

# Cylinder varies.

Contributes to profit improvement of production.

High power cylinder is a ultra energy saving cylinder developed for applications that high power is required at the stroke end. Comparing to conventional type, this cylinder has the advance of operation cost, space and environment. This cylinder meets tough requests for new age manufacturing lines and devices.

■ Ultra energy saving realized

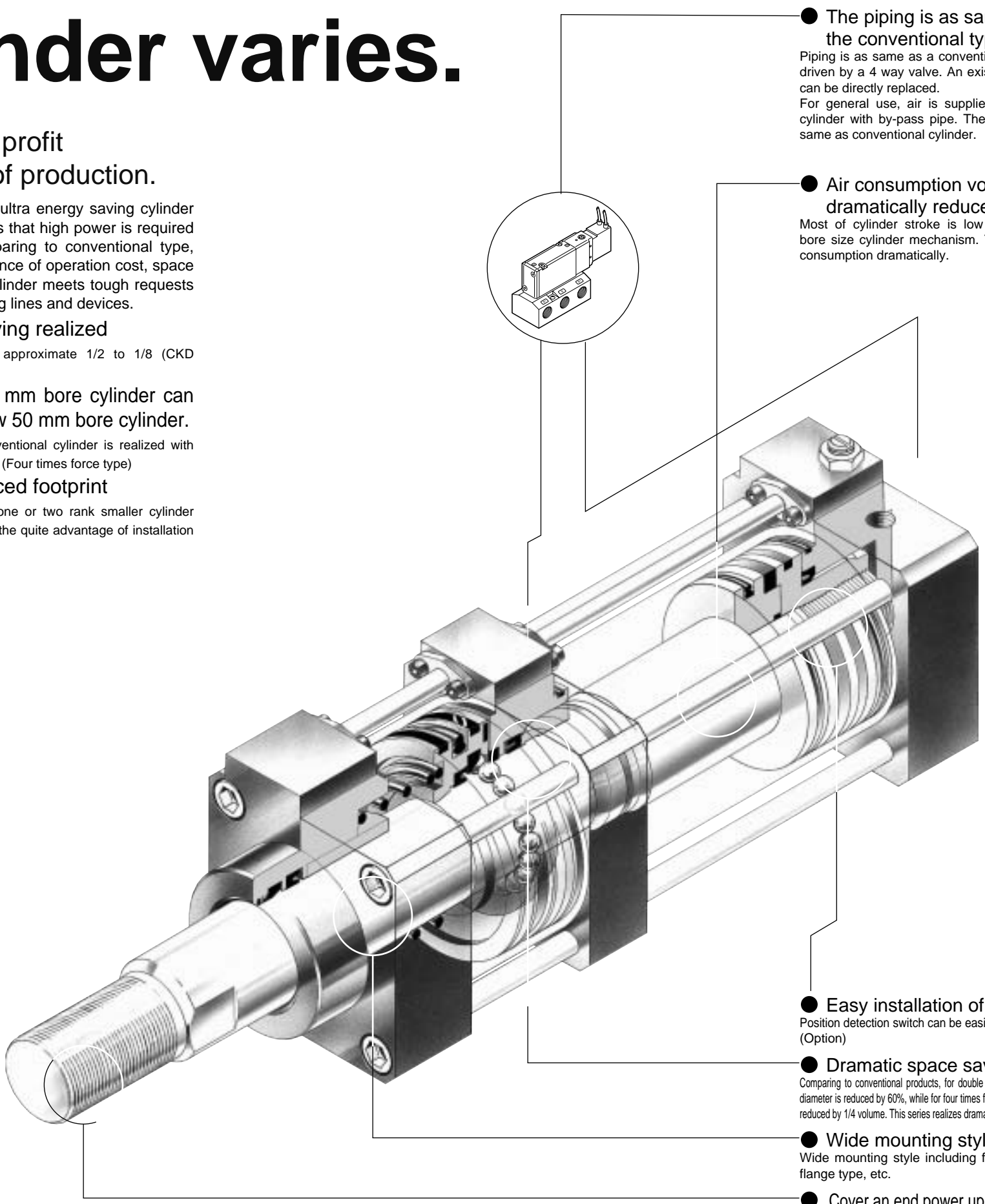
Air consumption volume is approximate 1/2 to 1/8 (CKD comparison).

■ Conventional 100 mm bore cylinder can be substituted by new 50 mm bore cylinder.

The power equivalent to conventional cylinder is realized with 50% or less cylinder bore size. (Four times force type)

■ Drastically reduced footprint

To obtain equivalent power, one or two rank smaller cylinder bore size is enough. This has the quite advantage of installation at the narrow space.



● The piping is as same as the conventional type  
Piping is as same as a conventional cylinder driven by a 4 way valve. An existing cylinder can be directly replaced.  
For general use, air is supplied to booster cylinder with by-pass pipe. The piping is as same as conventional cylinder.

● Air consumption volume dramatically reduced  
Most of cylinder stroke is low thrust small bore size cylinder mechanism. This reduces consumption dramatically.

● Easy installation of switch  
Position detection switch can be easily installed. (Option)

● Dramatic space saving  
Comparing to conventional products, for double force type, cylinder diameter is reduced by 60%, while for four times force type, volume is reduced by 1/4 volume. This series realizes dramatic space saving.

● Wide mounting style  
Wide mounting style including foot type and flange type, etc.

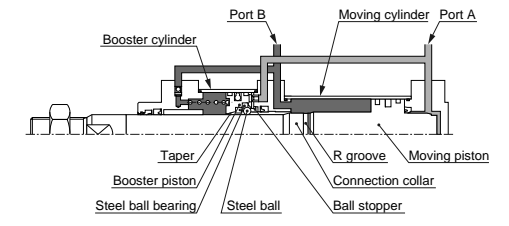
● Cover an end power up to  $\phi 200$  with  $\phi 40$  to  $\phi 100$  sizes

Double power and four times power types are available.

The booster generates double force of conventional cylinder thrust at the stroke end. For example, double force model with 63 mm bore equal to conventional 100 mm bore model, and four times force model equivalent to 125 mm bore are available. (Thrust attains 70% of theoretical thrust at booster section retracted.)

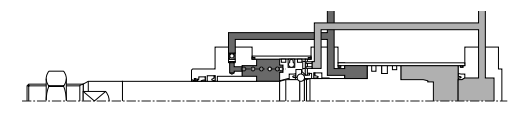
● Operational explanation

● PUSH



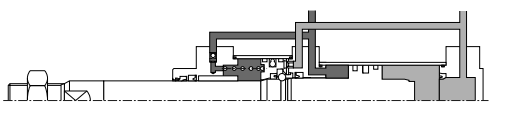
1) Air supply from Port A and exhaust from Port B results in moving of piston rod as same as regular cylinders.

● Connection



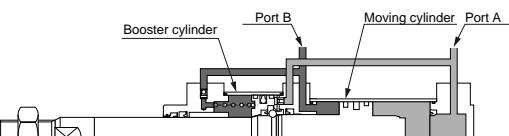
2) Moving the piston rod, the connection collar rushing into the booster piston, and reaching the booster piston taper results in moving the booster piston. This also leads to the steel ball inserting into R groove by elasticity of steel ball bearing, which establishes the booster cylinder by connecting the booster piston and the connection collar.

● When boosted



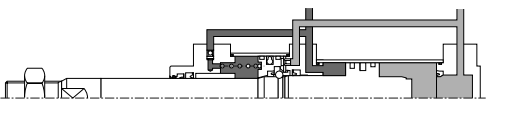
3) Thrust generated by the composite pressurized area of combined moving piston and booster piston is transmitted to the piston rod.

● When pulled, boosted return



4) When supplying air from Port B and exhausting air from Port A results in returning the piston rod, thrust is transmitted by the booster cylinder including composite pressurized area of booster piston and moving piston.

● Connection release



5) Just before booster piston return end, the steel ball is pushed out by the ball stopper from R groove to steel ball bearing direction to disconnect, then the piston rod return until the stroke end.

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

High power cylinder  
Special type

## Drastically saving operation cost.

### DATA

Comparative data to conventional cylinders

● Conventional type

**SHC**

● Double force type

**SHC-K**

● Four times force type

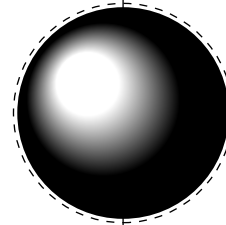
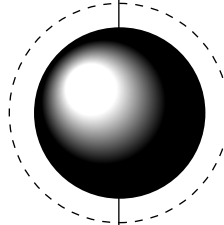
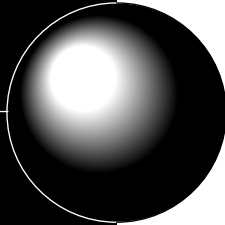
φ 100 x 300 mm stroke  
Theoretical thrust: 3927N  
(0.5MPa)

φ 63 x 300 mm stroke  
Theoretical thrust: 3139N  
(0.5MPa)

φ 50 x 300 mm stroke  
Theoretical thrust: 4507N  
(0.5MPa)

#### Weight

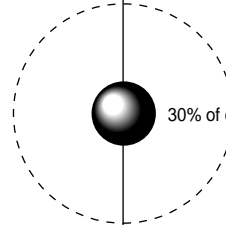
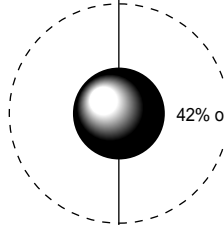
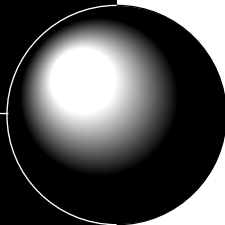
● Unit kg



#### Air consumption

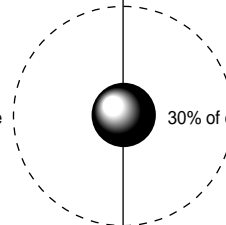
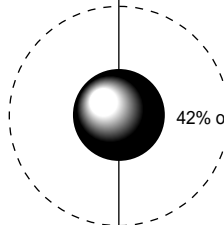
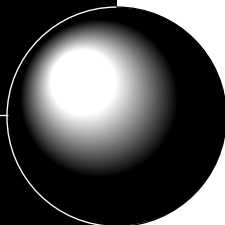
(One million cycles during reciprocating operation)

● Atmospheric pressure conversion at 0.5 MPa



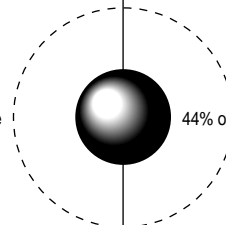
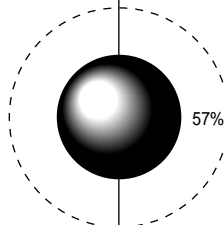
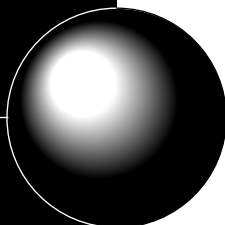
#### Operation costs

● Cost calculated by compressed air cost 8 yen/m<sup>2</sup>



#### Total cost

● Total cost at 1 million reciprocating cycles



#### Space

● Unit: mm

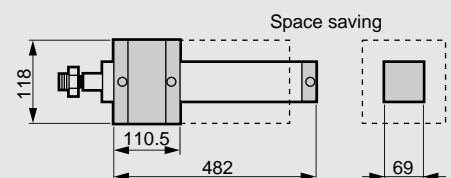
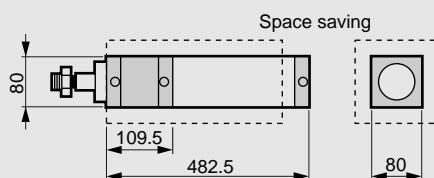
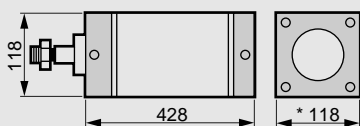
● Conventional type (100 mm bore)

**SHC**

● Double force type (63 mm bore)

**SHC-K**

● Four times force type (50 mm bore)

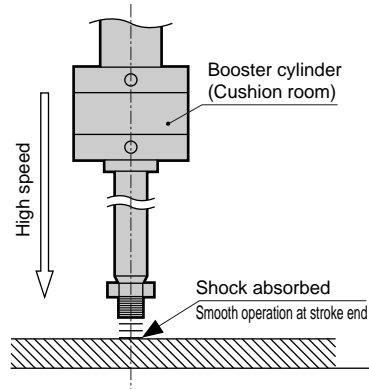


- SCP\*2
- CMK2
- CMA2
- SCM
- SCG
- SCA2
- SCS
- CKV2
- CA/OV2
- SSD
- CAT
- MDC2
- MVC
- SMD2
- MSD\*
- FC\*
- STK
- ULK\*
- JSK/M2
- JSG
- JSC3
- USSD
- USC
- JSB3
- LMB
- STG
- STS/L
- LCS
- LCG
- LCM
- LCT
- LCY
- STR2
- UCA2
- HCM
- HCA
- SRL2
- SRG
- SRM
- SRT
- MRL2
- MRG2
- SM-25
- CAC3
- UCAC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

## Excellent functionality and wide applications.

### Cushion functionality of high power cylinder

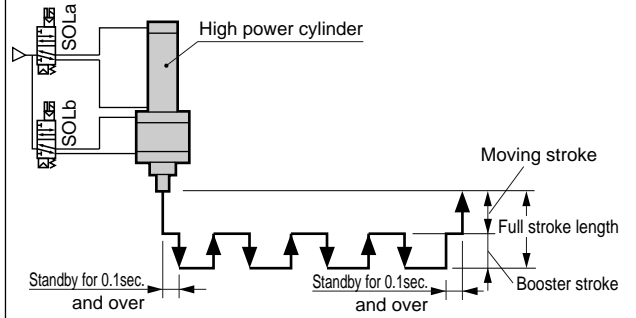
For high power cylinder, the booster cylinder part functions as a cushion room. This enables a high speed machines and long service life by absorbing shocks. The cushion functionality is much improved comparing to conventional products.



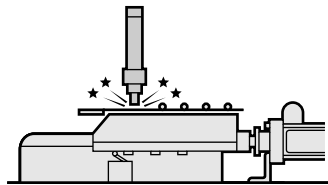
### Booster single control of high power

Using booster control (option symbol A) realizes high cycle that conventional cylinder could not achieve.

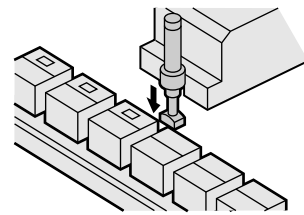
In the most of cases, for high frequent cylinder's reciprocating operation such as welding gun line etc., the tact time is decided by the reciprocating cycle of cylinder. In this case, using this high power cylinder enables high cycle operation as the following diagram, reaching object at the first moving stroke, then the booster stroke reciprocates several times. This dramatically reduces reciprocating stroke cycle, and improves productivity and energy saving.



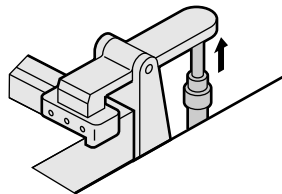
#### ● Welding gun



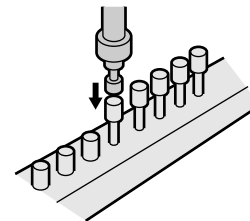
#### ● Stamp



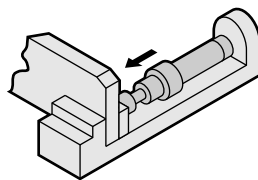
#### ● Clamp-1



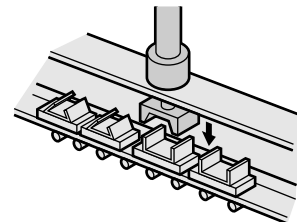
#### ● Pressfit and insertion



#### ● Clamp-2



#### ● Caulking



|            |
|------------|
| 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        |
| <b>SHC</b> |
| GLC        |

Ending

High power cylinder  
Special 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.

## High power cylinder SHC Series

### Design & Selection

#### ⚠ WARNING

##### ■ Braking

Due to the product structure, this cylinder is not used for braking because the stopping position may become extremely unstable.

#### ⚠ CAUTION

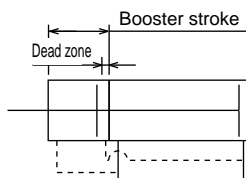
##### ■ Use within the maximum stroke.

##### ■ Do not use an A/B/R port connection solenoid valve for booster control.

B and D port passages are connected in the cylinder when the power stroke cylinder retracts, so air is exhausted from the solenoid valve R port.

##### ■ Set the boosted stroke at a position exceeding the dead zone below.

The boosted cylinder thrust is not achieved when used in the dead zone stroke.



Refer to double force stroke dead zone dimensions on pages 2338 and 2348.

##### ■ Use a discrete solenoid valves in the booster control circuit. When assembled into a manifold, use an individual exhaust spacer.

The booster port exhaust may flow into the movement port and cause operation faults.

##### ■ Provide a lag of 0.1 seconds or longer at the movement stroke limit in the booster control circuit.

If A and C ports are pressurized simultaneously, the boosted stroke piston and coupling collar do not couple correctly, and operation faults may result. When operating, pressurize port A, then provide a 0.1 second or longer lag at the movement stroke limit before pressurizing the C port.

##### ■ Do not allow a supply pressure difference between B and C/D ports in the booster control circuit.

Due to the product structure, air may flow in and cause operation faults. Consult with CKD if a pressure difference must be set.

##### ■ Select the cylinder taking the impact at cylinder connection into consideration.

Due to the product structure, impact is generated when the power stroke piston and coupling collar connect. Take impact into consideration when designing the device. Consult with CKD because the impact value differs with working conditions.

| Port size | Impact value (m/s <sup>2</sup> ) |
|-----------|----------------------------------|
| φ40       | 147                              |
| φ50       | 147                              |
| φ63       | 147                              |
| φ80       | 196                              |
| φ100      | 196                              |

##### ■ Note that thrust when the boosted stroke cylinder is advancing and retracting differs.

When the boosted stroke cylinder starts to retract, a thrust equivalent to double or 4-times is applied. However, due to the product structure, the thrust is about 70% of the theoretical thrust during movement. In the dead zone stroke, the double force stroke is not attained when advancing or retracting.

##### ■ Do not apply a deflected load to the piston rod.

Due to the product structure, the boosted stroke piston and coupling collar do not couple correctly and operation faults may occur. Provide a guide or floating joint, etc., so a deflected load is not applied.

##### ■ Install a flow control valve on the cylinder.

If each cylinder is used at a speed exceeding the working piston speed, correct coupling is not possible and operation faults may occur.

Contact CKD if the load ratio is large, because the cylinder may move to the double force stroke limit due to inertia, and may contact the workpiece.

##### ■ Do not use multiple cylinders synchronized.

Operation faults will occur when the power up piston and coupling collar cannot be connected.

##### ■ The piston rod may bounce slightly when the cylinder connection is released.

##### ■ Do not apply a reaction onto the piston rod in the middle of the travel stroke.

Due to the product structure, the boosted stroke piston and coupling collar do not couple correctly and operation faults may occur.

## Installation & Adjustment

### ⚠ WARNING

- Do not apply load on the pass-pipe section.  
Otherwise, air to the boosted stroke passes through and may prevent the boosted stroke cylinder from operating.



|             |
|-------------|
| 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       |
| <b>CAC3</b> |
| <b>UCAC</b> |
| <b>RCC2</b> |
| <b>MFC</b>  |
| <b>SHC</b>  |
| <b>GLC</b>  |
| Ending      |

High power cylinder  
Special type



High power cylinder (double acting double force type)

# SHC Series

● Bore size:  $\phi 40$ ,  $\phi 50$ ,  $\phi 63$ ,  $\phi 80$ ,  $\phi 100$

JIS symbol



## Specifications

| Descriptions                         |                      | SHC  |           |           |           |            |
|--------------------------------------|----------------------|--|-----------|-----------|-----------|------------|
| Bore size                            | mm                   | $\phi 40$  | $\phi 50$ | $\phi 63$ | $\phi 80$ | $\phi 100$ |
| Actuation                            |                      | Double acting extended part double force type                      |           |           |           |            |
| Working fluid                        |                      | Compressed air   |           |           |           |            |
| Max. working pressure                | MPa                  | 0.9  |           |           |           |            |
| Min. working pressure                | MPa                  | 0.2  | 0.15      |           |           |            |
| Withstanding pressure                | MPa                  | 1.35   |           |           |           |            |
| Ambient temperature                  | °C                   | -10 to 60 (no freezing)  |           |           |           |            |
| Port size                            | Rc                   | 1/8  | 1/4       | 1/4       | 3/8       | 3/8        |
| Stroke tolerance                     | mm                   | $^{+1.3}_0$ (to 300), $^{+1.7}_0$ (to 1000), $^{+2.1}_0$ (1000 to) |           |           |           |            |
| Working piston speed                 | Cylinder section     | 50 to 500  |           |           |           |            |
| Note 1                               | mm/s Booster section | 40 to 70   |           |           |           |            |
| Cushion                              |                      | Air cushion  |           |           |           |            |
| Lubrication                          |                      | Not required (use turbine oil Class 1 ISOVG32 if lubricated.)      |           |           |           |            |
| Rod end allowable energy absorption  | (J)                  | 12.2   | 22.9      | 31.3      | 47.2      | 76.2       |
| Head end allowable energy absorption | (J)                  | 5.84   | 9.99      | 15.1      | 25.5      | 41.0       |

Note 1 Since piston speed varies depending on supply pressure, please refer to technical data on page 2360.

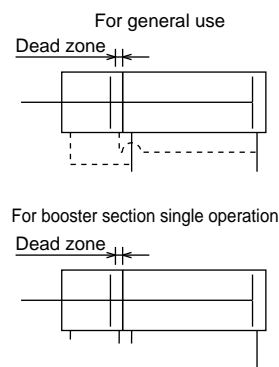
## Stroke length

| Bore size (mm) | Standard stroke length (mm)       | Max. stroke length (mm) | Booster stroke | Dead zone |
|----------------|-----------------------------------|-------------------------|----------------|-----------|
|                |                                   |                         |                | (mm)      |
| $\phi 40$      | 100, 150, 200, 250, 300, 400, 500 | 700                     | 10, 20         | 1.9       |
| $\phi 50$      |                                   |                         |                | 1.9       |
| $\phi 63$      |                                   | 2                       |                |           |
| $\phi 80$      |                                   | 2.3                     |                |           |
| $\phi 100$     |                                   | 2.8                     |                |           |

Note 1: Custom stroke length is available per 5mm increment.

Note 2: Dead zone (area not generating boosted thrust) stroke, until connection with booster piston completes, is included in the booster stroke.

Note 3: Minimum stroke length is 40mm with or without switch. For types with switches, the minimum stroke length varies depending on installation method. Refer to the below table.



