	<b>MRL2-GLF</b>	Fine speed type with switch
	<b>MRL2-W</b>	Without switch
	<b>MRL2-WL</b>	With switch
	<b>MRL2-WF</b>	Fine speed type
	<b>MRL2-WLF</b>	Fine speed type with switch

<b>B Bore size (mm)</b>	
<b>6</b>	φ 6
<b>10</b>	φ 10
<b>16</b>	φ 16
<b>20</b>	φ 20
<b>25</b>	φ 25
<b>32</b>	φ 32

<b>C Port thread type</b>	
<b>Blank</b>	Rc thread
<b>N</b>	NPT thread (φ 25 and over) (custom order)
<b>G</b>	G thread (φ 25 and over) (custom order)

<b>D Cushion</b>	
<b>Blank</b>	Rubber cushion
<b>C</b>	Rubber-air cushion

<b>E Stroke length (mm)</b>		
Bore size	Stroke length Note 4	Custom stroke length
φ 6	<b>1 to 300</b>	Per 1 mm increment
φ 10	<b>1 to 500</b>	
φ 16	<b>1 to 1000</b>	
φ 20 to φ 32	<b>1 to 1500</b>	

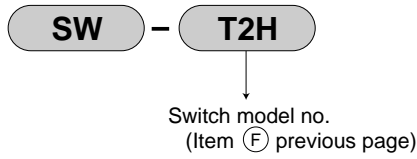
<b>F Switch model no.</b>				
Axial lead wire	Radial lead wire	Contact	Indication	Lead wire
<b>T1H*</b>	<b>T1V*</b>	1 color indicator type		2-wire
<b>T2H*</b>	<b>T2V*</b>			3-wire
<b>T3H*</b>	<b>T3V*</b>			2-wire
<b>T2YH*</b>	<b>T2YV*</b>	2 color indicator type	1 color indicator type (custom order)	2-wire
<b>T3YH*</b>	<b>T3YV*</b>			3-wire
<b>T3PH*</b>	<b>T3PV*</b>			3-wire
<b>T2YFH*</b>	<b>T2YFV*</b>			4-wire
<b>T3YFH*</b>	<b>T3YFV*</b>	2 color indicator type (w/ light for preventive maintenance output)		3-wire
<b>T2YMH*</b>	<b>T2YMV*</b>			3-wire
<b>T3YMH*</b>	<b>T3YMV*</b>	2 color indicator type (w/ light for preventive maintenance output (1 color))		4-wire

<b>*Lead wire length</b>	
<b>Blank</b>	1m (standard)
<b>3</b>	3m (option)
<b>5</b>	5m (option)

<b>G Switch quantity</b>	
<b>R</b>	One on R side
<b>L</b>	One on L side
<b>D</b>	Two
<b>T</b>	Three
<b>4</b>	Four (When more than 4 pieces, indicate switch quantity.)

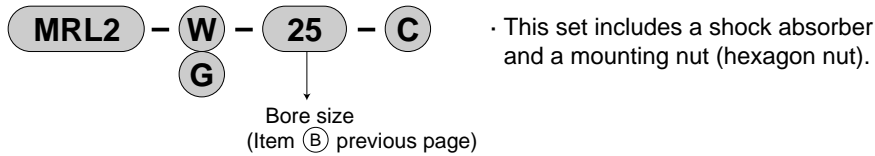
<b>H Option</b>	
<b>C</b>	With shock absorber (Basic type can not be selected.)
<b>S</b>	With scraper (The fine speed type can not be selected.)
<b>R</b>	Common porting type with switch (Basic type and φ 6 can not be selected.)

### How to order switch



### How to order discrete shock absorber

Used when changing from standard type to type with shock absorber.



### Applicable shock absorber model no.

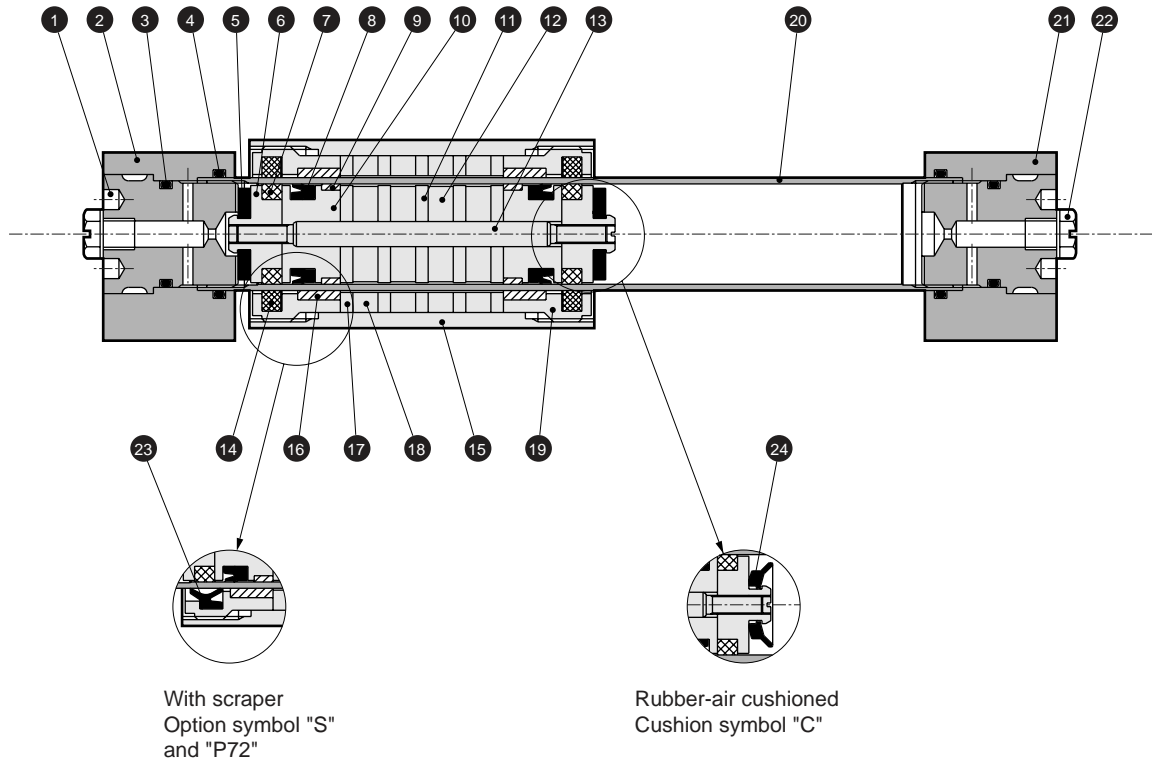
Model	Shock absorber model no.
MRL2-W-6, MRL2-G-6	NCK-00-0.1
MRL2-W-10, MRL2-G-10	NCK-00-0.1-C
MRL2-W-16, MRL2-G-16	NCK-00-0.3-C
MRL2-W-20, MRL2-G-20	NCK-00-0.7-C
MRL2-W-25, MRL2-G-25	NCK-00-1.2-C
MRL2-W-32, MRL2-G-32	NCK-00-1.2-C

SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
UCA2
HCM
HCA
SRL2
SRG
SRM
SRT
MRL2
MRG2
SM-25
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

Magnet type rodless cylinder  
Rodless type

## Internal structure and parts list MRL2 (basic type)

● MRL2 (basic type)



