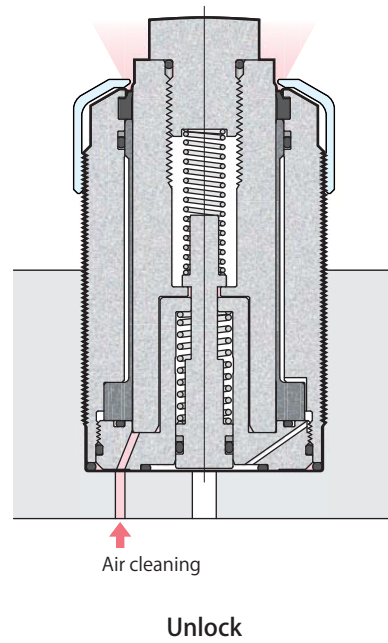
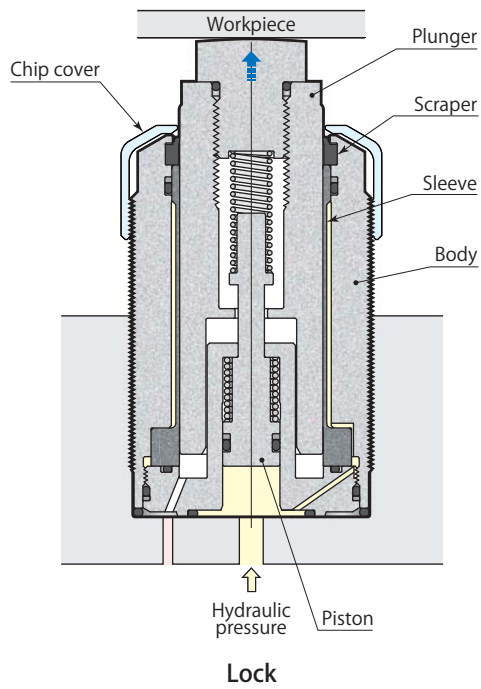
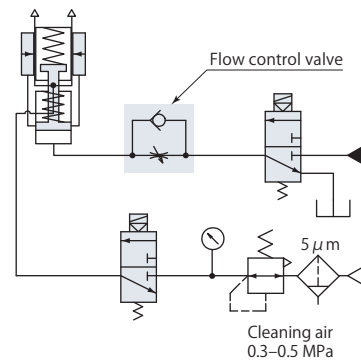


Hydraulic lift

model CSW □ M- □



Hydraulic and pneumatic circuit diagram



- Specifications page → 109
- Hydraulic pressure & support force page → 109
- Applied load & deformation page → 109
- Dimensions page → 110
- Mounting details page → 110

Specifications

Size
06
10
16
25

Plunger stroke
L : Standard stroke
D : Long stroke (only for CSW06)

CSW M -

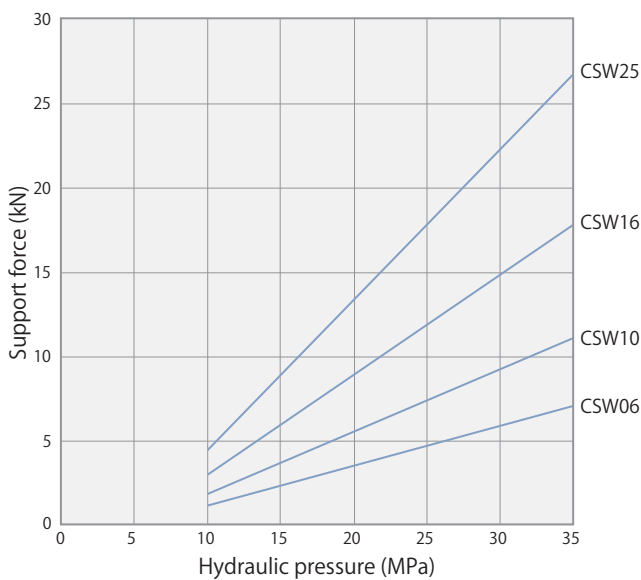
| Model | | CSW06M-L | CSW06M-D | CSW10M-L | CSW16M-L | CSW25M-L |
|--|-----------------|-------------|--------------|----------|----------|----------|
| | | 8 mm stroke | 15 mm stroke | | | |
| Support force (hydraulic pressure 35MPa)*1 | kN | 7.1 | | 11.1 | 17.8 | 26.7 |
| Cylinder capacity | cm ³ | 1.5 | 2.0 | 2.9 | 5.5 | 5.7 |
| Lift spring force*2 | N | 6-11 | 4-11 | 10-16 | 16-29 | 25-45 |
| Plunger stroke | mm | 8 | 15 | 10 | 10 | 13 |
| Max. allowable mass of head cap | kg | 0.1 | | 0.1 | 0.2 | 0.2 |
| Mass | kg | 0.29 | 0.33 | 0.43 | 1.03 | 1.89 |
| Recommended tightening torque of body | N·m | 35 | 35 | 60 | 130 | 250 |

- Pressure range: 10-35 MPa
- Proof pressure: 52.5 MPa
- Max. allowable back pressure: 0.05 MPa
- Operating temperature: 0-70°C
- Fluid used: General mineral based hydraulic oil (ISO-VG32 equivalent)
- Seals are resistant to chlorine-based cutting fluid. (not thermal resistant specification)

*1: When work support and clamp are used facing each other, work support and clamp must be selected in such a way that the support force is 1.5 times the applied load (clamping force + machining force).

