

# SRG3

## Rodless type High precision guided rodless cylinder

ø12·ø16·ø20·ø25

### Overview

High precision guided rodless cylinder with integrated linear guide with a bore size of ø12 to ø25. This is optimal for precision transfer of a small parts.

### Features

#### Compact and precise

Downsized by integrating in axis high precision guide on the side of rodless cylinder. Downsizing of device is achieved.

#### Thin design like SRL3

CKD original flat rodless cylinder structure realizes ultra low table position. This enables thin design of devices.

Also the design is based on SRL3 with same stroke length, making it easier to replace.

#### Common port

Common port (one end porting) and standard port (both ends porting) can be selected according to cylinder installation position.

This contributes to downsizing of devices.



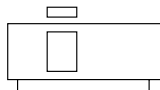
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|             |
|-------------|
| SCP*2       |
| CMK2        |
| CMA2        |
| SCM         |
| SCG         |
| SCA2        |
| SCS         |
| CKV2        |
| CA/OV2      |
| SSD         |
| CAT         |
| MDC2        |
| MVC         |
| SMD2        |
| MSD*        |
| FC*         |
| STK         |
| ULK*        |
| JSK/M2      |
| JSG         |
| JSC3        |
| USSD        |
| USC         |
| JSB3        |
| LMB         |
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| LCM         |
| LCT         |
| LCY         |
| STR2        |
| UCA2        |
| HCM         |
| HCA         |
| SRL3        |
| <b>SRG3</b> |
| SRM3        |
| SRT3        |
| MRL2        |
| MRG2        |
| SM-25       |
| CAC4        |
| UCAC2       |
| RCC2        |
| MFC         |
| SHC         |
| GLC         |
| Ending      |

Rodless type  
High precision guided rodless cylinder

● : Standard ○ : Option ■ : Not available

| Variation     | Model no.<br>JIS symbol   | Bore size<br>(mm) | Standard stroke length (mm) |     |     |     |     |     |     |     |      | Min. stroke length<br>(mm) | Max. stroke length<br>(mm) | Custom stroke length<br>(mm) | Mounting style |                 |                 | Cushion    |                      |                  | Option           |   |   |   |   | Switch | Page |                               |   |
|---------------|---|-------------------|-----------------------------|-----|-----|-----|-----|-----|-----|-----|------|----------------------------|----------------------------|------------------------------|----------------|-----------------|-----------------|------------|----------------------|------------------|------------------|---|---|---|---|--------|------|-------------------------------|---|
|               |   |                   | 200                         | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 |                            |                            |                              | Basic type     | Axial foot type | Axial foot type | No cushion | Both sides cushioned | R Side cushioned | L Side cushioned | Adjustable full-stroke both sides with shock absorber | Adjustable full-stroke R side with shock absorber | Adjustable full-stroke L side with shock absorber | Adjustable full-stroke bracket retrofitting |        |      | Table mounting thread size up |   |
|               |   |                   | 00                          | LB  | LB1 | N   | B   | R   | L   | A   | A1   |                            |                            |                              | A2             | A3              | H               |            |                      |                  |                  |   |   |   |   |        |      |                               |   |
| Double acting | SRG3<br> | ø12               | ●                           | ●   | ●   | ■   | ■   | ■   | ■   | ■   | ■    | 1                          | 450                        | 1                            | ●              | ●               | ●               | ●          | ●                    | ●                | ●                | ○   | ○   | ○   | ○   | ○      | ○    | 2090                          |   |
|               |   | ø16, 20           | ●                           | ●   | ●   | ●   | ●   | ●   | ●   | ■   | ■    |                            |                            |                              | ●              | ●               | ●               | ●          | ○                    | ○                | ○                | ○   | ○   | ○   | ○   | ○      |      |                               | ○ |
|               |   | ø25               | ●                           | ●   | ●   | ●   | ●   | ●   | ●   | ●   | ●    |                            |                            |                              | ●              | ●               | ●               | ●          | ●                    | ●                | ●                | ○   | ○   | ○   | ○   | ■      |      |                               | ○ |

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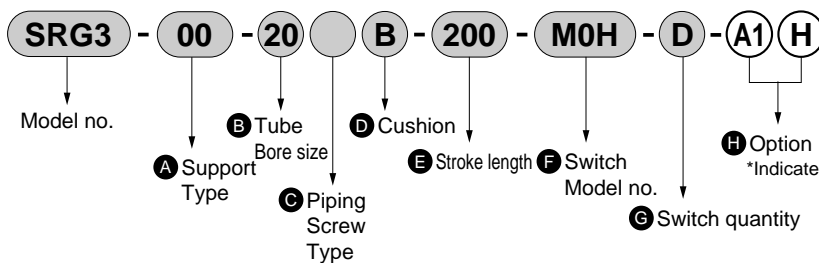
Rodless type  
High precision guided rodless cylinder

## Variation and option combination table

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

| Code        | Code  | Variation                | Piping Screw              |   | Option                       |                          |                          |   |                               |  |  |  |  |  |   |
|-------------|---|--------------------------|---------------------------|---|------------------------------|--------------------------|--------------------------|---|-------------------------------|--|--|--|--|--|---|
|             |   | Double acting basic type | NPT                       | G | Adjustable stroke both sides | Adjustable stroke R side | Adjustable stroke H side | For mounting adjustable stroke bracket afterwards | Table mounting thread size up | Port and cushion needle position specification | Port and cushion needle position specification | Port and cushion needle position specification | Port and cushion needle position specification | Port and cushion needle position specification |   |
|             |   | Symbol                   | No                        | N | G                            | A                        | A1                       | A2  | A3                            | H  | R  | B  | T  | D  | S |
| Variation   | Double acting basic type                          | Blank                    | ○                         | ○ | ◎                            | ◎                        | ◎                        | ◎   | ◎                             | ◎  | ◎  | ◎  | ◎  | ◎  | ◎ |
| Port thread | NPT   | N                        |                           | X | ○                            | ○                        | ○                        | ○   | ○                             | ○  | ○  | ○  | ○  | ○  | ○ |
|             | G   | G                        |                           |   | ○                            | ○                        | ○                        | ○   | ○                             | ○  | ○  | ○  | ○  | ○  | ○ |
|             | Adjustable stroke both sides                      | A                        |                           |   |                              | X                        | X                        | X   | ◎                             | ◎  | ◎  | ◎  | ◎  | ◎  | ◎ |
| Option      | Adjustable stroke R side                          | A1                       |                           |   |                              |                          | X                        | X   | ◎                             | ◎  | ◎  | ◎  | ◎  | ◎  | ◎ |
|             | Adjustable stroke H side                          | A2                       |                           |   |                              |                          |                          | X   | ◎                             | ◎  | ◎  | ◎  | ◎  | ◎  | ◎ |
|             | For mounting adjustable stroke bracket afterwards | A3                       |                           |   |                              |                          |                          |   | ◎                             | ◎  | ◎  | ◎  | ◎  | ◎  | ◎ |
|             | Table mounting thread size up                     | H                        |                           |   |                              |                          |                          |   |                               | ◎  | ◎  | ◎  | ◎  | ◎  | ◎ |
|             | Port and cushion needle position specification    | R                        |                           |   |                              |                          |                          |   |                               |  | X  | X  | X  | X  | X |
|             | Port and cushion needle position specification    | B                        |                           |   |                              |                          |                          |   |                               |  |  | X  | X  | X  | X |
|             | Port and cushion needle position specification    | T                        |                           |   |                              |                          |                          |   |                               |  |  |  | X  | X  | X |
|             | Port and cushion needle position specification    | D                        |                           |   |                              |                          |                          |   |                               |  |  |  |  | X  | X |
|             | Port and cushion needle position specification    | S                        |                           |   |                              |                          |                          |   |                               |  |  |  |  |  | X |
|             | Accessory   | Cylinder switch          | Listed on another section | ◎ | ○                            | ○                        | ◎                        | ◎   | ◎                             | ◎  | ◎  | ◎  | ◎  | ◎  | ◎ |

### <Example of model number>



\*Indicate symbols on the left table from left to right

Model no.: High precision guided rodless cylinder

- A Mounting style : Basic type
- B Bore size : ø20mm
- C Port thread type : Rc thread
- D Cushion : Both sides cushioned
- E Stroke length : 200mm
- F Switch model no.: Reed MOH switch and lead wire 1m
- G Switch quantity : 2
- H Option : Adjustable full-stroke both sides, with shock absorber or table mounting thread size up



# Safety precautions

Always read this section before starting use.

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

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Individual precautions: rodless cylinder with high precision guide SRG3 Series

## Installation & Adjustment

1. Common

**CAUTION**

■ Please watch out when designing intermediate stop circuit.

With a slit rodless cylinder such as the SRL3, some air leaks due to the structure, so braking cannot be controlled with the all ports closed 3-position valve, and it may not be possible to hold the table stop position. Use a double sided pressurized control circuit having a P/A/B connection 3-position valve. If air pressure drops once and is then pressurized again unenergized, the table may move and the origin deviate.

■ Basic circuit diagram

● Horizontal load

If piping is as shown in Fig. 1, equal pressure is applied on both sides of the piston when stopped, and the table does not pop out when restarting.

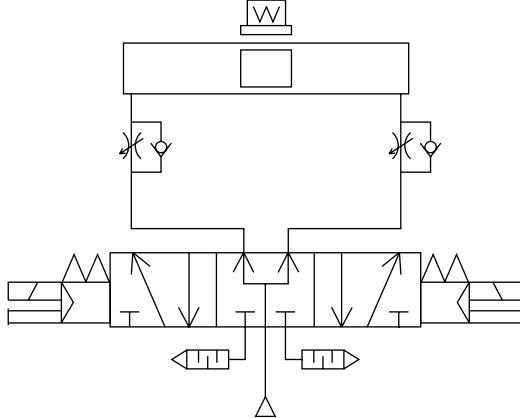


Fig.1

● Vertical load

● If a vertical load is applied as shown in Fig. 2, the table will move in the direction of the load. Thus, install a regulator with check valve to reduce the thrust in the load direction and balance the load.

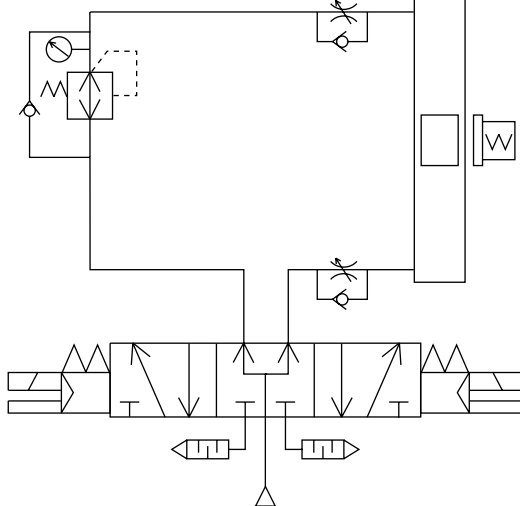


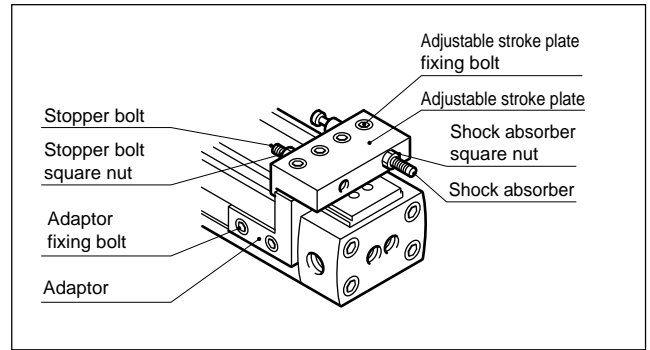
Fig.2

■ With the slit rodless cylinder, such as the SRL3, external air leaks at a level that does not affect speed control.

■ Do not use for applications that require constant pressurization to only one side such as a balancer.

**WARNING**

■ How to adjust stroke adjustment unit



(1) Moving the stroke adjustment unit

● Loosening adaptor fixing bolt and adjustable stroke end plate fixing bolt allows to move the adjustable stroke unit.