## Min. stroke length of type with switch

| Bore size (mm) | When installed on the same plane | When installed on different planes |
|----------------|----------------------------------|------------------------------------|
|                | $\phi 40$                        | 65                                 |
| $\phi 50$      |                                  |                                    |
| $\phi 63$      | 40                               |                                    |
| $\phi 80$      |                                  |                                    |
| $\phi 100$     |                                  |                                    |

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

High power cylinder  
Special type

### Switch specifications

● 1 color/2 color indicator

| Descriptions    | Proximity 2 wire                                     |    |                                   | Proximity 3 wire                                     |  |
|-----------------|--|----|-----------------------------------|--|--|
|                 | R1   | R2 | R2Y (2 color indicator type)      | R3   | R3Y (2 color indicator type)                     |
| Applications    | Programmable controller, relay, small solenoid valve |    | Programmable controller dedicated | Programmable controller, relay, small solenoid valve |  |
| Output method   | -  |    |                                   | NPN output   |  |
| Power voltage   | -  |    |                                   | 4.5 to 28 VDC  |  |
| Load voltage    | 85 to 265 VAC  |    | 10 to 30 VDC                      |  | 30 VDC or less                                   |
| Load current    | 5 to 100mA   |    | 5 to 30mA                         |  | 200mA or less<br>150mA or less                   |
| Light           | LED (ON lighting)                                    |    |                                   | Red/green LED (ON lighting)                          | LED (ON lighting)<br>Red/green LED (ON lighting) |
| Leakage current | 1mA or less with 100 VAC<br>2mA or less with 200 VAC |    | 1mA or less                       | 1.2mA or less  | 10 μA or less                                    |

| Descriptions    | Reed 2 wire                    |           |           |                                     |             |   |              |              |   |
|-----------------|--------------------------------|-----------|-----------|-------------------------------------|-------------|---|--------------|--------------|---|
|                 | R0                             |           |           | R4                                  |             | R5  |              |              | R6  |
| Applications    | Relay, programmable controller |           |           | High capacity relay, solenoid valve |             | Programmable controller, relay, IC circuit (w/o light), serial connection |              |              | Programmable controller (with DC self hold) |
| Load voltage    | 12/24 VDC                      | 110 VAC   | 220 VAC   | 110 VAC                             | 220 VAC     | 12/24 VDC   | 110 VAC      | 220 VAC      | 24 VDC                                      |
| Load current    | 5 to 50mA                      | 7 to 20mA | 7 to 10mA | 20 to 200mA                         | 10 to 200mA | 50mA or less  | 20mA or less | 10mA or less | 5 to 50mA                                   |
| Light           | LED (ON lighting)              |           |           | Neon light (OFF lighting)           |             | None  |              |              | LED (ON lighting)                           |
| Leakage current | 0mA                            |           |           | 1mA or less                         |             | 0mA   |              |              | 0.1mA or less                               |

● Strong magnetic field proof

| Descriptions    | Reed 2 wire                    |           |
|-----------------|--------------------------------|-----------|
|                 | H0                             |           |
| Applications    | Relay, programmable controller |           |
| Load voltage    | 12/24 VDC                      | 110 VAC   |
| Load current    | 5 to 50mA                      | 7 to 20mA |
| Light           | LED ON lighting                |           |
| Leakage current | 10 μA or less                  |           |

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

### Cylinder weight

(Unit: kg)

| Bore size (mm) | Product weight when stroke length 0mm |                 |             |                  |                     |               | Weight per switch |              |        | Additional weight per cylinder stroke 100mm | Additional weight per booster stroke 10mm | F type additional weight |
|----------------|---------------------------------------|-----------------|-------------|------------------|---------------------|---------------|-------------------|--------------|--------|---|---|--------------------------|
|                | Basic type                            | Axial foot type | Flange type | Eye bracket type | Clevis bracket type | Trunnion type | R type            |              | H type |   |   |                          |
|                | (00)                                  | (LB)            | (FA/FB)     | (CA)             | (CB)                | (TA/TB/TC)    | Grommet           | Terminal box |        |   |   |                          |
| φ 40           | 1.84                                  | 1.99            | 2.21        | 2.19             | 2.19                | 2.27          | 0.08              | 0.07         | 0.10   | 0.43  | 0.08                                      | 0.16                     |
| φ 50           | 2.80                                  | 3.02            | 3.23        | 3.24             | 3.24                | 3.37          |                   |              |        | 0.45  | 0.10                                      | 0.28                     |
| φ 63           | 4.02                                  | 4.35            | 5.02        | 4.57             | 4.62                | 4.92          |                   |              |        | 0.60  | 0.13                                      | 0.30                     |
| φ 80           | 6.78                                  | 7.40            | 8.48        | 8.32             | 8.33                | 8.18          | 0.09              | 0.08         | 0.11   | 0.79  | 0.19                                      | 0.50                     |
| φ 100          | 9.85                                  | 9.93            | 12.35       | 12.00            | 11.96               | 12.45         |                   |              |        | 1.23  | 0.40                                      | 0.49                     |

Product weight formula

(E.g.) Product weight of SHC-LB-40H-200-20-R0-D-F

● Product weight when stroke length 0mm: 1.99Kg

● Additional weight of moving stroke 180mm:  $0.43 \times \frac{180}{100} = 0.77\text{Kg}$

● Additional weight of 20mm booster stroke:  $0.08 \times \frac{20}{10} = 0.16\text{Kg}$

● Additional weight of two switches:  $0.08 \times 2 = 0.16\text{Kg}$

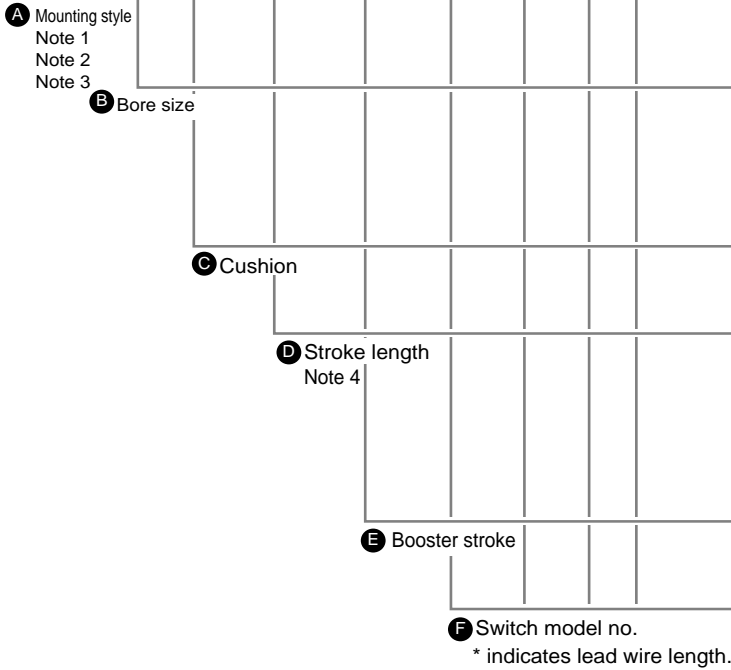
● F type additional weight: 0.16Kg

● Product weight:  $1.99\text{Kg} + 0.77\text{Kg} + 0.16\text{Kg} + 0.16\text{Kg} + 0.16\text{Kg} = 3.24\text{Kg}$



## How to order

- Without switch  
**SHC** - **LB** - **40** **H** - **100** - **20** - **S** **I**
- With R type switch  
**SHC** - **LB** - **40** **H** - **100** - **20** - **R0** - **R** - **S** **I**
- With strong magnetic field proof switch (HO, HOY)  
**SHC-L2** - **LB** - **40** **H** - **100** - **20** - **H0** - **R** - **S** **I**



### Note on model no. selection

- Note 1: For TA (rod end trunnion type), the position of booster section single control port, C/D are provided downside, viewed from the rod end.  
Refer to booster control port dimensions on page 2356.
- Note 2: For TA (rod end trunnion type), since trunnion installation position is placed at moving side stroke extended or booster side retracted, the position cannot be detected at cylinder switch moving side stroke extended or booster side retracted.
- Note 3: For TA (rod end trunnion type), TB (head end trunnion type), piping port position cannot be assigned on trunnion projecting side.
- Note 4: **For stroke length indicated in the "D" stroke length, indicate the full stroke length (moving stroke + booster stroke).**
- Note 5: Refer to page 2338 for minimum stroke length of type with switch.
- Note 6: L (bellows (maximum ambient temperature 100°C) and N (piston rod end thread length change) are custom orders.
- Note 7: Booster cylinder can be individually controlled.  
In this case, select option A (booster section single control port).
- Note 8: "I" and "Y" can not be selected at the same time.
- Note 9: The piping port position R and T cannot be selected for FA (rod side flange type).

### <Example of model number>

## SHC-LB-40H-100-20-R0-R-SI

Model no.: High power cylinder double acting double force type

- A** Mounting style : Axial foot type
- B** Bore size :  $\phi$  40mm
- C** Cushion : Head end cushion
- D** Stroke length : 100mm  
(Moving stroke 80mm + booster stroke 20mm)
- E** Booster stroke : 20mm
- F** Switch model no. : Reed R0 switch, lead wire 1m
- G** Switch quantity : One on rod end
- H** Option : Piping port position bottom from rod end
- I** Accessory : Rod eye

| Symbol                  | Descriptions                                     |
|-------------------------|--|
| <b>A Mounting style</b> |  |
| <b>00</b>               | Basic type                                       |
| <b>LB</b>               | Axial foot type                                  |
| <b>FA</b>               | Rod end flange type                              |
| <b>FB</b>               | Head end flange type                             |
| <b>CA</b>               | Eye bracket type                                 |
| <b>CB</b>               | Clevis bracket type (pin and snap ring attached) |
| <b>TA</b>               | Rod end trunnion type                            |
| <b>TB</b>               | Head end trunnion type                           |
| <b>TC</b>               | Center trunnion type                             |

| <b>B Bore size (mm)</b> |            |
|-------------------------|------------|
| <b>40</b>               | $\phi$ 40  |
| <b>50</b>               | $\phi$ 50  |
| <b>63</b>               | $\phi$ 63  |
| <b>80</b>               | $\phi$ 80  |
| <b>100</b>              | $\phi$ 100 |

| <b>C Cushion</b> |                  |
|------------------|------------------|
| <b>H</b>         | Head end cushion |
| <b>N</b>         | No cushion       |

| <b>D Stroke length (mm)</b> |                      |                      |
|-----------------------------|----------------------|----------------------|
| Bore size                   | Stroke length Note 5 | Custom stroke length |
| $\phi$ 40                   | <b>40 to 700</b>     | Per 5mm              |
| $\phi$ 50                   | <b>40 to 700</b>     |                      |
| $\phi$ 63                   | <b>40 to 800</b>     |                      |
| $\phi$ 80                   | <b>40 to 900</b>     |                      |
| $\phi$ 100                  | <b>40 to 1000</b>    |                      |

| <b>E Booster stroke (mm)</b> |    |
|------------------------------|----|
| <b>10</b>                    | 10 |
| <b>20</b>                    | 20 |

| <b>F Switch model no.</b> |                   |              |           |                             |           |
|---------------------------|-------------------|--------------|-----------|-----------------------------|-----------|
| Grommet Type              | Terminal box type |              | Contact   | Indicator                   | Lead wire |
|                           | Standard type     | Splash-proof |           |                             |           |
| <b>R1*</b>                | <b>R1B</b>        | <b>R1A</b>   | Proximity | 1 color indicator type      | 2-wire    |
| <b>R2*</b>                | <b>R2B</b>        | <b>R2A</b>   |           | 2 color indicator type      |           |
| <b>R2Y*</b>               | <b>R2YB</b>       | <b>R2YA</b>  |           | 1 color indicator type      |           |
| <b>R3*</b>                | <b>R3B</b>        | <b>R3A</b>   | Reed      | 2 color indicator type      | 3-wire    |
| <b>R3Y*</b>               | <b>R3YB</b>       | <b>R3YA</b>  |           | 1 color indicator type      |           |
| <b>R0*</b>                | <b>R0B</b>        | <b>R0A</b>   |           | Without indicator light     |           |
| <b>R4*</b>                | <b>R4B</b>        | <b>R4A</b>   | Reed      | 1 color indicator type      | 2-wire    |
| <b>R5*</b>                | <b>R5B</b>        | <b>R5A</b>   |           | 1 color indicator type      |           |
| <b>R6*</b>                | <b>R6B</b>        | <b>R6A</b>   |           | Strong magnetic field proof |           |
| <b>HO*</b>                | -                 | -            |           |                             |           |

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

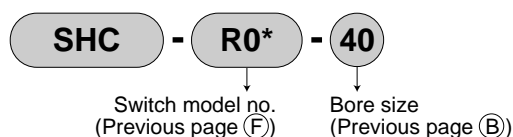
| <b>G Switch quantity</b> |               |
|--------------------------|---------------|
| <b>R</b>                 | 1 on rod end  |
| <b>H</b>                 | 1 on head end |
| <b>D</b>                 | 2             |
| <b>T</b>                 | 3             |
| <b>4</b>                 | 4             |
| <b>5</b>                 | 5             |

| <b>H Option</b> |  |              |                    |
|-----------------|--|--------------|--------------------|
|                 |  | Max. ambient | Instantaneous max. |
| <b>J</b>        | Bellows  | 100°C        | 200°C              |
| <b>L</b>        | Bellows  | 250°C        | 400°C              |
| <b>Blank</b>    | Rod end form, male thread type (standard)        |              |                    |
| <b>F</b>        | Rod end form, flange type                        |              |                    |
| <b>Blank</b>    | Piping port position/top from rod end (standard) |              |                    |
| <b>R</b>        | Piping port position/right from rod end          |              |                    |
| <b>S</b>        | Piping port position/bottom from rod end         |              |                    |
| <b>T</b>        | Piping port position/left from rod end           |              |                    |
| <b>G1</b>       | Metal scraper                                    |              |                    |
| <b>P6</b>       | Copper and PTFE free                             |              |                    |
| <b>A</b>        | Booster section single control port              |              |                    |

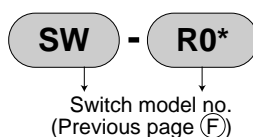
| <b>I Accessory</b> |  |
|--------------------|--|
| <b>I</b>           | Rod eye  |
| <b>Y</b>           | Rod clevis (pin and snap ring attached)                          |
| <b>B11</b>         | Eye bracket (for clevis)   |
| <b>B21</b>         | Eye bracket (for clevis)   |
| <b>B12</b>         | Eye bracket (for rod eye/clevis)                                 |
| <b>B22</b>         | Clevis bracket (for rod eye/clevis) (pin and snap ring attached) |

### How to order R type switch

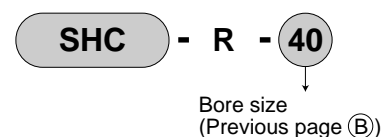
A) Switch body + bracket



B) Only switch body

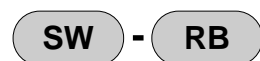


C) Mounting bracket

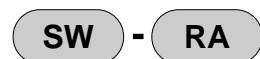


● Only terminal box

· R \* B

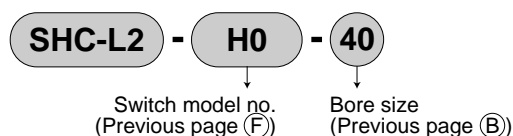


· R \* A

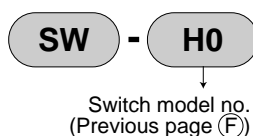


### How to order H type switch

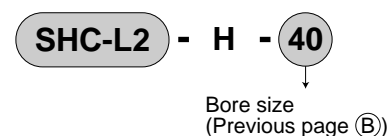
A) Switch body + mounting bracket



B) Only switch body



C) Mounting bracket



### How to order mounting bracket

| Bore size (mm)       | φ 40      | φ 50      | φ 63      | φ 80      | φ 100      |
|----------------------|-----------|-----------|-----------|-----------|------------|
| Mounting bracket     |           |           |           |           |            |
| Foot (LB)            | SHC-LB-40 | SHC-LB-50 | SHC-LB-63 | SHC-LB-80 | SHC-LB-100 |
| Rod end flange (FA)  | SHC-FA-40 | SHC-FA-50 | SHC-FA-63 | SHC-FA-80 | SHC-FA-100 |
| Head end flange (FB) | SHC-FB-40 | SHC-FB-50 | SHC-FB-63 | SHC-FB-80 | SHC-FB-100 |
| Eye (CA)             | SHC-CA-40 | SHC-CA-50 | SHC-CA-63 | SHC-CA-80 | SHC-CA-100 |
| Clevis (CB)          | SHC-CB-40 | SHC-CB-50 | SHC-CB-63 | SHC-CB-80 | SHC-CB-100 |

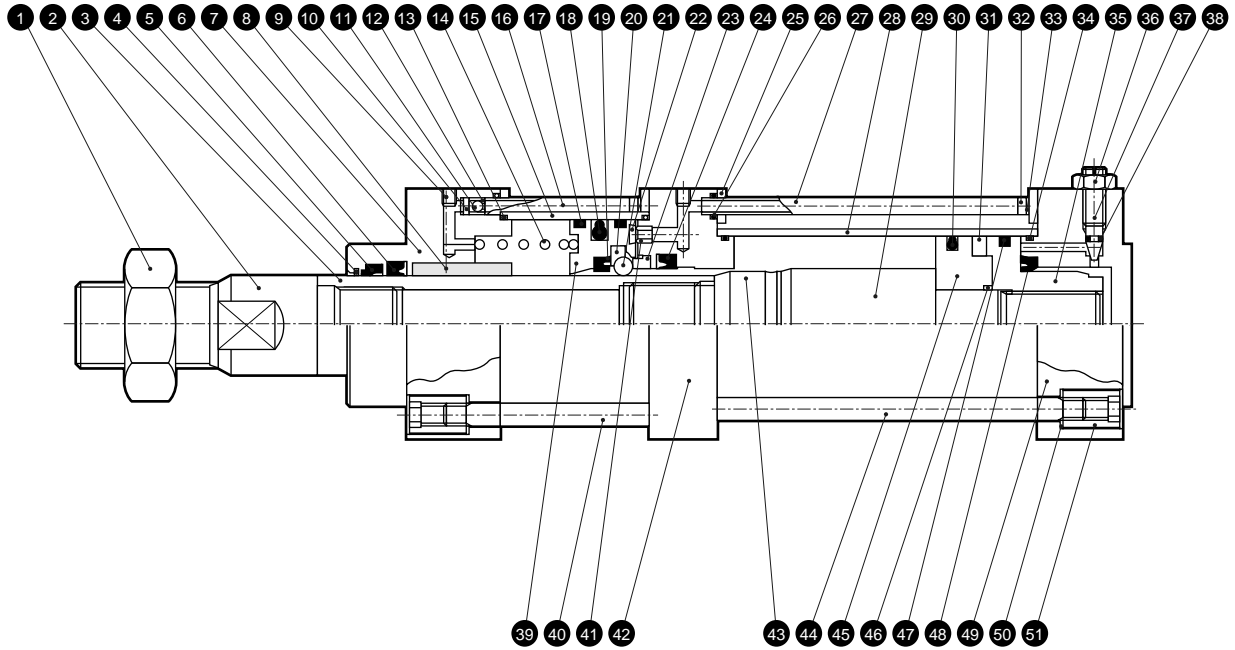
Note 1: The foot type mounting bracket is supplied as a two-piece set.

|            |
|------------|
| 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        |
| <b>SHC</b> |
| GLC        |

Ending

High power cylinder  
Special type

## Internal structure and parts list

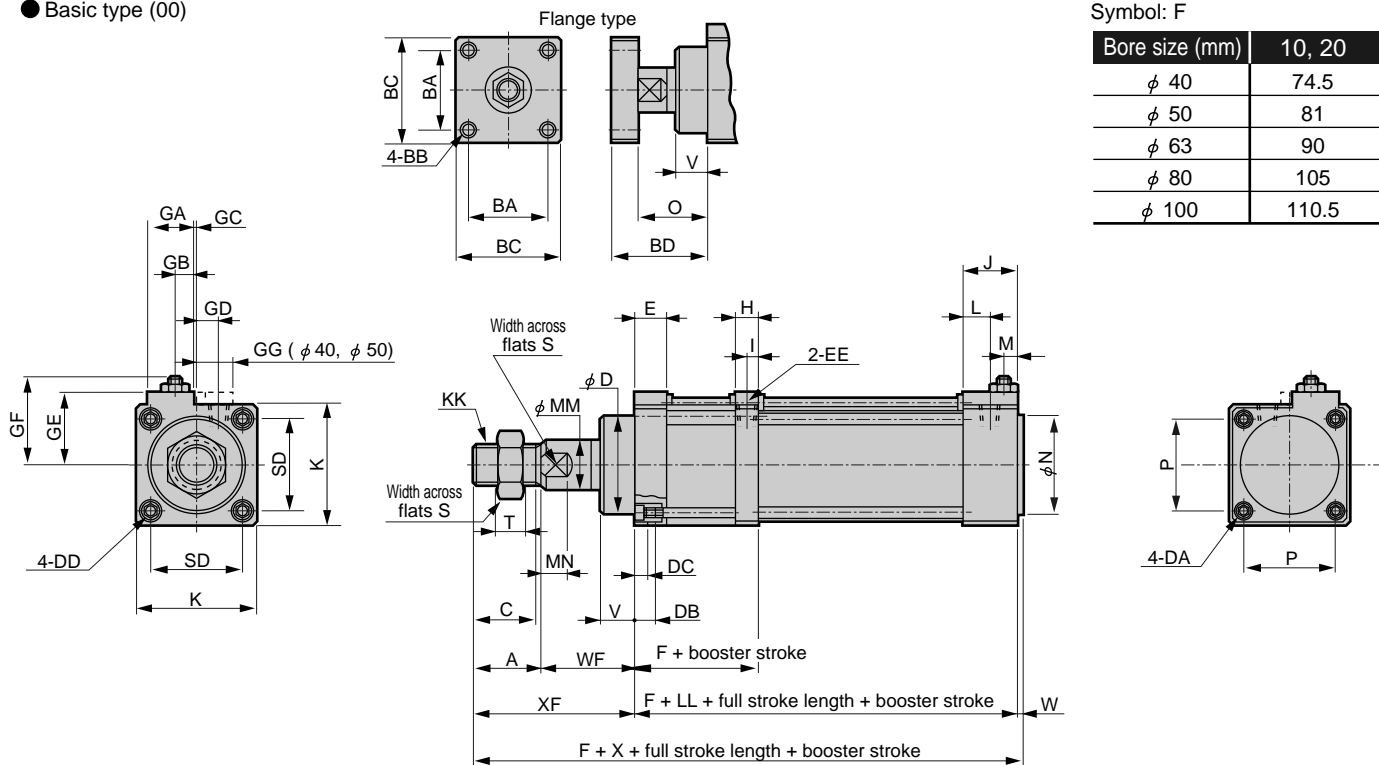


| No. | Parts name               | Material             | Remarks         | No. | Parts name               | Material        | Remarks |
|-----|--------------------------|----------------------|-----------------|-----|--------------------------|-----------------|---------|
| 1   | Rod nut                  | Steel                |                 | 27  | Pass-pipe (2)            | Stainless steel |         |
| 2   | Cap                      | Steel                |                 | 28  | Cylinder tube            | Aluminum alloy  |         |
| 3   | Piston rod               | Steel                |                 | 29  | Connection piston        | Steel           |         |
| 4   | Metal scraper            | Copper alloy         | Only G1 type    | 30  | Piston packing seal (2)  | Nitrile rubber  |         |
| 5   | Dust wiper               | Nitrile rubber       |                 | 31  | Magnet                   | Plastic         |         |
| 6   | Rod packing seal (1)     | Nitrile rubber       |                 | 32  | Hexagon socket bolt      | Alloy steel     |         |
| 7   | Rod cover                | Aluminum alloy       |                 | 33  | Spring washer            | Steel           |         |
| 8   | Bush                     | Copper alloy casting | Oil impregnated | 34  | Cylinder gasket (2)      | Nitrile rubber  |         |
| 9   | Hexagon socket set screw | Alloy steel          |                 | 35  | Piston (H)               | Aluminum alloy  |         |
| 10  | Spring pin               | Steel                |                 | 36  | Needle nut               | Copper alloy    |         |
| 11  | Check ball               | Alloy steel          |                 | 37  | Cushion needle           | Copper alloy    |         |
| 12  | Fixed orifice            | Copper alloy         |                 | 38  | Needle gasket            | Nitrile rubber  |         |
| 13  | Cylinder gasket (1)      | Nitrile rubber       |                 | 39  | Booster piston           | Alloy steel     |         |
| 14  | Compression spring       | Steel                |                 | 40  | Tie rod (1)              | Steel           |         |
| 15  | Booster pipe             | Aluminum alloy       |                 | 41  | Valve seat               | Copper alloy    |         |
| 16  | Pass-pipe (1)            | Stainless steel      |                 | 42  | Intermediate guard       | Aluminum alloy  |         |
| 17  | Wear ring (1)            | Polyacetal           |                 | 43  | Connection collar        | Alloy steel     |         |
| 18  | Piston packing seal (1)  | Nitrile rubber       |                 | 44  | Tie rod (2)              | Steel           |         |
| 19  | Cushion packing seal (1) | Nitrile rubber       |                 | 45  | Piston (R)               | Aluminum alloy  |         |
| 20  | Steel ball bearing       | Nitrile rubber       |                 | 46  | Piston gasket            | Nitrile rubber  |         |
| 21  | Steel ball               | Alloy steel          |                 | 47  | Wear ring (2)            | Acetar resin    |         |
| 22  | Sealant cushion          | Nitrile rubber       |                 | 48  | Cushion packing seal (2) | Nitrile rubber  |         |
| 23  | Paul stopper             | Steel                |                 | 49  | Head cover               | Aluminum alloy  |         |
| 24  | Rod packing seal (2)     | Nitrile rubber       |                 | 50  | Conical spring washer    | Steel           |         |
| 25  | Packing gland            | Steel                |                 | 51  | Round nut                | Steel           |         |
| 26  | Pass-pipe gasket         | Nitrile rubber       |                 |     |                          |                 |         |

Note: This product can not be disassembled.

### Dimensions

● Basic type (00)



Symbol: F

| Bore size (mm) | 10, 20 |
|----------------|--------|
| φ 40           | 74.5   |
| φ 50           | 81     |
| φ 63           | 90     |
| φ 80           | 105    |
| φ 100          | 110.5  |

Note 1: GG dimensions apply to 40, 50 mm bore.

Note 2: The value of symbol F may vary depending on booster stroke. Refer to the right above table.

Note 3: Refer to page 2356 for the dimension with bellows.