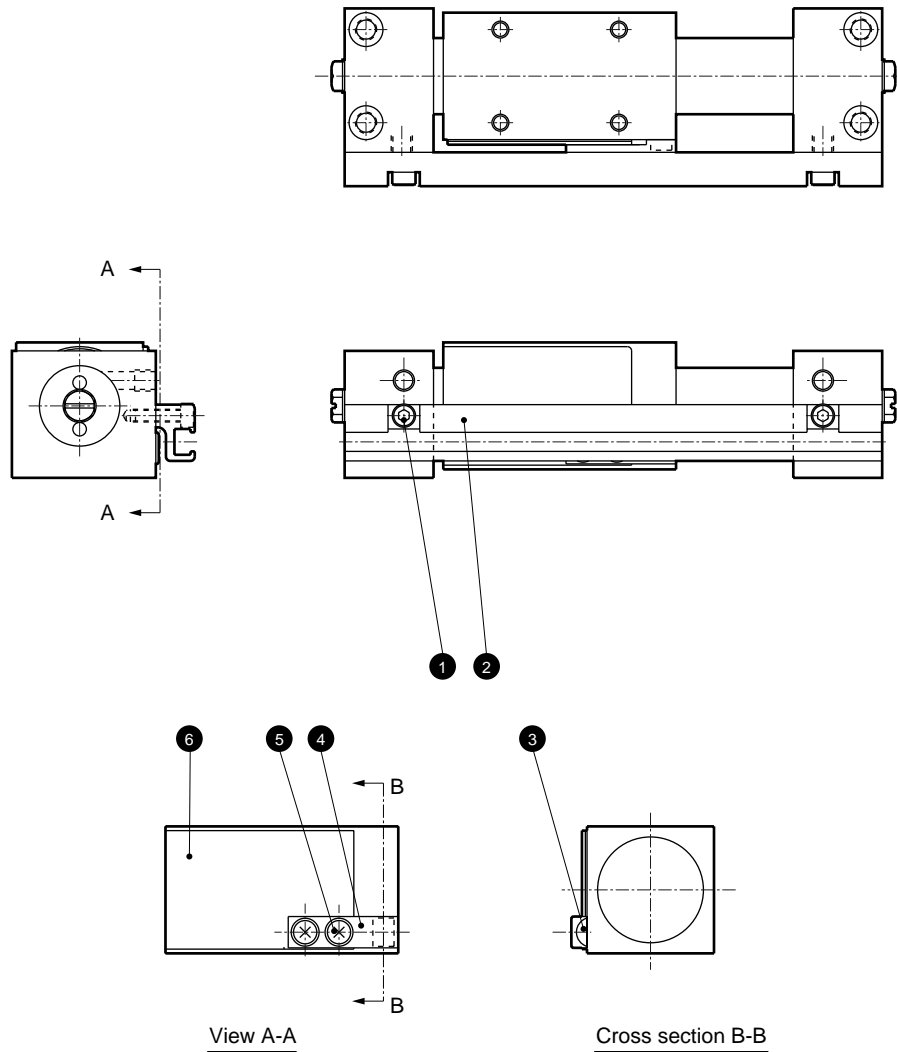
### Parts list

No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	End cap	Aluminum alloy	Chromate	13	Piston shaft	Stainless steel	
2	End plate (L)	Aluminum alloy	Alumite	14	Lube keeping structure (slider)	Special rubber	None for P72
3	O ring	Nitrile rubber		15	Slider	Aluminum alloy	Alumite
4	O ring	Nitrile rubber		16	Slider wear ring	Polyacetal resin	
5	Cushion rubber	Urethane rubber		17	Slider yoke	Steel	Galvanizing
6	Piston (2)	Aluminum alloy	Chromate	18	Magnet	Special alloy	
7	Lube keeping structure (piston)	Special rubber		19	Slider guard	Aluminum alloy	Chromate
8	Piston packing seal	Nitrile rubber		20	Cylinder tube	Stainless steel	
9	Piston wear ring	Polyacetal resin		21	End plate (R)	Aluminum alloy	Alumite
10	Piston (1)	Aluminum alloy	Chromate	22	Plug	Copper alloy or steel	
11	Piston yoke	Steel	Galvanizing	23	Scraper	Urethane rubber	
12	Magnet	Special alloy		24	Cushion rubber	Special rubber	

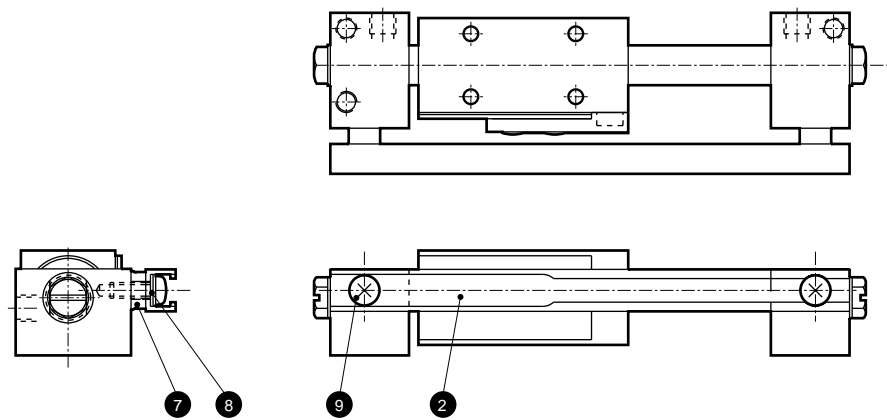
Note: A magnetic force of integrated magnet is powerful. Do not disassemble the product.

### Internal structure and parts list MRL2 (basic type)

● MRL2-L (with switch)



● MRL2-L-6 only



### Parts list

No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	Hexagon socket head cap bolt	Stainless steel		6	Shield plate	Steel	Nickeling
2	Switch rail	Aluminum alloy	Alumite	7	Spacer	Copper alloy	Nickeling
3	Magnet	Special alloy		8	Plain washer	Stainless steel	
4	Magnet holder	Polyacetal resin		9	Cross headed pan	Stainless steel	
5	Cross headed pan	Stainless steel					

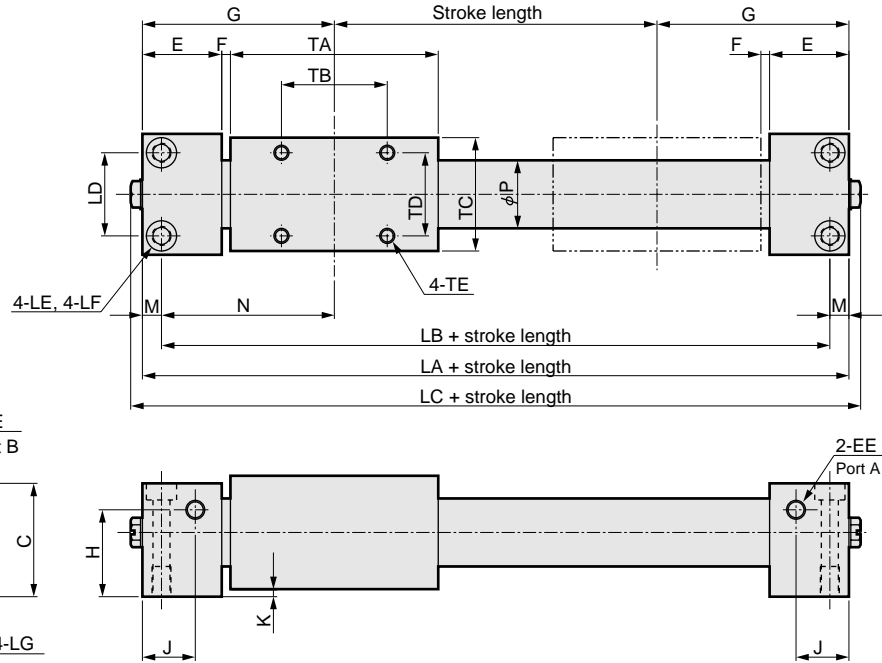
SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
UCA2
HCM
HCA
<b>SRL2</b>
<b>SRG</b>
<b>SRM</b>
<b>SRT</b>
<b>MRL2</b>
<b>MRG2</b>
<b>SM-25</b>
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

Magnet type rodless cylinder  
Rodless type

## Dimensions: MRL2 (basic type)



● MRL2 (basic type) without switch



Note: Air piping port A, B can be selected.  
 A plug is assembled to Port B at shipment.  
 ·  $\phi 6$  to  $\phi 20$  : Plug (FPL-M5)  
 ·  $\phi 25, \phi 32$  : Hexagon socket head tapered screw plug

Symbol	Dimensions					Installation dimensions								
	LA	LC	A	C	D	LB	LD	LE	LF	LG	TB	TD	TE	
$\phi 6$	74	80.2	20	16.5	20	68	14	$\phi 3.5$	-	M4 depth 6	20	12	M3 depth 4.5	
$\phi 10$	80	86.2	26	24	26	72	18	$\phi 3.5$	$\phi 6.5$ spot face depth 3.3	M4 depth 8	20	18	M3 depth 4.5	
$\phi 16$	102	108.2	32	30	32	92	22	$\phi 4.5$	$\phi 8$ spot face depth 4.4	M5 depth 8	28	22	M4 depth 6	
$\phi 20$	128	134.2	38	36	38	116	26	$\phi 5.5$	$\phi 9.5$ spot face depth 5.4	M6 depth 12	44	26	M4 depth 6	
$\phi 25$	130	132.2	52	45	48	118	40	$\phi 5.5$	$\phi 9.5$ spot face depth 5.4	M6 depth 12	40	30	M6 depth 6	
$\phi 32$	138	140.2	60	53	56	124	46	$\phi 6.9$	$\phi 11$ spot face depth 6.5	M8 depth 12	40	40	M6 depth 9	