(2) Fixing the stroke adjustment unit

● After moving adjustable stroke unit to the specified position, fix the adaptor fixing bolt and the adjustable stroke end plate fixing bolt using values in Table 1. If tightened at a lower value, the stroke adjustment unit may deviate.

Table 1 Tightening torque for adaptor fixing bolt and stroke adjustment plate fixing bolt

| Tightening torque | Adaptor fixing bolt (N·m) | Adjustable stroke plate fixing bolt (N·m) |
|-------------------|---------------------------|---|
| Model             |                           |   |
| SRG3-12/16        | 1.0 to 1.2                | 0.5 to 0.7                                |
| SRG3-20           | 2.5 to 2.7                |   |
| SRG3-25           | 5.2 to 5.6                | 2.5 to 2.7                                |

(3) Stroke adjustment using stopper bolt

With 12 to 20mm bore, clearance between the table and stroke adjustment plate is small, and fingers may be pinched during adjustment. The stroke must basically be adjusted by moving the stroke adjustment unit.

Loosen the stopper bolt lock nut, turn the stopper bolt, and adjust the stroke.

After adjusting the stroke, tighten and fix the stopper bolt lock nut using values in Table 2.

Table 2 Tightening torque of stopper bolt fixing nut, shock absorber fixing nut

| Tightening torque | Square nut (N·m) | Square nut (N·m) |
|-------------------|------------------|------------------|
| Model             |                  |                  |
| SRG3-12/16        | 1.1 to 1.2       | 1.3 to 1.8       |
| SRG3-20           | 2.5 to 2.7       | 2.9 to 3.9       |
| SRG3-25           | 8.8 to 9.5       | 4.5 to 6.0       |

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## (4) Adjusting shock absorber

### ● Standard shock absorber

Absorbed energy of shock absorber is adjusted by changing operational stroke length of shock absorber.

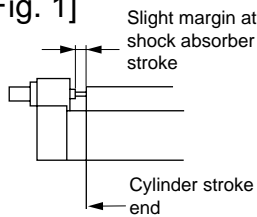
Adjust the shock absorber working stroke by loosening the shock absorber lock nut and turning the shock absorber. After adjusting, tighten the shock absorber fixing nut with the tightening torque shown below.

### (5) Precautions upon use

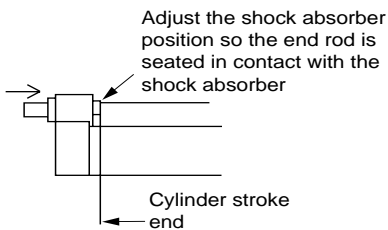
● The shock absorber absorbs rated energy with the rated stroke. When the product is shipped, the shock absorber is installed with a slight margin to the stroke at the cylinder stroke limit.

Absorbed energy is smaller than allowable energy absorption for the individual shock absorber, so if rated absorbed energy is required, adjust so the full stroke for the shock absorber is used.

[Fig. 1]



[Fig. 2]



Note: Explanation of shock absorber with adjustable full stroke.

● The absorption energy differs according to the collision speed, so if the collision speed is 1000mm/s, make sure that half of the maximum absorption energy shown in Table 3 is not exceeded.

Table 3 Adjustable full-stroke shock absorber specifications (initial setpoint)

| Type       | Absorbed energy (J) | Valid mm stroke (mm) |
|------------|---------------------|----------------------|
| SRG3-12/16 | 2.4                 | 5.5                  |
| SRG3-20    | 5.7                 | 7                    |
| SRG3-25    | 10                  | 8                    |

### ■ Avoid electrical welding after installing the rodless cylinder.

If the current flows into the cylinder and generates sparks between the dust-proof belt and cylinder tube, the dust-proof belt may be damaged.

■ If a unit with excessive inertia, etc., is moved, the cylinder may be damaged or malfunctioning may occur. Use only within the allowable range.

■ Do not apply shock or excessive moment on the table.

■ Align before connecting to an load with an external guide mechanism.

● Carefully consider connection (floating) so deviation is absorbed. The longer the stroke, the greater the shaft center may deviate.

■ Check that moment, including inertia generated when moving or stopping the load, does not exceed the allowable load, or damage may result. If this value is exceeded, the product is damaged.

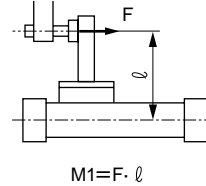
(When the overhang is large)

● If overhang is large and the cylinder is stopped at both ends with the piston, the bending moment functions due to load inertia even within internal cushion energy absorption.

If kinetic energy is large and an external cushion, etc., is used, try contact with the work-piece center of gravity as much as possible.

(When using an external stopper)

● When selecting an external stopper, consider the bending moment generated by cylinder thrust.



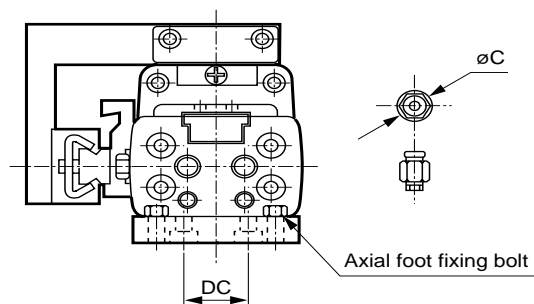
F: Cylinder thrust  
l: Distance from cylinder center

### ■ Use of common port piping

● Applicable fittings for common port (option symbol R and T) are limited. Refer to Table 4.

Table 4

| Mounting style<br>Bore size (mm) | Applicable joint outer diameter $\phi C$ |                                     |            |
|----------------------------------|--|-------------------------------------|------------|
|                                  | 00                                       | LB                                  | LB         |
| $\phi 12$                        | 11 or less                               | Common port piping<br>not available | 11 or less |
| $\phi 16$                        | 12 or less                               |                                     | 12 or less |
| $\phi 20$                        | 16 or less                               |                                     | 16 or less |
| $\phi 25$                        | 26 or less                               |                                     | 26 or less |



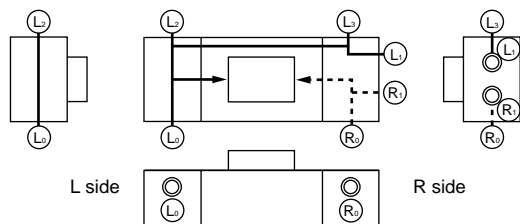
● When mounting style is axial foot type (LB1), and option symbol R or T, the joint interferes with the axial foot fixing bolt. Fix the cylinder main body with (axial foot fixing bolt) before pipe joint installation.

(The fitting will interfere with the axial foot fixing bolt if assembled before it)

### ■Piping port position and operating direction.

Bore size  $\phi 20$  to 63.

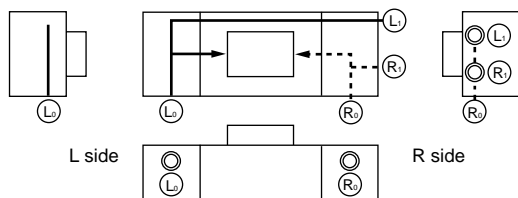
#### ●Option symbol (Blank, R, B, T)



(R) indicates R side pressurized port and (L) indicates L side pressurized port. Before shipping, all plugs other than 1 each at (R<sub>0</sub>) and (L<sub>0</sub>) are sealed with plugs. Piping to other ports becomes possible by removing plug. Option symbol D not available.

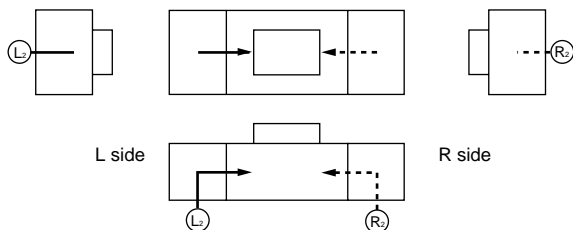
Bore size  $\phi 25$

#### ●Option symbol (Blank, R, B, T)



(R) indicates R side pressurized port and (L) indicates L side pressurized port. Before shipping, all plugs other than 1 each at (R<sub>0</sub>) and (L<sub>0</sub>) are sealed with plugs. Piping to other ports becomes possible by removing plug. However, bottom side piping is not possible. Select options (D) if such connection is necessary.

#### ●For option symbols (D) (bottom piping)



(R) indicates R side pressurized port and (L) indicates L side pressurized port. There are no ports other than (R<sub>2</sub>) or (L<sub>2</sub>), so pipes cannot be connected.

■Do not make nicks and scratches that impair flatness of the main body (tube) fixing surface and end plate surface.

### ⚠ CAUTION

■Please watch out when designing intermediate stop circuit. With a slit rodless cylinder such as the SRL3, some air leaks due to the structure, so braking cannot be controlled with the all ports closed 3-position valve, and it may not be possible to hold the table stop position. Therefore, use a double sided pressurized control circuit having a P/A/B connection 3-position valve.

If air pressure drops once and is then pressurized again deenergized, the table may move and the origin deviate.

### ■Basic circuit diagram

#### ●Horizontal load

If piping is as shown in Fig. 1, equal pressure is applied on both sides of the piston when stopped, and the table does not pop out when restarting.

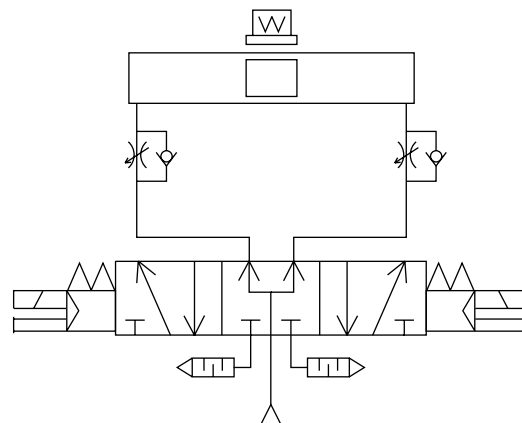


Fig.1

#### ●Vertical load

If a vertical load is applied as shown in Fig. 2, the table will move in the direction of the load. Thus, install a regulator with check valve to reduce the thrust in the load direction and balance the load.

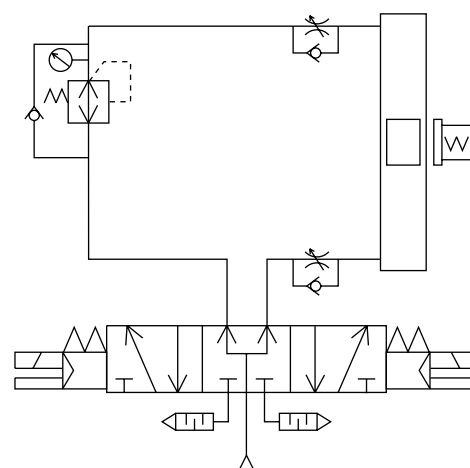


Fig.2

■Do not use in a place where coolant, coolant fluid or oil mist, etc., could come in direct contact with the cylinder.

Always protect the cylinder with a cover if it needs to be installed in such environment.

■Do not use in a place where foreign matter such as swarf, powder dust, dust or spatter come in contact or are suspended in the environment.

If unavoidable because of the cylinder installation position, always provide protection with a cover, etc. Consult with CKD when using in such environment.

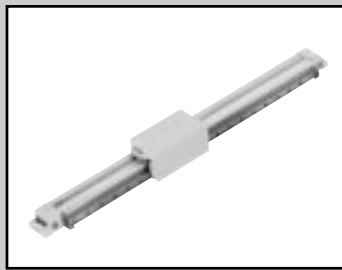
■The CKD shock absorber is treated as a consumable.