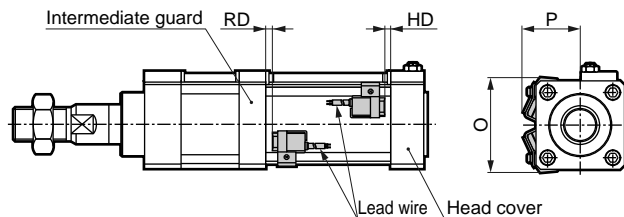
Note 4: Refer to page 2357 for the dimensions of the accessory.

| Bore size (mm) | Basic type (00) basic dimensions |    |    |     |     |      |    |        |     |    |     |     |      |       |    |      |    |     |      |      |    |
|----------------|----------------------------------|----|----|-----|-----|------|----|--------|-----|----|-----|-----|------|-------|----|------|----|-----|------|------|----|
|                | A                                | B  | BA | BB  | BC  | BD   | C  | D      | DA  | DB | DC  | DD  | E    | EE    | GA | GB   | GC | GD  | GE   | GF   | H  |
| φ 40           | 36                               | 32 | 32 | M8  | 50  | 68   | 34 | φ 43   | M8  | 9  | 3.5 | M6  | 25   | Rc1/8 | 26 | 4    | -  | 8.5 | 36.5 | 47.5 | 18 |
| φ 50           | 45                               | 41 | 40 | M10 | 60  | 75   | 43 | φ 51   | M8  | 9  | 3.5 | M6  | 26.5 | Rc1/4 | 30 | 2    | -  | 10  | 43   | 53.5 | 22 |
| φ 63           | 50                               | 46 | 48 | M12 | 70  | 74.5 | 47 | φ 57   | M8  | 12 | 4   | M8  | 33   | Rc1/4 | 32 | 9    | 1  | 13  | 48   | 58   | 24 |
| φ 80           | 56                               | 55 | 54 | M14 | 80  | 89   | 53 | φ 62.5 | M12 | 12 | 4   | M10 | 34   | Rc3/8 | 38 | 8    | 1  | 16  | 59   | 69   | 28 |
| φ 100          | 72                               | 70 | 70 | M16 | 100 | 100  | 69 | φ 75   | M12 | 15 | 5   | M12 | 37   | Rc3/8 | 41 | 12.5 | 5  | 20  | 71   | 81   | 26 |

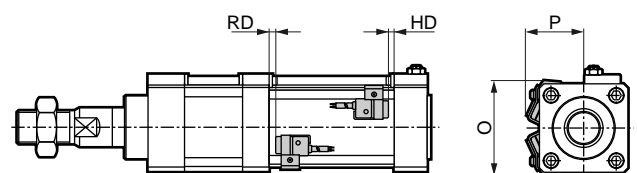
| Bore size (mm) | Basic dimensions |    |     |           |    |      |    |      |    |      |    |      |    |    |    |    |   |    |       |     |    |
|----------------|------------------|----|-----|-----------|----|------|----|------|----|------|----|------|----|----|----|----|---|----|-------|-----|----|
|                | I                | J  | K   | KK        | L  | LL   | M  | MM   | MN | N    | O  | P    | S  | SD | T  | V  | W | WF | X     | XF  | GG |
| φ 40           | 8                | 26 | 57  | M22 x 1.5 | 7  | 65.5 | 8  | φ 25 | 14 | φ 31 | 52 | 40.5 | 23 | 44 | 13 | 24 | 2 | 48 | 151.5 | 84  | 20 |
| φ 50           | 10.5             | 32 | 69  | M26 x 1.5 | 9  | 73.5 | 9  | φ 30 | 17 | φ 38 | 54 | 48   | 26 | 56 | 16 | 24 | 2 | 53 | 173.5 | 98  | 20 |
| φ 63           | 11               | 30 | 80  | M30 x 1.5 | 15 | 73   | 10 | φ 35 | 20 | φ 38 | 53 | 59   | 31 | 63 | 18 | 21 | 3 | 63 | 189   | 113 | -  |
| φ 80           | 13               | 34 | 98  | M36 x 1.5 | 17 | 87.5 | 11 | φ 40 | 26 | φ 43 | 64 | 74   | 36 | 78 | 21 | 24 | 2 | 70 | 215.5 | 126 | -  |
| φ 100          | 14               | 37 | 118 | M45 x 1.5 | 22 | 96   | 15 | φ 50 | 26 | φ 51 | 71 | 90   | 46 | 96 | 27 | 30 | 2 | 87 | 257   | 159 | -  |

● R type switch installation position



| Bore size (mm) | RD  | HD   | O   | P  |
|----------------|-----|------|-----|----|
| φ 40           | 6   | 4    | 66  | 42 |
| φ 50           | 4.5 | 7    | 73  | 44 |
| φ 63           | 7   | 6    | 84  | 47 |
| φ 80           | 12  | 11.5 | 104 | 58 |
| φ 100          | 12  | 16   | 120 | 64 |

● H type switch installation position



| Bore size (mm) | RD   | HD   | O   | P  |
|----------------|------|------|-----|----|
| φ 40           | 4.5  | 2.5  | 66  | 42 |
| φ 50           | 3    | 5.5  | 73  | 44 |
| φ 63           | 5.5  | 4.5  | 84  | 47 |
| φ 80           | 10.5 | 10   | 104 | 58 |
| φ 100          | 10.5 | 14.5 | 120 | 64 |

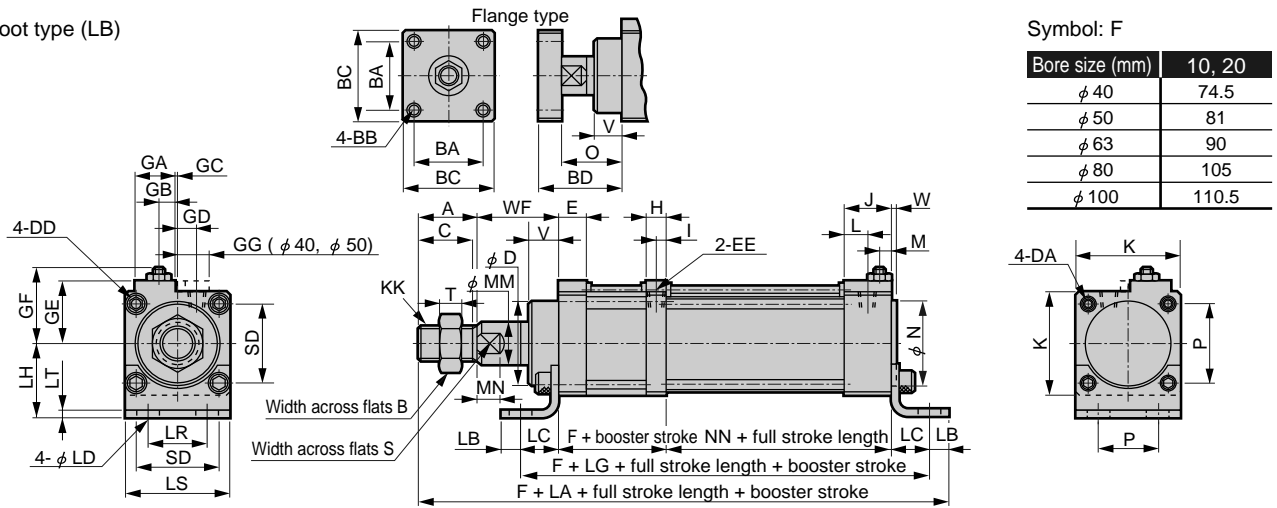
SCP\*2  
CMK2  
CMA2  
SCM  
SCG  
SCA2  
SCS  
CKV2  
CA/OV2  
SSD  
CAT  
MDC2  
MVC  
SMD2  
MSD\*  
FC\*  
STK  
ULK\*  
JSK/M2  
JSG  
JSC3  
USSD  
USC  
JSB3  
LMB  
STG  
STS/L  
LCS  
LCG  
LCM  
LCT  
LCY  
STR2  
UCA2  
HCM  
HCA  
SRL2  
SRG  
SRM  
SRT  
MRL2  
MRG2  
SM-25  
CAC3  
UCAC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

Ending

High power cylinder  
Special type

## Dimensions

### ● Axial foot type (LB)



Note 1: GG dimensions apply to 40, 50 mm bore.

Note 2: The value of symbol F may vary depending on booster stroke. Refer to the right above table.

Note 3: Refer to page 2356 for dimensions with bellows.

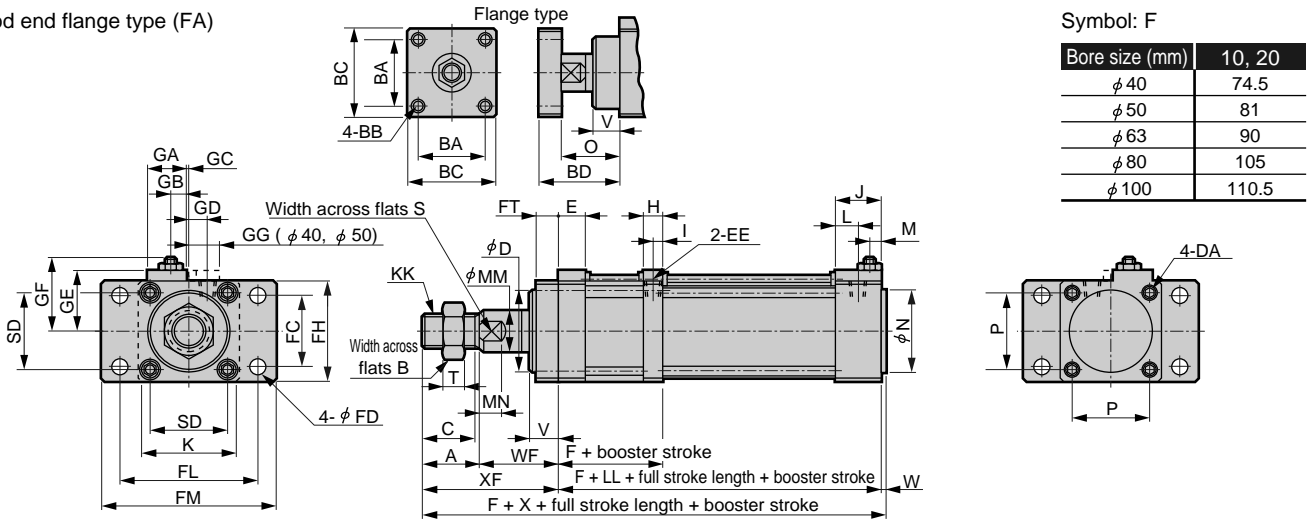
Note 4: Refer to page 2357 for the dimensions of the accessory.

| Bore size (mm) | Axial foot type (LB) basic dimensions |    |    |     |     |      |    |       |     |     |      |       |    |      |    |     |      |      |    |      |    |     |
|----------------|---------------------------------------|----|----|-----|-----|------|----|-------|-----|-----|------|-------|----|------|----|-----|------|------|----|------|----|-----|
|                | A                                     | B  | BA | BB  | BC  | BD   | C  | D     | DA  | DD  | E    | EE    | GA | GB   | GC | GD  | GE   | GF   | H  | I    | J  | K   |
| φ40            | 36                                    | 32 | 32 | M8  | 50  | 68   | 34 | φ43   | M8  | M6  | 25   | Rc1/8 | 26 | 4    | -  | 8.5 | 36.5 | 47.5 | 18 | 8    | 26 | 57  |
| φ50            | 45                                    | 41 | 40 | M10 | 60  | 75   | 43 | φ51   | M8  | M6  | 26.5 | Rc1/4 | 30 | 2    | -  | 10  | 43   | 55.5 | 22 | 10.5 | 32 | 69  |
| φ63            | 50                                    | 46 | 48 | M12 | 70  | 74.5 | 47 | φ57   | M8  | M8  | 33   | Rc1/4 | 32 | 9    | 1  | 13  | 48   | 58   | 24 | 11   | 30 | 80  |
| φ80            | 56                                    | 55 | 54 | M14 | 80  | 89   | 53 | φ62.5 | M12 | M10 | 34   | Rc3/8 | 38 | 8    | 1  | 16  | 59   | 69   | 28 | 13   | 34 | 98  |
| φ100           | 72                                    | 70 | 70 | M16 | 100 | 100  | 69 | φ75   | M12 | M12 | 37   | Rc3/8 | 41 | 12.5 | 5  | 20  | 71   | 81   | 26 | 14   | 37 | 118 |

| Bore size (mm) | Axial foot type (LB) accessory dimensions |    |       |    |      |    |       |    |    |     |     |    |     |    |     |      |    |      |    |    |    |    |   |    |    |
|----------------|---|----|-------|----|------|----|-------|----|----|-----|-----|----|-----|----|-----|------|----|------|----|----|----|----|---|----|----|
|                | KK  | L  | LA    | LB | LC   | LD | LG    | LH | LR | LS  | LT  | M  | MM  | MN | N   | NN   | O  | P    | S  | SD | T  | V  | W | WF | GG |
| φ40            | M22 x 1.5                                 | 7  | 179   | 10 | 19.5 | 9  | 104.5 | 40 | 40 | 57  | 3.2 | 8  | φ25 | 14 | φ31 | 65.5 | 52 | 40.5 | 23 | 44 | 13 | 24 | 2 | 48 | 20 |
| φ50            | M26 x 1.5                                 | 9  | 205.5 | 12 | 22   | 9  | 117.5 | 40 | 46 | 69  | 4.5 | 9  | φ30 | 17 | φ38 | 73.5 | 54 | 48   | 26 | 56 | 16 | 24 | 2 | 53 | 20 |
| φ63            | M30 x 1.5                                 | 15 | 228   | 12 | 30   | 11 | 133   | 50 | 60 | 80  | 4.5 | 10 | φ35 | 20 | φ38 | 73   | 53 | 59   | 31 | 63 | 18 | 21 | 3 | 63 | -  |
| φ80            | M36 x 1.5                                 | 17 | 264.5 | 14 | 37   | 14 | 161.5 | 60 | 74 | 98  | 6.0 | 11 | φ40 | 26 | φ43 | 87.5 | 64 | 74   | 36 | 78 | 21 | 24 | 2 | 70 | -  |
| φ100           | M45 x 1.5                                 | 22 | 307   | 21 | 31   | 14 | 158   | 67 | 80 | 118 | 6.0 | 15 | φ50 | 26 | φ51 | 96   | 71 | 90   | 46 | 96 | 27 | 30 | 2 | 87 | -  |

### ● Rod end flange type (FA)



Note 1: GG dimensions apply to 40, 50 mm bore.

Note 2: The value of symbol F may vary depending on booster stroke. Refer to the right above table.

Note 3: Refer to page 2356 for dimensions with bellows.

Note 4: Refer to page 2357 for the dimensions of the accessory.

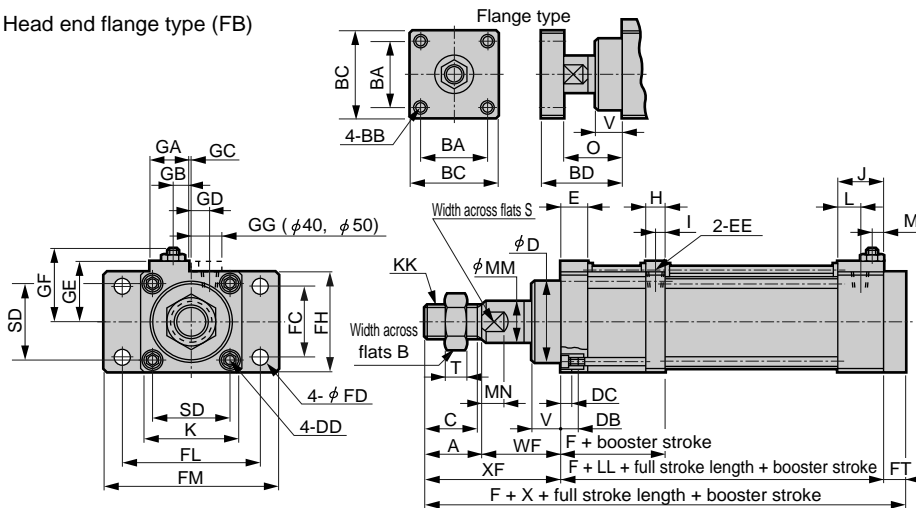
| Bore size (mm) | Rod end flange type (FA) basic dimensions |    |    |     |     |      |    |       |     |      |       |    |     |     |     |     |    |    |      |    |     |
|----------------|---|----|----|-----|-----|------|----|-------|-----|------|-------|----|-----|-----|-----|-----|----|----|------|----|-----|
|                | A   | B  | BA | BB  | BC  | BD   | C  | D     | DA  | E    | EE    | FC | FD  | FH  | FL  | FM  | FT | GA | GB   | GC | GD  |
| φ40            | 36  | 32 | 32 | M8  | 50  | 68   | 34 | φ43   | M8  | 25   | Rc1/8 | 40 | φ9  | 57  | 80  | 100 | 12 | 26 | 4    | -  | 8.5 |
| φ50            | 45  | 41 | 40 | M10 | 60  | 75   | 43 | φ51   | M8  | 26.5 | Rc1/4 | 47 | φ9  | 69  | 85  | 108 | 12 | 30 | 2    | -  | 10  |
| φ63            | 50  | 46 | 48 | M12 | 70  | 74.5 | 47 | φ57   | M8  | 33   | Rc1/4 | 60 | φ11 | 80  | 106 | 130 | 16 | 32 | 9    | 1  | 13  |
| φ80            | 56  | 55 | 54 | M14 | 80  | 89   | 53 | φ62.5 | M12 | 34   | Rc3/8 | 74 | φ14 | 98  | 125 | 153 | 19 | 38 | 8    | 1  | 16  |
| φ100           | 72  | 70 | 70 | M16 | 100 | 100  | 69 | φ75   | M12 | 37   | Rc3/8 | 88 | φ14 | 118 | 144 | 180 | 19 | 41 | 12.5 | 5  | 20  |

| Bore size (mm) | Rod end flange type (FA) accessory dimensions |      |    |      |    |     |           |    |      |    |     |    |     |    |      |    |    |    |    |   |    |       |     |    |
|----------------|---|------|----|------|----|-----|-----------|----|------|----|-----|----|-----|----|------|----|----|----|----|---|----|-------|-----|----|
|                | GE  | GF   | H  | I    | J  | K   | KK        | L  | LL   | M  | MM  | MN | N   | O  | P    | S  | SD | T  | V  | W | WF | X     | XF  | GG |
| φ40            | 36.5  | 47.5 | 18 | 8    | 26 | 57  | M22 x 1.5 | 7  | 65.5 | 8  | φ25 | 14 | φ31 | 52 | 40.5 | 23 | 44 | 13 | 24 | 2 | 48 | 151.5 | 84  | 20 |
| φ50            | 43  | 55.5 | 22 | 10.5 | 32 | 69  | M26 x 1.5 | 9  | 73.5 | 9  | φ30 | 17 | φ38 | 54 | 48   | 26 | 56 | 16 | 24 | 2 | 53 | 173.5 | 98  | 20 |
| φ63            | 48  | 58   | 24 | 11   | 30 | 80  | M30 x 1.5 | 15 | 73   | 10 | φ35 | 20 | φ38 | 53 | 59   | 31 | 63 | 18 | 21 | 3 | 63 | 189   | 113 | -  |
| φ80            | 59  | 69   | 28 | 13   | 34 | 98  | M36 x 1.5 | 17 | 87.5 | 11 | φ40 | 26 | φ43 | 64 | 74   | 36 | 78 | 21 | 24 | 2 | 70 | 215.5 | 126 | -  |
| φ100           | 71  | 81   | 26 | 14   | 37 | 118 | M45 x 1.5 | 22 | 96   | 15 | φ50 | 26 | φ51 | 71 | 90   | 46 | 96 | 27 | 30 | 2 | 87 | 257   | 159 | -  |

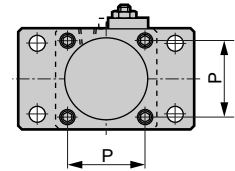
### Dimensions

#### ● Head end flange type (FB)



Symbol: F

| Bore size (mm) | 10, 20 |
|----------------|--------|
| φ 40           | 74.5   |
| φ 50           | 81     |
| φ 63           | 90     |
| φ 80           | 105    |
| φ 100          | 110.5  |



Note 1: GG dimensions apply to 40, 50 mm bore.

Note 2: The value of symbol F may vary depending on booster stroke. Refer to the right above table.

Note 3: Refer to page 2356 for dimensions with bellows.

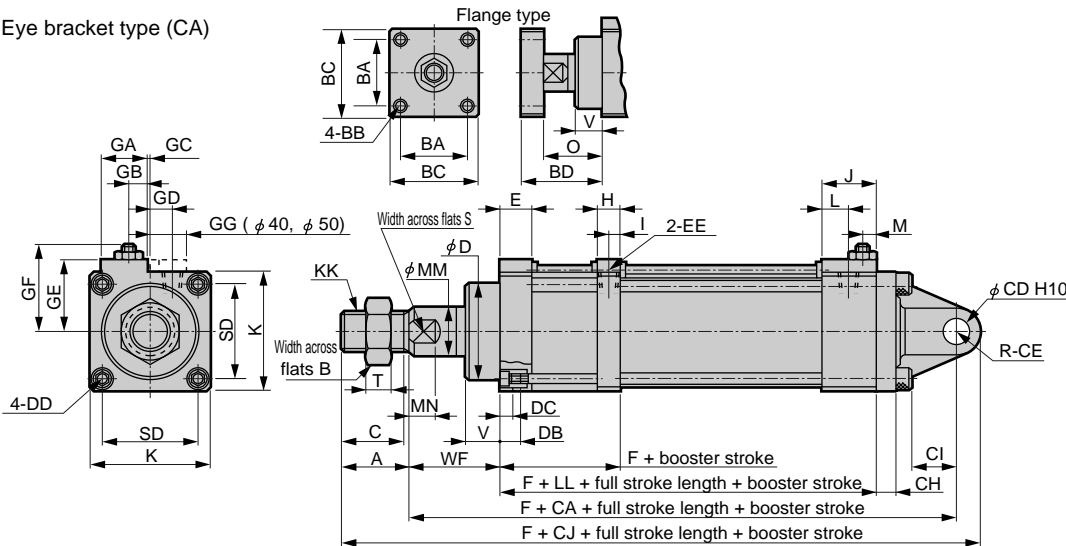
Note 4: Refer to Page 2357 on dimensions of an accessory.

| Bore size (mm) | Head end flange type (FB) basic dimensions |    |    |     |     |      |    |       |    |     |     |      |       |    |     |     |     |     |    |    |      |    |     |
|----------------|--|----|----|-----|-----|------|----|-------|----|-----|-----|------|-------|----|-----|-----|-----|-----|----|----|------|----|-----|
|                | A  | B  | BA | BB  | BC  | BD   | C  | D     | DB | DC  | DD  | E    | EE    | FC | FD  | FH  | FL  | FM  | FT | GA | GB   | GC | GD  |
| φ 40           | 36   | 32 | 32 | M8  | 50  | 68   | 34 | φ43   | 9  | 3.5 | M6  | 25   | Rc1/8 | 40 | φ9  | 57  | 80  | 100 | 12 | 26 | 4    | -  | 8.5 |
| φ 50           | 45   | 41 | 40 | M10 | 60  | 75   | 43 | φ51   | 9  | 3.5 | M6  | 26.5 | Rc1/4 | 47 | φ9  | 69  | 85  | 108 | 12 | 30 | 2    | -  | 10  |
| φ 63           | 50   | 46 | 48 | M12 | 70  | 74.5 | 47 | φ57   | 12 | 4   | M8  | 33   | Rc1/4 | 60 | φ11 | 80  | 106 | 130 | 16 | 32 | 9    | 1  | 13  |
| φ 80           | 56   | 55 | 54 | M14 | 80  | 89   | 53 | φ62.5 | 12 | 4   | M10 | 34   | Rc3/8 | 74 | φ14 | 98  | 125 | 153 | 19 | 38 | 8    | 1  | 16  |
| φ 100          | 72   | 70 | 70 | M16 | 100 | 100  | 69 | φ75   | 15 | 5   | M12 | 37   | Rc3/8 | 88 | φ14 | 118 | 144 | 180 | 19 | 41 | 12.5 | 5  | 20  |

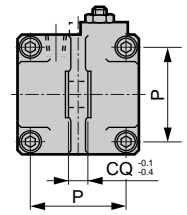
| Bore size (mm) | Head end flange type (FB) basic dimensions |      |    |      |    |     |           |    |      |    |     |    |    |      |    |    |    |    |    |       |     |    |
|----------------|--|------|----|------|----|-----|-----------|----|------|----|-----|----|----|------|----|----|----|----|----|-------|-----|----|
|                | GE   | GF   | H  | I    | J  | K   | KK        | L  | LL   | M  | MM  | MN | O  | P    | S  | SD | T  | V  | WF | X     | XF  | GG |
| φ 40           | 36.5                                       | 47.5 | 18 | 8    | 26 | 57  | M22 x 1.5 | 7  | 65.5 | 8  | φ25 | 14 | 52 | 40.5 | 23 | 44 | 13 | 24 | 48 | 161.5 | 84  | 20 |
| φ 50           | 43   | 55.5 | 22 | 10.5 | 32 | 69  | M26 x 1.5 | 9  | 73.5 | 9  | φ30 | 17 | 54 | 48   | 26 | 56 | 16 | 24 | 53 | 183.5 | 98  | 20 |
| φ 63           | 48   | 58   | 24 | 11   | 30 | 80  | M30 x 1.5 | 15 | 73   | 10 | φ35 | 20 | 53 | 59   | 31 | 63 | 18 | 21 | 63 | 202   | 113 | -  |
| φ 80           | 59   | 69   | 28 | 13   | 34 | 98  | M36 x 1.5 | 17 | 87.5 | 11 | φ40 | 26 | 64 | 74   | 36 | 78 | 21 | 24 | 70 | 232.5 | 126 | -  |
| φ 100          | 71   | 81   | 26 | 14   | 37 | 118 | M45 x 1.5 | 22 | 96   | 15 | φ50 | 26 | 71 | 90   | 46 | 96 | 27 | 30 | 87 | 274   | 159 | -  |

#### ● Eye bracket type (CA)



Symbol: F

| Bore size (mm) | 10, 20 |
|----------------|--------|
| φ 40           | 74.5   |
| φ 50           | 81     |
| φ 63           | 90     |
| φ 80           | 105    |
| φ 100          | 110.5  |



Note 1: GG dimensions apply to 40, 50 mm bore.

Note 2: The value of symbol F may vary depending on booster stroke. Refer to the right above table.

Note 3: Refer to page 2356 for dimensions with bellows.