Symbol	General dimensions												
	B	E	EE	F	G	H	J	K	M	N	P	TA	TC
$\phi 6$	11	15	M5 depth 4	2	37	9	9.5	2	3	34	7.6	40	18
$\phi 10$	14	18	M5 depth 4	2	40	5.5	10	2	4	36	12	40	24
$\phi 16$	17	21	M5 depth 4	2.5	51	23	14	2	5	46	18	55	30
$\phi 20$	20	24	M5 depth 4	3	64	28	15.5	2	6	58	23	74	36
$\phi 25$	25.5	27	Rc1/8	3	65	29	17	3	6	59	28	70	45
$\phi 32$	29.5	27	Rc1/8	3	69	37	17	3	7	62	35	78	53



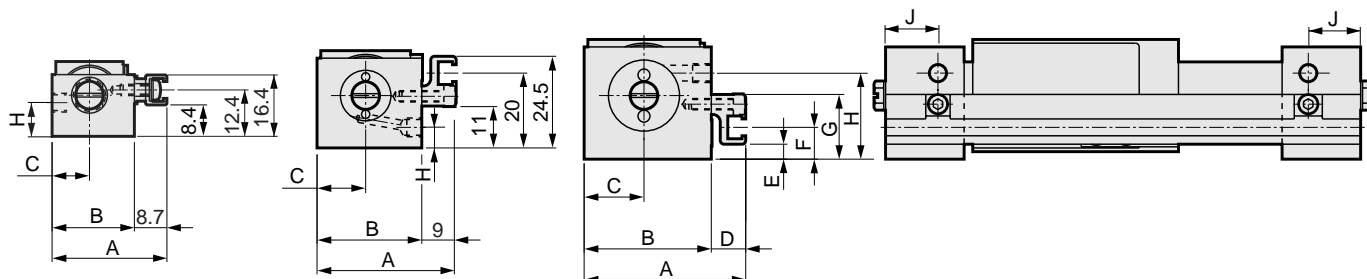
### Dimensions: MRL2 (basic type)

● MRL2-L (basic type) with switch

● For  $\phi 6$

● For  $\phi 10$

● For  $\phi 16$  to  $\phi 32$



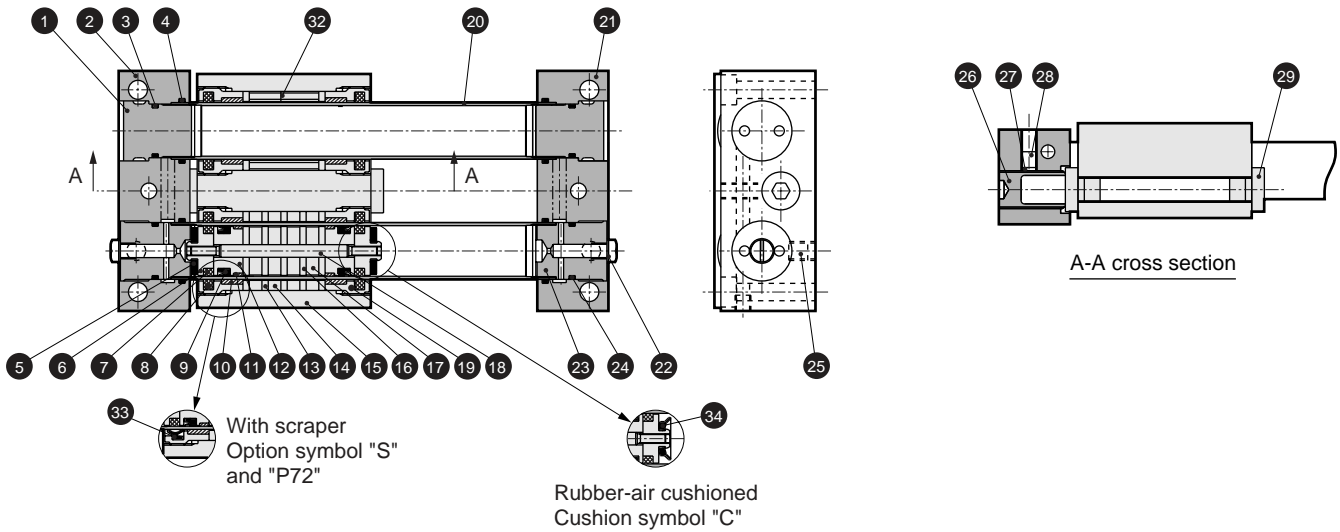
Symbol	A	B	C	D	E	F	G	H	J
Bore size (mm)									
$\phi 6$	30.7	22	10	-	-	-	-	9	9.5
$\phi 10$	37	28	13	-	-	-	-	5.5	10
$\phi 16$	43	34	16	9.0	4	8.5	17.3	23	14
$\phi 20$	49	40	19	9.0	9	13.5	22.3	28	15.5
$\phi 25$	60.7	52	26	8.7	2	7.5	21	29	17
$\phi 32$	68.7	60	30	8.7	10	15.5	29	37	17

SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
UCA2
HCM
HCA
<b>SRL2</b>
SRG
SRM
SRT
<b>MRL2</b>
MRG2
SM-25
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

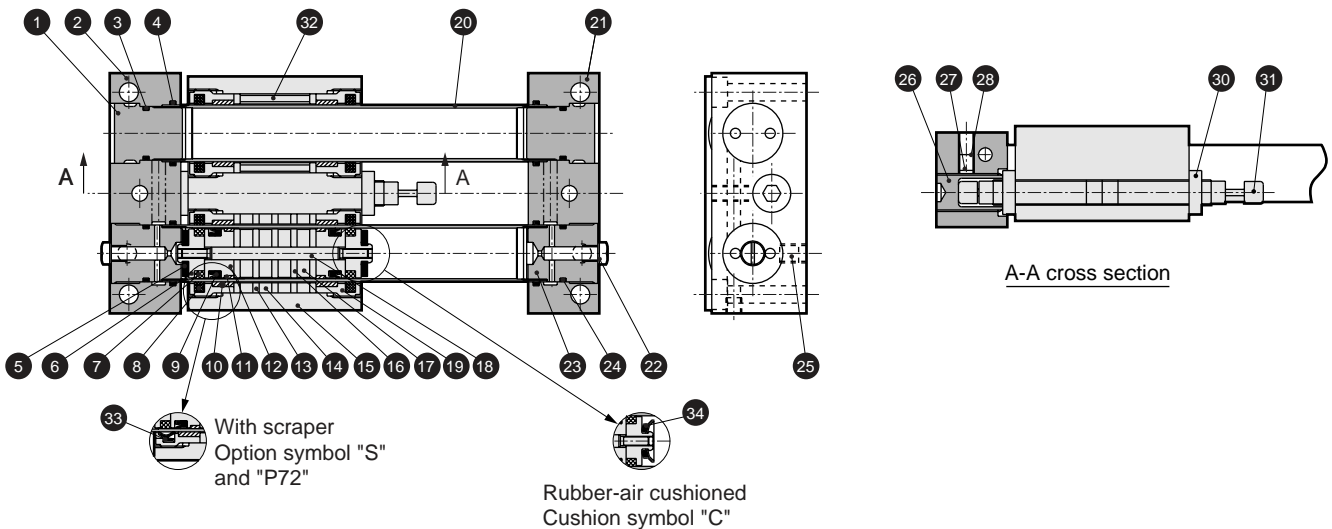
Magnet type rodless cylinder  
Rodless type