Replace the shock absorber if energy absorption performance drops or if movement is no longer smooth.

|             |
|-------------|
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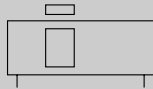




Rodless cylinder with high precision guide

# SRG3 Series

● Bore size:  $\varnothing 12$ ,  $\varnothing 16$ ,  $\varnothing 20$ ,  $\varnothing 25$



## Specifications

| Descriptions              | SRG3 (standard type/with switch)   |                  |                  |                  |
|---------------------------|--|------------------|------------------|------------------|
| Bore size                 | $\varnothing 12$   | $\varnothing 16$ | $\varnothing 20$ | $\varnothing 25$ |
| Actuation                 | Double acting  |                  |                  |                  |
| Working fluid             | Compressed air   |                  |                  |                  |
| Max. working pressure MPa | 0.7  |                  |                  |                  |
| Min. working pressure MPa | 0.2  |                  | 0.1              |                  |
| Withstanding pressure MPa | 1.05   |                  |                  |                  |
| Ambient temperature °C    | 5 to 60  |                  |                  |                  |
| Port size                 | M5   |                  | Rc1/8            |                  |
| Stroke tolerance mm       | $+ \frac{2.0}{0}$  |                  |                  |                  |
| Working piston speed mm/s | 50 to 1000 (Note 1)  |                  |                  |                  |
| Repeatability mm          | $\pm 0.05$ (if it has shock absorber)  |                  |                  |                  |
| Cushion                   | Air cushion  |                  |                  |                  |
| Lubrication               | Not required (Use the turbine oil Class 1 ISOVG32 if lubricated.)<br>Lubricate continuously if lubricated. |                  |                  |                  |

Note 1: Piston speed used with common port piping differs with the stroke. Contact CKD for details.

## Allowable energy absorption

| Bore size (mm)   | Cushioned                       |                            | No cushion                      | With shock absorber (initial setpoint) |                          |
|------------------|---------------------------------|----------------------------|---------------------------------|--|--------------------------|
|                  | Allowable energy absorption (J) | Cushion stroke length (mm) | Allowable energy absorption (J) | Absorbed energy (J)                    | Valid stroke length (mm) |
| $\varnothing 12$ | 0.03                            | 14.5                       | 0.003                           | 2.4                                    | 5.5                      |
| $\varnothing 16$ | 0.22                            | 19.2                       | 0.007                           | 2.4                                    | 5.5                      |
| $\varnothing 20$ | 0.59                            | 22.2                       | 0.010                           | 5.7                                    | 7                        |
| $\varnothing 25$ | 1.40                            | 20.9                       | 0.015                           | 10                                     | 9                        |

## Stroke length

| Bore size (mm)   | Standard stroke length (mm)                      | Max. stroke length (mm) | Min. stroke length (mm) |
|------------------|--|-------------------------|-------------------------|
| $\varnothing 12$ | 200, 300, 400                                    | 450                     | 1                       |
| $\varnothing 16$ | 200, 300, 400, 500                               | 800                     |                         |
| $\varnothing 20$ | 600, 700, 800                                    |                         |                         |
| $\varnothing 25$ | 200, 300, 400<br>500, 600, 700<br>800, 900, 1000 | 1000                    |                         |

\*\* The intermediate stroke can be manufactured in 1 mm increments.

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

| Switch quantity  | 1   |     | 2   |         | 3   |          | 4   |           | 5   |           | 6   |           |
|------------------|-----|-----|-----|---------|-----|----------|-----|-----------|-----|-----------|-----|-----------|
|                  | M*V | M*H | M*V | M*H     | M*V | M*H      | M*V | M*H       | M*V | M*H       | M*V | M*H       |
| Bore size (mm)   |     |     |     |         |     |          |     |           |     |           |     |           |
| $\varnothing 12$ | 10  | 10  | 30  | 45 (70) | 60  | 90 (120) | 90  | 135 (170) | 120 | 180 (220) | 150 | 225 (270) |
| $\varnothing 16$ | 10  | 10  | 30  | 45 (70) | 60  | 90 (120) | 90  | 135 (170) | 120 | 180 (220) | 150 | 225 (270) |
| $\varnothing 20$ | 10  | 10  | 30  | 45 (70) | 60  | 90 (120) | 90  | 135 (170) | 120 | 180 (220) | 150 | 225 (270) |
| $\varnothing 25$ | 10  | 10  | 30  | 45 (70) | 60  | 90 (120) | 90  | 135 (170) | 120 | 180 (220) | 150 | 225 (270) |

Note: The minimal stroke for full stroke adjustment models with switches are shown in ( ).

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

| Switch quantity  | 1   |     | 2   |         | 3   |           | 4   |           | 5   |           | 6   |           |
|------------------|-----|-----|-----|---------|-----|-----------|-----|-----------|-----|-----------|-----|-----------|
|                  | T*V | T*H | T*V | T*H     | T*V | T*H       | T*V | T*H       | T*V | T*H       | T*V | T*H       |
| Bore size (mm)   |     |     |     |         |     |           |     |           |     |           |     |           |
| $\varnothing 12$ | 5   | 5   | 45  | 50 (70) | 85  | 100 (120) | 125 | 150 (170) | 165 | 200 (220) | 205 | 250 (270) |
| $\varnothing 16$ | 5   | 5   | 45  | 50 (70) | 85  | 100 (120) | 125 | 150 (170) | 165 | 200 (220) | 205 | 250 (270) |
| $\varnothing 20$ | 5   | 5   | 45  | 50 (70) | 85  | 100 (120) | 125 | 150 (170) | 165 | 200 (220) | 205 | 250 (270) |
| $\varnothing 25$ | 10  | 10  | 45  | 50 (70) | 85  | 100 (120) | 125 | 150 (170) | 165 | 200 (220) | 205 | 250 (270) |

Note: The minimal stroke for full stroke adjustment models with switches are shown in ( ).

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  
SRL3  
**SRG3**  
SRM3  
SRT3  
MRL2  
MRG2  
SM-25  
CAC4  
UCAC2  
RCC2  
MFC  
SHC  
GLC  
Ending

Rodless type  
High precision guided rodless cylinder

### Switch specifications (M type switch)

●1 Color/2 color indicator

| Descriptions    | Proximity 2 wire  |                               | Proximity 3 wire                               |                          |                             |
|-----------------|-------------------|-------------------------------|--|--------------------------|-----------------------------|
|                 | M2V and M2H       | M2WV (2 color indicator type) | M3H and M3V                                    | M3PH/M3PV (custom order) | M3WV                        |
| Applications    | PLC               |                               | PLC, relay, IC circuit or small solenoid valve |                          |                             |
| Output method   | -                 |                               | NPN output                                     | PNP output               | NPN output                  |
| Power voltage   | -                 |                               | 4.5 to 28 VDC                                  |                          | 10 to 28 VDC                |
| Load voltage    | 10 to 30 VDC      |                               | 30 VDC or less                                 |                          |                             |
| Load current    | 5 to 20mA         |                               | 200mA or less                                  | 100mA or less            | 150mA or less               |
| Light           | LED (ON lighting) | Red/green LED (ON lighting)   | LED (ON lighting)                              | Yellow LED (ON lighting) | Red/green LED (ON lighting) |
| Leakage current | 1mA or less       |                               | 10μA or less                                   | 0.05mA or less           | 10μA or less                |

| Descriptions    | Reed 2 wire       |           |  |                 |
|-----------------|-------------------|-----------|--|-----------------|
|                 | M0V and M0H       |           | M5V and M5H  |                 |
| Applications    | PLC, relay        |           | PLC, relay, IC circuit (w/o lamp), serial connection |                 |
| Power voltage   | -                 |           |  |                 |
| Load voltage    | 12/24 VDC         | 110 VAC   | 24 VDC or less                                       | 110 VAC or less |
| Load current    | 5 to 50mA         | 7 to 20mA | 50mA or less   | 20mA or less    |
| Light           | LED (ON lighting) |           | Without indicator light                              |                 |
| Leakage current | 0mA               |           |  |                 |

Note 1: For MO\* switch, if load current is within 7 to 20mA, this switch can be used with 24 VAC and 48 VAC.  
Note 2: Refer to Ending 1 for other switch specifications.

### Switch specifications (T type switch)

●2 Color indicator type

| Descriptions    | Proximity 2 wire            |                             | Proximity 3 wire            |                             |
|-----------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|                 | T2YH/T2YV                   | T2WH/T2WV                   | T3YH/T3YV                   | T3WH/T3WV                   |
| Applications    | PLC                         |                             | PLC, relay                  |                             |
| Output method   | -                           |                             | NPN output                  | NPN output                  |
| Power voltage   | -                           |                             | 10 to 28 VDC                |                             |
| Load voltage    | 10 to 30 VDC                | 24 VDC ± 10%                | 30 VDC or less              |                             |
| Load current    | 5 to 20mA (Note 1)          |                             | 50mA or less                |                             |
| Light           | Red/green LED (ON lighting) | Red/green LED (ON lighting) | Red/green LED (ON lighting) | Red/green LED (ON lighting) |
| Leakage current | 1mA or less                 |                             | 10μA or less                |                             |

●Strong magnetic field proof

| Descriptions          | Proximity 2 wire            |  |
|-----------------------|-----------------------------|--|
|                       | T2YD and T2YDT              |  |
| Applications          | PLC                         |  |
| Light                 | Red/green LED (ON lighting) |  |
| Load voltage          | 24 VDC ± 10%                |  |
| Load current          | 5 to 20mA                   |  |
| Internal voltage drop | 6V or less                  |  |
| Leakage current       | 1.0mA or less               |  |

### Cylinder weight

Unit: kg

| Bore size (mm) | Weight when stroke length is 0mm |           |       | Additional weight per stroke length = 100mm |
|----------------|----------------------------------|-----------|-------|---|
|                | Basic type (00)                  | Foot type |       |   |
|                |                                  | (LB)      | (LB1) |   |
| ø12            | 0.46                             | 0.25      | 0.26  | 0.02  |
| ø16            | 0.61                             | 0.33      | 0.35  |   |
| ø20            | 0.96                             | 0.54      | 0.58  |   |
| ø25            | 1.73                             | 1.1       | 1.1   |   |



- 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
- SRL3
- SRG3**
- SRM3
- SRT3
- MRL2
- MRG2
- SM-25
- CAC4
- UCAC2
- RCC2
- MFC
- SHC
- GLC
- Ending

## How to order

Without switch

**SRG3** - **00** - **25** - **B** - **200** - **A**

With switch

**SRG3** - **00** - **25** - **B** - **200** - **M0H** - **R** - **A**

**A** Mounting style

**B** Bore size

**C** Port thread type

**D** Cushion

**E** Stroke length

**F** Switch model no.  
Note 2 · Note 3

**G** Switch quantity

**H** Option  
Note 4, Note 5  
Note 6, note 7

### ⚠ Note on model no. selection

- Note 1 : Refer to page 2090 for the minimum stroke length with switch.
- Note 2 : Welding spatter can not be used for in cylinder splashed environment.  
When T2YD and T2YDT use, care must be taken.
- Note 3 : **F** Switches other than A switch model no. are also available. (Custom order) Refer to Ending 1 for details.
- Note 4 : Refer to dimensions about ports and cushion needle position indicating symbols.
- Note 5 : Mounting style "00" or "LB1" is used for option "R" and "T".  
(Mounting style "LB" is not available for option "R" and "T" because it can not be piped.)
- Note 6 : "A3" is a option that will have a plate nut for mounting installed beforehand so that it can be mounted afterwards without removing the cover.
- Note 7 : Thread size for option "H" will be M4 for 12 and ø16, M5 for ø20.