Note 4: Refer to page 2357 for the dimensions of the accessory.

| Bore size (mm) | Eye bracket type (CA) basic dimensions |    |    |     |     |      |    |       |    |    |    |    |       |    |       |    |     |     |      |       |    |
|----------------|--|----|----|-----|-----|------|----|-------|----|----|----|----|-------|----|-------|----|-----|-----|------|-------|----|
|                | A                                      | B  | BA | BB  | BC  | BD   | C  | CA    | CD | CE | CH | CI | CJ    | CQ | D     | DB | DC  | DD  | E    | EE    | GA |
| φ 40           | 36                                     | 32 | 32 | M8  | 50  | 68   | 34 | 145.5 | 12 | 12 | 10 | 18 | 193.5 | 18 | φ43   | 9  | 3.5 | M6  | 25   | Rc1/8 | 26 |
| φ 50           | 45                                     | 41 | 40 | M10 | 60  | 75   | 43 | 158.5 | 12 | 12 | 10 | 18 | 215.5 | 18 | φ51   | 9  | 3.5 | M6  | 26.5 | Rc1/4 | 30 |
| φ 63           | 50                                     | 46 | 48 | M12 | 70  | 74.5 | 47 | 173   | 14 | 16 | 10 | 24 | 239   | 20 | φ57   | 12 | 4   | M8  | 33   | Rc1/4 | 32 |
| φ 80           | 56                                     | 55 | 54 | M14 | 80  | 89   | 53 | 209.5 | 20 | 20 | 14 | 30 | 285.5 | 28 | φ62.5 | 12 | 4   | M10 | 34   | Rc3/8 | 38 |
| φ 100          | 72                                     | 70 | 70 | M16 | 100 | 100  | 69 | 235   | 20 | 20 | 16 | 30 | 327   | 28 | φ75   | 15 | 5   | M12 | 37   | Rc3/8 | 41 |

| Bore size (mm) | Eye bracket type (CA) basic dimensions |    |     |      |      |    |      |    |     |           |    |      |    |     |    |    |      |    |    |    |    |    |    |
|----------------|--|----|-----|------|------|----|------|----|-----|-----------|----|------|----|-----|----|----|------|----|----|----|----|----|----|
|                | GB                                     | GC | GD  | GE   | GF   | H  | I    | J  | K   | KK        | L  | LL   | M  | MM  | MN | O  | P    | S  | SD | T  | V  | WF | GG |
| φ 40           | 4                                      | -  | 8.5 | 36.5 | 47.5 | 18 | 8    | 26 | 57  | M22 x 1.5 | 7  | 65.5 | 8  | φ25 | 14 | 52 | 40.5 | 23 | 44 | 13 | 24 | 48 | 20 |
| φ 50           | 2                                      | -  | 10  | 43   | 55.5 | 22 | 10.5 | 32 | 69  | M26 x 1.5 | 9  | 73.5 | 9  | φ30 | 17 | 54 | 48   | 26 | 56 | 16 | 24 | 53 | 20 |
| φ 63           | 9                                      | 1  | 13  | 48   | 58   | 24 | 11   | 30 | 80  | M30 x 1.5 | 15 | 73   | 10 | φ35 | 20 | 53 | 59   | 31 | 63 | 18 | 21 | 63 | -  |
| φ 80           | 8                                      | 1  | 16  | 59   | 69   | 28 | 13   | 34 | 98  | M36 x 1.5 | 17 | 87.5 | 11 | φ40 | 26 | 64 | 74   | 36 | 78 | 21 | 24 | 70 | -  |
| φ 100          | 12.5                                   | 5  | 20  | 71   | 81   | 26 | 14   | 37 | 118 | M45 x 1.5 | 22 | 96   | 15 | φ50 | 26 | 71 | 90   | 46 | 96 | 27 | 30 | 87 | -  |

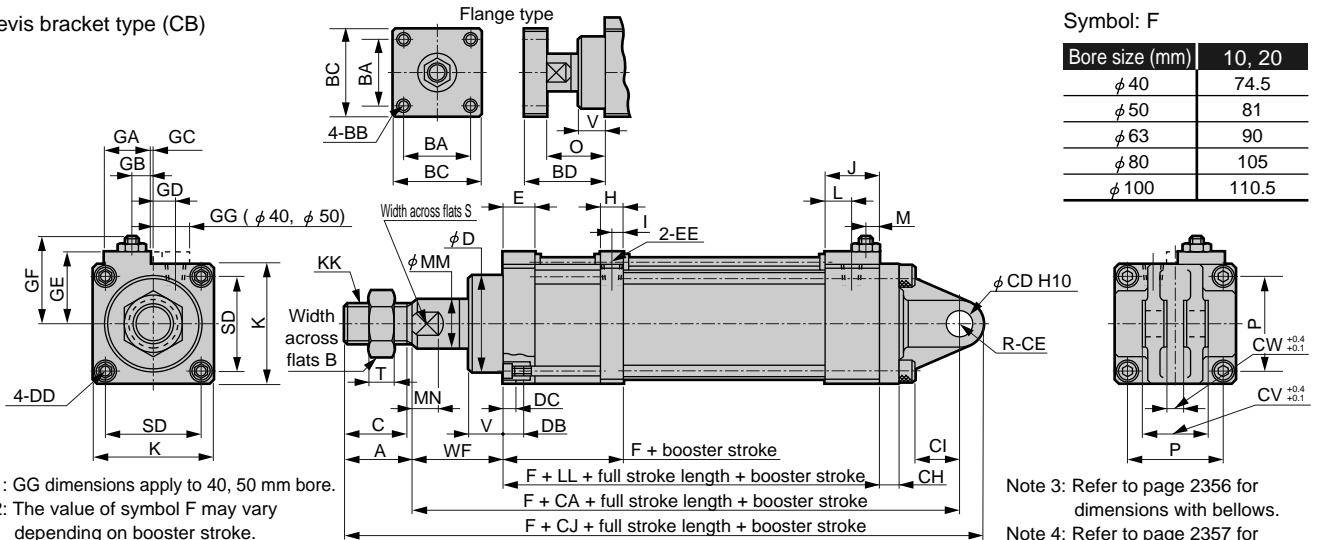
- SCP\*2
- CMK2
- CMA2
- SCM
- SCG
- SCA2
- SCS
- CKV2
- CA/OV2
- SSD
- CAT
- MDC2
- MVC
- SMD2
- MSD\*
- FC\*
- STK
- ULK\*
- JSK/M2
- JSG
- JSC3
- USSD
- USC
- JSB3
- LMB
- STG
- STS/L
- LCS
- LCG
- LCM
- LCT
- LCY
- STR2
- UCA2
- HCM
- HCA
- SRL2
- SRG
- SRM
- SRT
- MRL2
- MRG2
- SM-25
- CAC3
- UCAC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

Ending

High power cylinder  
Special type

## Dimensions

### ● Clevis bracket type (CB)



Symbol: F

| Bore size (mm) | 10, 20 |
|----------------|--------|
| φ40            | 74.5   |
| φ50            | 81     |
| φ63            | 90     |
| φ80            | 105    |
| φ100           | 110.5  |

Note 1: GG dimensions apply to 40, 50 mm bore.  
 Note 2: The value of symbol F may vary depending on booster stroke. Refer to the right above table.

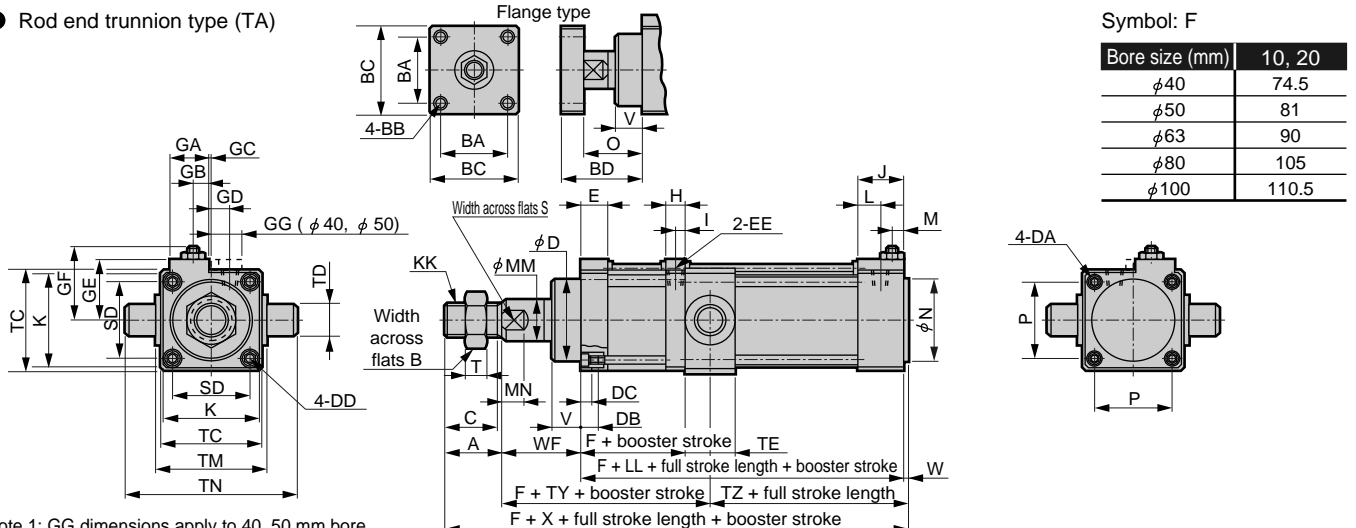
Note 3: Refer to page 2356 for dimensions with bellows.  
 Note 4: Refer to page 2357 for dimensions of an accessory.

| Bore size (mm) | Clevis bracket type (CB) basic dimensions. |    |    |     |     |      |    |       |    |    |    |    |       |    |    |       |    |     |     |      |       |
|----------------|--|----|----|-----|-----|------|----|-------|----|----|----|----|-------|----|----|-------|----|-----|-----|------|-------|
|                | A  | B  | BA | BB  | BC  | BD   | C  | CA    | CD | CE | CH | CI | CJ    | CV | CW | D     | DB | DC  | DD  | E    | EE    |
| φ40            | 36   | 32 | 32 | M8  | 50  | 68   | 34 | 145.5 | 12 | 12 | 10 | 18 | 193.5 | 36 | 18 | φ43   | 9  | 3.5 | M6  | 25   | Rc1/8 |
| φ50            | 45   | 41 | 40 | M10 | 60  | 75   | 43 | 158.5 | 12 | 12 | 10 | 18 | 215.5 | 36 | 18 | φ51   | 9  | 3.5 | M6  | 26.5 | Rc1/4 |
| φ63            | 50   | 46 | 48 | M12 | 70  | 74.5 | 47 | 173   | 14 | 16 | 10 | 24 | 239   | 40 | 20 | φ57   | 12 | 4   | M8  | 33   | Rc1/4 |
| φ80            | 56   | 55 | 54 | M14 | 80  | 89   | 53 | 209.5 | 20 | 20 | 14 | 30 | 285.5 | 56 | 28 | φ62.5 | 12 | 4   | M10 | 34   | Rc3/8 |
| φ100           | 72   | 70 | 70 | M16 | 100 | 100  | 69 | 235   | 20 | 20 | 16 | 30 | 327   | 56 | 28 | φ75   | 15 | 5   | M12 | 37   | Rc3/8 |

| Bore size (mm) | GA  | GB   | GC | GD | GE  | GF   | H    | I    | J  | K   | KK        | L         | LL   | M    | MM  | MN  | O  | P  | S    | SD | T  | V  | WF | GG |
|----------------|-----|------|----|----|-----|------|------|------|----|-----|-----------|-----------|------|------|-----|-----|----|----|------|----|----|----|----|----|
|                | φ40 | 26   | 4  | -  | 8.5 | 36.5 | 47.5 | 18   | 8  | 26  | 57        | M22 x 1.5 | 7    | 65.5 | 8   | φ25 | 14 | 52 | 40.5 | 23 | 44 | 13 | 24 | 48 |
| φ50            | 30  | 2    | -  | 10 | 43  | 55.5 | 22   | 10.5 | 32 | 69  | M26 x 1.5 | 9         | 73.5 | 9    | φ30 | 17  | 54 | 48 | 26   | 56 | 16 | 24 | 53 | 20 |
| φ63            | 32  | 9    | 1  | 13 | 48  | 58   | 24   | 11   | 30 | 80  | M30 x 1.5 | 15        | 73   | 10   | φ35 | 20  | 53 | 59 | 31   | 63 | 18 | 21 | 63 | -  |
| φ80            | 38  | 8    | 1  | 16 | 59  | 69   | 28   | 13   | 34 | 98  | M36 x 1.5 | 17        | 87.5 | 11   | φ40 | 26  | 64 | 74 | 36   | 78 | 21 | 24 | 70 | -  |
| φ100           | 41  | 12.5 | 5  | 20 | 71  | 81   | 26   | 14   | 37 | 118 | M45 x 1.5 | 22        | 96   | 15   | φ50 | 26  | 71 | 90 | 46   | 96 | 27 | 30 | 87 | -  |

### ● Rod end trunnion type (TA)



Symbol: F

| Bore size (mm) | 10, 20 |
|----------------|--------|
| φ40            | 74.5   |
| φ50            | 81     |
| φ63            | 90     |
| φ80            | 105    |
| φ100           | 110.5  |

Note 1: GG dimensions apply to 40, 50 mm bore.  
 Note 2: The value of symbol F may vary depending on booster stroke. Refer to the right above table.  
 Note 3: Since trunnion is interfered, switch cannot be installed at the advanced end.  
 Note 4: Refer to page 2356 for dimensions with bellows.  
 Note 5: Refer to page 2357 for the dimensions of the accessory.

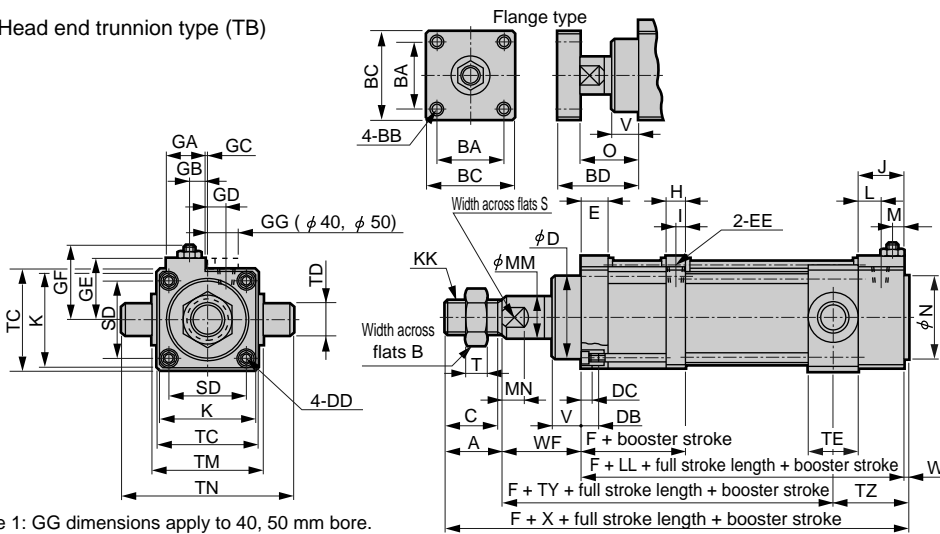
| Bore size (mm) | Rod end trunnion type (TA) basic dimensions |    |    |     |     |      |    |       |     |    |     |     |      |       |    |      |    |     |      |      |    |      |    |     |
|----------------|---|----|----|-----|-----|------|----|-------|-----|----|-----|-----|------|-------|----|------|----|-----|------|------|----|------|----|-----|
|                | A   | B  | BA | BB  | BC  | BD   | C  | D     | DA  | DB | DC  | DD  | E    | EE    | GA | GB   | GC | GD  | GE   | GF   | H  | I    | J  | K   |
| φ40            | 36  | 32 | 32 | M8  | 50  | 68   | 34 | φ43   | M8  | 9  | 3.5 | M6  | 25   | Rc1/8 | 26 | 4    | -  | 8.5 | 36.5 | 47.5 | 18 | 8    | 26 | 57  |
| φ50            | 45  | 41 | 40 | M10 | 60  | 75   | 43 | φ51   | M8  | 9  | 3.5 | M6  | 26.5 | Rc1/4 | 30 | 2    | -  | 10  | 43   | 55.5 | 22 | 10.5 | 32 | 69  |
| φ63            | 50  | 46 | 48 | M12 | 70  | 74.5 | 47 | φ57   | M8  | 12 | 4   | M8  | 33   | Rc1/4 | 32 | 9    | 1  | 13  | 48   | 58   | 24 | 11   | 30 | 80  |
| φ80            | 56  | 55 | 54 | M14 | 80  | 89   | 53 | φ62.5 | M12 | 12 | 4   | M10 | 34   | Rc3/8 | 38 | 8    | 1  | 16  | 59   | 69   | 28 | 13   | 34 | 98  |
| φ100           | 72  | 70 | 70 | M16 | 100 | 100  | 69 | φ75   | M12 | 15 | 5   | M12 | 37   | Rc3/8 | 41 | 12.5 | 5  | 20  | 71   | 81   | 26 | 14   | 37 | 118 |

| Bore size (mm) | KK        | L         | LL   | M    | MM  | MN  | N   | O   | P  | S    | SD | T  | TC  | TD | TE | TM  | TN  | TY   | TZ   | V    | W  | WF | X     | GG    |
|----------------|-----------|-----------|------|------|-----|-----|-----|-----|----|------|----|----|-----|----|----|-----|-----|------|------|------|----|----|-------|-------|
|                | φ40       | M22 x 1.5 | 7    | 65.5 | 8   | φ25 | 14  | φ31 | 52 | 40.5 | 23 | 44 | 13  | 57 | 16 | 30  | 63  | 95   | 63   | 52.5 | 24 | 2  | 48    | 151.5 |
| φ50            | M26 x 1.5 | 9         | 73.5 | 9    | φ30 | 17  | φ38 | 54  | 48 | 26   | 56 | 16 | 67  | 18 | 30 | 80  | 116 | 68   | 60.5 | 24   | 2  | 53 | 173.5 | 20    |
| φ63            | M30 x 1.5 | 15        | 73   | 10   | φ35 | 20  | φ38 | 53  | 59 | 31   | 63 | 18 | 82  | 20 | 35 | 90  | 130 | 80.5 | 58.5 | 21   | 3  | 63 | 189   | -     |
| φ80            | M36 x 1.5 | 17        | 87.5 | 11   | φ40 | 26  | φ43 | 64  | 74 | 36   | 78 | 21 | 100 | 25 | 40 | 115 | 165 | 90   | 69.5 | 24   | 2  | 70 | 215.5 | -     |
| φ100           | M45 x 1.5 | 22        | 96   | 15   | φ50 | 26  | φ51 | 71  | 90 | 46   | 96 | 27 | 121 | 35 | 50 | 135 | 205 | 112  | 73   | 30   | 2  | 87 | 257   | -     |

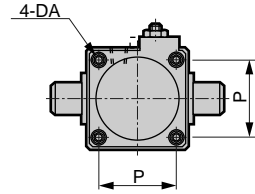
### Dimensions

#### ● Head end trunnion type (TB)



Symbol: F

| Bore size (mm) | 10, 20 |
|----------------|--------|
| φ 40           | 74.5   |
| φ 50           | 81     |
| φ 63           | 90     |
| φ 80           | 105    |
| φ 100          | 110.5  |



Note 3: For 100mm stroke or less, any cylinder switch cannot be installed.  
 Note 4: Refer to page 2356 for dimensions with bellows.  
 Note 5: Refer to page 2357 for the dimensions of the accessory.

Note 1: GG dimensions apply to 40, 50 mm bore.

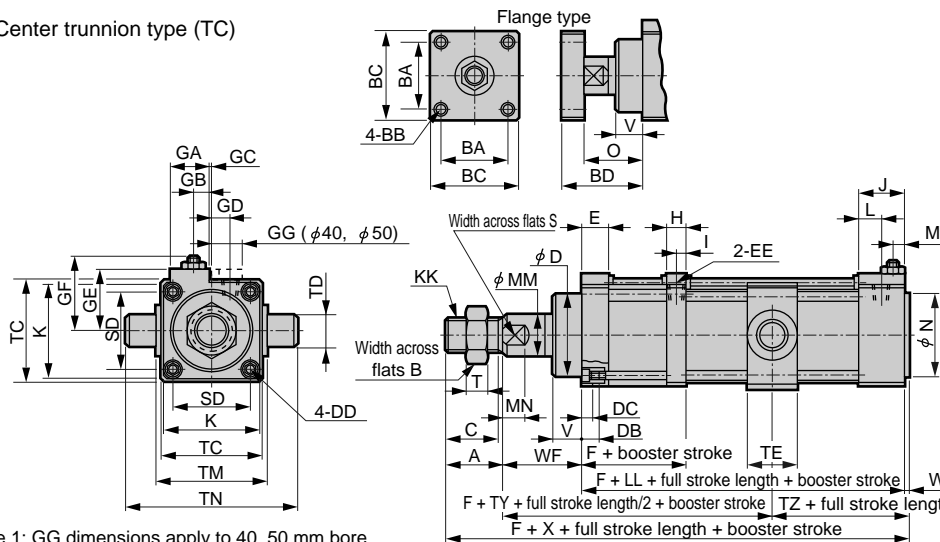
Note 2: The value of symbol F may vary depending on booster stroke. Refer to the right above table.

| Bore size (mm) | Head end trunnion type (TB) basic dimensions |    |    |     |     |      |    |       |     |    |     |     |      |       |    |      |    |     |      |      |    |      |    |     |
|----------------|--|----|----|-----|-----|------|----|-------|-----|----|-----|-----|------|-------|----|------|----|-----|------|------|----|------|----|-----|
|                | A  | B  | BA | BB  | BC  | BD   | C  | D     | DA  | DB | DC  | DD  | E    | EE    | GA | GB   | GC | GD  | GE   | GF   | H  | I    | J  | K   |
| φ 40           | 36   | 32 | 32 | M8  | 50  | 68   | 34 | φ43   | M8  | 9  | 3.5 | M6  | 25   | Rc1/8 | 26 | 4    | -  | 8.5 | 36.5 | 47.5 | 18 | 8    | 26 | 57  |
| φ 50           | 45   | 41 | 40 | M10 | 60  | 75   | 43 | φ51   | M8  | 9  | 3.5 | M6  | 26.5 | Rc1/4 | 30 | 2    | -  | 10  | 43   | 55.5 | 22 | 10.5 | 32 | 69  |
| φ 63           | 50   | 46 | 48 | M12 | 70  | 74.5 | 47 | φ57   | M8  | 12 | 4   | M8  | 33   | Rc1/4 | 32 | 9    | 1  | 13  | 48   | 58   | 24 | 11   | 30 | 80  |
| φ 80           | 56   | 55 | 54 | M14 | 80  | 89   | 53 | φ62.5 | M12 | 12 | 4   | M10 | 34   | Rc3/8 | 38 | 8    | 1  | 16  | 59   | 69   | 28 | 13   | 34 | 98  |
| φ 100          | 72   | 70 | 70 | M16 | 100 | 100  | 69 | φ75   | M12 | 15 | 5   | M12 | 37   | Rc3/8 | 46 | 12.5 | 5  | 20  | 71   | 81   | 26 | 14   | 37 | 118 |

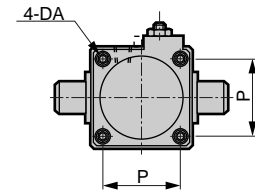
| Bore size (mm) | Head end trunnion type (TB) basic dimensions |    |      |    |     |    |     |    |      |    |    |    |     |    |    |     |     |       |      |    |   |    |       |    |
|----------------|--|----|------|----|-----|----|-----|----|------|----|----|----|-----|----|----|-----|-----|-------|------|----|---|----|-------|----|
|                | KK   | L  | LL   | M  | MM  | MN | N   | O  | P    | S  | SD | T  | TC  | TD | TE | TM  | TN  | TY    | TZ   | V  | W | WF | X     | GG |
| φ 40           | M22 x 1.5                                    | 7  | 65.5 | 8  | φ25 | 14 | φ31 | 52 | 40.5 | 23 | 44 | 13 | 57  | 16 | 30 | 63  | 95  | 72.5  | 43   | 24 | 2 | 48 | 151.5 | 20 |
| φ 50           | M26 x 1.5                                    | 9  | 73.5 | 9  | φ30 | 17 | φ38 | 54 | 48   | 26 | 56 | 16 | 67  | 18 | 30 | 80  | 116 | 79.5  | 49   | 24 | 2 | 53 | 173.5 | 20 |
| φ 63           | M30 x 1.5                                    | 15 | 73   | 10 | φ35 | 20 | φ38 | 53 | 59   | 31 | 63 | 18 | 82  | 20 | 35 | 90  | 130 | 88.5  | 50.5 | 21 | 3 | 63 | 189   | -  |
| φ 80           | M36 x 1.5                                    | 17 | 87.5 | 11 | φ40 | 26 | φ43 | 64 | 74   | 36 | 78 | 21 | 100 | 25 | 40 | 115 | 165 | 103.5 | 56   | 24 | 2 | 70 | 215.5 | -  |
| φ 100          | M45 x 1.5                                    | 22 | 96   | 15 | φ50 | 26 | φ51 | 71 | 90   | 46 | 96 | 27 | 121 | 35 | 50 | 135 | 205 | 121   | 64   | 30 | 2 | 87 | 257   | -  |

#### ● Center trunnion type (TC)



Symbol: F

| Bore size (mm) | 10, 20 |
|----------------|--------|
| φ 40           | 74.5   |
| φ 50           | 81     |
| φ 63           | 90     |
| φ 80           | 105    |
| φ 100          | 110.5  |



Note 3: For 100mm stroke or less, any cylinder switch cannot be installed.  
 Note 4: Refer to page 2356 for dimensions with bellows.  
 Note 5: Refer to page 2357 for the dimensions of the accessory.

Note 1: GG dimensions apply to 40, 50 mm bore.