## Internal structure and parts list MRL2-G (simplified guide type 1 piston)

### ● MRL2-G (simplified guide type 1 piston)



### ● MRL2-G\*-C (with shock absorber)



### Parts list

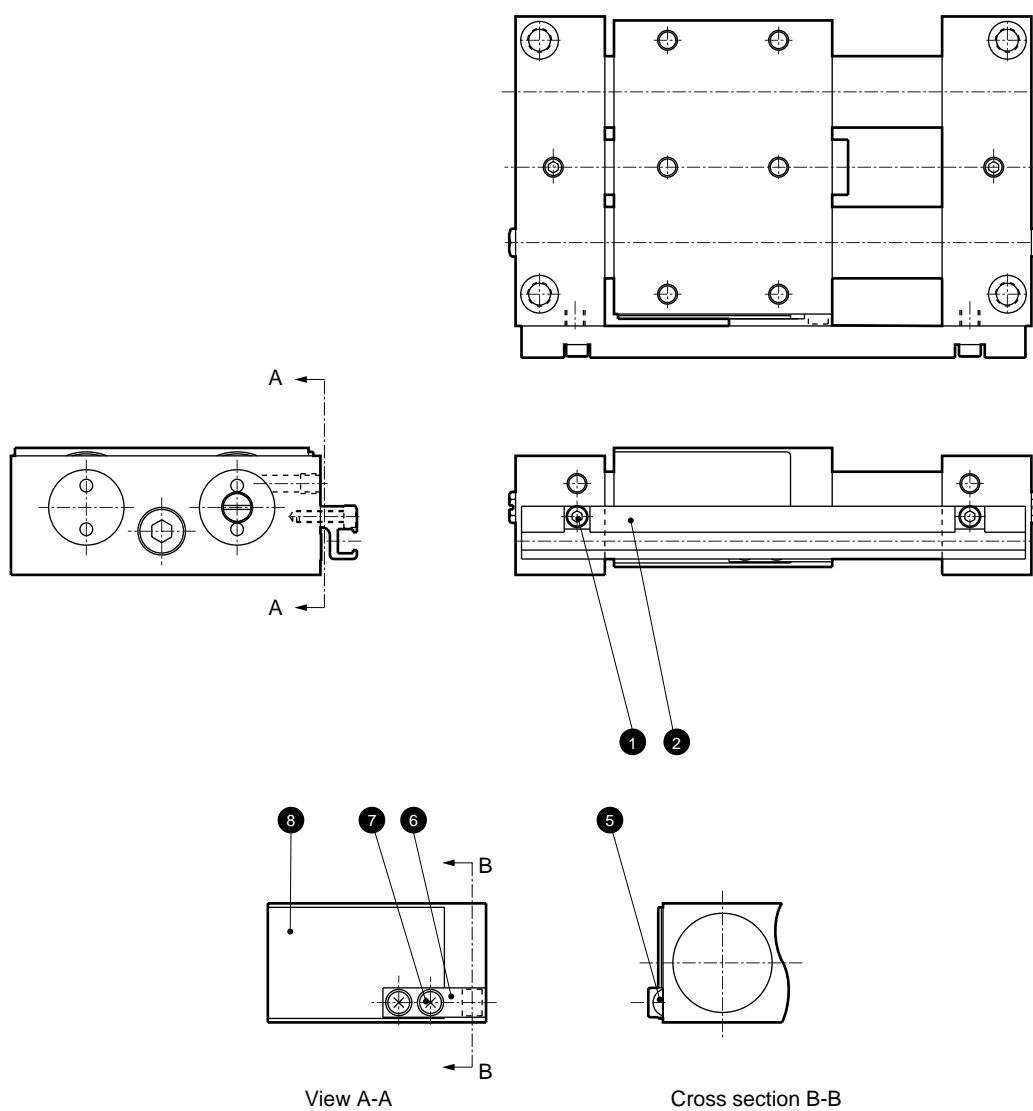
No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	End cap	Aluminum alloy	Chromate	18	Piston shaft	Stainless steel	
2	End plate (L)	Aluminum alloy	Alumite	19	Slider guard	Aluminum alloy	Chromate
3	O ring	Nitrile rubber		20	Cylinder tube	Stainless steel	
4	O ring	Nitrile rubber		21	End plate (R)	Aluminum alloy	Alumite
5	Cushion rubber	Urethane rubber		22	Plug	Copper alloy or steel	
6	Piston (2)	Aluminum alloy	Chromate	23	End cap	Aluminum alloy	Chromate
7	Lube keeping structure (piston)	Special rubber		24	O ring	Nitrile rubber	
8	Lube keeping structure (slider)	Special rubber	None for P72	25	Hexagon socket head set screw	Alloy steel	
9	Piston packing seal	Nitrile rubber		26	Stopper	Alloy steel	Nickeling
10	Slider wear ring	Polyacetal resin		27	Set shoe	Aluminum alloy	
11	Piston wear ring	Polyacetal resin		28	Hexagon socket head set screw	Stainless steel	
12	Piston (1)	Aluminum alloy	Chromate	29	Stopper bolt	Steel	Nickeling
13	Slider yoke	Steel	Galvanizing	30	Hexagon nut	Steel	
14	Magnet	Special alloy		31	Shock absorber		
15	Slider	Aluminum alloy	Alumite	32	Spacer	Stainless steel	
16	Piston yoke	Steel	Galvanizing	33	Scraper	Urethane rubber	
17	Magnet	Special alloy		34	Cushion rubber	Special rubber	

Note: A magnetic force of magnet is powerful. Do not disassemble the product.

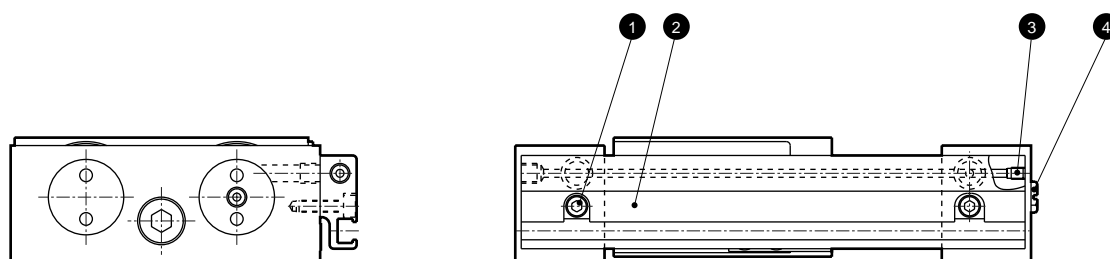
SCP\*2  
CMK2  
CMA2  
SCM  
SCG  
SCA2  
SCS  
CKV2  
CA/OV2  
SSD  
CAT  
MDC2  
MVC  
SMD2  
MSD\*  
FC\*  
STK  
ULK\*  
JSK/M2  
JSG  
JSC3  
USSD  
USC  
JSB3  
LMB  
STG  
STS/L  
LCS  
LCG  
LCM  
LCT  
LCY  
STR2  
UCA2  
HCM  
HCA  
SRL2  
SRG  
SRM  
SRT  
MRL2  
MRG2  
SM-25  
CAC3  
UCAC  
RCC2  
MFC  
SHC  
GLC  
Ending

### Internal structure and parts list MRL2-G (simplified guide type 1 piston)

● MRL2-GL (with switch)



● MRL2-GL-\*R (common porting type with switch)



### Parts list

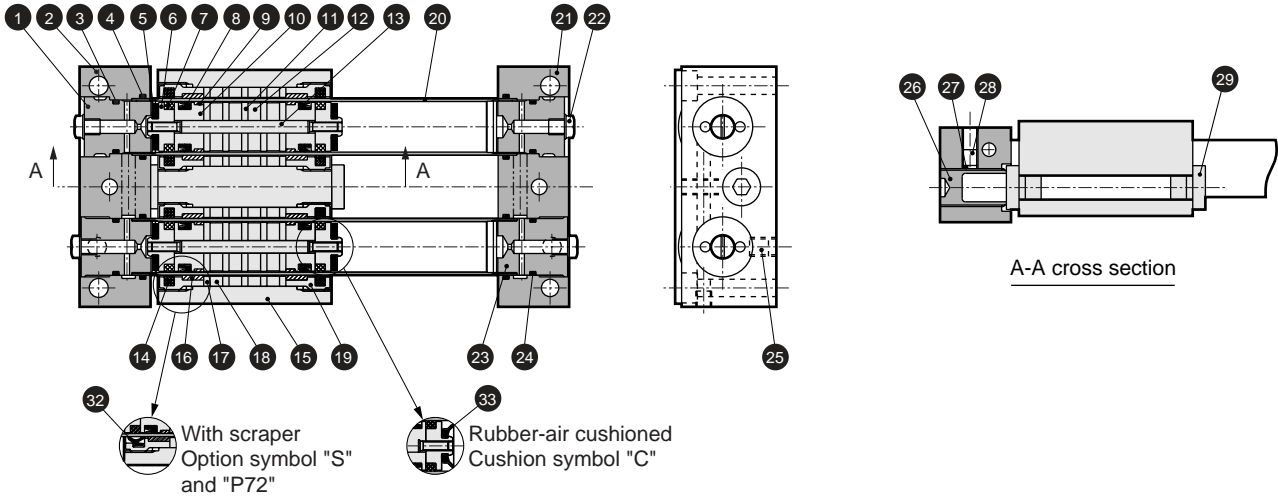
No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	Hexagon socket head cap bolt	Stainless steel		5	Magnet	Special alloy	
2	Switch rail	Aluminum alloy	Alumite	6	Magnet holder	Polyacetal resin	
3	Hexagon socket head set screw	Stainless steel		7	Cross headed pan	Stainless steel	
4	Plug	Copper alloy or steel		8	Shield plate	Steel	Nickeling

SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
UCA2
HCM
HCA
SRL2
SRG
SRM
SRT
<b>MRL2</b>
MRG2
SM-25
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

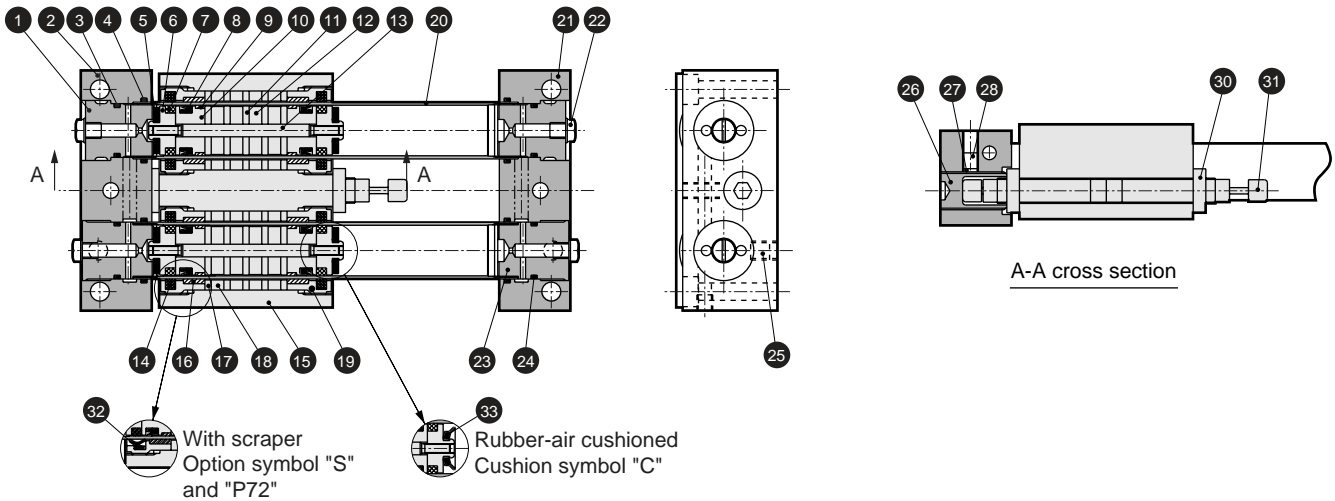
Magnet type rodless cylinder  
Rodless type

## Internal structure and parts list MRL2-W (simplified guide type 2 piston)

### ● MRL2-W (simplified guide type 2 piston)



### ● MRL2-W\*-C (with shock absorber)



### Parts list

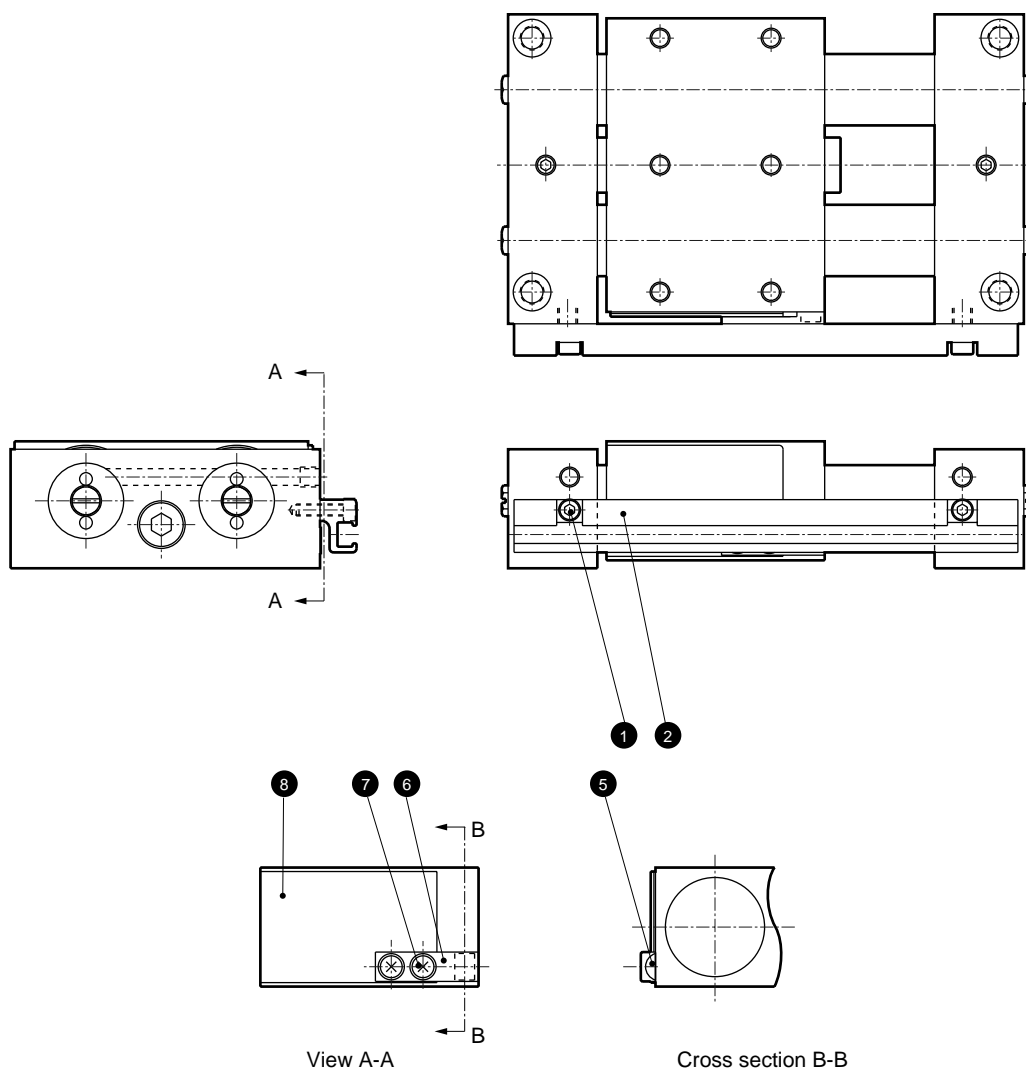
No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	End cap	Aluminum alloy	Chromate	17	Slider yoke	Steel	Galvanizing
2	End plate (L)	Aluminum alloy	Alumite	18	Magnet	Special alloy	
3	O ring	Nitrile rubber		19	Slider guard	Aluminum alloy	Chromate
4	O ring	Nitrile rubber		20	Cylinder tube	Stainless steel	
5	Cushion rubber	Urethane rubber		21	End plate (R)	Aluminum alloy	Alumite
6	Piston (2)	Aluminum alloy	Chromate	22	Plug	Copper alloy or steel	
7	Lube keeping structure (piston)	Special rubber		23	End cap	Aluminum alloy	Chromate
8	Piston packing seal	Nitrile rubber		24	O ring	Nitrile rubber	
9	Piston wear ring	Polyacetal resin		25	Hexagon socket head set screw	Alloy steel	
10	Piston (1)	Aluminum alloy	Chromate	26	Stopper	Alloy steel	Nickeling
11	Piston yoke	Steel	Galvanizing	27	Set shoe	Aluminum alloy	
12	Magnet	Special alloy		28	Hexagon socket head set screw	Stainless steel	
13	Piston shaft	Stainless steel		29	Stopper bolt	Steel	Nickeling
14	Lube keeping structure (slider)	Special rubber		30	Hexagon nut	Steel	
15	Slider	Aluminum alloy	Alumite	31	Shock absorber		
16	Slider wear ring	Polyacetal resin		32	Scraper	Urethane rubber	
				33	Cushion rubber	Special rubber	

Note: A magnetic force of magnet is powerful. Do not disassemble the product.