<Example of model number>

**SRG3-00-25B-200-M0H-R-A**

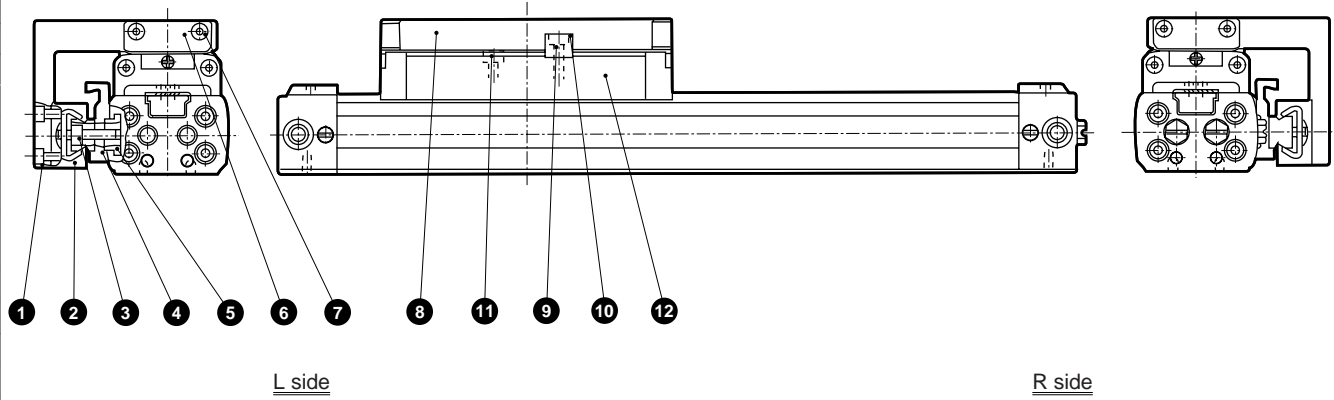
Model: Rodless cylinder high precision guided

- A** Mounting style: basic type
- B** Bore size: ø25mm
- C** Port thread type: Rc thread
- D** Cushion: both sides cushioned
- E** Stroke length: 200mm
- F** Switch model no.: reed switch M0H
- G** Switch quantity.: R side 1 piece
- H** Option: Adjustable full-stroke both sides, with shock absorber

| Symbol                      | Descriptions   |   |  |                        |           |   |   |   |
|-----------------------------|--|---|--|------------------------|-----------|---|---|---|
| <b>A Mounting style</b>     |  |   |  |                        |           |   |   |   |
| <b>00</b>                   | Basic type   |   |  |                        |           |   |   |   |
| <b>LB</b>                   | Axial foot type  |   |  |                        |           |   |   |   |
| <b>LB1</b>                  | Axial foot type  |   |  |                        |           |   |   |   |
| <b>B Bore size (mm)</b>     |  |   |  |                        |           |   |   |   |
| <b>12</b>                   | ø12  |   |  |                        |           |   |   |   |
| <b>16</b>                   | ø16  |   |  |                        |           |   |   |   |
| <b>20</b>                   | ø20  |   |  |                        |           |   |   |   |
| <b>25</b>                   | ø25  |   |  |                        |           |   |   |   |
| <b>C Port thread type</b>   |  |   |  |                        |           |   |   |   |
| <b>Blank</b>                | Rc thread  |   |  |                        |           |   |   |   |
| <b>N</b>                    | NPT thread (ø20 and over) (custom order)               |   |  |                        |           |   |   |   |
| <b>G</b>                    | G thread (ø20 and over) (custom order)                 |   |  |                        |           |   |   |   |
| <b>D Cushion</b>            |  |   |  |                        |           |   |   |   |
| <b>B</b>                    | Both sides cushioned                                   |   |  |                        |           |   |   |   |
| <b>R</b>                    | R side cushioned                                       |   |  |                        |           |   |   |   |
| <b>L</b>                    | L side cushioned                                       |   |  |                        |           |   |   |   |
| <b>N</b>                    | No cushion   |   |  |                        |           |   |   |   |
| <b>E Stroke length (mm)</b> |  |   |  |                        |           |   |   |   |
| <b>Bore size</b>            | <b>Stroke length Note 1</b>                            | <b>Custom stroke length</b>                       |  |                        |           |   |   |   |
| ø12                         | <b>1 to 450</b>  | <b>By 1 mm increment</b>                          |  |                        |           |   |   |   |
| ø16                         | <b>1 to 800</b>  |   |  |                        |           |   |   |   |
| ø20                         | <b>1 to 800</b>  |   |  |                        |           |   |   |   |
| ø25                         | <b>1 to 1000</b>                                       |   |  |                        |           |   |   |   |
| <b>F Switch model no.</b>   |  |   |  |                        |           |   |   |   |
| <b>Lead wire</b>            | <b>Lead wire</b>                                       | <b>Contact</b>                                    | <b>Indicator</b>   | <b>Lead Line</b>       |           |   |   |   |
| <b>Axial</b>                | <b>Radial</b>  | <b>Reed</b>                                       |  |                        |           |   |   |   |
| <b>M0H*</b>                 | <b>M0V*</b>  | 1 color indicator type<br>Without indicator light |  | 2-wire                 |           |   |   |   |
| <b>M5H*</b>                 | <b>M5V*</b>  |   |  |                        |           |   |   |   |
| <b>M2H*</b>                 | <b>M2V*</b>  | 2 color indicator type                            | 1 color indicator type                                       | 2-wire                 |           |   |   |   |
| -                           | <b>M2WV*</b>   |   | 2 color indicator type                                       |                        |           |   |   |   |
| <b>M3H*</b>                 | <b>M3V*</b>  |   | 1 color indicator type                                       | 3-wire                 |           |   |   |   |
| -                           | <b>M3WV*</b>   |   | 2 color indicator type                                       |                        |           |   |   |   |
| <b>M3PH*</b>                | <b>M3PV*</b>   | 2 color indicator type                            | 1 color indicator type (custom order)                        | 3-wire                 |           |   |   |   |
| <b>T2WH*</b>                | <b>T2WV*</b>   |   |  | 2-wire                 |           |   |   |   |
| <b>T2YH*</b>                | <b>T2YV*</b>   |   |  |                        |           |   |   |   |
| <b>T3WH*</b>                | <b>T3WV*</b>   |   |  | 3-wire                 |           |   |   |   |
| <b>T3YH*</b>                | <b>T3YV*</b>   |   |  |                        |           |   |   |   |
| <b>T2YD*</b>                | -  |   | Strong magnetic field proof<br>(AC magnetic field dedicated) |                        | 2-wire    |   |   |   |
| <b>T2YDT*</b>               | -  |   |  |                        |           |   |   |   |
| <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>                    | 2  |   |  |                        |           |   |   |   |
| <b>T</b>                    | 3  |   |  |                        |           |   |   |   |
| <b>4</b>                    | 4 (fill in switch quantity for 4 or more)              |   |  |                        |           |   |   |   |
| <b>H Option</b>             |  |   |  |                        |           |   |   |   |
|                             | <b>Bore size (ø)</b>                                   | <b>12</b>   | <b>16</b>  | <b>20</b>              | <b>25</b> |   |   |   |
| <b>A</b>                    | Adjustable full-stroke both ends, with shock absorber  | ●   | ●  | ●                      | ●         |   |   |   |
| <b>A1</b>                   | Adjustable full-stroke R end only, with shock absorber | ●   | ●  | ●                      | ●         |   |   |   |
| <b>A2</b>                   | Adjustable full-stroke L end only, with shock absorber | ●   | ●  | ●                      | ●         |   |   |   |
| <b>A3</b>                   | Adjustable full-stroke bracket retrofitting            | ●   | ●  | ●                      | ●         |   |   |   |
| <b>H</b>                    | Table mounting thread size up                          | ●   | ●  | ●                      | ●         |   |   |   |
| <b>Blank</b>                | <b>Port position</b>                                   | <b>F</b> (standard)                               | <b>Cushion needle position</b>                               | <b>F</b> (standard)    | ●         | ● | ● | ● |
| <b>R</b>                    |  |   |  | <b>R</b> (common port) | <b>F</b>  | ● | ● | ● |
| <b>B</b>                    |  | <b>F</b>  | <b>B</b>   | ●                      | ●         | ● | ● |   |
| <b>T</b>                    |  | <b>R</b> (common port)                            | <b>B</b>   | ●                      | ●         | ● | ● |   |
| <b>D</b>                    | <b>D</b>   | <b>F</b>  |  |                        |           |   | ● |   |



## Internal structure and parts list



| No. | Parts name                   | Material        | Remarks     | No. | Parts name                   | Material       | Remarks     |
|-----|------------------------------|-----------------|-------------|-----|------------------------------|----------------|-------------|
| 1   | Hexagon socket head cap bolt | Alloy steel     | Blackening  | 7   | Hexagon socket head cap bolt | Alloy steel    | Galvanizing |
| 2   | High precision guide         | Stainless steel |             | 8   | Connection plate             | Aluminum alloy | Alumite     |
| 3   | Hexagon socket head cap bolt | Alloy steel     | Blackening  | 9   | Key                          | Steel          | Blackening  |
| 4   | Guide holder                 | Aluminum alloy  | Alumite     | 10  | Hexagon socket head cap bolt | Alloy steel    | Blackening  |
| 5   | Square nut (B)               | Steel           | Blackening  | 11  | Hexagon socket head cap bolt | Alloy steel    | Galvanizing |
| 6   | Stopper plate                | Steel           | Galvanizing | 12  | Table                        | Aluminum alloy | Alumite     |

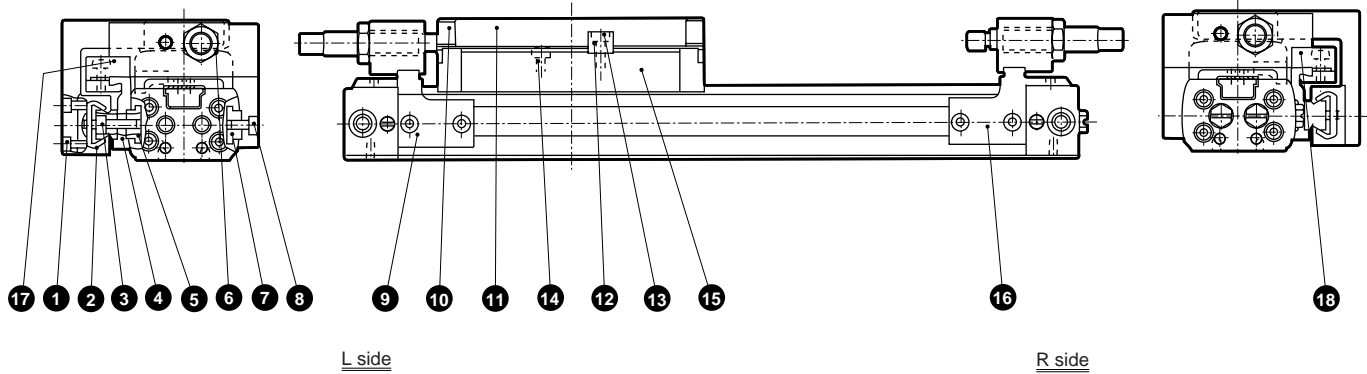
## Repair parts list

| Bore size (mm) | Kit No.    | Repair parts number  |
|----------------|------------|--|
| ø12            | SRL3-12K-* | Repair parts of rodless cylinders are same as SRL3 Series. Refer to page 2005. |
| ø16            | SRL3-16K-* |  |
| ø20            | SRL3-20K-* |  |
| ø25            | SRL3-25K-* |  |

Note 1: Specify the kit no. when placing an order Specify stroke length for "\*\*".