Note 2: The value of symbol F may vary depending on booster stroke. Refer to the right above table.

| Bore size (mm) | Center trunnion type (TC) basic dimensions |    |    |     |     |      |    |       |     |    |     |     |      |       |    |      |    |     |      |      |    |    |    |     |
|----------------|--|----|----|-----|-----|------|----|-------|-----|----|-----|-----|------|-------|----|------|----|-----|------|------|----|----|----|-----|
|                | A  | B  | BA | BB  | BC  | BD   | C  | D     | DA  | DB | DC  | DD  | E    | EE    | GA | GB   | GC | GD  | GE   | GF   | H  | I  | J  | K   |
| φ 40           | 36   | 32 | 32 | M8  | 50  | 68   | 34 | φ43   | M8  | 9  | 3.5 | M6  | 25   | Rc1/8 | 26 | 4    | -  | 8.5 | 36.5 | 47.5 | 18 | 8  | 26 | 57  |
| φ 50           | 45   | 41 | 40 | M10 | 60  | 75   | 43 | φ51   | M8  | 9  | 3.5 | M6  | 26.5 | Rc1/4 | 30 | 2    | -  | 10  | 43   | 55.5 | 22 | 11 | 32 | 69  |
| φ 63           | 50   | 46 | 48 | M12 | 70  | 74.5 | 47 | φ57   | M8  | 12 | 4   | M8  | 33   | Rc1/4 | 32 | 9    | 1  | 13  | 48   | 58   | 24 | 11 | 30 | 80  |
| φ 80           | 56   | 55 | 54 | M14 | 80  | 89   | 53 | φ62.5 | M12 | 12 | 4   | M10 | 34   | Rc3/8 | 38 | 8    | 1  | 16  | 59   | 69   | 28 | 13 | 34 | 98  |
| φ 100          | 72   | 70 | 70 | M16 | 100 | 100  | 69 | φ75   | M12 | 15 | 5   | M12 | 37   | Rc3/8 | 41 | 12.5 | 5  | 20  | 71   | 81   | 26 | 14 | 37 | 118 |

| Bore size (mm) | Center trunnion type (TC) basic dimensions |    |      |    |     |    |     |    |      |    |    |    |     |    |    |     |     |       |      |    |   |    |       |    |
|----------------|--|----|------|----|-----|----|-----|----|------|----|----|----|-----|----|----|-----|-----|-------|------|----|---|----|-------|----|
|                | KK   | L  | LL   | M  | MM  | MN | N   | O  | P    | S  | SD | T  | TC  | TD | TE | TM  | TN  | TY    | TZ   | V  | W | WF | X     | GG |
| φ 40           | M22 x 1.5                                  | 7  | 65.5 | 8  | φ25 | 14 | φ31 | 52 | 40.5 | 23 | 44 | 13 | 57  | 16 | 30 | 63  | 95  | 68    | 47.5 | 24 | 2 | 48 | 151.5 | 20 |
| φ 50           | M26 x 1.5                                  | 9  | 73.5 | 9  | φ30 | 17 | φ38 | 54 | 48   | 26 | 56 | 16 | 67  | 18 | 30 | 80  | 116 | 74    | 54.5 | 21 | 2 | 53 | 173.5 | 20 |
| φ 63           | M30 x 1.5                                  | 15 | 73   | 10 | φ35 | 20 | φ38 | 53 | 59   | 31 | 63 | 18 | 82  | 20 | 35 | 90  | 130 | 84.5  | 54.5 | 21 | 3 | 63 | 189   | -  |
| φ 80           | M36 x 1.5                                  | 17 | 87.5 | 11 | φ40 | 26 | φ43 | 64 | 74   | 36 | 78 | 21 | 100 | 25 | 40 | 115 | 165 | 97    | 62.5 | 24 | 2 | 70 | 215.5 | -  |
| φ 100          | M45 x 1.5                                  | 22 | 96   | 15 | φ50 | 26 | φ51 | 71 | 90   | 46 | 96 | 27 | 121 | 35 | 50 | 135 | 205 | 116.5 | 68.5 | 30 | 2 | 87 | 257   | -  |

- 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

High power cylinder  
Special type





High power cylinder (double acting four times force type)

# SHC-K Series

● Bore size:  $\phi 40$ ,  $\phi 50$ ,  $\phi 63$ ,  $\phi 80$ ,  $\phi 100$

JIS symbol



## Specifications

| Descriptions                             | SHC-K  |           |           |           |            |
|--|--|-----------|-----------|-----------|------------|
| Bore size mm                             | $\phi 40$  | $\phi 50$ | $\phi 63$ | $\phi 80$ | $\phi 100$ |
| Actuation                                | Double acting extended part four times force type                  |           |           |           |            |
| Working fluid                            | Compressed air   |           |           |           |            |
| Max. working pressure MPa                | 0.9  |           |           |           |            |
| Min. working pressure MPa                | 0.2  | 0.15      |           |           |            |
| Withstanding pressure MPa                | 1.35   |           |           |           |            |
| Ambient temperature $^{\circ}\text{C}$   | -10 to 60 (no freezing)  |           |           |           |            |
| Port size Rc                             | 1/8  | 1/4       | 1/4       | 3/8       | 3/8        |
| Stroke tolerance mm                      | $^{+1.3}_0$ (to 300), $^{+1.7}_0$ (to 1000), $^{+2.1}_0$ (1000 to) |           |           |           |            |
| Working piston speed                     | 50 to 500  |           |           |           |            |
| Note 1 mm/s                              | 10 to 30   |           |           |           |            |
| Cushion                                  | Air cushion  |           |           |           |            |
| Lubrication                              | Not required (use turbine oil Class 1 ISOVG32 if lubricated.)      |           |           |           |            |
| Rod end allowable energy absorption (J)  | 23.3   | 39.9      | 60.2      | 102       | 164        |
| Head end allowable energy absorption (J) | 5.84   | 9.99      | 15.1      | 25.5      | 41.0       |

Note 1 Since piston speed varies depending on supply pressure, please refer to technical data on page 2360.

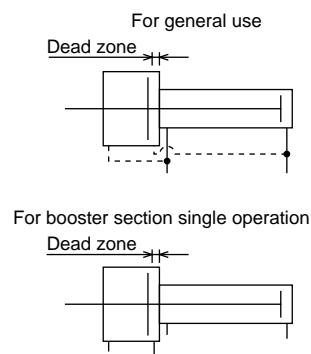
## Stroke length

| Bore size (mm) | Standard stroke length (mm)          | Max. stroke length (mm) | Booster stroke | Dead zone |
|----------------|--------------------------------------|-------------------------|----------------|-----------|
|                |                                      |                         |                |           |
| $\phi 40$      | 100, 150, 200, 250,<br>300, 400, 500 | 700                     | 10, 20         | 1.9       |
| $\phi 50$      |                                      |                         |                | 1.9       |
| $\phi 63$      |                                      | 2                       |                |           |
| $\phi 80$      |                                      | 2.3                     |                |           |
| $\phi 100$     |                                      | 2.8                     |                |           |

Note 1: Custom stroke length is available per 5mm increment.

Note 2: Dead zone (area not generating boosted thrust) stroke, until connection with booster piston completes, is included in the booster stroke.

Note 3: Minimum stroke length is 40mm with or without switch. For types with switches, the minimum stroke length varies depending on installation method. Refer to the below table.



## Min. stroke length of type with switch

| Bore size (mm) | When installed on the same plane | When installed on different planes |
|----------------|----------------------------------|------------------------------------|
|                | $\phi 40$                        | 65                                 |
| $\phi 50$      |                                  |                                    |
| $\phi 63$      | 40                               |                                    |
| $\phi 80$      |                                  |                                    |
| $\phi 100$     |                                  |                                    |

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

High power cylinder  
Special type

### Switch specifications

- 1 color/2 color indicator

| Descriptions    | Proximity 2 wire                                     |    |                              | Proximity 3 wire                                     |                              |
|-----------------|--|----|------------------------------|--|------------------------------|
|                 | R1   | R2 | R2Y (2 color indicator type) | R3   | R3Y (2 color indicator type) |
| Applications    | Programmable controller, relay, small solenoid valve |    | Programmable controller      | Programmable controller, relay, small solenoid valve |                              |
| Output method   | -  |    |                              | NPN output   |                              |
| Power voltage   | -  |    |                              | 4.5 to 28 VDC  |                              |
| Load voltage    | 85 to 265 VAC  |    | 10 to 30 VDC                 | 30 VDC or less                                       |                              |
| Load current    | 5 to 100mA   |    | 5 to 30mA                    | 200mA DC or less                                     | 150mA DC or less             |
| Light           | LED (ON lighting)                                    |    | Red/green LED (ON lighting)  | LED (ON lighting)                                    | Red/green LED (ON lighting)  |
| Leakage current | 1mA or less with 100 VAC<br>2mA or less with 200 VAC |    | 1mA or less                  | 1.2mA or less  | 10 μA or less                |

| Descriptions    | Reed 2 wire                    |           |           |                                     |             |   |              |   |
|-----------------|--------------------------------|-----------|-----------|-------------------------------------|-------------|---|--------------|---|
|                 | R0                             |           |           | R4                                  |             | R5  |              | R6  |
| Applications    | Relay, programmable controller |           |           | High capacity relay, solenoid valve |             | Programmable controller, relay, IC circuit (w/o light), serial connection |              | Programmable controller (with DC self hold) |
| Load voltage    | 12/24 VDC                      | 110 VAC   | 220 VAC   | 110 VAC                             | 220 VAC     | 12/24 VDC   | 110 VAC      | 220 VAC                                     |
| Load current    | 5 to 50mA                      | 7 to 20mA | 7 to 10mA | 20 to 200mA                         | 10 to 200mA | 50mA or less  | 20mA or less | 10mA or less                                |
| Light           | LED (ON lighting)              |           |           | Neon light (OFF lighting)           |             | None  |              | LED (ON lighting)                           |
| Leakage current | 0mA                            |           |           | 1mA or less                         |             | 0mA   |              | 0.1mA or less                               |

- Strong magnetic field proof

| Descriptions    | Reed 2 wire                    |           |
|-----------------|--------------------------------|-----------|
|                 | H0                             |           |
| Applications    | Relay, programmable controller |           |
| Load voltage    | 12/24 VDC                      | 110 VAC   |
| Load current    | 5 to 50mA                      | 7 to 20mA |
| Light           | LED (ON lighting)              |           |
| Leakage current | 10 μA or less                  |           |

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

### Cylinder weight

(Unit: kg)

| Bore size (mm) | Product weight when stroke length 0mm |                      |                  |                    | Weight per switch |              |        | Additional weight per cylinder stroke 100mm | Additional weight per booster stroke 10mm | F type additional weight |
|----------------|---------------------------------------|----------------------|------------------|--------------------|-------------------|--------------|--------|---|---|--------------------------|
|                | Basic type (00)                       | Axial foot type (LB) | Flange type (FA) | Trunnion type (TA) | R type            |              | H type |   |   |                          |
|                |                                       |                      |                  |                    | Grommet           | Terminal box |        |   |   |                          |
| φ 40           | 3.37                                  | 4.14                 | 5.22             | 4.73               | 0.08              | 0.07         | 0.10   | 0.43  | 0.15                                      | 0.16                     |
| φ 50           | 5.17                                  | 6.09                 | 7.82             | 7.69               |                   |              |        | 0.48  | 0.15                                      | 0.28                     |
| φ 63           | 7.35                                  | 8.95                 | 10.40            | 10.85              |                   |              |        | 0.59  | 0.27                                      | 0.30                     |
| φ 80           | 13.93                                 | 17.23                | 20.65            | 20.43              | 0.09              | 0.08         | 0.11   | 0.96  | 0.36                                      | 0.50                     |
| φ 100          | 21.76                                 | 28.13                | 34.36            | 33.56              |                   |              |        | 0.93  | 0.65                                      | 0.49                     |

Product weight formula  
(E.g.) Product weight of SHC-LB-40H-200-20-R0-D-F  
 ● Product weight when stroke length 0mm: 4.14Kg  
 ● Additional weight of moving stroke 180mm:  $0.43 \times \frac{180}{100} = 0.77\text{Kg}$   
 ● Additional weight of booster stroke 20mm:  $0.15 \times \frac{20}{10} = 0.30\text{Kg}$   
 ● Additional weight of two switches:  $0.08 \times 2 = 0.16\text{Kg}$   
 ● Additional weight of F type: 0.16Kg  
 ● Product weight:  $4.14\text{Kg} + 0.77\text{Kg} + 0.30\text{Kg} + 0.16\text{Kg} + 0.16\text{Kg} = 5.53\text{Kg}$

# SHC-K 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

● Without switch

SHC-K - LB - 40 H - 100 - 20 - S I

● With R type switch

SHC-K - LB - 40 H - 100 - 20 - R0 - R - S I

● With strong magnetic field proof switch (H0, H0Y)

SHC-K-L2 - LB - 40 H - 100 - 20 - H0 - R - S I

A Mounting style

Note 1

Note 2

B Bore size

C Cushion

D Stroke length

Note 3

E Booster stroke

F Switch model no.

\* indicates lead wire length.

G Switch quantity

H Option

Note 5

Note 6

Note 7

| Symbol                  | Descriptions          |
|-------------------------|-----------------------|
| <b>A Mounting style</b> |                       |
| LB                      | Axial foot type       |
| FA                      | Rod end flange type   |
| TA                      | Rod end trunnion type |

| B Bore size (mm) |       |
|------------------|-------|
| 40               | φ 40  |
| 50               | φ 50  |
| 63               | φ 63  |
| 80               | φ 80  |
| 100              | φ 100 |

| C Cushion |                  |
|-----------|------------------|
| H         | Head end cushion |
| N         | No cushion       |

| D Stroke length (mm) |                      |                      |
|----------------------|----------------------|----------------------|
| Bore size            | Stroke length Note 4 | Custom stroke length |
| φ40                  | 40 to 700            | Per 5mm              |
| φ50                  | 40 to 700            |                      |
| φ63                  | 40 to 800            |                      |
| φ80                  | 40 to 900            |                      |
| φ100                 | 40 to 1000           |                      |

| E Booster stroke (mm) |    |
|-----------------------|----|
| 10                    | 10 |
| 20                    | 20 |

| F Switch model no. |                   |              |           |                             |           |
|--------------------|-------------------|--------------|-----------|-----------------------------|-----------|
| Grommet type       | Terminal box type |              | Contact   | Indicator                   | Lead wire |
|                    | Standard type     | Splash-proof |           |                             |           |
| R1*                | R1B               | R1A          | Proximity | 1 color indicator type      | 2-wire    |
| R2*                | R2B               | R2A          |           | 2 color indicator type      |           |
| R2Y*               | R2YB              | R2YA         |           | 1 color indicator type      |           |
| R3*                | R3B               | R3A          | Reed      | 2 color indicator type      | 3-wire    |
| R3Y*               | R3YB              | R3YA         |           | 1 color indicator type      |           |
| R0*                | R0B               | R0A          | Reed      | 1 color indicator type      | 2-wire    |
| R4*                | R4B               | R4A          |           | Without indicator light     |           |
| R5*                | R5B               | R5A          |           | 1 color indicator type      |           |
| R6*                | R6B               | R6A          |           | Strong magnetic field proof |           |
| H0*                | -                 | -            |           |                             | 2-wire    |

| *Lead wire length |               |
|-------------------|---------------|
| Blank             | 1m (standard) |
| 3                 | 3m (option)   |
| 5                 | 5m (option)   |

| G Switch quantity |               |
|-------------------|---------------|
| R                 | 1 on rod end  |
| H                 | 1 on head end |
| D                 | 2             |
| T                 | 3             |
| 4                 | 4             |
| 5                 | 5             |

| H Option |  |              |                    |
|----------|--|--------------|--------------------|
|          |  | Max. ambient | Instantaneous max. |
| J        | Bellows  | 100 °C       | 200 °C             |
| L        | Bellows  | 250 °C       | 400 °C             |
| Blank    | Rod end form, male thread type (standard)        |              |                    |
| F        | Rod end form, flange type                        |              |                    |
| Blank    | Piping port position/top from rod end (standard) |              |                    |
| R        | Piping port position/right from rod end          |              |                    |
| S        | Piping port position/bottom from rod end         |              |                    |
| T        | Piping port position/left from rod end           |              |                    |
| G1       | Metal scraper                                    |              |                    |
| P6       | Copper and PTFE free                             |              |                    |
| A        | Booster section single control port              |              |                    |

| I Accessory |  |
|-------------|--|
| I           | Rod eye  |
| Y           | Rod clevis (pin and snap ring attached)                          |
| B12         | Eye bracket (for rod eye/clevis)                                 |
| B22         | Clevis bracket (for rod eye/clevis) (pin and snap ring attached) |

## ⚠ Note on model no. selection

- Note 1: For TA (rod end trunnion type), since trunnion installation position is placed at moving side stroke extended or booster side retracted, the position cannot be detected at cylinder switch moving side stroke extended or booster side retracted.
- Note 2: For TA (rod end trunnion type), TB (head end trunnion type), piping port position cannot be assigned on trunnion projecting side.
- Note 3: For stroke length indicated in the "D" stroke length, indicate the full stroke length (moving stroke + booster stroke).
- Note 4: Refer to page 2348 for minimum stroke length of type with switch.
- Note 5: L (bellows (maximum ambient temperature 100°C)) and N (piston rod end thread length change) are custom orders.
- Note 6: Booster cylinder can be individually controlled. In this case, select option A (booster section single control port).

<Example of model number>

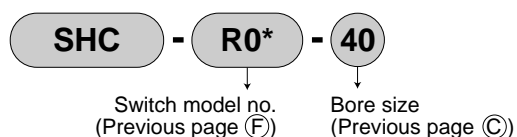
**SHC-K-LB-40H-100-20-R0-R-SI**

Model no.: High power cylinder double acting four times force type

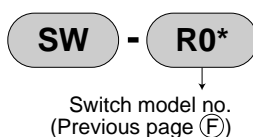
- A Mounting style : Axial foot type
- B Bore size : φ 40mm
- C Cushion : Head end cushion
- D Stroke length : 100mm  
(Moving stroke 80mm + booster stroke 20mm)
- E Booster stroke : 20mm
- F Switch model no. : Reed R0 switch, lead wire 1m
- G Switch quantity : One on rod end
- H Option : Piping port position bottom from rod end
- I Accessory : Rod eye

### How to order R type switch

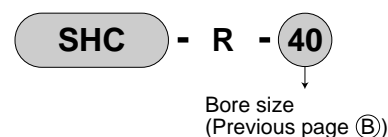
A) Switch body + bracket



B) Only switch body

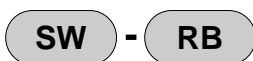


C) Mounting bracket

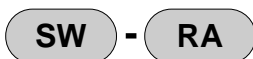


● Only terminal box

· R \* B

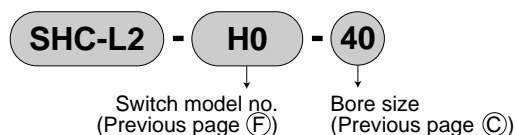


· R \* A

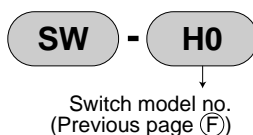


### How to order H type switch

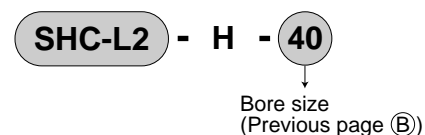
A) Switch body + mounting bracket



B) Only switch body



C) Mounting bracket



### How to order mounting bracket

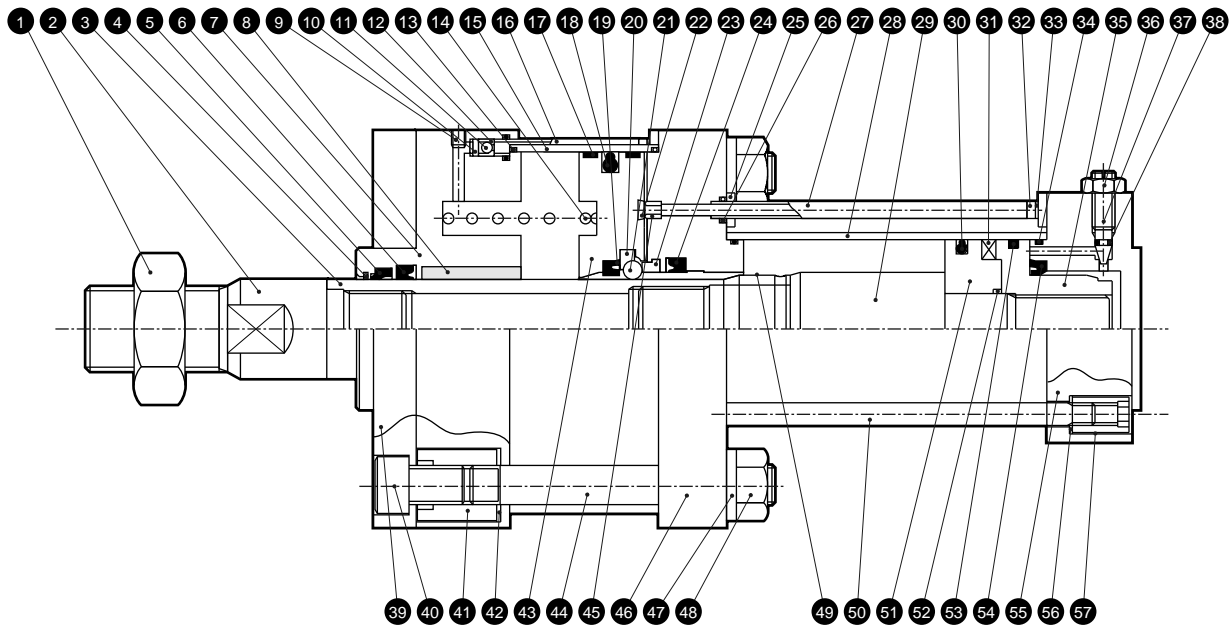
| Bore size (mm)      | φ40         | φ50         | φ63         | φ80         | φ100         |
|---------------------|-------------|-------------|-------------|-------------|--------------|
| Mounting bracket    |             |             |             |             |              |
| Foot (LB)           | SHC-K-LB-40 | SHC-K-LB-50 | SHC-K-LB-63 | SHC-K-LB-80 | SHC-K-LB-100 |
| Rod end flange (FA) | SHC-K-FA-40 | SHC-K-FA-50 | SHC-K-FA-63 | SHC-K-FA-80 | SHC-K-FA-100 |

Note 1: The foot type mounting bracket is supplied as a two-piece set.

- 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

High power cylinder  
Special type

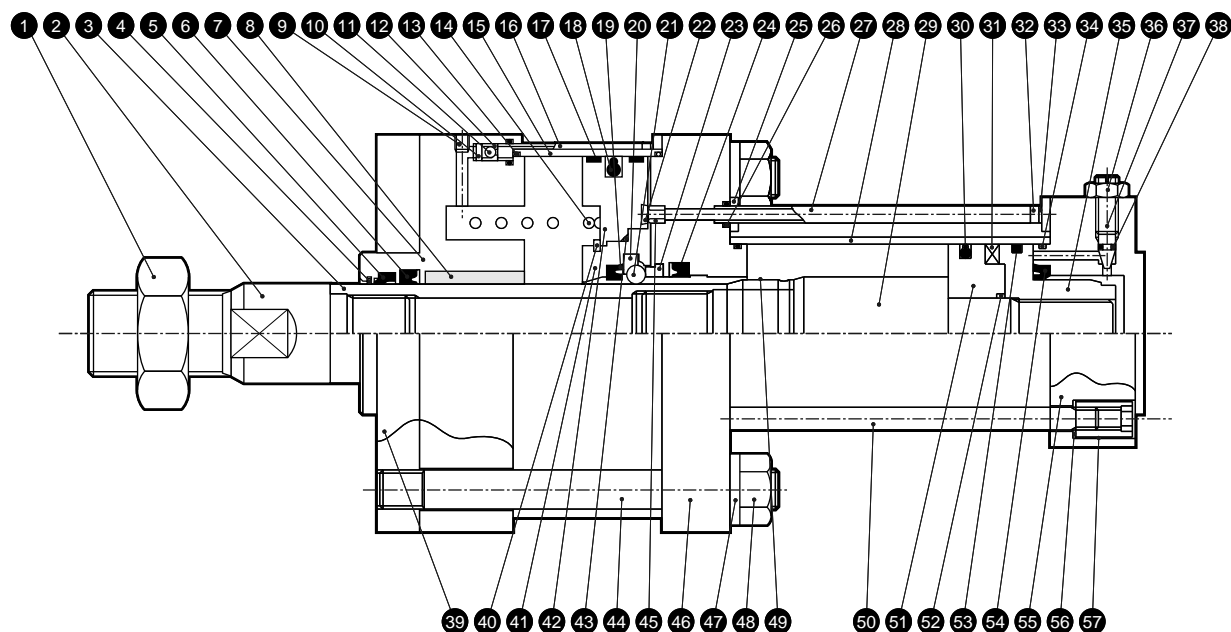
## Internal structure and parts list ( φ 40, φ 50)



| No. | Parts name               | Material             | Remarks         | No. | Parts name                | Material       | Remarks |
|-----|--------------------------|----------------------|-----------------|-----|---------------------------|----------------|---------|
| 1   | Rod nut                  | Steel                |                 | 30  | Piston packing seal (2)   | Nitrile rubber |         |
| 2   | Cap                      | Steel                |                 | 31  | Magnet                    | Plastic        |         |
| 3   | Piston rod               | Steel                |                 | 32  | Hexagon socket bolt       | Alloy steel    |         |
| 4   | Metal scraper            | Copper alloy         | Only G1 type    | 33  | Spring washer             | Steel          |         |
| 5   | Dust wiper               | Nitrile rubber       |                 | 34  | Cylinder gasket (2)       | Nitrile rubber |         |
| 6   | Rod packing seal (1)     | Nitrile rubber       |                 | 35  | Piston (H)                | Aluminum alloy |         |
| 7   | Rod cover                | Aluminum alloy       |                 | 36  | Needle nut                | Copper alloy   |         |
| 8   | Bush                     | Copper alloy casting | Oil impregnated | 37  | Cushion needle            | Copper alloy   |         |
| 9   | Hexagon socket set screw | Alloy steel          |                 | 38  | Needle gasket             | Nitrile rubber |         |
| 10  | Spring pin               | Steel                |                 | 39  | FA flange                 | Steel          |         |
| 11  | Check ball               | Alloy steel          |                 | 40  | Hexagon socket bolt       | Alloy steel    |         |
| 12  | Fixed orifice            | Copper alloy         |                 | 41  | Round nut (1)             | Steel          |         |
| 13  | Cylinder gasket (1)      | Nitrile rubber       |                 | 42  | Conical spring washer (1) | Steel          |         |
| 14  | Compression spring       | Steel                |                 | 43  | Booster piston            | Alloy steel    |         |
| 15  | Booster pipe             | Aluminum alloy       |                 | 44  | Tie rod (1)               | Steel          |         |
| 16  | Pass-pipe (1)            | Stainless steel      |                 | 45  | Valve seat                | Copper alloy   |         |
| 17  | Wear ring (1)            | Polyacetal           |                 | 46  | Intermediate guard        | Aluminum alloy |         |
| 18  | Piston packing seal (1)  | Nitrile rubber       |                 | 47  | Washer with the teeth     | Steel          |         |
| 19  | Cushion packing seal (1) | Nitrile rubber       |                 | 48  | Hexagon nut               | Steel          |         |
| 20  | Steel ball bearing       | Nitrile rubber       |                 | 49  | Connection collar         | Alloy steel    |         |
| 21  | Steel ball               | Alloy steel          |                 | 50  | Tie rod (2)               | Steel          |         |
| 22  | Sealant cushion          | Urethane rubber      |                 | 51  | Piston (R)                | Aluminum alloy |         |
| 23  | Ball stopper             | Steel                |                 | 52  | Piston gasket             | Nitrile rubber |         |
| 24  | Rod packing seal (2)     | Nitrile rubber       |                 | 53  | Wear ring (2)             | Polyacetal     |         |
| 25  | Packing gland            | Steel                |                 | 54  | Cushion packing seal (2)  | Nitrile rubber |         |
| 26  | Pass-pipe gasket         | Nitrile rubber       |                 | 55  | Head cover                | Aluminum alloy |         |
| 27  | Pass-pipe (2)            | Stainless steel      |                 | 56  | Conical spring washer     | Steel          |         |
| 28  | Cylinder tube            | Aluminum alloy       |                 | 57  | Round nut (2)             | Steel          |         |
| 29  | Connection piston        | Steel                |                 |     |                           |                |         |

Note: This product can not be disassembled.