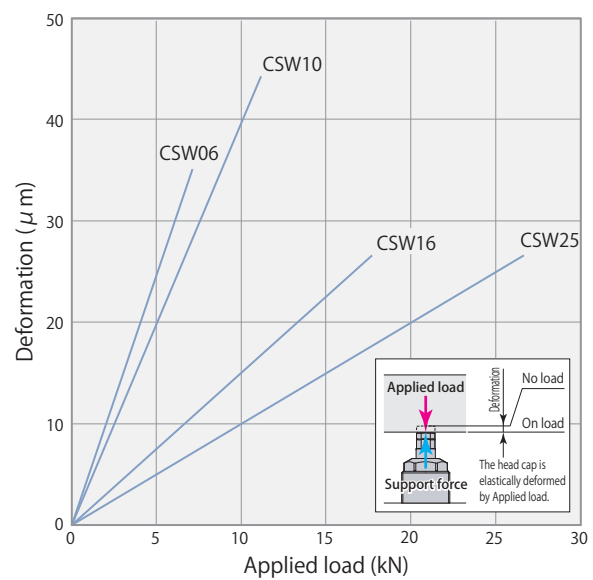
*2: Figures are for "upper end to lower end" of plunger action.

Hydraulic pressure & support force



| Hydraulic pressure MPa | Support force kN | | | |
|------------------------|------------------|-------|-------|-------|
| | CSW06 | CSW10 | CSW16 | CSW25 |
| 10 | 1.2 | 1.9 | 3.0 | 4.5 |
| 15 | 2.3 | 3.7 | 6.0 | 8.9 |
| 20 | 3.5 | 5.6 | 8.9 | 13.4 |
| 25 | 4.7 | 7.4 | 11.9 | 17.8 |
| 30 | 5.9 | 9.3 | 14.8 | 22.3 |
| 35 | 7.1 | 11.1 | 17.8 | 26.7 |

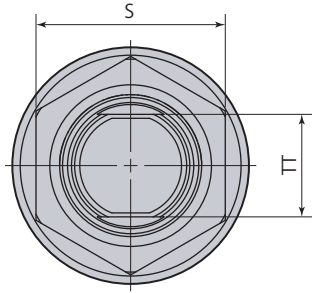
Applied load & deformation



| Applied load kN | Deformation μm | | | |
|-----------------|----------------|-------|-------|-------|
| | CSW06 | CSW10 | CSW16 | CSW25 |
| 0 | 0 | 0 | 0 | 0 |
| 5 | 25 | 20 | 7.5 | 5 |
| 10 | 40 | 40 | 15 | 10 |
| 15 | 55 | 60 | 22.5 | 15 |
| 20 | 70 | 80 | 30 | 20 |
| 25 | 85 | 100 | 37.5 | 25 |
| 30 | 100 | 120 | 45 | 30 |