### Internal structure and parts list

- Adjustable full-stroke with shock absorber



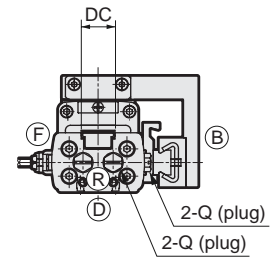
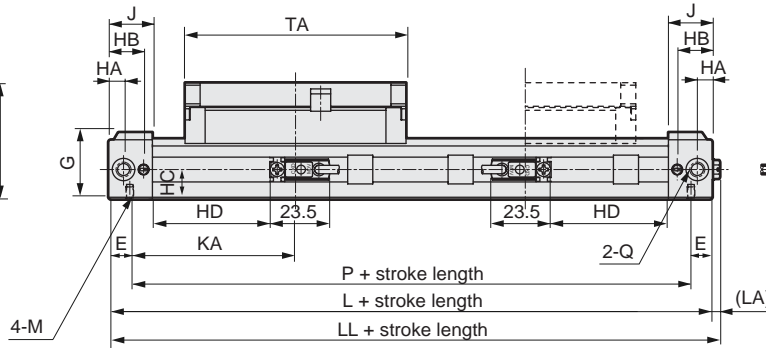
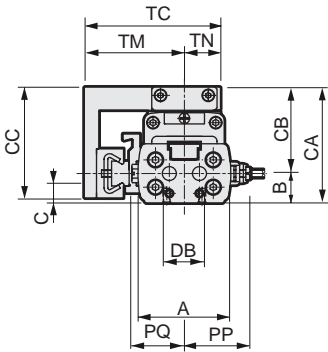
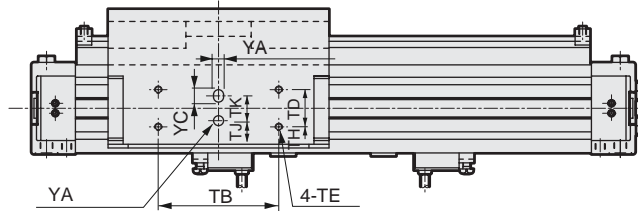
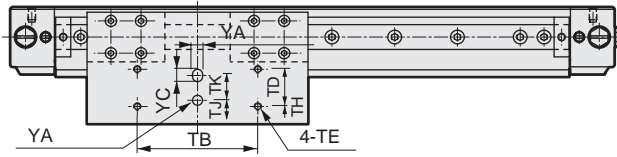
| No. | Parts name                   | Material        | Remarks     | No. | Parts name                   | Material       | Remarks     |
|-----|------------------------------|-----------------|-------------|-----|------------------------------|----------------|-------------|
| 1   | Hexagon socket head cap bolt | Alloy steel     | Blackening  | 10  | Stopper plate                | Steel          | Galvanizing |
| 2   | High precision guide         | Stainless steel |             | 11  | Connection plate             | Aluminum alloy | Alumite     |
| 3   | Hexagon socket head cap bolt | Alloy steel     | Blackening  | 12  | Key                          | Steel          | Blackening  |
| 4   | Guide holder                 | Aluminum alloy  | Alumite     | 13  | Hexagon socket head cap bolt | Alloy steel    | Blackening  |
| 5   | Square nut (B)               | Steel           | Blackening  | 14  | Hexagon socket head cap bolt | Alloy steel    | Galvanizing |
| 6   | Square nut                   | Steel           | Galvanizing | 15  | Table                        | Aluminum alloy | Alumite     |
| 7   | Square nut                   | Alloy steel     | Blackening  | 16  | Adaptor (L)                  | Steel          | Galvanizing |
| 8   | Hexagon socket head cap bolt | Alloy steel     | Galvanizing | 17  | Adaptor (LG)                 | Steel          | Galvanizing |
| 9   | Adaptor (R)                  | Steel           | Galvanizing | 18  | Adaptor (RG)                 | Steel          | Galvanizing |

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  
SRL3  
**SRG3**  
SRM3  
SRT3  
MRL2  
MRG2  
SM-25  
CAC4  
UCAC2  
RCC2  
MFC  
SHC  
GLC  
Ending

Rodless type  
High precision guided rodless cylinder

## Dimensions

● SRG3 with cylinder switch SRG3-\*\*-\*\*-\*\*-M\*V\*  
(Radial lead wire)

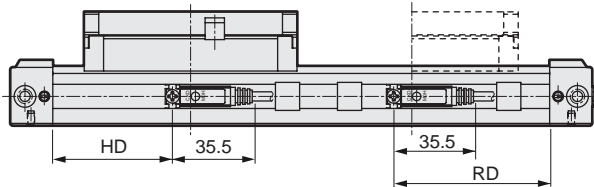
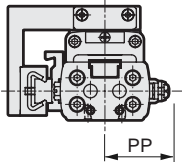


HC: needle position

L side

R side

● SRG3 with cylinder switch SRG3-\*\*-\*\*-\*\*-M\*H\*  
(Axial lead wire)



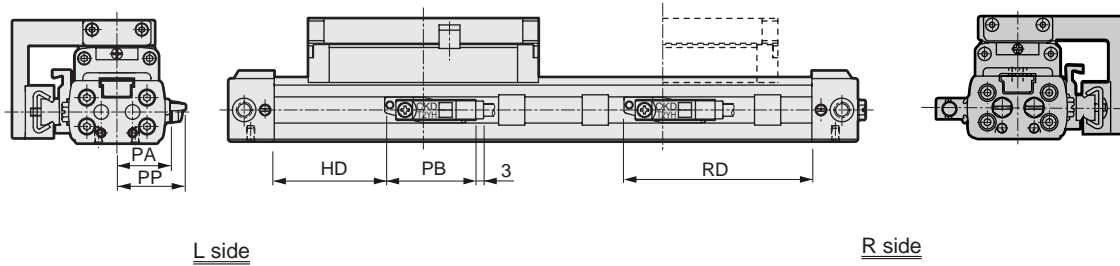
- SCP\*2
- CMK2
- CMA2
- SCM
- SCG
- SCA2
- SCS
- CKV2
- CA/OV2
- SSD
- CAT
- MDC2
- MVC
- SMD2
- MSD\*
- FC\*
- STK
- ULK\*
- JSK/M2
- JSG
- JSC3
- USSD
- USC
- JSB3
- LMB
- STG
- STS L
- LCS
- LCG
- LCM
- LCT
- LCY
- STR2
- UCA2
- HCM
- HCA
- SRL3
- SRG3**
- SRM3
- SRT3
- MRL2
- MRG2
- SM-25
- CAC4
- UCAC2
- RCC2
- MFC
- SHC
- GLC
- Ending

| Symbol          | A  | B    | CA | CB   | CC   | DB | DC | E    | G    | HA  | HB   | HC   | J    | KA   | L   | LL    | LA  | M            | P   | PQ   | Q     | TA  | TB | TC   |
|-----------------|----|------|----|------|------|----|----|------|------|-----|------|------|------|------|-----|-------|-----|--------------|-----|------|-------|-----|----|------|
| Bores size (mm) |    |      |    |      |      |    |    |      |      |     |      |      |      |      |     |       |     |              |     |      |       |     |    |      |
| ø12             | 33 | 10.5 | 43 | 32.5 | 40.5 | 10 | 11 | 8.5  | 24   | 6   | 14   | 10.5 | 17.5 | 59.5 | 136 | 139   | 3   | M3 depth 5   | 119 | 19   | M5    | 81  | 42 | 49   |
| ø16             | 37 | 12   | 47 | 35   | 45   | 14 | 12 | 8.5  | 27   | 6   | 14   | 12   | 17.5 | 66   | 149 | 152   | 3   | M3 depth 5   | 132 | 21   | M5    | 88  | 48 | 54.5 |
| ø20             | 44 | 14   | 54 | 40   | 50   | 16 | 16 | 10.5 | 31   | 8.5 | 18.5 | 14   | 22   | 74   | 169 | 171.5 | 2.5 | M4 depth 6.5 | 148 | 24.5 | Rc1/8 | 100 | 60 | 61.5 |
| ø25             | 53 | 17   | 67 | 50   | 63.5 | 20 | 26 | 14   | 40.5 | 7.5 | 20   | 18.9 | 24   | 81   | 190 | 192   | 2   | M6 depth 9   | 162 | -    | Rc1/8 | 122 | 70 | 80   |

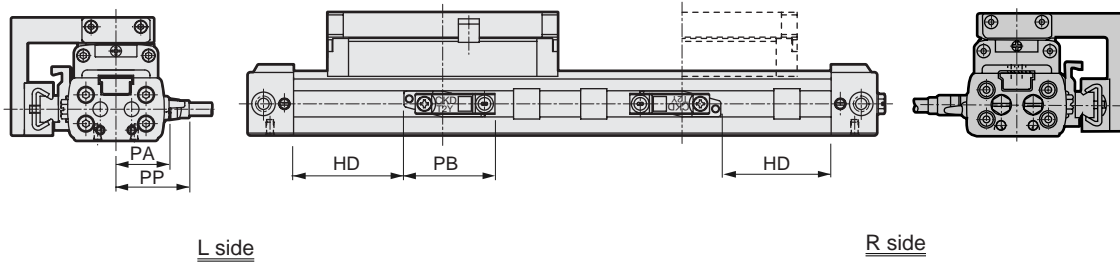
Note: Also refer to the right table.

## Dimensions

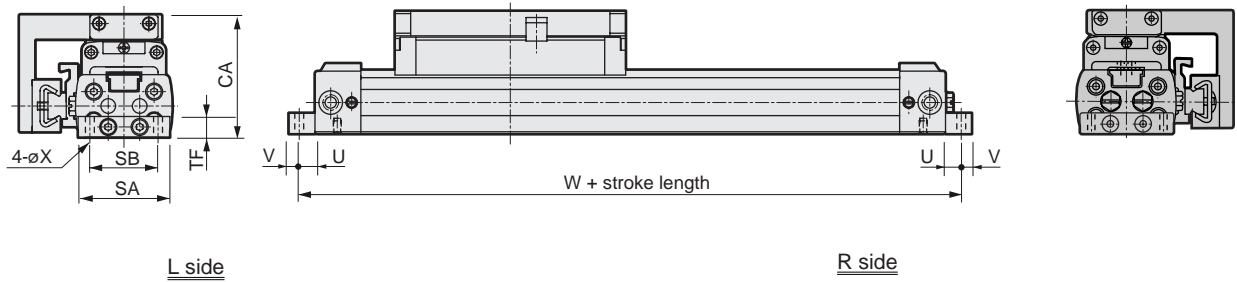
- SRG3-\*\*-\*\*-\*\*-T\*H with cylinder switch (T\*W, T\*Y or T2YD)



- SRG3-\*\*-\*\*-\*\*-T\*V with cylinder switch (T\*W and T\*Y)



- SRG3-LB-\*\*-\*\*-\*\* with foot bracket



| Symbol | TD | TE         | TH  | TJ   | TK | TM | TN   | YA               | YC | With foot bracket (LB) |    |    |   |    |     |     |
|--------|----|------------|-----|------|----|----|------|------------------|----|------------------------|----|----|---|----|-----|-----|
|        |    |            |     |      |    |    |      |                  |    | SA                     | SB | TF | U | V  | W   | X   |
| ø12    | 13 | M3 depth 5 | 6.5 | 8    | 10 | 36 | 13   | 4 ± 0.02 depth 4 | 5  | 32                     | 24 | 8  | 6 | 4  | 148 | 3.4 |
| ø16    | 15 | M3 depth 6 | 7   | 9.5  | 10 | 40 | 14.5 | 4 ± 0.02 depth 4 | 5  | 35                     | 26 | 8  | 6 | 4  | 161 | 3.4 |
| ø20    | 18 | M4 depth 6 | 8.5 | 10   | 15 | 44 | 17.5 | 6 ± 0.02 depth 6 | 7  | 43                     | 33 | 10 | 6 | 6  | 181 | 4.5 |
| ø25    | 20 | M5 depth 8 | 12  | 14.5 | 15 | 58 | 22   | 6 ± 0.02 depth 6 | 7  | 52                     | 20 | 12 | 9 | 11 | 208 | 7   |

| Symbol | With switch |      |     |      |      |     |      |      |      |      |      |      |      |      |      |      |      |
|--------|-------------|------|-----|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|
|        | HD          |      |     | RD   |      |     | PA   | PB   |      |      | PP   |      |      |      |      |      |      |
|        | M*          | T*Y* | T*W | M*   | T*Y* | T*W |      | T*Y* | T2YD | T*W* | M*V  | M*H  | T*YV | T*YH | T2YD | T*WV | T*WH |
| ø12    | 40.5        | 36   | 32  | 60.5 | 65   | 69  | 24.3 | 35   | 34   | 33.5 | 24.5 | 24.5 | 26   | 23   | 28.4 | 20.7 | 17.2 |
| ø16    | 47          | 42   | 38  | 67   | 72   | 76  | 26.3 | 35   | 34   | 33.5 | 26.5 | 26.5 | 28   | 25   | 30.4 | 22.7 | 19.2 |
| ø20    | 52.5        | 48   | 44  | 72.5 | 77   | 81  | 29.3 | 35   | 34   | 33.5 | 29.5 | 29.5 | 31   | 28   | 33.4 | 25.7 | 22.2 |
| ø25    | 60          | 56   | 52  | 82   | 86   | 90  | 34.3 | 35   | 34   | 33.5 | 34.5 | 34.5 | 36   | 33   | 38.4 | 30.7 | 27.2 |

Note: Also refer to the left table.