### Internal structure and parts list ( φ 63 to φ 100)



| No. | Parts name               | Material             | Remarks         | No. | Parts name               | Material       | Remarks |
|-----|--------------------------|----------------------|-----------------|-----|--------------------------|----------------|---------|
| 1   | Rod nut                  | Steel                |                 | 30  | Piston packing seal (2)  | Nitrile rubber |         |
| 2   | Cap                      | Steel                |                 | 31  | Magnet                   | Plastic        |         |
| 3   | Piston rod               | Steel                |                 | 32  | Hexagon socket bolt      | Steel          |         |
| 4   | Metal scraper            | Copper alloy         | Only G1 type    | 33  | Spring washer            | Steel          |         |
| 5   | Dust wiper               | Nitrile rubber       |                 | 34  | Cylinder gasket (2)      | Nitrile rubber |         |
| 6   | Rod packing seal (1)     | Nitrile rubber       |                 | 35  | Piston (H)               | Aluminum alloy |         |
| 7   | Rod cover                | Aluminum alloy       |                 | 36  | Needle nut               | Copper alloy   |         |
| 8   | Bush                     | Copper alloy casting | Oil impregnated | 37  | Cushion needle           | Copper alloy   |         |
| 9   | Hexagon socket set screw | Alloy steel          |                 | 38  | Needle gasket            | Nitrile rubber |         |
| 10  | Spring pin               | Steel                |                 | 39  | FA flange                | Steel          |         |
| 11  | Check ball               | Alloy steel          |                 | 40  | C type snap ring         | Steel          |         |
| 12  | Fixed orifice            | Copper alloy         |                 | 41  | Booster piston (A)       | Alloy steel    |         |
| 13  | Cylinder gasket (1)      | Nitrile rubber       |                 | 42  | Booster piston (B)       | Steel          |         |
| 14  | Compression spring       | Steel                |                 | 43  | Gasket                   | Nitrile rubber |         |
| 15  | Booster pipe             | Aluminum alloy       |                 | 44  | Tie rod (1)              | Steel          |         |
| 16  | Pass-pipe (1)            | Stainless steel      |                 | 45  | Valve seat               | Copper alloy   |         |
| 17  | Wear ring (1)            | Polyacetal           |                 | 46  | Intermediate guard       | Aluminum alloy |         |
| 18  | Piston packing seal (1)  | Nitrile rubber       |                 | 47  | Washer with the teeth    | Steel          |         |
| 19  | Cushion packing seal (1) | Nitrile rubber       |                 | 48  | Hexagon nut              | Steel          |         |
| 20  | Steel ball bearing       | Nitrile rubber       |                 | 49  | Connection collar        | Alloy steel    |         |
| 21  | Steel ball               | Alloy steel          |                 | 50  | Tie rod (2)              | Steel          |         |
| 22  | Sealant cushion          | Urethane rubber      |                 | 51  | Piston (R)               | Aluminum alloy |         |
| 23  | Ball stopper             | Steel                |                 | 52  | Piston gasket            | Nitrile rubber |         |
| 24  | Rod packing seal (2)     | Nitrile rubber       |                 | 53  | Wear ring (2)            | Polyacetal     |         |
| 25  | Packing gland            | Steel                |                 | 54  | Cushion packing seal (2) | Nitrile rubber |         |
| 26  | Pass-pipe gasket         | Nitrile rubber       |                 | 55  | Head cover               | Aluminum alloy |         |
| 27  | Pass-pipe (2)            | Stainless steel      |                 | 56  | Conical spring washer    | Steel          |         |
| 28  | Cylinder tube            | Aluminum alloy       |                 | 57  | Round nut                | Steel          |         |
| 29  | Connection piston        | Steel                |                 |     |                          |                |         |

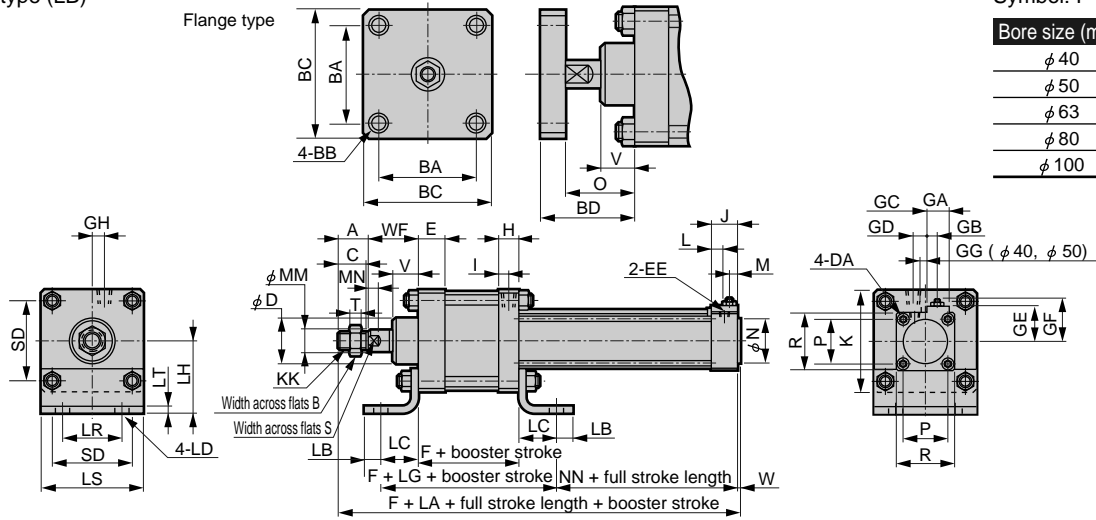
Note: This product can not be disassembled.

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

High power cylinder  
Special type

## Dimensions [Axial foot type (LB), Rod end flange type (FA)]

### ● Axial foot type (LB)



Note 1: GG dimensions apply to 40, 50 mm bore.

Note 3: Refer to page 2356 for dimensions with bellows.

Note 2: The value of symbol F may vary depending on booster stroke. Refer to the right above table.

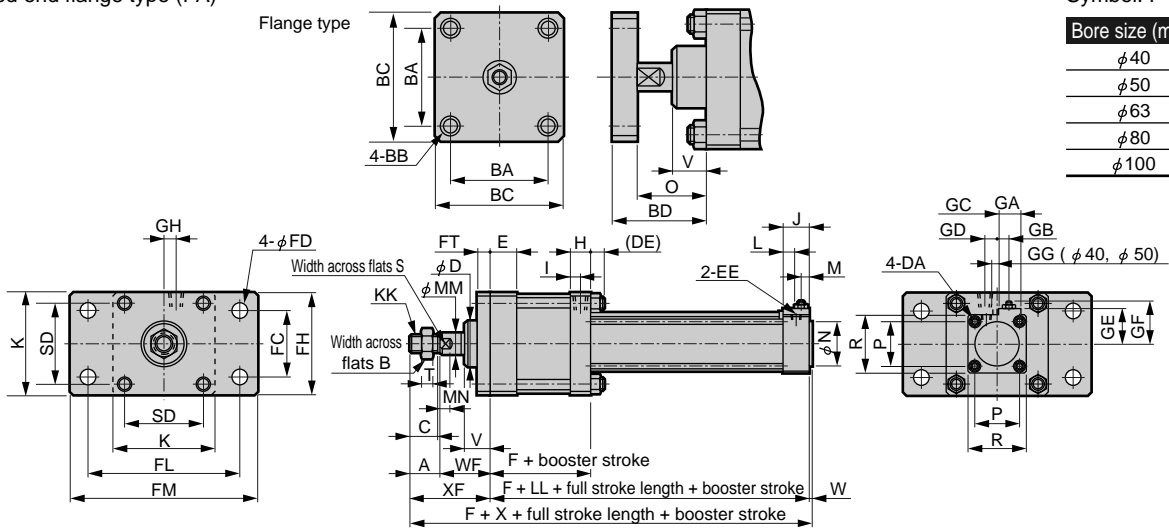
Note 4: Refer to page 2357 for the dimensions of the accessory.

| Bore size (mm) | A  | B  | BA  | BB  | BC  | BD  | C  | D     | DA  | E  | EE    | GA | GB   | GC | GD  | GE   | GF   | GH | H  | I    | J  | K   | KK        |
|----------------|----|----|-----|-----|-----|-----|----|-------|-----|----|-------|----|------|----|-----|------|------|----|----|------|----|-----|-----------|
| φ 40           | 36 | 32 | 50  | M12 | 74  | 68  | 34 | φ43   | M8  | 35 | Rc1/8 | 26 | 4    | -  | 8.5 | 36.5 | 47.5 | 12 | 18 | 10   | 26 | 98  | M22 x 1.5 |
| φ 50           | 45 | 41 | 60  | M12 | 90  | 75  | 43 | φ51   | M8  | 36 | Rc1/4 | 30 | 2    | -  | 10  | 43   | 53.5 | 16 | 22 | 11.5 | 32 | 118 | M26 x 1.5 |
| φ 63           | 50 | 46 | 80  | M14 | 110 | 74  | 47 | φ57   | M8  | 33 | Rc1/4 | 32 | 9    | 1  | 13  | 48   | 58   | 13 | 24 | 13   | 30 | 140 | M30 x 1.5 |
| φ 80           | 56 | 55 | 110 | M16 | 142 | 89  | 53 | φ62.5 | M12 | 34 | Rc3/8 | 38 | 8    | 1  | 16  | 59   | 69   | 15 | 28 | 15   | 34 | 177 | M36 x 1.5 |
| φ 100          | 72 | 70 | 130 | M20 | 175 | 100 | 69 | φ75   | M12 | 37 | Rc3/8 | 41 | 12.5 | 5  | 20  | 71   | 81   | 20 | 26 | 13   | 37 | 220 | M45 x 1.5 |

| Bore size (mm) | L  | LA    | LB | LC | LD | LG  | LH  | LI  | LS  | LT | M  | MM  | MN | N   | NN   | O  | P    | S  | SD  | T  | V  | W | WF | GG | R   |
|----------------|----|-------|----|----|----|-----|-----|-----|-----|----|----|-----|----|-----|------|----|------|----|-----|----|----|---|----|----|-----|
| φ 40           | 7  | 151.5 | 14 | 37 | 14 | 74  | 60  | 74  | 98  | 6  | 8  | φ25 | 14 | φ31 | 28.5 | 52 | 40.5 | 23 | 74  | 13 | 24 | 2 | 48 | 20 | 57  |
| φ 50           | 9  | 173.5 | 21 | 31 | 14 | 62  | 67  | 80  | 118 | 6  | 9  | φ30 | 17 | φ38 | 42.5 | 54 | 48   | 26 | 90  | 16 | 24 | 2 | 53 | 20 | 69  |
| φ 63           | 15 | 189   | 20 | 45 | 19 | 90  | 85  | 100 | 140 | 7  | 10 | φ35 | 20 | φ38 | 28   | 53 | 59   | 31 | 110 | 18 | 21 | 3 | 63 | -  | 80  |
| φ 80           | 17 | 215.5 | 20 | 53 | 19 | 106 | 106 | 118 | 177 | 10 | 11 | φ40 | 26 | φ43 | 34.5 | 64 | 74   | 36 | 142 | 21 | 24 | 2 | 70 | -  | 98  |
| φ 100          | 22 | 257   | 27 | 62 | 24 | 124 | 132 | 150 | 220 | 12 | 15 | φ50 | 26 | φ51 | 34   | 71 | 90   | 46 | 175 | 27 | 30 | 2 | 87 | -  | 118 |

### ● Rod end flange type (FA)



Note 1: GG dimensions apply to 40, 50 mm bore.

Note 3: Refer to page 2356 for dimensions with bellows.

Note 2: The value of symbol F may vary depending on booster stroke. Refer to the right above table.

Note 4: Refer to page 2357 for the dimensions of the accessory.

| Bore size (mm) | A  | B  | BA  | BB  | BC  | BD  | C  | D     | DA  | DE | E  | EE    | FC  | FD | FH  | FL  | FM  | FT | GA | GB   | GC | GD  | GE   | GF   |
|----------------|----|----|-----|-----|-----|-----|----|-------|-----|----|----|-------|-----|----|-----|-----|-----|----|----|------|----|-----|------|------|
| φ 40           | 36 | 32 | 50  | M12 | 74  | 68  | 34 | φ43   | M8  | -  | 35 | Rc1/8 | 74  | 14 | 98  | 125 | 153 | 19 | 26 | 4    | -  | 8.5 | 36.5 | 47.5 |
| φ 50           | 45 | 41 | 60  | M12 | 90  | 75  | 43 | φ51   | M8  | -  | 36 | Rc1/4 | 88  | 14 | 118 | 144 | 180 | 19 | 30 | 2    | -  | 10  | 43   | 53.5 |
| φ 63           | 50 | 46 | 80  | M14 | 110 | 74  | 47 | φ57   | M8  | 18 | 33 | Rc1/4 | 100 | 19 | 140 | 190 | 230 | 14 | 32 | 9    | 1  | 13  | 48   | 58   |
| φ 80           | 56 | 55 | 110 | M16 | 142 | 89  | 53 | φ62.5 | M12 | 20 | 34 | Rc3/8 | 118 | 19 | 177 | 236 | 280 | 19 | 38 | 8    | 1  | 16  | 59   | 69   |
| φ 100          | 72 | 70 | 130 | M20 | 175 | 100 | 69 | φ75   | M12 | 24 | 37 | Rc3/8 | 150 | 24 | 220 | 280 | 330 | 25 | 41 | 12.5 | 5  | 20  | 71   | 81   |

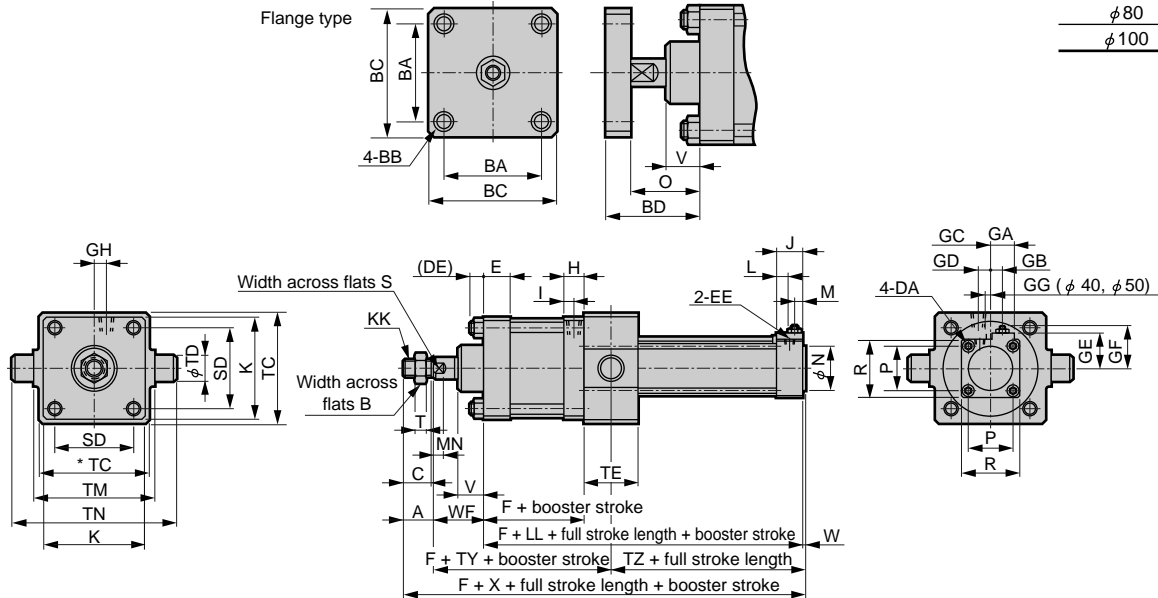
| Bore size (mm) | GH | H  | I    | J  | K   | KK        | L  | LL   | M  | MM  | MN | N   | O  | P    | R   | S  | SD  | T  | V  | W | WF | X     | XF  | GG |
|----------------|----|----|------|----|-----|-----------|----|------|----|-----|----|-----|----|------|-----|----|-----|----|----|---|----|-------|-----|----|
| φ 40           | 12 | 18 | 10   | 26 | 98  | M22 x 1.5 | 7  | 65.5 | 8  | φ25 | 14 | φ31 | 52 | 40.5 | 57  | 23 | 74  | 13 | 24 | 2 | 48 | 151.5 | 84  | 20 |
| φ 50           | 16 | 22 | 11.5 | 32 | 118 | M26 x 1.5 | 9  | 73.5 | 9  | φ30 | 17 | φ38 | 54 | 48   | 69  | 26 | 90  | 16 | 24 | 2 | 53 | 173.5 | 98  | 20 |
| φ 63           | 13 | 24 | 13   | 30 | 140 | M30 x 1.5 | 15 | 73   | 10 | φ35 | 20 | φ38 | 53 | 59   | 80  | 31 | 110 | 18 | 21 | 3 | 63 | 189   | 113 | -  |
| φ 80           | 15 | 28 | 15   | 34 | 177 | M36 x 1.5 | 17 | 87.5 | 11 | φ40 | 26 | φ43 | 64 | 74   | 98  | 36 | 142 | 21 | 24 | 2 | 70 | 215.5 | 126 | -  |
| φ 100          | 20 | 26 | 13   | 37 | 220 | M45 x 1.5 | 22 | 96   | 15 | φ50 | 26 | φ51 | 71 | 90   | 118 | 46 | 175 | 27 | 30 | 2 | 87 | 257   | 159 | -  |

### Dimensions [Rod end trunnion type (TA)]

● Rod end trunnion type (TA)

Symbol: F

| Bore size (mm) | 10, 20 |
|----------------|--------|
| φ 40           | 84.5   |
| φ 50           | 90.5   |
| φ 63           | 90     |
| φ 80           | 105    |
| φ 100          | 110.5  |



Note 1: GG dimensions apply to 40, 50 mm bore.

Note 2: The value of symbol F may vary depending on booster stroke.

Refer to the table on the right.

Note 3: Since trunnion is interfered, switch cannot be installed at the advanced end.

Note 4: An piping port cannot be provided on the side where a trunnion axis end.

Note 5: Refer to page 2356 for dimensions with bellows.

Note 6: Refer to page 2357 for the dimensions of the accessory.

| Bore size (mm) | A         | B  | BA   | BB  | BC   | BD  | C    | D      | DA   | DE  | E  | EE    | GA | GB   | GC | GD  | GE   | GF   | GH  | H    | I    | J  | K   |       |    |
|----------------|-----------|----|------|-----|------|-----|------|--------|------|-----|----|-------|----|------|----|-----|------|------|-----|------|------|----|-----|-------|----|
| φ 40           | 36        | 32 | 50   | M12 | 74   | 68  | 34   | φ 43   | M8   | -   | 35 | Rc1/8 | 26 | 4    | -  | 8.5 | 36.5 | 47.5 | 12  | 18   | 10   | 26 | 98  |       |    |
| φ 50           | 45        | 41 | 60   | M12 | 90   | 75  | 43   | φ 51   | M8   | -   | 36 | Rc1/4 | 30 | 2    | -  | 10  | 43   | 53.5 | 16  | 22   | 11.5 | 32 | 118 |       |    |
| φ 63           | 50        | 46 | 80   | M14 | 110  | 74  | 47   | φ 57   | M8   | 18  | 33 | Rc1/4 | 32 | 9    | 1  | 13  | 48   | 58   | 13  | 24   | 13   | 30 | 140 |       |    |
| φ 80           | 56        | 55 | 110  | M16 | 142  | 89  | 53   | φ 62.5 | M12  | 20  | 34 | Rc3/8 | 38 | 8    | 1  | 16  | 59   | 69   | 15  | 28   | 15   | 34 | 177 |       |    |
| φ 100          | 72        | 70 | 130  | M20 | 175  | 100 | 69   | φ 75   | M12  | 24  | 37 | Rc3/8 | 41 | 12.5 | 5  | 20  | 71   | 81   | 20  | 26   | 13   | 37 | 220 |       |    |
| Bore size (mm) | KK        | L  | LL   | M   | MM   | MN  | N    | O      | P    | R   | S  | SD    | T  | TC   | TD | TE  | TM   | TN   | TY  | TZ   | V    | W  | WF  | X     | GG |
| φ 40           | M22 x 1.5 | 7  | 65.5 | 8   | φ 25 | 14  | φ 31 | 52     | 40.5 | 57  | 23 | 74    | 13 | 100  | 25 | 40  | 115  | 165  | 68  | 47.5 | 24   | 2  | 48  | 151.5 | 20 |
| φ 50           | M26 x 1.5 | 9  | 73.5 | 9   | φ 30 | 17  | φ 38 | 54     | 48   | 69  | 26 | 90    | 16 | 121  | 35 | 50  | 135  | 205  | 78  | 50.5 | 24   | 2  | 53  | 173.5 | 20 |
| φ 63           | M30 x 1.5 | 15 | 73   | 10  | φ 35 | 20  | φ 38 | 53     | 59   | 80  | 31 | 110   | 18 | 150  | 32 | 50  | 170  | 234  | 88  | 51   | 21   | 3  | 63  | 189   | -  |
| φ 80           | M36 x 1.5 | 17 | 87.5 | 11  | φ 40 | 26  | φ 43 | 64     | 74   | 98  | 36 | 142   | 21 | 190  | 40 | 60  | 212  | 292  | 100 | 59.5 | 24   | 2  | 70  | 215.5 | -  |
| φ 100          | M45 x 1.5 | 22 | 96   | 15  | φ 50 | 26  | φ 51 | 71     | 90   | 118 | 46 | 175   | 27 | 242  | 45 | 70  | 265  | 355  | 122 | 63   | 30   | 2  | 87  | 257   | -  |

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

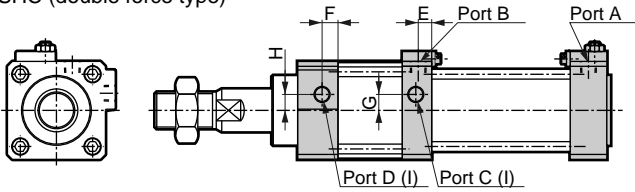
High power cylinder  
Special type



# SHC/SHC-K Series

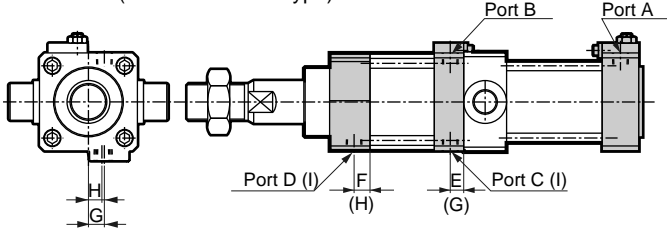
## Dimensions with booster single control port position (option)

### ● SHC (double force type)

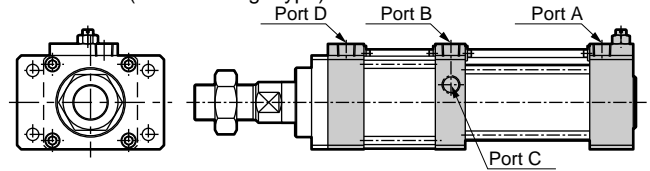


| Bore size (mm) | E  | F  | G  | H   | 2-I   |
|----------------|----|----|----|-----|-------|
| φ40            | 10 | 11 | 10 | 2   | Rc1/8 |
| φ50            | 11 | 13 | 13 | 5   | Rc1/4 |
| φ63            | 13 | 14 | 14 | 9.5 | Rc1/4 |
| φ80            | 14 | 14 | 18 | 21  | Rc3/8 |
| φ100           | 13 | 15 | 26 | 26  | Rc3/8 |

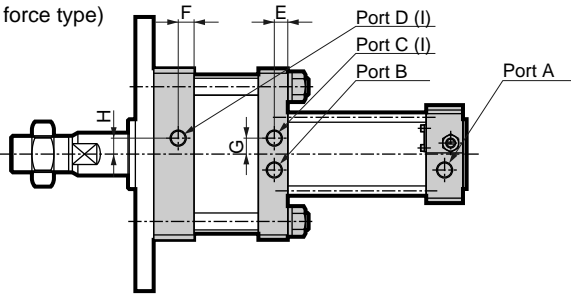
### ● SHC-TA (rod end trunnion type)



### ● SHC-FA (rod end flange type)



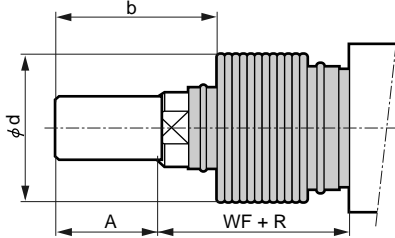
### ● SHC-K (four times force type)



| Bore size (mm) | E    | F  | G  | H  | 2-I   |
|----------------|------|----|----|----|-------|
| φ40            | 8    | 10 | 6  | 6  | Rc1/8 |
| φ50            | 10.5 | 11 | 6  | 6  | Rc1/4 |
| φ63            | 13   | 13 | 13 | 13 | Rc1/4 |
| φ80            | 14   | 14 | 14 | 14 | Rc3/8 |
| φ100           | 13   | 13 | 21 | 42 | Rc3/8 |

## Dimensions with bellows (SHC, SHC-K common)

### ● Standard type



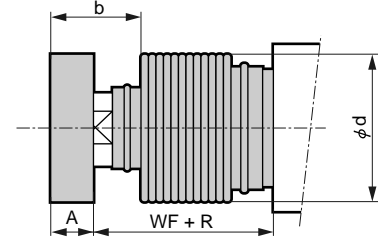
### ● SHC

| Bore size (mm) | A                              | b         | d          | WF         |            |            |            |                                |
|----------------|--------------------------------|-----------|------------|------------|------------|------------|------------|--------------------------------|
| φ40            | 36                             | 51.5      | 53         | 42         |            |            |            |                                |
| φ50            | 45                             | 65        | 61         | 47         |            |            |            |                                |
| φ63            | 50                             | 80        | 75         | 55.5       |            |            |            |                                |
| φ80            | 56                             | 88        | 80         | 61         |            |            |            |                                |
| φ100           | 72                             | 108       | 95         | 71         |            |            |            |                                |
| Bore size (mm) | R                              |           |            |            |            |            |            |                                |
| φ40            | 50 or less                     | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 500 and over                   |
|                | 14                             | 26        | 38         | 49         | 72         | 96         | 119        | (Full stroke length/4.3) + 2.5 |
| φ50            | 50 or less                     | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 500 and over                   |
|                | 20                             | 32        | 42         | 53         | 76         | 98         | 120        | (Full stroke length/4.5) + 9   |
| φ63            | (Full stroke length/4.55) + 11 |           |            |            |            |            |            |                                |
| φ80            | (Full stroke length/5.15) + 9  |           |            |            |            |            |            |                                |
| φ100           | (Full stroke length/5.3) + 9   |           |            |            |            |            |            |                                |