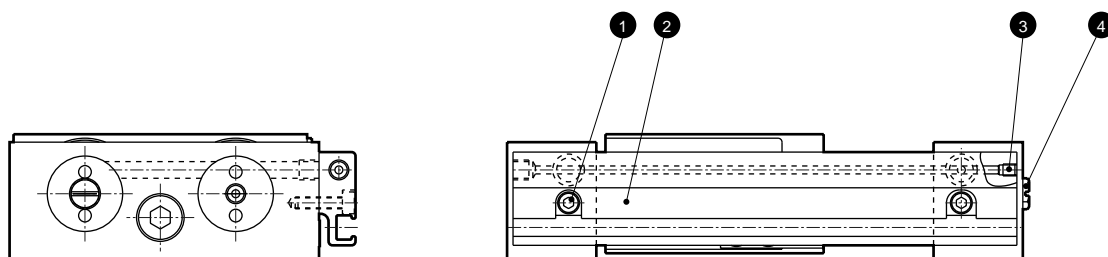
SCP\*2  
CMK2  
CMA2  
SCM  
SCG  
SCA2  
SCS  
CKV2  
CA/OV2  
SSD  
CAT  
MDC2  
MVC  
SMD2  
MSD\*  
FC\*  
STK  
ULK\*  
JSK/M2  
JSG  
JSC3  
USSD  
USC  
JSB3  
LMB  
STG  
STS/L  
LCS  
LCG  
LCM  
LCT  
LCY  
STR2  
UCA2  
HCM  
HCA  
SRL2  
SRG  
SRM  
SRT  
MRL2  
MRG2  
SM-25  
CAC3  
UCAC  
RCC2  
MFC  
SHC  
GLC  
Ending

### Internal structure and parts list MRL2-W (simplified guide type 2 piston)

● MRL2-WL (with switch)



● MRL2-WL-\*R (common porting type with switch)



### Parts list

No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	Hexagon socket head cap bolt	Stainless steel		5	Magnet	Special alloy	
2	Switch rail	Aluminum alloy	Alumite	6	Magnet holder	Polyacetal resin	
3	Hexagon socket head set screw	Stainless steel		7	Cross headed pan	Stainless steel	
4	Plug	Copper alloy or steel		8	Shield plate	Steel	Nickeling

SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
UCA2
HCM
HCA
SRL2
SRG
SRM
SRT
<b>MRL2</b>
MRG2
SM-25
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

Magnet type  
Rodless cylinder  
Rodless type

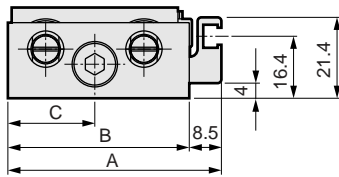


### Dimensions: MRL2-G (simplified guide type, 1 piston) / MRL2-W (simplified guide type, 2 piston)

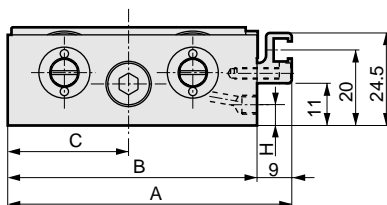
- MRL2-GL (simplified guide type 1 piston) with switch
- MRL2-WL (simplified guide type 2 piston) with switch



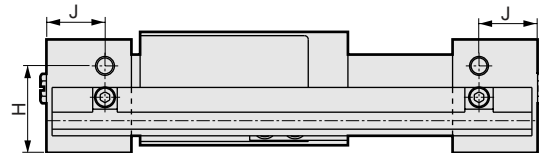
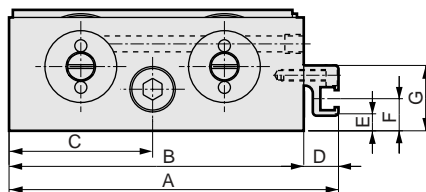
- For  $\phi 6$



- For  $\phi 10$



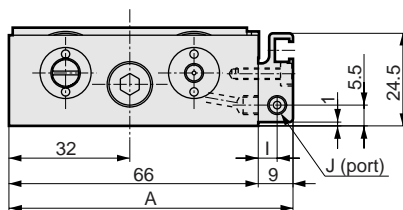
- For  $\phi 16$  to  $\phi 32$



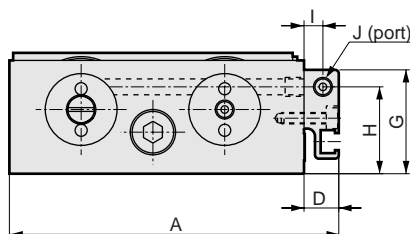
Symbol	A	B	C	D	E	F	G	H	J
Bore size (mm)									
$\phi 6$	56.5	48	23	-	-	-	-	9	9.5
$\phi 10$	75	66	32	-	-	-	-	5.5	11.5
$\phi 16$	87	78	38	9	4	8.5	17.3	23	15.5
$\phi 20$	101	92	45	9	9	13.5	22.3	28	17
$\phi 25$	116.7	108	54	8.7	2	7.5	21	29	20
$\phi 32$	134.7	126	63	8.7	10	15.5	29	37	20

- MRL2-GL-\*R (simplified guide type 1 piston) common porting type with switch
- MRL2-WL-\*R (simplified guide type 2 piston) common porting type with switch

- For  $\phi 10$



- For  $\phi 16$  to  $\phi 32$



Symbol	A	D	G	H	I	J
Bore size (mm)						
$\phi 10$	75	-	-	-	5	M5 depth 4
$\phi 16$	87	9	27.5	23	5	M5 depth 4
$\phi 20$	101	9	32.5	28	5	M5 depth 4
$\phi 25$	122	14	45	29	7.5	Rc1/8
$\phi 32$	140	14	53	37	7.5	Rc1/8

SCP\*2  
CMK2  
CMA2  
SCM  
SCG  
SCA2  
SCS  
CKV2  
CA/OV2  
SSD  
CAT  
MDC2  
MVC  
SMD2  
MSD\*  
FC\*  
STK  
ULK\*  
JSK/M2  
JSG  
JSC3  
USSD  
USC  
JSB3  
LMB  
STG  
STS/L  
LCS  
LCG  
LCM  
LCT  
LCY  
STR2  
UCA2  
HCM  
HCA  
SRL2  
SRG  
SRM  
SRT  
MRL2  
MRG2  
SM-25  
CAC3  
UCAC  
RCC2  
MFC  
SHC  
GLC  
Ending

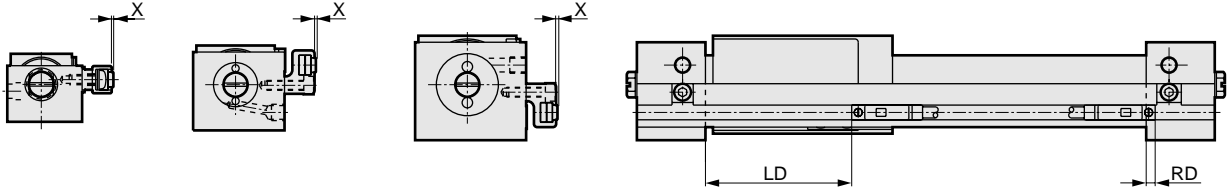
Magnet type rodless cylinder  
Rodless type



## Switch installation position dimensional drawing

● MRL2-L-\* (switch: T2H/V, T3H/V)  
GL  
WL

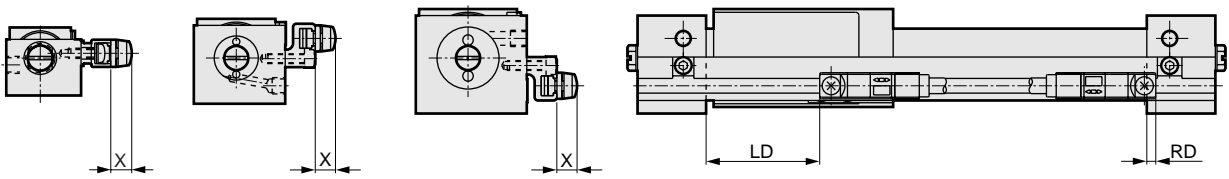
● For  $\phi 6$       ● For  $\phi 10$       ● For  $\phi 16$  to  $\phi 32$



Symbol	RD	LD	X
Bore size (mm)			
$\phi 6$	2.5	27	0.5
$\phi 10$	2.5	27	0.5
$\phi 16$	2	42.5	0.5
$\phi 20$	1.5	62	0.5
$\phi 25$	1.5	58	0.5
$\phi 32$	1.5	60	0.5

● MRL2-L-\* (switch: T1H/V, T2Y\*H/V, T3Y\*H/V)  
GL  
WL

● For  $\phi 6$       ● For  $\phi 10$       ● For  $\phi 16$  to  $\phi 32$



Symbol	RD	LD	X
Bore size (mm)			
$\phi 6$	3.5	26	6 (11.5)
$\phi 10$	3.5	26	6 (11.5)
$\phi 16$	3	41.5	6 (11.5)
$\phi 20$	2.5	61	6 (11.5)
$\phi 25$	2.5	57	6 (11.5)
$\phi 32$	2.5	65	6 (11.5)

Note 1: Values in parentheses apply for the T1H/V and preventive maintenance output type.