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  
SRL3  
**SRG3**  
SRM3  
SRT3  
MRL2  
MRG2  
SM-25  
CAC4  
UCAC2  
RCC2  
MFC  
SHC  
GLC

Ending

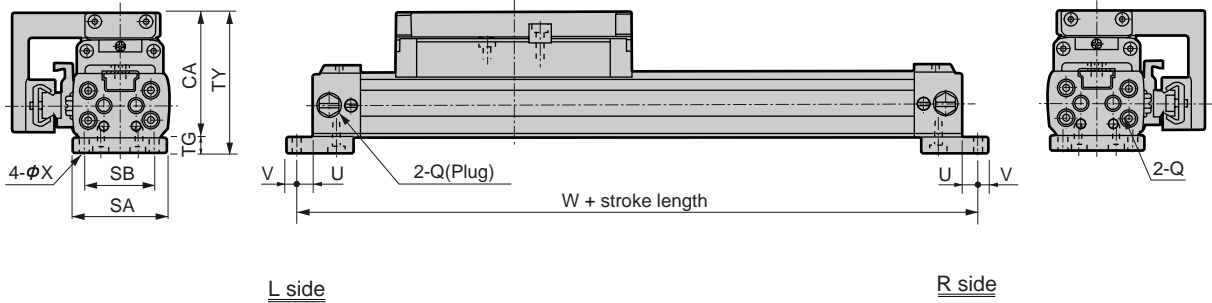
Rodless type  
High precision guided rodless cylinder

# SRG3 Series

## Dimensions



- SRG3-LB1-\*\*-\*\*\*with foot bracket

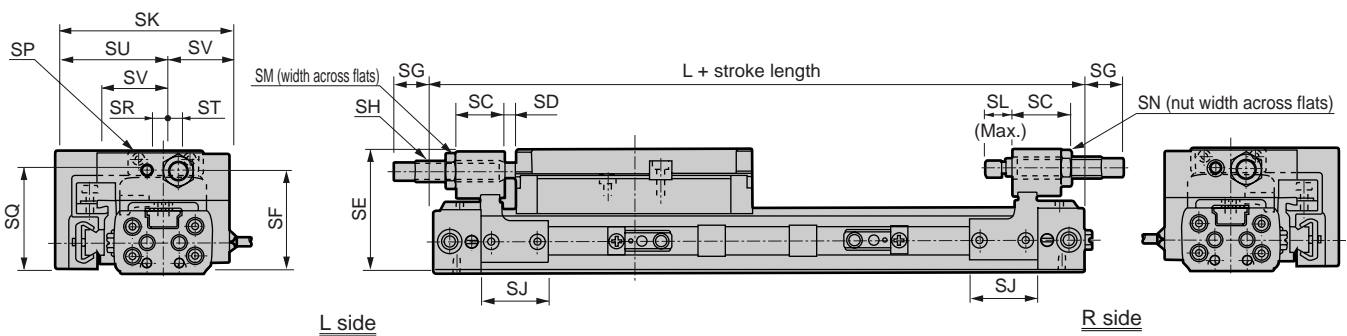


| Symbol         | With foot bracket (LB1) |    |    |    |    |    |   |    |     |     |
|----------------|-------------------------|----|----|----|----|----|---|----|-----|-----|
| Bore size (mm) | Q                       | SA | SB | TG | TY | CA | U | V  | W   | X   |
| ø12            | M5                      | 32 | 24 | 6  | 49 | 43 | 6 | 4  | 148 | 3.4 |
| ø16            | M5                      | 35 | 26 | 6  | 53 | 47 | 6 | 4  | 161 | 3.4 |
| ø20            | Rc1/8                   | 43 | 33 | 8  | 62 | 54 | 6 | 6  | 181 | 4.5 |
| ø25            | Rc1/8                   | 50 | 20 | 10 | 77 | 67 | 9 | 11 | 208 | 7   |

## Dimensions: With option



- Adjustable full-stroke with shock absorber (SRG3)



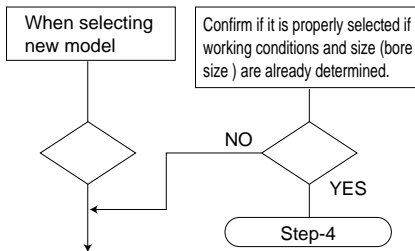
| Symbol | SC   | SD  | SE   | SF   | SG   |     |                 | SH                    |                               | SJ | SK   | SL   | SM | SN | SP | SQ   | SR | ST | SU | SV   |
|--------|------|-----|------|------|------|-----|-----------------|-----------------------|-------------------------------|----|------|------|----|----|----|------|----|----|----|------|
|        |      |     |      |      | MAX  | MIN | Adjusting range | Outer diameter thread | Maximum energy absorption (J) |    |      |      |    |    |    |      |    |    |    |      |
| ø12    | 19.5 | 2.5 | 42   | 35   | 17.5 | 7.5 | 10              | M8 x 0.75             | 3                             | 25 | 58.5 | 8.5  | 12 | 7  | M4 | 35.5 | 6  | 3  | 36 | 22.5 |
| ø16    | 18   | 4   | 46   | 39   | 14.5 | 4.5 | 10              | M8 x 0.75             | 3                             | 25 | 64.5 | 10   | 12 | 7  | M4 | 40   | 6  | 4  | 40 | 24.5 |
| ø20    | 22.5 | 3.5 | 53   | 45   | 14.5 | 4.5 | 10              | M10 x 1.0             | 7                             | 39 | 72.5 | 11.5 | 14 | 8  | M5 | 48   | 8  | 5  | 44 | 28.5 |
| ø25    | 20   | 2.5 | 65.5 | 54.5 | 14.5 | 4.5 | 10              | M12 x 1.0             | 12                            | 50 | 96.5 | 11.5 | 17 | 10 | M6 | 56   | 12 | 10 | 58 | 38.5 |



## SRG3 Series selection guide

Selecting conditions are different from standard cylinders. Use the selection guide to select the appropriate model.

### 1 Step-1



### 2 Step-2 Working conditions confirmation

1. Working pressure (P) (MPa)
2. Load weight (M) (kg)
3. Load (FL) (N)
4. Mounting direction
5. Stroke length (L) (mm)
6. Moving time (t) (s)
7. Operation speed (V) (m/s)

Cylinder average operation speed V formula

$$V = \frac{L}{t} \times \frac{1}{1000} \text{ (m/s)}$$

(Load weight)

The value shows (Load weight + jig weight)

(Mounting direction)

Operation direction Horizontal, vertical-up or vertical-down

Mounting direction Table upward, table downward

### 3 Step-3 Roughly selecting cylinder size

- When finding the value according to theoretical thrust value on Table 1.

Rough required thrust  $\geq$  load x 2

("X2" in "load X2" is a safety factor of 50%")

(Example) working pressure 0.5MPa

Load 5N

\*Necessary thrust is 5N x 2 = 10N.

ø12 is selected to meet theoretical thrust of more than 10N

at working pressure 0.5MPa according to Table 1.

$$D = \text{ø}12$$

(cylinder theoretical thrust)

Table 1 cylinder theoretical thrust

Unit: N

| Bore size (mm) | Pressurized area (mm <sup>2</sup> ) | Working pressure MPa |     |     |     |     |     |     |     |
|----------------|-------------------------------------|----------------------|-----|-----|-----|-----|-----|-----|-----|
|                |                                     | 0.05                 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 |
| ø12            | 138                                 | -                    | -   | 28  | 41  | 55  | 69  | 83  | 97  |
| ø16            | 216                                 | -                    | -   | 43  | 65  | 86  | 108 | 130 | 151 |
| ø20            | 315                                 | -                    | -   | 63  | 94  | 126 | 157 | 189 | 220 |
| ø25            | 542                                 | -                    | 54  | 108 | 163 | 217 | 271 | 325 | 380 |

Note 1: Value in table 1 does not include thrust coefficient.

### 4 Calculation of step-4 load (W), each moment value

- Calculate static load (W), and moment (M1, M2, M3)

according to load mounting conditions of cylinder.

$$W = W \quad (\text{N}) \quad (W = M \times 9.8)$$

$$M1 = F1 \times 1 \ell \quad (\text{N}\cdot\text{m})$$

$$M2 = F2 \times 2 \ell \quad (\text{N}\cdot\text{m})$$

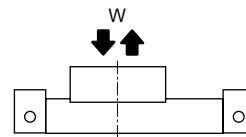
$$M3 = F3 \times 3 \ell \quad (\text{N}\cdot\text{m})$$

Substitute the loads applied on Fig.1 to the values of F1, F2, F3.

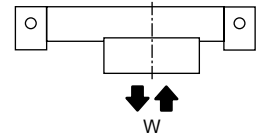
Fig. 1 Formula of each moment

(Vertical load)

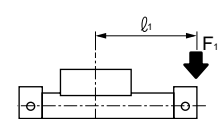
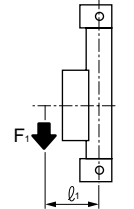
Downward



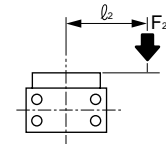
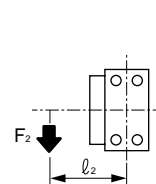
Upward



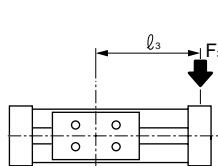
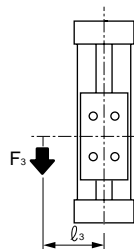
(Bending moment)  $M1 = F1 \times 1 \ell$



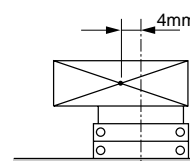
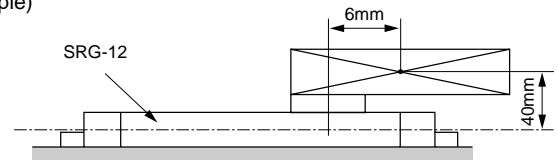
(Radial moment)  $M2 = F2 \times 2 \ell$



(Twist moment)  $M3 = F3 \times 3 \ell$



(Example)



$$M = 0.51 \text{ kg}$$

$$W = 5 \text{ N} \quad (W = M \times 9.8)$$

$$V_a = 200 \text{ mm/s}$$

Working pressure P = 0.5MPa

$$M1 = 5 \times 0.006 = 0.03 \text{ (N}\cdot\text{m)}$$

$$M2 = 5 \times 0.004 = 0.02 \text{ (N}\cdot\text{m)}$$

$$M3 = 0$$

$$W = 5 \text{ N} \quad M1 = 0.03 \text{ N}\cdot\text{m} \quad M2 = 0.02 \text{ N}\cdot\text{m} \quad M3 = 0$$

- 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
- SRL3
- SRG3**
- SRM3
- SRT3
- MRL2
- MRG2
- SM-25
- CAC4
- UCAC2
- 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 (example)
- LCM
- LCT
- LCY
- STR2
- UCA2
- HCM
- HCA
- SRL3
- SRG3**
- SRM3
- SRT3
- MRL2
- MRG2
- SM-25
- CAC4
- UCAC2
- RCC2
- MFC
- SHC
- GLC
- Ending

### 5 Step-5 Confirming load and composite moment

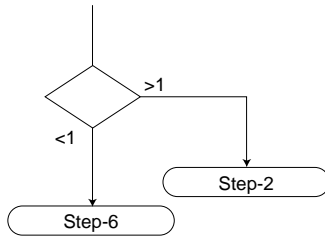
● Divide each load by the value on Table 2 to find moment ratio, and confirm if the total is 1.0 or less. and confirm the total is 1.0 or less.

● Formula

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

● If the total is larger than 1.0,

1. Reexamine load
2. Increase cylinder bore size



**Table 2 Allowable load/moment**

| Descriptions<br>Bore size (mm) | Vertical load<br>W: N | Bending moment<br>M1: N·m | Radial moment<br>M2: N·m | Twist moment<br>M3: N·m |
|--------------------------------|-----------------------|---------------------------|--------------------------|-------------------------|
| ø12                            | 20                    | 1                         | 0.5                      | 3                       |
| ø16                            | 40                    | 2.5                       | 1                        | 5.5                     |
| ø20                            | 40                    | 2.5                       | 1                        | 5.5                     |
| ø25                            | 90                    | 6.5                       | 2.5                      | 17                      |

(example)

W = 5 (N), M = 0.03 (N·m), M2 = 0.02 (N·m), M3 = 0 (N·m)

Cylinder size to be used.: Equivalent to ø12.

$$\frac{5}{20} + \frac{0.03}{1.0} + \frac{0.02}{0.5} + \frac{0}{3} = 0.32 \leq 1.0$$

Since the total of load, moment ratio is 1.0 or less, this is OK.