### ● SHC-K

| Bore size (mm) | A                              | b         | d          | WF         |            |            |            |                                |
|----------------|--------------------------------|-----------|------------|------------|------------|------------|------------|--------------------------------|
| φ40            | 36                             | 51.5      | 53         | 42         |            |            |            |                                |
| φ50            | 45                             | 65        | 61         | 47         |            |            |            |                                |
| φ63            | 50                             | 80        | 75         | 55.5       |            |            |            |                                |
| φ80            | 56                             | 88        | 80         | 61         |            |            |            |                                |
| φ100           | 72                             | 108       | 95         | 71         |            |            |            |                                |
| Bore size (mm) | R                              |           |            |            |            |            |            |                                |
| φ40            | 50 or less                     | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 500 and over                   |
|                | 14                             | 26        | 38         | 49         | 72         | 96         | 119        | (Full stroke length/4.3) + 2.5 |
| φ50            | 50 or less                     | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 500 and over                   |
|                | 20                             | 32        | 42         | 53         | 76         | 98         | 120        | (Full stroke length/4.5) + 9   |
| φ63            | (Full stroke length/4.55) + 11 |           |            |            |            |            |            |                                |
| φ80            | (Full stroke length/5.15) + 9  |           |            |            |            |            |            |                                |
| φ100           | (Full stroke length/5.3) + 9   |           |            |            |            |            |            |                                |

### ● Rod end flange type



### ● SHC

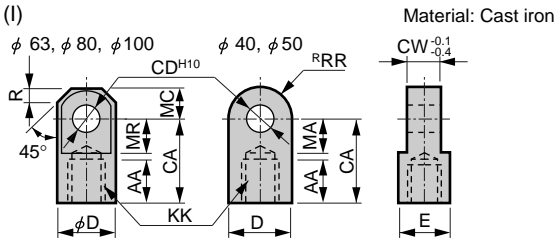
| Bore size (mm) | A                              | b         | d          | WF         |            |            |            |                                |
|----------------|--------------------------------|-----------|------------|------------|------------|------------|------------|--------------------------------|
| φ40            | 16                             | 35.5      | 53         | 46         |            |            |            |                                |
| φ50            | 21                             | 42        | 61         | 48         |            |            |            |                                |
| φ63            | 21                             | 41        | 75         | 45.5       |            |            |            |                                |
| φ80            | 25                             | 51        | 80         | 56         |            |            |            |                                |
| φ100           | 29                             | 49        | 95         | 55         |            |            |            |                                |
| Bore size (mm) | R                              |           |            |            |            |            |            |                                |
| φ40            | 50 or less                     | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 500 and over                   |
|                | 14                             | 26        | 38         | 49         | 72         | 96         | 119        | (Full stroke length/4.3) + 2.5 |
| φ50            | 50 or less                     | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 500 and over                   |
|                | 20                             | 32        | 42         | 53         | 76         | 98         | 120        | (Full stroke length/4.5) + 9   |
| φ63            | (Full stroke length/4.55) + 11 |           |            |            |            |            |            |                                |
| φ80            | (Full stroke length/5.15) + 9  |           |            |            |            |            |            |                                |
| φ100           | (Full stroke length/5.3) + 9   |           |            |            |            |            |            |                                |

### ● SHC-K

| Bore size (mm) | A                              | b         | d          | WF         |            |            |            |                                |
|----------------|--------------------------------|-----------|------------|------------|------------|------------|------------|--------------------------------|
| φ40            | 16                             | 35.5      | 53         | 46         |            |            |            |                                |
| φ50            | 21                             | 42        | 61         | 48         |            |            |            |                                |
| φ63            | 21                             | 41        | 75         | 45.5       |            |            |            |                                |
| φ80            | 25                             | 51        | 80         | 56         |            |            |            |                                |
| φ100           | 29                             | 49        | 95         | 55         |            |            |            |                                |
| Bore size (mm) | R                              |           |            |            |            |            |            |                                |
| φ40            | 50 or less                     | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 500 and over                   |
|                | 14                             | 26        | 38         | 49         | 72         | 96         | 119        | (Full stroke length/4.3) + 2.5 |
| φ50            | 50 or less                     | 51 to 100 | 101 to 150 | 151 to 200 | 201 to 300 | 301 to 400 | 401 to 500 | 500 and over                   |
|                | 20                             | 32        | 42         | 53         | 76         | 98         | 120        | (Full stroke length/4.5) + 9   |
| φ63            | (Full stroke length/4.55) + 11 |           |            |            |            |            |            |                                |
| φ80            | (Full stroke length/5.15) + 9  |           |            |            |            |            |            |                                |
| φ100           | (Full stroke length/5.3) + 9   |           |            |            |            |            |            |                                |

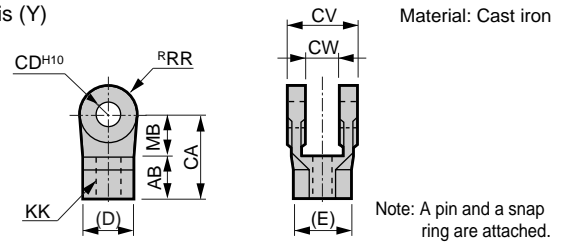
### Accessory (rod eye/clevis, bracket, pin) dimensions

#### ● Rod eye (I)



| Model no. | Applicable bore size (mm) | AA | CA  | CD | CW | D  | E  | KK        | MA   | MC   | R    | RR | Weight (kg) |
|-----------|---------------------------|----|-----|----|----|----|----|-----------|------|------|------|----|-------------|
| SHC-I-40  | φ40                       | 30 | 70  | 20 | 28 | 46 | 41 | M22 x 1.5 | 30   | -    | -    | 25 | 0.83        |
| SHC-I-50  | φ50                       | 30 | 70  | 20 | 28 | 46 | 41 | M26 x 1.5 | 30   | -    | -    | 25 | 0.83        |
| SHC-I-63  | φ63                       | 50 | 85  | 25 | 32 | 55 | -  | M30 x 1.5 | 32   | 27.5 | 15.5 | -  | 1.2         |
| SHC-I-80  | φ80                       | 60 | 105 | 32 | 40 | 70 | -  | M36 x 1.5 | 40   | 35   | 21   | -  | 2.5         |
| SHC-I-100 | φ100                      | 75 | 125 | 40 | 50 | 85 | -  | M45 x 1.5 | 47.5 | 42.5 | 29   | -  | 4.2         |

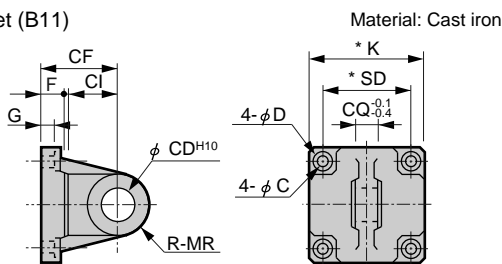
#### ● Rod clevis (Y)



| Model no. | Applicable bore size (mm) | AB | CA  | CD | CW | CV  | D  | E    | KK        | MB | RR   | Weight (kg) |
|-----------|---------------------------|----|-----|----|----|-----|----|------|-----------|----|------|-------------|
| SHC-Y-40  | φ40                       | 35 | 70  | 20 | 28 | 56  | 41 | 47.3 | M22 x 1.5 | 30 | 25   | 0.7         |
| SHC-Y-50  | φ50                       | 35 | 70  | 20 | 28 | 56  | 41 | 47.3 | M26 x 1.5 | 30 | 25   | 0.7         |
| SHC-Y-63  | φ63                       | 50 | 85  | 25 | 32 | 64  | 46 | 53.1 | M30 x 1.5 | 35 | 27.5 | 1           |
| SHC-Y-80  | φ80                       | 60 | 105 | 32 | 40 | 80  | 55 | 63.5 | M36 x 1.5 | 45 | 35   | 2           |
| SHC-Y-100 | φ100                      | 75 | 125 | 40 | 50 | 100 | 70 | 80.8 | M45 x 1.5 | 50 | 42.5 | 3.7         |

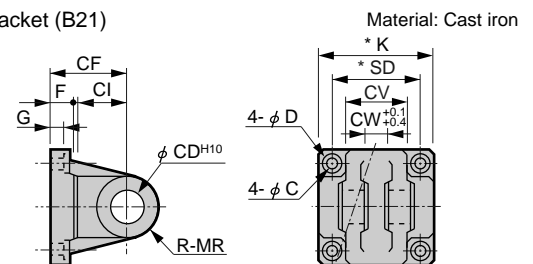
#### A) For clevis No. 2 bracket

##### ● Eye bracket (B11)



| Model no.   | Applicable bore size (mm) | C  | CD | CF | CI | CQ | D  | F  | G    | K   | MR | SD   | Weight (kg) |
|-------------|---------------------------|----|----|----|----|----|----|----|------|-----|----|------|-------------|
| SHC-B11-40  | φ40                       | 9  | 12 | 32 | 18 | 18 | 14 | 10 | 6.5  | 57  | 12 | 40.5 | 0.27        |
| SHC-B11-50  | φ50                       | 9  | 12 | 32 | 18 | 18 | 14 | 10 | 6.5  | 66  | 12 | 48   | 0.33        |
| SHC-B11-63  | φ63                       | 9  | 14 | 37 | 24 | 20 | 14 | 10 | 7.5  | 80  | 16 | 59   | 0.54        |
| SHC-B11-80  | φ80                       | 14 | 20 | 52 | 30 | 28 | 20 | 14 | 10.5 | 98  | 20 | 74   | 1.3         |
| SHC-B11-100 | φ100                      | 14 | 20 | 52 | 30 | 28 | 20 | 16 | 10.5 | 118 | 20 | 90   | 1.7         |

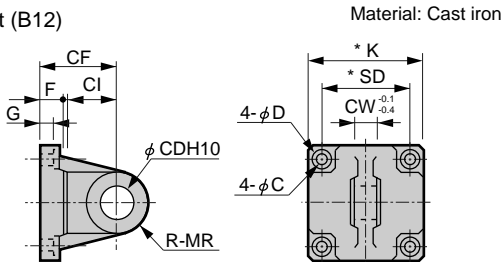
##### ● Clevis bracket (B21)



| Model no.   | Applicable bore size (mm) | C  | CD | CF | CI | CV | CW | D  | F  | G    | K   | MR | SD   | Weight (kg) |
|-------------|---------------------------|----|----|----|----|----|----|----|----|------|-----|----|------|-------------|
| SHC-B21-40  | φ40                       | 9  | 12 | 32 | 18 | 36 | 18 | 14 | 10 | 6.5  | 57  | 12 | 40.5 | 0.28        |
| SHC-B21-50  | φ50                       | 9  | 12 | 32 | 18 | 36 | 18 | 14 | 10 | 6.5  | 66  | 12 | 48   | 0.33        |
| SHC-B21-63  | φ63                       | 9  | 14 | 37 | 24 | 40 | 20 | 14 | 10 | 7.5  | 80  | 16 | 59   | 0.53        |
| SHC-B21-80  | φ80                       | 14 | 20 | 52 | 30 | 56 | 28 | 20 | 14 | 10.5 | 98  | 20 | 74   | 1.3         |
| SHC-B21-100 | φ100                      | 14 | 20 | 52 | 30 | 56 | 28 | 20 | 16 | 10.5 | 118 | 20 | 90   | 1.7         |

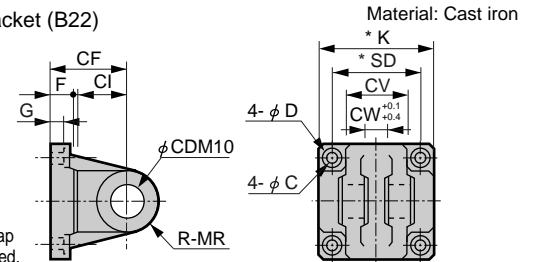
#### B) No.2 bracket for rod eye/clevis

##### ● Eye bracket (B12)



| Model no.   | Applicable bore size (mm) | C  | CD | CF | CI | CW | D  | F  | G    | K   | MR | SD  | Weight (kg) |
|-------------|---------------------------|----|----|----|----|----|----|----|------|-----|----|-----|-------------|
| SHC-B12-40  | φ40                       | 14 | 20 | 52 | 30 | 28 | 20 | 14 | 10.5 | 98  | 20 | 74  | 1.3         |
| SHC-B12-50  | φ50                       | 14 | 20 | 52 | 30 | 28 | 20 | 16 | 10.5 | 118 | 20 | 90  | 1.7         |
| SHC-B12-63  | φ63                       | 16 | 25 | 63 | 35 | 32 | 23 | 20 | 18   | 140 | 25 | 110 | 2.3         |
| SHC-B12-80  | φ80                       | 18 | 32 | 75 | 40 | 40 | 26 | 24 | 22   | 174 | 32 | 142 | 4.6         |
| SHC-B12-100 | φ100                      | 22 | 40 | 90 | 55 | 50 | 32 | 30 | 28   | 220 | 40 | 175 | 8.9         |

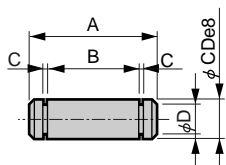
##### ● Clevis bracket (B22)



| Model no.   | Applicable bore size (mm) | C  | CD | CF | CI | CV  | CW | D  | F  | G    | K   | MR | SD  | Weight (kg) |
|-------------|---------------------------|----|----|----|----|-----|----|----|----|------|-----|----|-----|-------------|
| SHC-B22-40  | φ40                       | 14 | 20 | 52 | 30 | 56  | 28 | 20 | 14 | 10.5 | 98  | 20 | 74  | 1.3         |
| SHC-B22-50  | φ50                       | 14 | 20 | 52 | 30 | 56  | 28 | 20 | 16 | 10.5 | 118 | 20 | 90  | 1.7         |
| SHC-B22-63  | φ63                       | 16 | 25 | 63 | 35 | 64  | 32 | 23 | 20 | 18   | 140 | 25 | 110 | 2.6         |
| SHC-B22-80  | φ80                       | 18 | 32 | 75 | 40 | 80  | 40 | 26 | 24 | 22   | 174 | 32 | 142 | 5           |
| SHC-B22-100 | φ100                      | 22 | 40 | 90 | 55 | 100 | 50 | 32 | 30 | 28   | 220 | 40 | 175 | 9.2         |

#### For clevis pin

##### ● Pin (P)

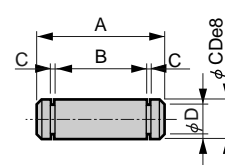


Material: Carbon steel

| Model no. | Applicable bore size (mm) | A    | B    | C    | D    | CD | Applicable snap rings | Weight (kg) |
|-----------|---------------------------|------|------|------|------|----|-----------------------|-------------|
| S1-P-40   | φ40, 50                   | 43.5 | 36.3 | 1.15 | 11.5 | 12 | Axis C type 12        | 0.04        |
| S1-P-63   | φ63                       | 47.5 | 40.2 | 1.15 | 13.4 | 14 | Axis C type 14        | 0.04        |
| S1-P-80   | φ80, 100                  | 64   | 56.2 | 1.35 | 19   | 20 | Axis C type 20        | 0.16        |

#### For rod eye/clevis pin

##### ● Pin (P)



Material: Carbon steel

| Model no. | Applicable bore size (mm) | A   | B     | C    | CD | C    | Applicable snap rings | Weight (kg) |
|-----------|---------------------------|-----|-------|------|----|------|-----------------------|-------------|
| S1-P-80   | φ40, 50                   | 64  | 56.2  | 1.35 | 20 | 19   | Axis C type 20        | 0.16        |
| SCS-125-P | φ63                       | 75  | 66.3  | 1.35 | 25 | 23.9 | Axis C type 25        | 0.27        |
| SCS-160-P | φ80                       | 92  | 82.7  | 1.65 | 32 | 30.3 | Axis C type 32        | 0.56        |
| SCS-180-P | φ100                      | 115 | 103.2 | 1.9  | 40 | 38   | Axis C type 40        | 1.1         |

Note) For clevis bracket, rod clevis and clevis bracket types, a pin and a snap ring are attached.

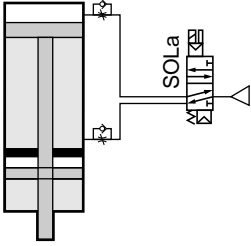
SCP\*2  
CMK2  
CMA2  
SCM  
SCG  
SCA2  
SCS  
CKV2  
CA/OV2  
SSD  
CAT  
MDC2  
MVC  
SMD2  
MSD\*  
FC\*  
STK  
ULK\*  
JSK/M2  
JSG  
JSC3  
USSD  
USC  
JSB3  
LMB  
STG  
STS/L  
LCS  
LCG  
LCM  
LCT  
LCY  
STR2  
UCA2  
HCM  
HCA  
SRL2  
SRG  
SRM  
SRT  
MRL2  
MRG2  
SM-25  
CAC3  
UCAC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

Ending

High power cylinder  
Special type

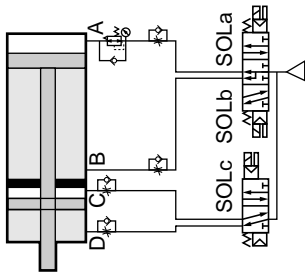
## Control circuit

### ● Standard SHC/SHC-K (circuit 1)



Driven as same as general cylinder.

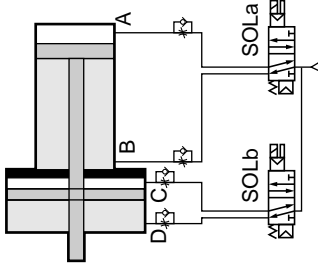
### ● Booster section single control circuit SHC-A (circuit 3)



| Solenoid valve              | Moving stroke | Booster stroke |      |
|-----------------------------|---------------|----------------|------|
| Operation state             | SOLa          | SOLb           | SOLc |
| Moving stroke advance       | ON            | OFF            | OFF  |
| Moving stroke end           | OFF           | OFF            | OFF  |
| Standby for 0.1 second over | OFF           | OFF            | OFF  |
| Booster stroke advance      | ON            | OFF            | ON   |
| Booster stroke return       | OFF           | OFF            | OFF  |
| Standby for 0.1 second over | OFF           | OFF            | OFF  |
| Moving stroke return        | OFF           | ON             | OFF  |

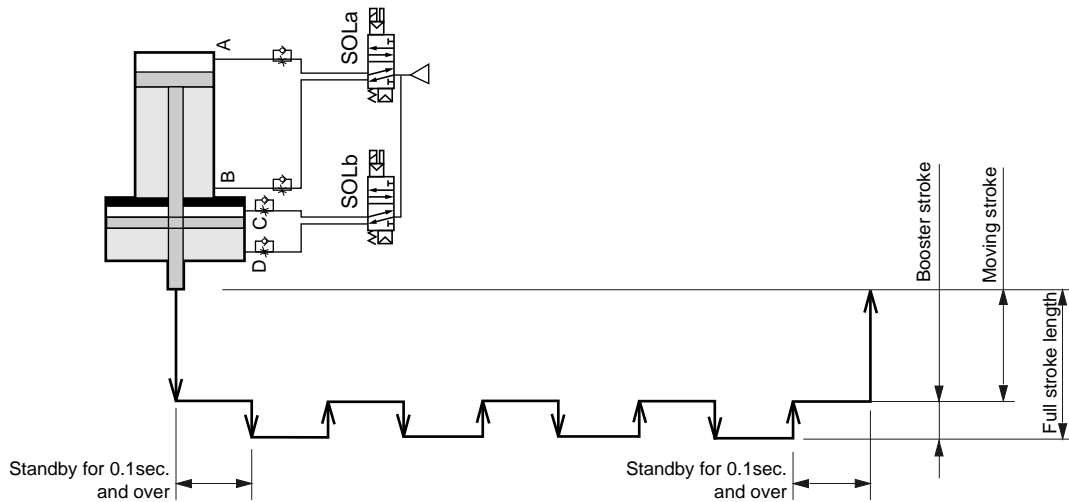
(Note) Install a reverse regulator onto the moving cylinder advance side. Failure to observe this causes operational failures at booster cylinder retracted.

### ● Booster section single control circuit SHC-K-A (circuit 4)



| Solenoid valve              | Moving stroke | Booster stroke |
|-----------------------------|---------------|----------------|
| Operation state             | SOLa          | SOLb           |
| Moving stroke advance       | ON            | OFF            |
| Moving stroke end           | ON            | OFF            |
| Standby for 0.1 second over | ON            | OFF            |
| Booster stroke advance      | ON            | ON             |
| Booster stroke return       | ON            | OFF            |
| Standby for 0.1 second over | ON            | OFF            |
| Moving stroke return        | OFF           | OFF            |

## Booster section single control operational diagram



\* Selection of solenoid valve is as same as selection of conventional cylinder bore size.

Note 1: When using a manifold, since upward load may allow back pressure from Port D to enter Port B, use individual exhaust spacers, or control a discrete valve.

Do not use 5 port valve with 2-position type because speed adjustment is not possible.

### Air consumption (at standard conditions)

A) For simple reciprocating operation

(1) Air consumption per reciprocating

$$V = Q_1 \times \frac{S_1}{100} + Q_2 \times \frac{S_2}{10}$$

(2) Air consumption per minute

$$Q = V \times N = (Q_1 \times \frac{S_1}{100} + Q_2 \times \frac{S_2}{10}) \times N$$

B) For high frequency operation

(1) Air consumption per reciprocating

$$V = Q_1 \times \frac{S_1}{100} + Q_2 \times \frac{S_2}{10} \times n$$

(2) Air consumption per minute

$$Q = V \times N = (Q_1 \times \frac{S_1}{100} + Q_2 \times \frac{S_2}{10} \times n) \times N$$

V : Air consumption per reciprocating ℓ (ANR)

Q : Air consumption per minute ℓ/min (ANR)

Q<sub>1</sub> : Air consumption of moving stroke section (table 1) ℓ (ANR)

Q<sub>2</sub> : Air consumption of booster stroke section (table 2) ℓ (ANR)

S<sub>1</sub> : Full stroke length mm

S<sub>2</sub> : Booster stroke mm

N : Full stroke reciprocating cycle per minute cpm

n : Number of reciprocating operation of booster stroke Cycle

Table 1. Air consumption of moving stroke section (SHC, SHC-K common)

| Bore size (mm) | One reciprocating air consumption per stroke length 100mm: Q <sub>1</sub> ℓ (ANR) |      |      |      |      |       |       |       |
|----------------|---|------|------|------|------|-------|-------|-------|
|                | Working pressure MPa  |      |      |      |      |       |       |       |
|                | 0.2   | 0.3  | 0.4  | 0.5  | 0.6  | 0.7   | 0.8   | 0.9   |
| φ 40           | 0.60  | 0.80 | 1.00 | 1.20 | 1.40 | 1.60  | 1.80  | 2.00  |
| φ 50           | 0.96  | 1.28 | 1.59 | 1.91 | 2.23 | 2.55  | 2.87  | 3.18  |
| φ 63           | 1.57  | 2.09 | 2.61 | 3.13 | 3.65 | 4.17  | 4.69  | 5.21  |
| φ 80           | 2.62  | 3.48 | 4.35 | 5.22 | 6.09 | 6.96  | 7.83  | 8.69  |
| φ 100          | 4.09  | 5.44 | 6.80 | 8.16 | 9.52 | 10.87 | 12.23 | 13.59 |

Table 2. Air consumption of booster stroke section

| Bore size (mm)         |      | One reciprocating air consumption per stroke length 100mm: Q <sub>2</sub> ℓ (ANR) |      |      |      |      |      |      |      |
|------------------------|------|---|------|------|------|------|------|------|------|
|                        |      | Working pressure MPa  |      |      |      |      |      |      |      |
|                        |      | 0.2   | 0.3  | 0.4  | 0.5  | 0.6  | 0.7  | 0.8  | 0.9  |
| Double force SHC       | φ40  | 0.08  | 0.11 | 0.14 | 0.17 | 0.20 | 0.22 | 0.25 | 0.28 |
|                        | φ50  | 0.14  | 0.19 | 0.23 | 0.28 | 0.33 | 0.37 | 0.42 | 0.47 |
|                        | φ63  | 0.20  | 0.26 | 0.33 | 0.39 | 0.46 | 0.52 | 0.59 | 0.65 |
|                        | φ80  | 0.28  | 0.38 | 0.47 | 0.56 | 0.66 | 0.75 | 0.85 | 0.94 |
|                        | φ100 | 0.42  | 0.56 | 0.70 | 0.84 | 0.98 | 1.12 | 1.26 | 1.41 |
| Four times force SHC-K | φ40  | 0.27  | 0.35 | 0.44 | 0.53 | 0.62 | 0.71 | 0.80 | 0.88 |
|                        | φ50  | 0.42  | 0.56 | 0.70 | 0.84 | 0.98 | 1.12 | 1.26 | 1.40 |
|                        | φ63  | 0.66  | 0.88 | 1.10 | 1.33 | 1.55 | 1.77 | 1.99 | 2.21 |
|                        | φ80  | 1.10  | 1.47 | 1.83 | 2.20 | 2.56 | 2.93 | 3.29 | 3.66 |
|                        | φ100 | 1.73  | 2.30 | 2.87 | 3.45 | 4.02 | 4.59 | 5.16 | 5.74 |

#### Example of calculation

Example 1. Simple reciprocating operation

Model no.: SHC-00-63H-300-20

Full stroke length S<sub>1</sub> = 300mm

Booster stroke S<sub>2</sub> = 20mm

Working pressure = 0.5MPa

Full stroke reciprocating cycle per minute N = 10cpm

(1) Air consumption per reciprocating

$$V = 3.13 \times \frac{300}{100} + 0.39 \times \frac{20}{10} = 10.17 \text{ ℓ (ANR)}$$

(2) Air consumption per minute

$$Q = 10.17 \times 10 = 101.7 \text{ ℓ /min. (ANR)}$$

Example 2. High frequency operation

Model no.: SHC-00-63H-300-20

Full stroke length S<sub>1</sub> = 300mm

Booster stroke S<sub>2</sub> = 20mm

Working pressure = 0.5MPa

Full stroke reciprocating cycle per minute N = 1cpm

Booster stroke reciprocating cycle n = 10 cycle

(1) Air consumption per reciprocating

$$V = 3.13 \times \frac{300}{100} + 0.39 \times \frac{20 \times 10}{10} = 17.19 \text{ ℓ (ANR)}$$

(2) Air consumption per minute

$$Q = 17.19 \times 1 = 17.19 \text{ ℓ /min. (ANR)}$$

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

High power cylinder  
Special type

# SHC/SHC-K Series

## Calculating movement and boosting speed relationship

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 type

Symbol

Sz: (mm/s)

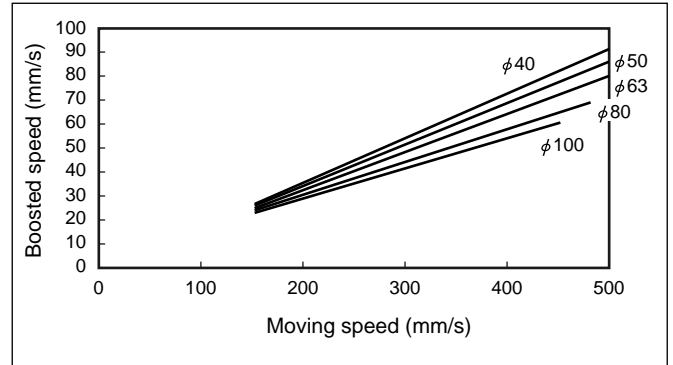
Si: Movement speed (mm/s)

a: Coefficient

b: Initial speed (at movement of 50 mm/s) (mm/s)

SHC Formula for 0.5MPa supply pressure

| Bore size (mm) | Boosted speed formula (mm/s)<br>$Sz = a (Si - 50) + b$<br>( $50 \leq Si \leq \text{max. moving speed}$ ) | Max. moving speed (mm/s) |           |
|----------------|--|--------------------------|-----------|
|                |  | 0.5 (MPa)                | 0.9 (MPa) |
| φ 40           | $Sz = 0.186 (Si - 50) + 7.2$   | 540                      | 640       |
| φ 50           | $Sz = 0.173 (Si - 50) + 8$   | 520                      | 620       |
| φ 63           | $Sz = 0.157 (Si - 50) + 9$   | 510                      | 610       |
| φ 80           | $Sz = 0.135 (Si - 50) + 10.3$  | 480                      | 570       |
| φ 100          | $Sz = 0.123 (Si - 50) + 11.1$  | 450                      | 540       |



Note that movement and boosting speeds change about 5% when pressure increases by 0.1(MPa).