## MRL2 series selection guide

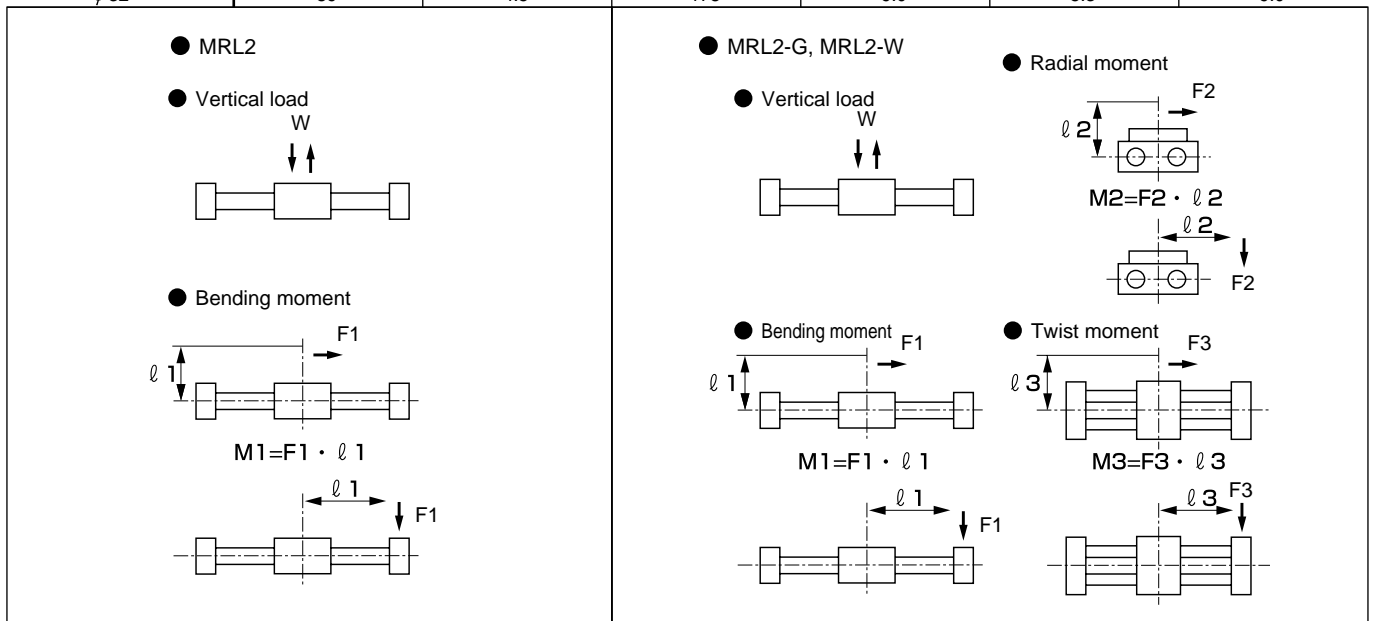
### STEP-1 Judgment of allowable load

- Calculate load (W), and moment (M1, M2, M3) per load.
- Find the load /moment ratio with dividing each load by the maximum value on the following table.  
The total should be 1.0 or less.

$$\frac{W}{W_{\max}} + \frac{M1}{M1_{\max}} + \frac{M2}{M2_{\max}} + \frac{M3}{M3_{\max}} \leq 1.0$$

#### Max. allowable load

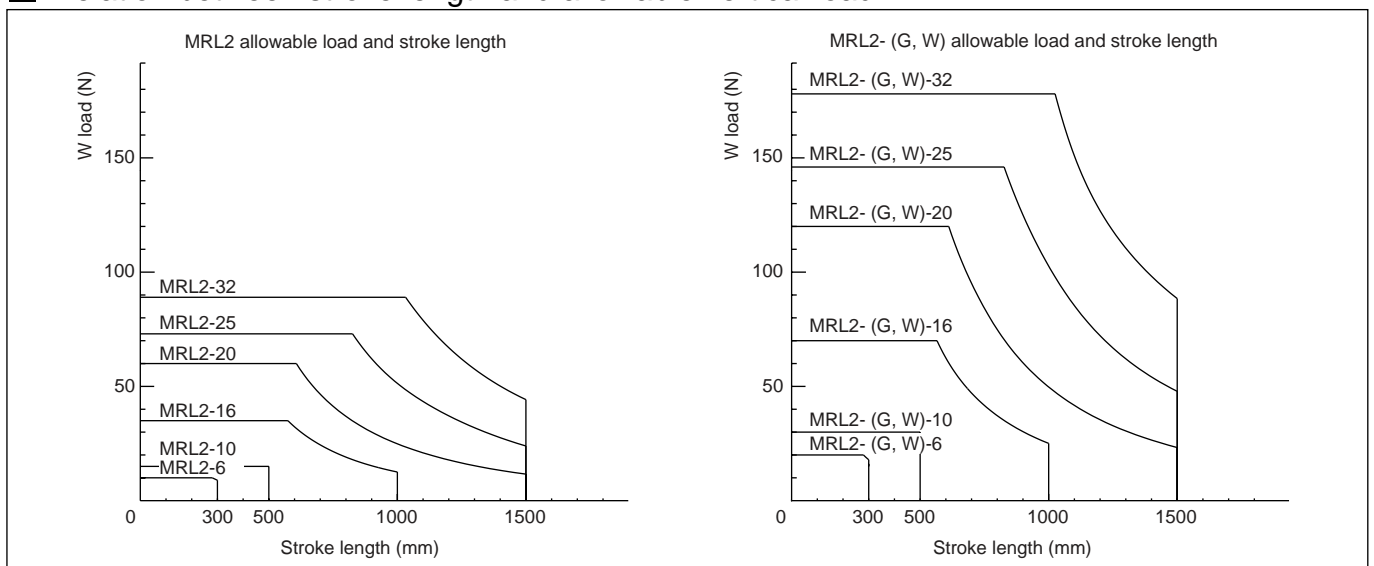
Descriptions	MRL2		MRL2-G/MRL2-W			
	Vertical load W (N)	Bending moment M1 (N·m)	Vertical load W (N)	Bending moment M1 (N·m)	Radial moment M2 (N·m)	Twist moment M3 (N·m)
φ 6	10	0.1	20	0.2	0.1	0.2
φ 10	15	0.3	30	0.6	0.2	0.6
φ 16	35	1.2	70	2.4	0.5	2.4
φ 20	60	2.5	120	5.0	1.0	5.0
φ 25	73	3.3	146	6.6	3.7	6.6
φ 32	89	4.5	178	9.0	5.3	9.0



Note: When a load moves or stops, consider about the inertia force.

The value of allowable vertical load W may vary depending on stroke length. Select the value within the range of graph on Fig. 1.