### 6 Step-6 Calculating required thrust

● Calculate the required thrust (FN) according to each moment.

1. During horizontal operation

$$F_N = F_W + F_{M1} + F_{M2} + F_{M3} + F_L \quad (N)$$

$$F_W = W \times 0.2 \quad (N)$$

$$F_{M1} = M1 \times C1 \quad (N)$$

$$F_{M2} = M2 \times C2 \quad (N)$$

$$F_{M3} = M3 \times C3 \quad (N)$$

FL: load (N)

Frictional force coefficient caused by C1: moment M1 (table 3)

Frictional force coefficient caused by C2: moment M2 (table 3)

Frictional force coefficient caused by C3: moment M3 (table 3)

2. During vertical operation

$$F_N = W + F_{M1} + F_{M3} + F_L \quad (N)$$

$$F_N = \boxed{\phantom{000}} \quad (N)$$

(Frictional force coefficient caused by each moment)

● Since friction force varies depending on the moment applied to cylinder, calculate frictional force per moment according to Table 3.

**Table 3 Friction force coefficient per moment** <sup>1/m</sup>

| Bore size (mm) | C1 | C2 | C3 |
|----------------|----|----|----|
| ø12            | 8  | 27 | 8  |
| ø16            | 7  | 24 | 7  |
| ø20            | 6  | 21 | 6  |
| ø25            | 5  | 16 | 5  |

(example)

W = 5 (N), M1 = 0.03 (N·m), M2 = 0.02 (N·m), M3 = 0 (N·m)

Cylinder size to be used.: Equivalent to ø12.

$$F_W = 5 \times 0.2 = 1(N)$$

$$F_{M1} = 0.03 \times 8 = 0.24(N)$$

$$F_{M2} = 0.02 \times 27 = 0.54(N)$$

$$F_{M3} = 0$$

$$F_L = 0$$

$$F_N = 1 + 0.24 + 0.54 + 0 + 0 = 1.78(N)$$

## 7 Step-7 load factor confirmation

● Load factor is determined according to stability of cylinder operation speed, safety factor and service life, etc.

● Formula of load factor ( $\alpha$ )

$$\alpha = \frac{\text{Necessary thrust (FN)}}{\text{Cylinder thrust (F)}} \times 100 (\%)$$

$$F = A \times P \times \frac{a}{100} (\text{N})$$

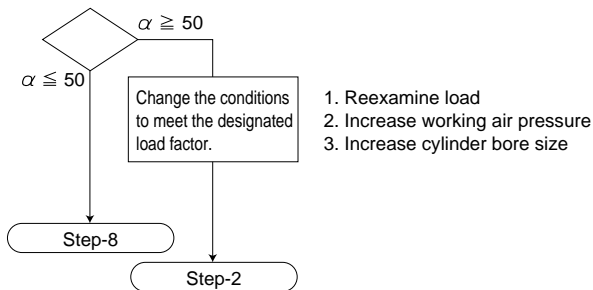
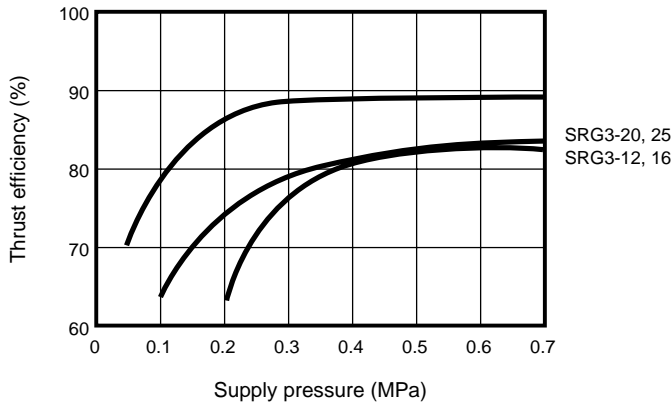
A = pressurized area (mm<sup>2</sup>) (refer to the table 1.)

● Cylinder theoretical value of table 1 as can be used as a value of A x P.

P: Working pressure (MPa)

a: thrust efficiency Use value in Fig. 2.

### Tendency of thrust efficiency of fig.2 SRG3



(Range of appropriate load factor)

● Speed of piston varies on the load factor but the speed should be within the range shown on Table 4 for general use.

Table 4 (Adequate range of load factor-reference value)

| Working pressure MPa | Load factor (%)  |
|----------------------|------------------|
| 0.2 to 0.3           | $\alpha \leq 40$ |
| 0.3 to 0.6           | $\alpha \leq 50$ |
| 0.6 to 0.7           | $\alpha \leq 60$ |

(Example) Cylinder size: Equivalent to  $\phi 12$

Necessary thrust 1.78 (N)

Working pressure 0.5 (MPa)

$$\alpha = \frac{1.78}{138 \times 0.5 \times \frac{95}{100}} \times 100$$

$$= 2.7\%$$

$\alpha \leq 50\%$ , so it is OK.

## 8 Step-8 cushion performance confirmation

Check if the kinetic energy of actual load can be absorbed according to cushion performance of cylinder.

● The allowable energy absorption of cylinder ( $E_1$ ) is the characteristic value of cylinder. For SRG, use the values on Table 5)

● Formula of piston kinetic energy ( $E_2$ )

$$E_2 = \frac{1}{2} \times M \times V^2 (\text{J})$$

m: Load weight (kg)

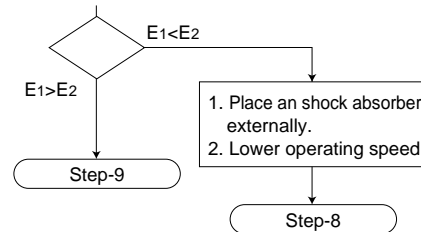
V: Cushion entry speed of piston (m/s)

$$V = \frac{L}{t} \times \frac{\alpha}{100}$$

L: Stroke (m)

t: operation time (s)

$\alpha$ : load factor (%)



(Cylinder allowable energy absorption)

● For cylinder cushion mechanism, value of kinetic energy absorbing performance varies depending on cylinder bore size. For SRG3, refer to the value on Table 5

Table 5 Allowable energy absorption of SRG3 (E1)

| Bore size (mm) | Allowable energy absorption (J) |
|----------------|---------------------------------|
| $\phi 12$      | 0.03                            |
| $\phi 16$      | 0.22                            |
| $\phi 20$      | 0.59                            |
| $\phi 25$      | 1.40                            |

## 9 Step-9 Confirming inertia load

● Check if the force applied to load generated by piston operation is within the range of cylinder faculty.

(1) Calculate inertia force ( $F_1$ ) from cushion entry speed (V) and inertia coefficient of SRG3 shown on table 3.

$$F_1 = 10 \times M \times G (\text{N})$$

m: Load weight (kg)

G: inertia force coefficient

(2) Find bending moment ( $M_{1i}$ ) and twist moment ( $M_{3i}$ ) according to inertia force ( $F_1$ ). ( $M_{3i}$ ) is asked.

$$M_{1i} = F_1 \times l_1$$

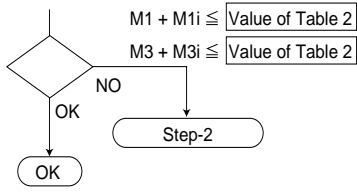
$$M_{3i} = F_1 \times l_3$$

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  
SRL3  
SRG3  
SRM3  
SRT3  
MRL2  
MRG2  
SM-25  
CAC4  
UCAC2  
RCC2  
MFC  
SHC  
GLC  
Ending

Rodless type  
High precision guided rodless cylinder

## Selection guide

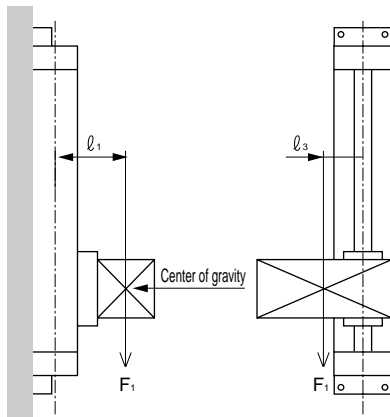
(3) Add static load moment (M1 and M3) to inertia load moment (M1i and M3i). Confirm if the composite value is less than value on Table 2.



(When M1 and M3 are generated simultaneously)

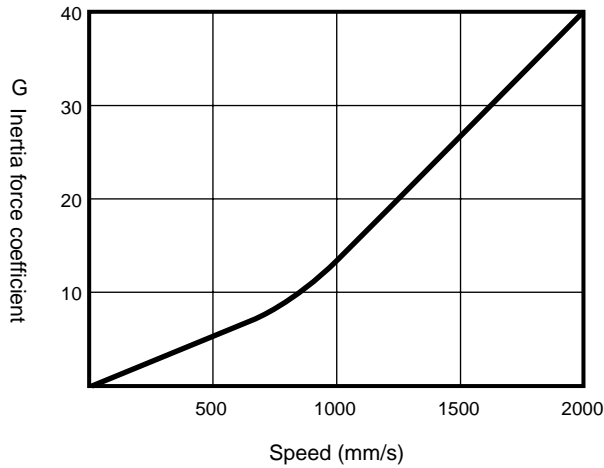
$$M1i = F_1 \times l_1$$

$$M3i = F_1 \times l_3$$



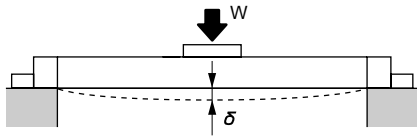
(Tendency of SRG inertia force)

Fig. 3 Tendency of inertia force coefficient of SRG3

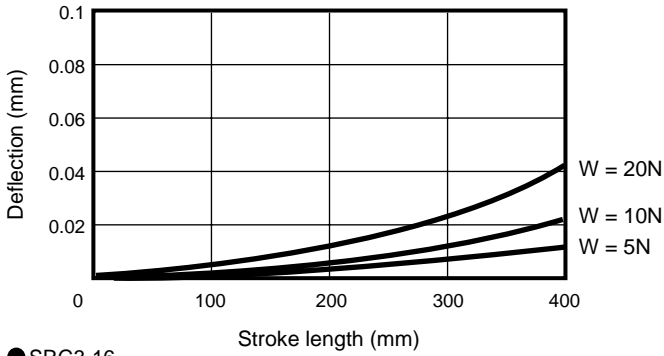


- SCP\*2
- CMK2
- CMA2
- SCM
- SCG
- SCA2
- SCS
- CKV2
- CA/OV2
- SSD
- CAT
- MDC2
- MVC
- SMD2
- MSD\*
- FC\*
- STK
- ULK\*
- JSK/M2
- JSG
- JSC3
- USSD
- USC
- JSB3
- LMB
- STG
- STS L
- LCS
- LCG
- LCM
- LCT
- LCY
- STR2
- UCA2
- HCM
- HCA
- SRL3
- SRG3**
- SRM3
- SRT3
- MRL2
- MRG2
- SM-25
- CAC4
- UCAC2
- RCC2
- MFC
- SHC
- GLC
- Ending