· Example of formula

Boosting speed to move SHC-00-63H-300-20 cylinder at a pressure of 0.5(Mpa) and movement speed of 500(mm/s).

With the above formula,

$$Sz = 0.157 (500 - 50) + 9 = 79.6(\text{mm/s}) \doteq 79(\text{mm/s})$$

If pressure is 0.8(Mpa), speed changes 5% when pressure rises 0.1(MPa), so

$$Sz' = 1.15Sz = 91.6(\text{mm/s}) \doteq 91(\text{mm/s})$$

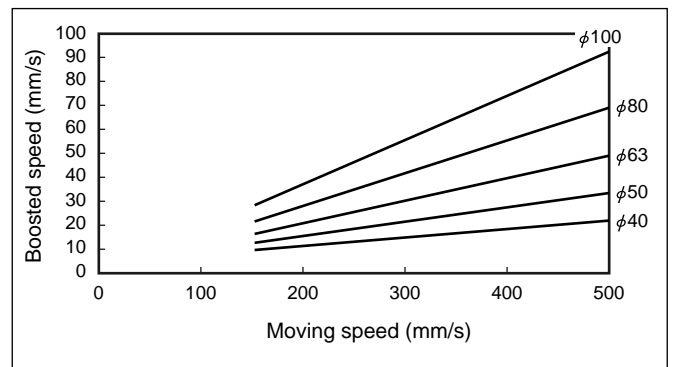
The maximum movement speed also changes about 5% when pressure rises 0.1(MPa), so

$$Sz_{\text{MAX}} = 510 \times 1.2 = 612 \doteq 610(\text{mm/s})$$

The same formula applies when calculating the following type.

SHC-K Formula for 0.5MPa supply pressure

| Bore size (mm) | Boosted speed formula (mm/s)<br>$Sz = a (Si - 50) + b$<br>( $50 \leq Si \leq \text{max. moving speed}$ ) | Max. moving speed (mm/s) |           |
|----------------|--|--------------------------|-----------|
|                |  | 0.5 (MPa)                | 0.9 (MPa) |
| φ 40           | $Sz = 0.0149 (Si - 50) + 2.3$  | 540                      | 640       |
| φ 50           | $Sz = 0.025 (Si - 50) + 2.6$   | 520                      | 620       |
| φ 63           | $Sz = 0.0381 (Si - 50) + 2.9$  | 510                      | 610       |
| φ 80           | $Sz = 0.0553 (Si - 50) + 3.3$  | 480                      | 570       |
| φ 100          | $Sz = 0.0756 (Si - 50) + 3.9$  | 450                      | 540       |



### Booster single control type

The booster cylinder reciprocates independently, so boosting speed changes with changes in supply pressure.

#### Symbol

Sz : boosted speed (mm/s)

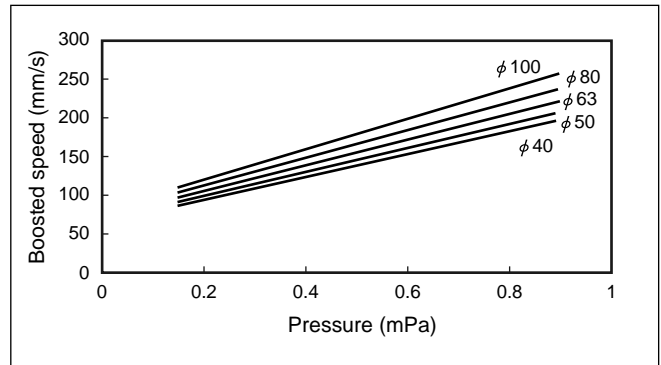
P : pressure (MPa)

c : coefficient

d : boosting speed coefficient (mm/s)

### SHC-A

| Bore size (mm) | Boosted speed formula (mm/s)<br>$Sz = cP + d$<br>( $0.15 \leq P \leq 0.9$ (MPa)) |
|----------------|--|
| φ 40           | $Sz = 144P + 67.3$   |
| φ 50           | $Sz = 152.1P + 69.8$   |
| φ 63           | $Sz = 162.7P + 73$   |
| φ 80           | $Sz = 176.6P + 77.3$   |
| φ 100          | $Sz = 193P + 82.3$   |



#### · Example of formula

Boosting speed to move SHC-00-40-300-20-A cylinder at a pressure of 0.5(MPa).

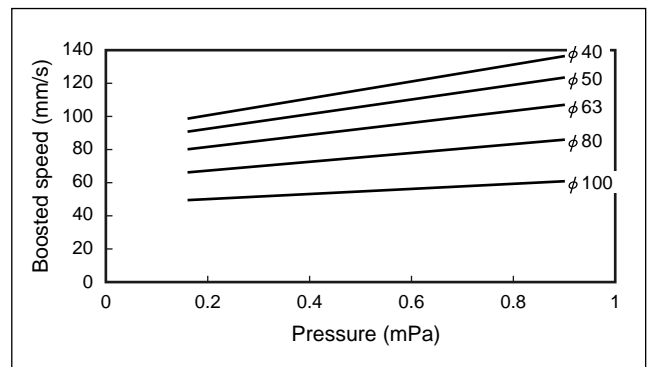
With the above formula,

$$Sz = 144 \times 0.5 + 67.3 = 139.3 \text{ ( mm/s ) } \doteq 139 \text{ ( mm/s )}$$

The same formula applies when calculating the following type.

### SHC-K-A

| Bore size (mm) | Boosted speed formula (mm/s)<br>$Sz = cP + d$<br>( $0.15 \leq P \leq 0.9$ (MPa)) |
|----------------|--|
| φ 40           | $Sz = 48.4P + 92.6$  |
| φ 50           | $Sz = 42.7P + 85.3$  |
| φ 63           | $Sz = 35.2P + 75.7$  |
| φ 80           | $Sz = 25.5P + 63.2$  |
| φ 100          | $Sz = 14.1P + 48.6$  |



|            |
|------------|
| 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        |
| <b>SHC</b> |
| GLC        |

Ending

High power cylinder  
Special type

# SHC/SHC-K Series

## Movement speed and time to reach 90% thrust

Standard type

Symbol

t: Time to reach 90% thrust (time to reach 90% thrust after contacting object) (s)

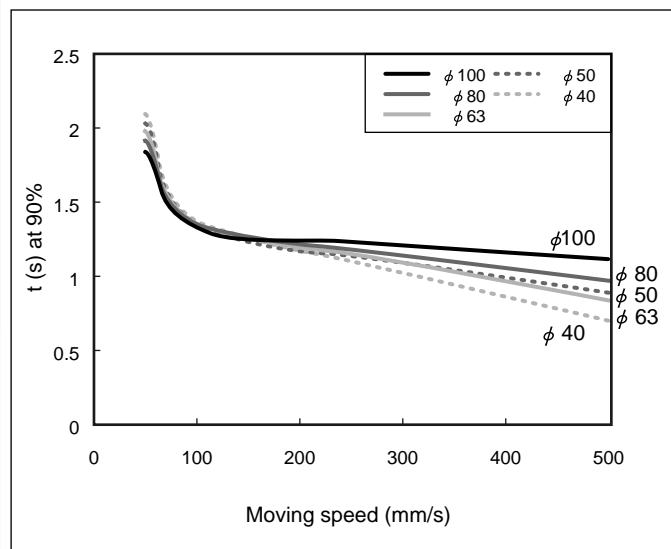
e, e': Coefficient

Si: Movement speed (mm/s)

f, f', f'': Time at movement speed 50, 100, 300 mm/s (s)

SHC Formula for 0.5MPa supply pressure

| Bore size (mm) | Formula for time to reach 90% thrust at 50 to 100 mm/s movement speed (s)<br>$t = e (Si - 50) + f$<br>( $50 \leq Si \leq 100$ ) | Formula for time to reach 90% thrust at 100 mm/s or higher movement speed (s)<br>$t = e' (Si - 100) + f'$<br>( $100 \leq Si \leq \text{maximum movement speed}$ ) | Max. moving speed (mm/s) |
|----------------|---|---|--------------------------|
| $\phi 40$      | $t = -0.0146 (Si - 50) + 2.1$   | $t = -0.00167 (Si - 100) + 1.37$  | 540                      |
| $\phi 50$      | $t = -0.013 (Si - 50) + 2.05$   | $t = -0.0013 (Si - 100) + 1.4$  | 520                      |
| $\phi 63$      | $t = -0.013 (Si - 50) + 1.93$   | $t = -0.00125 (Si - 100) + 1.35$  | 510                      |
| $\phi 80$      | $t = -0.0118 (Si - 50) + 1.93$  | $t = -0.000934 (Si - 100) + 1.34$   | 480                      |
| $\phi 100$     | $t = -0.0104 (Si - 50) + 1.85$  | $t = -0.0005625 (Si - 100) + 1.33$  | 450                      |



Note that the time to reach 90% thrust takes about 5 to 10% longer when supply pressure raises by 0.1(Mpa). The maximum movement speed increases about 5% when pressure rises by 0.1(MPa).

· Example of calculation

Time to reach 90% thrust when SHC-00-63H-300-20 cylinder is moved at a pressure of 0.5[MPa] and movement speed of 500[mm/s].

With the above formula,

$$t = -0.00125 \times (500 - 100) + 1.35 = 0.85(s) \approx 0.8(s)$$

If pressure is 0.8(MPa), time changes 5 to 10% at about 0.1(MPa), so the following guide applies:

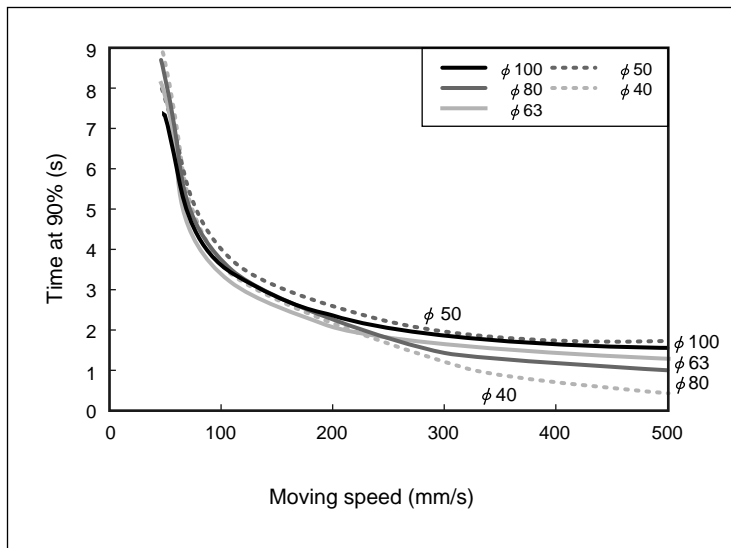
$$t' = (1.15 \text{ to } 1.3) t = 0.98 \text{ to } 1.1(s) \approx 1.0(s)$$

When using the double force type, time is not varied much by the full stroke length. The K (four times force) type below has a separate function expression because the time to attain thrust differs slightly with the full stroke length (full stroke < 300 and full stroke  $\geq 300$ ). The time for the boosted stroke 10 [mm] and 20 [mm] does not differ much.

SHC-K Formula for supply pressure 0.5MPa  
 · When full stroke length < 300mm

| Bore size (mm) |      | Movement speed 50 to 100mm/s<br>$t = e'(Si - 50) + f$<br>( $50 \leq Si \leq 100$ ) | Movement speed 100 to 300mm/s<br>$t = e'(Si - 100) + f'$<br>( $100 \leq Si \leq \text{maximum movement speed}$ ) | Movement speed 300mm/s over<br>$t = e''(Si - 300) + f''$<br>( $300 \leq Si \leq \text{maximum movement speed}$ ) | Max. moving speed (mm/s) |
|----------------|------|--|--|--|--------------------------|
| $\phi 40$      | Note | $t = -0.094(Si - 50) + 8.7$  | $t = -0.014(Si - 100) + 4$   | $t = -0.0034(Si - 300) + 1.2$  | 540                      |
| $\phi 50$      |      | $t = -0.1(Si - 50) + 8.9$  | $t = -0.01(Si - 100) + 3.9$  | $t = -0.00078(Si - 300) + 1.9$   | 520                      |
| $\phi 63$      |      | $t = -0.095(Si - 50) + 8.51$   | $t = -0.009885(Si - 100) + 3.76$   | $t = -0.0011(Si - 300) + 1.783$  | 510                      |
| $\phi 80$      |      | $t = -0.0886(Si - 50) + 8$   | $t = -0.0097(Si - 100) + 3.57$   | $t = -0.00152(Si - 300) + 1.63$  | 480                      |
| $\phi 100$     |      | $t = -0.081(Si - 50) + 7.4$  | $t = -0.0095(Si - 100) + 3.35$   | $t = -0.002(Si - 300) + 1.45$  | 450                      |

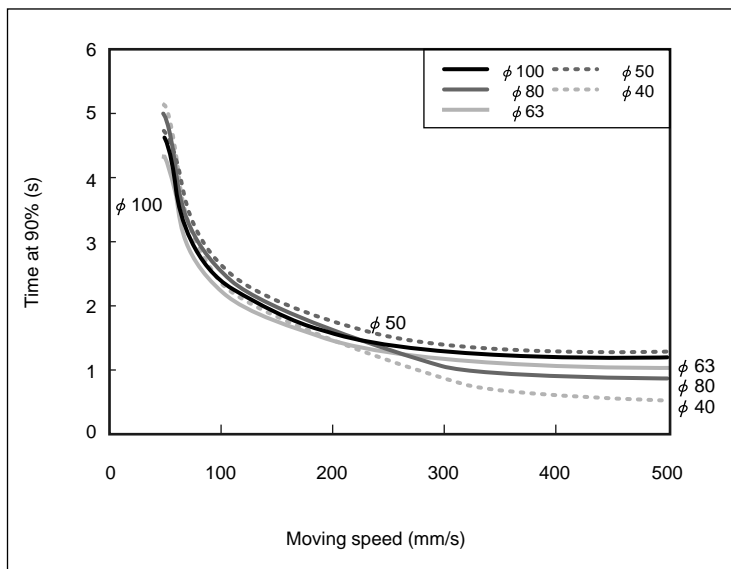
Note For SHC-K-40 only, when movement speed is 500 (mm/s) and over, time variation until thrust attains to 90% is almost nothing.



· When full stroke length  $\geq 300$ mm

| Bore size (mm) |      | Movement speed 50 to 100mm/s<br>$t = e'(Si - 50) + f$<br>( $50 \leq Si \leq 100$ ) | Movement speed 100 to 300mm/s<br>$t = e'(Si - 100) + f'$<br>( $100 \leq Si \leq \text{maximum movement speed}$ ) | Movement speed 300/s over<br>$t = e''(Si - 300) + f''$<br>( $300 \leq Si \leq \text{maximum movement speed}$ ) | Max. moving speed (mm/s) |
|----------------|------|--|--|--|--------------------------|
| $\phi 40$      | Note | $t = -0.049(Si - 50) + 5.15$   | $t = -0.00925(Si - 100) + 2.7$   | $t = -0.0017(Si - 300) + 0.85$   | 540                      |
| $\phi 50$      |      | $t = -0.051(Si - 50) + 5.21$   | $t = -0.0063(Si - 100) + 2.66$   | $t = -0.00039(Si - 300) + 1.4$   | 520                      |
| $\phi 63$      |      | $t = -0.0484(Si - 50) + 4.98$  | $t = -0.0062(Si - 100) + 2.56$   | $t = -0.000548(Si - 300) + 1.32$   | 510                      |
| $\phi 80$      |      | $t = -0.045(Si - 50) + 4.68$   | $t = -0.00612(Si - 100) + 2.43$  | $t = -0.000765(Si - 300) + 1.206$  | 480                      |
| $\phi 100$     |      | $t = -0.041(Si - 50) + 4.33$   | $t = -0.006(Si - 100) + 2.28$  | $t = -0.001(Si - 300) + 1.08$  | 450                      |

Note : For SHC-K-40 only, when movement speed is 500 (mm/s) and over, time variation until thrust attains to 90% is almost nothing.



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

High power cylinder  
 Special type



# SHC/SHC-K Series

Booster single control type

Individually reciprocating booster cylinder part varies the time until thrust is generated by supply pressure. The time until thrust generated is applied only to the booster cylinder section.

Symbol

t: Time until thrust attains to 90% (time to reach 90% thrust after contacting object) (s)

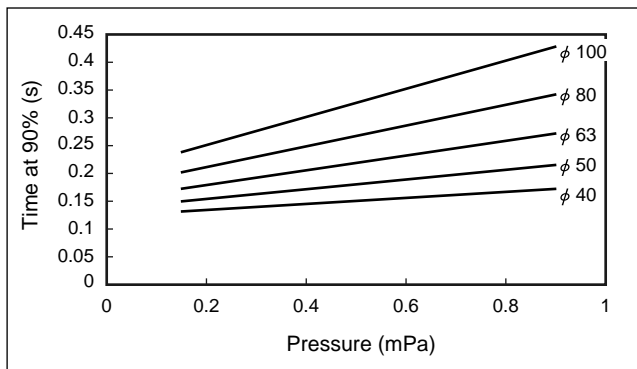
G: Coefficient

P: Pressure (MPa)

H: Time coefficient (s) until thrust attains 90%

SHC-A

| Bore size (mm) | Formula of time at thrust 90% (s)<br>$t = GP + H$<br>( $0.15 \leq P \leq 0.9$ (MPa)) |
|----------------|--|
| φ40            | $t = 0.05P + 0.123$  |
| φ50            | $t = 0.0826P + 0.135$  |
| φ63            | $t = 0.125P + 0.1525$  |
| φ80            | $t = 0.18P + 0.174$  |
| φ100           | $t = 0.245P + 0.2$   |



· Example of calculation

When operating the cylinder of SHC-00-63H-300-20-A at 0.5 (MPa) pressure. Time until thrust attains 90%.

With the above formula,

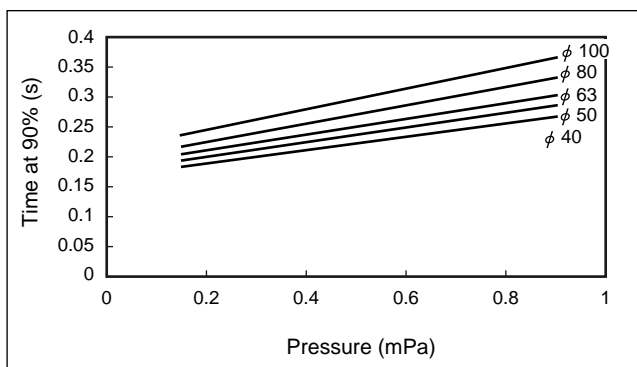
$$t = 0.125 \times 0.5 + 0.1525 = 0.215(\text{s}) \approx 0.2(\text{s})$$

The time for the boosted stroke 10 [mm] and 20 [mm] does not differ much.

The same formula applies when calculating the following type.

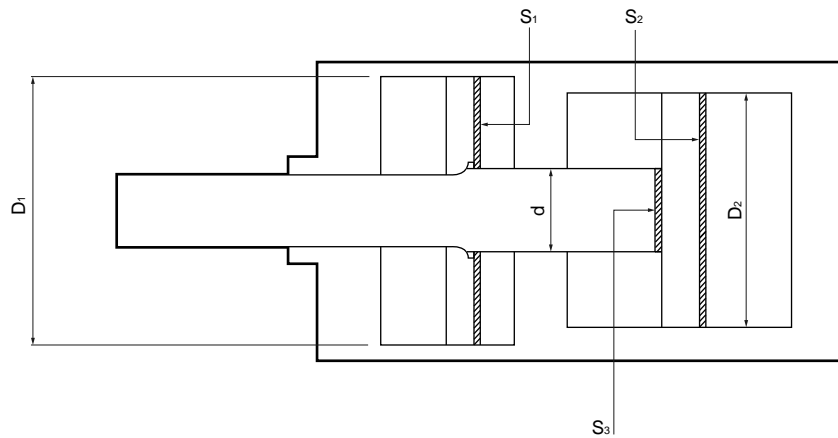
SHC-K-A

| Bore size (mm) | $t = GP + H$<br>( $0.15 \leq P \leq 0.9$ (MPa)) |
|----------------|---|
| φ40            | $t = 0.11P + 0.165$                             |
| φ50            | $t = 0.121P + 0.172$                            |
| φ63            | $t = 0.135P + 0.181$                            |
| φ80            | $t = 0.153P + 0.193$                            |
| φ100           | $t = 0.175P + 0.2075$                           |



### Theoretical thrust formula

SHC Pressurized area table



#### ● SHC

| Bore size (mm) | S <sub>1</sub> (cm <sup>2</sup> ) | S <sub>2</sub> (cm <sup>2</sup> ) | S <sub>3</sub> (cm <sup>2</sup> ) | D <sub>1</sub> (mm) | D <sub>2</sub> (mm) | d (mm) |
|----------------|-----------------------------------|-----------------------------------|-----------------------------------|---------------------|---------------------|--------|
| φ 40           | 13.4                              | 12.5                              | 6.15                              | φ 50                | φ 40                | φ 28   |
| φ 50           | 23.1                              | 19.6                              | 8.04                              | φ 63                | φ 50                | φ 32   |
| φ 63           | 31.6                              | 31.1                              | 12.5                              | φ 75                | φ 63                | φ 40   |
| φ 80           | 43.9                              | 50.2                              | 19.6                              | φ 90                | φ 80                | φ 50   |
| φ 100          | 66.7                              | 78.5                              | 28.2                              | φ 110               | φ 100               | φ 60   |

#### ● SHC-K

| Bore size (mm) | S <sub>1</sub> (cm <sup>2</sup> ) | S <sub>2</sub> (cm <sup>2</sup> ) | S <sub>3</sub> (cm <sup>2</sup> ) | D <sub>1</sub> (mm) | D <sub>2</sub> (mm) | d (mm) |
|----------------|-----------------------------------|-----------------------------------|-----------------------------------|---------------------|---------------------|--------|
| φ 40           | 44.1                              | 12.5                              | 6.15                              | φ 80                | φ 40                | φ 28   |
| φ 50           | 70.4                              | 19.6                              | 8.04                              | φ 100               | φ 50                | φ 32   |
| φ 63           | 110.1                             | 31.1                              | 12.5                              | φ 125               | φ 63                | φ 40   |
| φ 80           | 181.4                             | 50.2                              | 19.6                              | φ 160               | φ 80                | φ 50   |
| φ 100          | 285.8                             | 78.5                              | 28.2                              | φ 200               | φ 100               | φ 60   |

$$S_1 = \frac{\pi}{4} (D_1^2 - d^2)$$

$$S_2 = \frac{\pi}{4} D_2^2$$

$$S_3 = \frac{\pi}{4} d^2$$

#### Formula

Theoretical thrust = low thrust section (booster section) effective sectional area \* air pressure

E.g. Theoretical thrust when 63 mm bore cylinders is operated with 0.5(MPa).

· Theoretical thrust of thrust section at Push

$$F = S_2 P = 31.1(\text{cm}^2) \times 10^{-4} \times 0.5(\text{MPa}) \times 10^6 = 1558(\text{N})$$

· When Push, theoretical thrust of thrust section

$$F = (S_1 + S_2) P = (31.6 + 31.1)(\text{cm}^2) \times 10^{-4} \times 0.5(\text{MPa}) \times 10^6 = 3139(\text{N})$$

· When Pull, theoretical thrust of thrust section

$$F = (S_2 - S_3) P = (31.1 - 12.5)(\text{cm}^2) \times 10^{-4} \times 0.5(\text{MPa}) \times 10^6 = 930(\text{N})$$

· When Pull, theoretical thrust of thrust section

$$F = \{S_1 + (S_2 - S_3)\} P = \{31.6 + (31.1 - 12.5)\}(\text{cm}^2) \times 10^{-4} \times 0.5(\text{MPa}) \times 10^6 = 2511(\text{N})$$

Below decimal point is rounded up.

|            |
|------------|
| 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        |
| <b>SHC</b> |
| GLC        |

Ending

High power cylinder  
Special type