#### Relation between stroke length and allowable vertical load



SCP\*2  
 CMK2  
 CMA2  
 SCM  
 SCG  
 SCA2  
 SCS  
 CKV2  
 CA/OV2  
 SSD  
 CAT  
 MDC2  
 MVC  
 SMD2  
 MSD\*  
 FC\*  
 STK  
 ULK\*  
 JSK/M2  
 JSG  
 JSC3  
 USSD  
 USC  
 JSB3  
 LMB  
 STG  
 STS/L  
 LCS  
 LCG  
 LCM  
 LCT  
 LCY  
 STR2  
 UCA2  
 HCM  
 HCA  
 SRL2  
 SRG  
 SRM  
 SRT  
**MRL2**  
 MRG2  
 SM-25  
 CAC3  
 UCAC  
 RCC2  
 MFC  
 SHC  
 GLC  
 Ending

Magnet type  
 rodless cylinder  
 Rodless type

## STEP-2 Calculation of load factor

1. Calculate the required thrust by the load size, direction, installation attitude according to the below Table 2, 3.

Table 2

	Vertical load	Bending moment	Radial moment	Twist moment
Load size/direction				
Mouring attitude	Horizontal	Vertical	Horizontal	Vertical
Required thrust	$F_N = 0.2 (W + W_0)$	$F_N = \frac{0.2Wl_1}{L_1} + W + W_0$	$F_N = 0.2 \left( \frac{Wl_2}{L_2} + W + W_0 \right)$	$F_N = \frac{0.2Wl_3}{L_1} + W + W_0$

For single type, radial moment and twist moment should not be applied to the slider because the slider rotates.

$F_N$  : Required thrust (N)  
 $W$  : Load (N)  
 $W_0$  : Slider self-weight (N)  
 $l_n$  (n = 1, 2, 3): Overhang (mm)  
 $L_1$  : Slider bearing pitch (mm)  
 $L_2$  : Pitch of guide (mm)

Table 3

Model no.	$W_0$	$L_1$	$L_2$
MRL2-6	0.4	27	-
10	0.6	27	-
16	1.2	39	-
20	2.4	58	-
25	3.8	70	-
32	5.2	78	-
MRL2-G-w-6	0.9	27	26
10	1.7	27	34
16	3.0	39	38
20	5.9	58	46
25	8.5	70	50
32	11.9	78	60


2. Calculate the load factor according to required thrust calculated at (1), on Table 4, and on Fig. 2. (Load factor should be 50% or less.)

$$\text{Load factor } \alpha = \frac{F_N}{\frac{a}{100} \cdot A} \times 100$$

$$B = \frac{a}{100} \cdot A$$

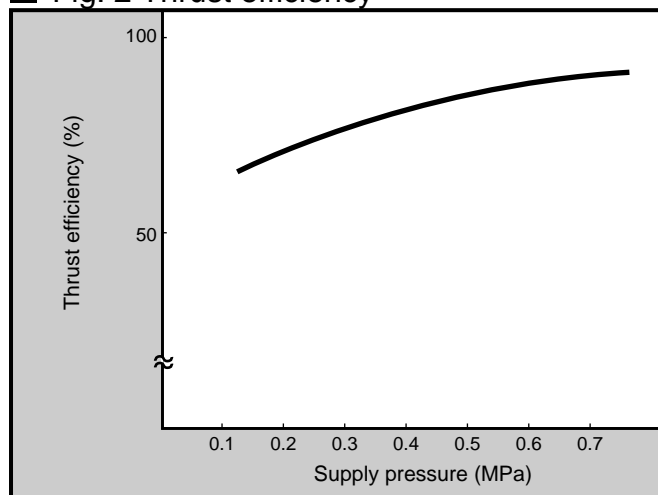
$F_N$  : Required thrust (N)       $a$  : Thrust efficiency (%)  
 $A$  : Theoretical thrust (N)     $B$  : Effective thrust (N)

■ Table 4 Theoretical thrust table

Symbol 		Working pressure MPa					
Model no.	0.2	0.3	0.4	0.5	0.6	0.7	
MRL2, MRL2-G-6	-	8	11	14	17	20	
10	-	24	31	39	47	54	
16	40	60	80	101	121	139	
20	63	94	126	157	188	217	
25	98	147	196	245	295	344	
32	161	241	322	402	483	563	
MRL2-W-6	11	17	23	28	34	39	
10	31	47	63	79	94	108	
16	80	121	161	201	241	277	
20	126	188	251	314	377	434	
25	196	294	392	490	590	688	
32	322	482	644	804	966	1126	

\* When low pressure, low thrust efficiency results in large differential between effective thrust and theoretical thrust.

■ Fig. 2 Thrust efficiency



SCP\*2  
CMK2  
CMA2  
SCM  
SCG  
SCA2  
SCS  
CKV2  
CA/OV2  
SSD  
CAT  
MDC2  
MVC  
SMD2  
MSD\*  
FC\*  
STK  
ULK\*  
JSK/M2  
JSG  
JSC3  
USSD  
USC  
JSB3  
LMB  
STG  
STS/L  
LCS  
LCG  
LCM  
LCT  
LCY  
STR2  
UCA2  
HCM  
HCA  
SRL2  
SRG  
SRM  
SRT  
MRL2  
MRG2  
SM-25  
CAC3  
UCAC  
RCC2  
MFC  
SHC  
GLC

Ending  
Magnet type  
Rodless type  
Rodless cylinder

### STEP-3 Calculation of kinetic energy

Calculate the kinetic energy according to load weight (m) and speed (V), and the value should not be greater than allowable value on Table 5.

When exceeding the value of allowable energy absorption, select large size of cylinder or install an external shock absorber.

In this case, this speed is the speed rush into cushion but not the average speed, please calculate the speed according to formula (1).

$$E = \frac{1}{2} mV^2$$

$$V_a = \frac{L}{t}$$

$$V = V_a \times \left(1 + 1.5 \frac{\alpha}{100}\right) \text{--- (1)}$$

E : Kinetic energy (J)

m : Weight (kg)

V : Rush-into the cushion speed (m/s)

V<sub>a</sub> : Average speed (m/s)

L : Stroke (m)

t : Moving time (s)

α : Load factor (%)

■ Table 5 Allowable energy absorption

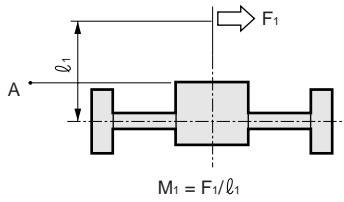
Bore size	Allowable energy absorption (J)	
	MRL2	MRL2-G W
φ 6	0.006	0.12
φ 10	0.028	0.12
φ 16	0.100	0.25
φ 20	0.265	0.58
φ 25	0.283	0.74
φ 32	0.523	0.74

■ Shock absorber specifications

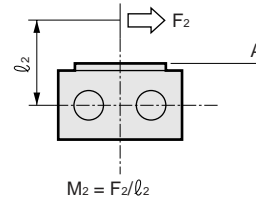
Bore size	Max. energy absorption (J)	Stroke length (mm)
φ 6	0.24	4
φ 10	0.24	4
φ 16	0.80	5.5
φ 20	2.11	7.5
φ 25	3.88	9.5
φ 32	3.88	9.5

### Runout volume of MRL2-G/MRL2-W slider

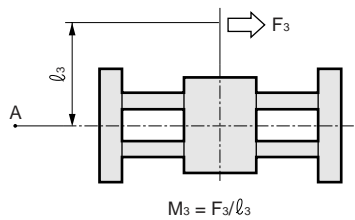
● Bending moment



● Radial moment



● Twist moment



Port size	Moment load		Table deflection at point A (±mm)		
	MRL2	MRL2-G,W	M1 direction	M2 direction	M3 direction
φ 6	M1, M3: 0.2N·m M2: 0.1N·m		1.5	1.46	1.05
φ 10	M1, M3: 0.6N·m M2: 0.2N·m		1.61	1.12	0.92
φ 16	M1, M3: 2.5N·m M2: 0.5N·m		1.3	1.16	0.87
φ 20	M1, M2, M3: 2.5N·m		0.89	0.96	0.65
φ 25	M1, M2, M3: 5N·m		1.1	0.92	0.7
φ 32	M1, M2, M3: 5N·m		1.0	0.77	0.6

Note 1: Point A is 200 mm from the center of the slider.

### Comparative data of rubber cushion and rubber-air cushion (reference value)

Measure noise levels (dB) when the piston collides against the stroke end.

Measuring conditions

- Sample cylinder : MRL2 basic type, stroke length 200mm
- Piston speed at collision against stroke end :  $V = 300\text{mm/S}$
- Distance between noise level meter and cylinder : 0.25m
- Load : Loadless

Example

Unit: dB

Bore size	Rubber cushion	Rubber-air cushion
φ 6	51.2	44.7
φ 10	51.2	45.6
φ 16	63.4	48.2
φ 20	75.9	59.3