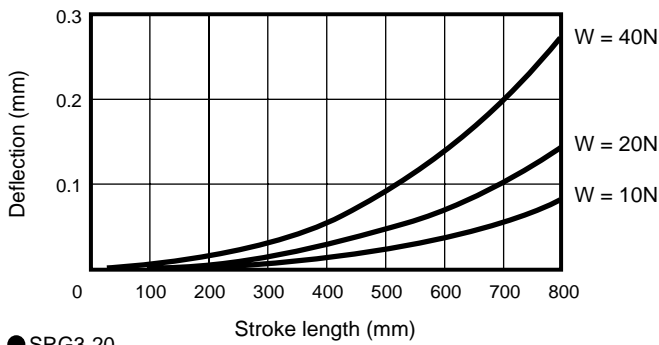
### 1 Bent of cylinder tube $\delta$



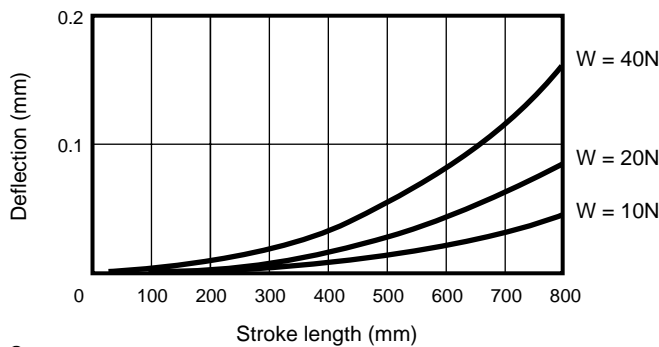
#### ● SRG3-12



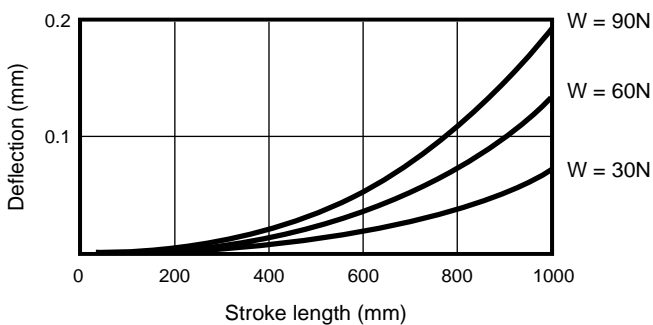
#### ● SRG3-16



#### ● SRG3-20

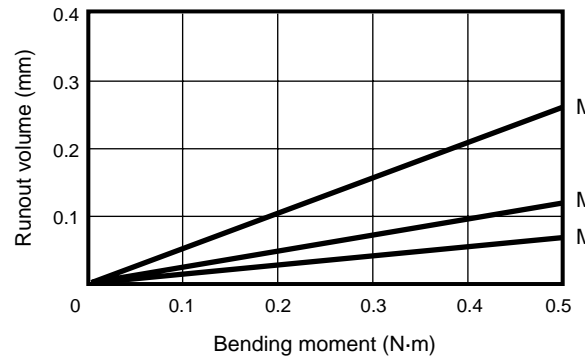


#### ● SRG3-25

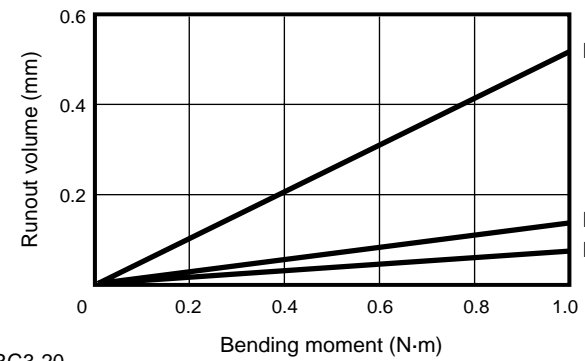


### 2 Runout of table (Runout from at cylinder center 70mm position)

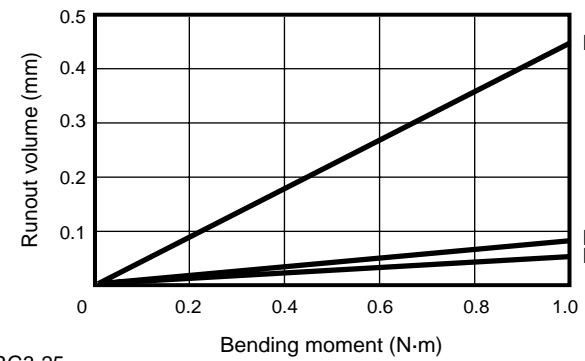
#### ● SRG3-12



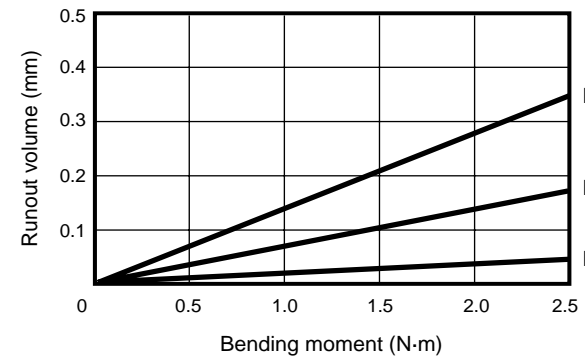
#### ● SRG3-16



#### ● SRG3-20



#### ● SRG3-25



|             |
|-------------|
| 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         |
| SRL3        |
| <b>SRG3</b> |
| SRM3        |
| SRT3        |
| MRL2        |
| MRG2        |
| SM-25       |
| CAC4        |
| UCAC2       |
| RCC2        |
| MFC         |
| SHC         |
| GLC         |
| Ending      |

Rodless type  
High precision guided rodless cylinder

## 3 How to adjust adjustable full stroke unit

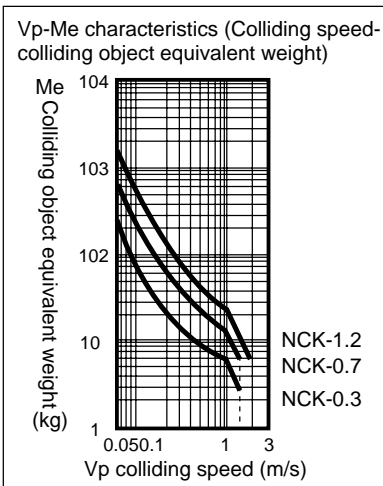
- (1) Confirming allowable colliding energy of shock absorber  
 Calculate the colliding object equivalent weight  $Me$ , and colliding energy  $E$  according to the formula on the table below, and confirm if  $Me$  and  $E$  should not be greater than the allowable values on Fig. 4. Also, refer to Table 11 to check if specifications of repeat frequency and colliding speed etc, should be allowable values or less. Allowable value of colliding object equivalent weight  $Me$  and colliding energy  $E$  may vary depending on colliding speed.

● Symbol

- $E$  : Colliding energy (J)  
 $Me$  : Colliding object equivalent weight (kg)  
 $m$  : Weight of workpiece (kg)  
 $F$  : Cylinder thrust (N)  
 $V$  : Colliding speed (m/s)  
 $St$  : Stroke of shock absorber (m)  
 $g$  : Gravity acceleration 9.8 (m/s<sup>2</sup>)

|  | Horizontal movement                | Moving downward                                  | Moving upward                                    |
|--|------------------------------------|--|--|
| Applications   |                                    |  |  |
| Colliding object weight or equivalent weight $Me$ (kg) | $Me = m + \frac{2F \cdot St}{V^2}$ | $Me = m + \frac{2 \cdot St \cdot (F + mg)}{V^2}$ | $Me = m + \frac{2 \cdot St \cdot (F - mg)}{V^2}$ |
| Energy $E$ (J)   | $E = \frac{mV^2}{2} + F \cdot St$  | $E = \frac{mV^2}{2} + (F + mg) \cdot St$         | $E = \frac{mV^2}{2} + (F - mg) \cdot St$         |

Fig.4 Colliding object equivalent weight



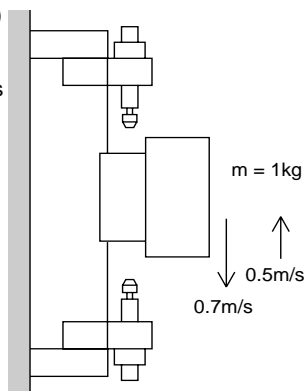
(2) Shock absorber

**Table 6 Specifications**

| Type                                  |            | SRG3-12/16                          | SRG3-20      | SRG3-25    |
|---------------------------------------|------------|-------------------------------------|--------------|------------|
| Shock absorber model no.              |            | NCK-00-0.3-C                        | NCK-00-0.7-C | NCK-00-1.2 |
| Descriptions                          |            | Without adjuster spring return type |              |            |
| Type/category                         |            | Without adjuster spring return type |              |            |
| Maximum energy absorption             | J          | 3                                   | 7            | 12         |
| Stroke length                         | mm         | 6                                   | 8            | 10         |
| Maximum energy absorption per hour    | kJ/        | 6,300                               | 12,600       | 21,600     |
| Max. colliding speed                  | m/s        | 1.5                                 |              |            |
| Max. repeating cycle                  | Time/min.  | 35                                  | 30           |            |
| Ambient temperature                   | °C         | -10 to 80                           |              |            |
| Required strength of mounting bracket | N          | 3,540                               | 6,150        | 8,400      |
| Return time                           | S          | 0.3 or less                         |              |            |
| Product weight                        | kg         | 0,012                               | 0.02         | 0.04       |
| Recoiling force                       | Extended   | N                                   | 3.0          | 2.9        |
|                                       | Compressed | N                                   | 4.6          | 5.9        |

(3) For example of calculation (SRG3-20)

- Example of calculation (1) when lifting up/down Working conditions
- Load M1 (kg)
- Colliding speed  
0.5 when lifting up (m/s)  
0.7 when lifting down (m/s)
- Working pressure 0.5 (MPa)  
(157N)



(1) Kinetic energy of when lifting (E<sub>1</sub>)

$$E_1 = \frac{1 \times 0.5^2}{2} + (157 - 1 \times 9.8) \times 0.008$$

$$= 1.30 \text{ (J)}$$

The value is less than half of max. energy absorption on Table 12. Kinetic energy (E<sub>1</sub>) can be absorbed.

$$Me = 1 + \frac{2 \times 0.008 (157 - 1 \times 9.8)}{0.52}$$

$$= 10.42 \text{ (kg)}$$

Me of shock absorber for SRG3-20 is 18kg at V=0.5m/s according to Fig. 4, thus can be absorbed.

(2) Kinetic energy when lifting down (E<sub>1</sub>)

$$E_1 = \frac{1 \times 0.7^2}{2} + (157 + 1 \times 9.8) \times 0.008$$

$$= 1.58 \text{ (J)}$$

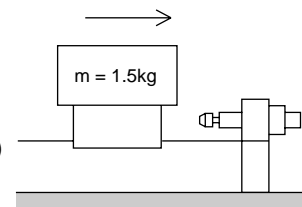
The value is less than half of maximum energy absorption on Table 12. Kinetic energy (E<sub>1</sub>) can be absorbed.

$$Me = 1 + \frac{2 \times 0.008 (157 + 1 \times 9.8)}{0.7^2}$$

$$= 6.45 \text{ (kg)}$$

Me of shock absorber used for SRG-20, as Fig 4. shows, is 16 kg when V=0.7m/s. The value can be absorbed.

- Example of calculation (2) horizontal v = 0.5m/s  
Working conditions  
Load weight M 1.5 (kg)  
Colliding speed  
Horizontal 0.5 (m/s)  
Working pressure 0.3 (MPa)  
(94N)



Kinetic energy of horizontal (E<sub>1</sub>)

$$E_1 = \frac{1.5 \times 0.5^2}{2} + 94 \times 0.008$$

$$= 0.94 \text{ (J)}$$

The value is less than half of max. energy absorption on Table 12. Kinetic energy (E<sub>1</sub>) can be absorbed.

$$Me = 1.5 + \frac{2 \times 94 \times 0.008}{0.52}$$

$$= 1.53 \text{ (kg)}$$

Fig. 4 shows, Me value of shock absorber for SRG-20 as 18 kg when V = 0.5 (m/s). Since 1.53 < 18, this can be absorbed.

(Note) Refer to "9 Confirming inertia load" at Step-9 for inertia load. The value should not exceed allowable value.

|             |
|-------------|
| 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         |
| SRL3        |
| <b>SRG3</b> |
| SRM3        |
| SRT3        |
| MRL2        |
| MRG2        |
| SM-25       |
| CAC4        |
| UCAC2       |
| RCC2        |
| MFC         |
| SHC         |
| GLC         |
| Ending      |

Rodless type  
High precision guided rodless cylinder