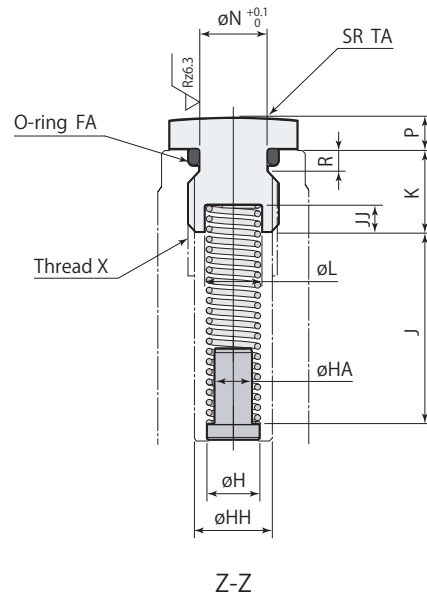
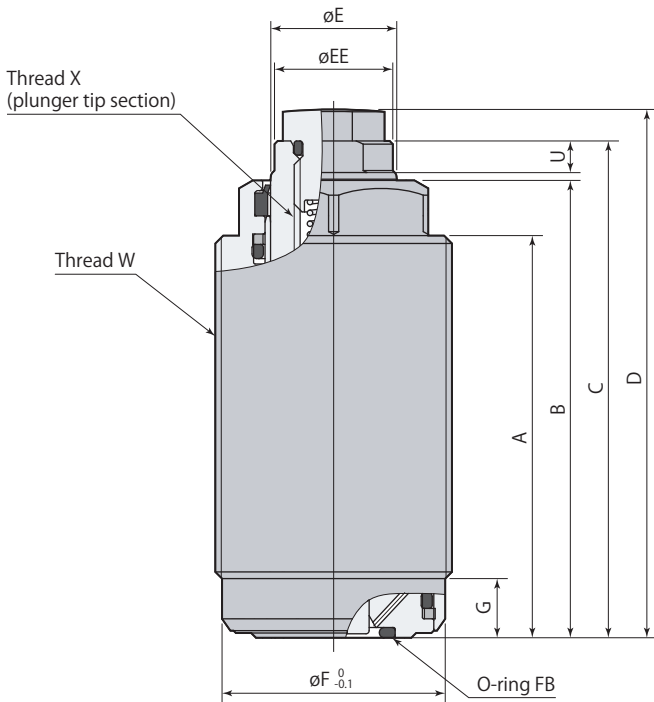
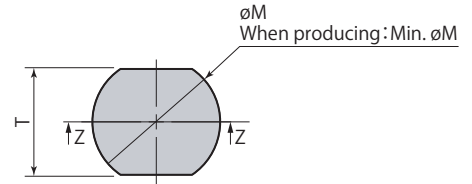
Held with hydraulic pressure of 35 MPa.

Dimensions

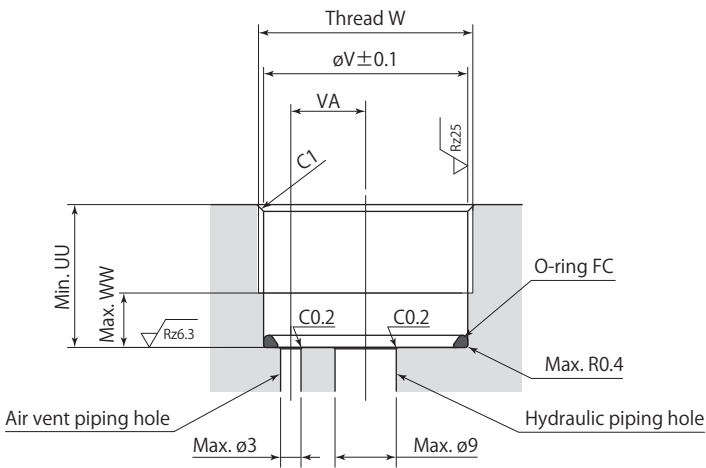


Head cap details

Hardness: HRC52



Mounting details



Rz: ISO4287(1997)

- When fixing the hexagon part of body with a vise, etc., make sure the tightening force is 2.5 kN or less.
- Always attach head cap (lift spring cannot be retained). When fabricating head cap, ensure that O-ring slot, spring spot facing and guide are made by referring to head cap details. Be sure to always use O-ring.
- When fabricating a lift spring, determine dimensions by referring to head cap details. Furthermore, rustproofing must be implemented (however, there is no guarantee for operation).
- Install O-ring FC at the bottom of the hole. The O-ring FC is packed with a work support.
- This diagram indicates a situation where head cap has been fitted into plunger with no pressure applied.

| Model | CSW06M-L | CSW06M-D | CSW10M-L | CSW16M-L | CSW25M-L |
|--|------------------------------|------------------------------|-------------------------------|-----------------------------|-----------------------------|
| A | 51 | 58 | 58 | 59.5 | 68.5 |
| B | 58 | 65 | 67 | 71.8 | 82 |
| C | 63 | 70 | 73 | 78 | 89 |
| D | 67 | 74 | 77 | 84 | 96 |
| øE | 16 | 16 | 20 | 30 | 40 |
| øEE | 15 | 15 | 19 | 29 | 39 |
| øF | 28.3 | 28.3 | 33.2 | 48.2 | 63.2 |
| G | 7.5 | 7.5 | 7.5 | 7.5 | 8 |
| øH | 7 | 7 | 7 | 8.5 | 10 |
| øHA | 5 | 5 | 5 | 6 | 7.5 |
| øHH | 8.5 | 8.5 | 10.3 | 14 | 14 |
| J | 20.5 | 21.3 | 25.5 | 25 | 32.5 |
| JJ | 1.5 | 1.5 | 3.5 | 1.5 | 1.5 |
| K | 9 | 9 | 11 | 12 | 11 |
| øL | 7.4 | 7.4 | 7.6 | 9.2 | 11.2 |
| øM | 12.9 | 12.9 | 16.9 | 23 | 30 |
| Min. øM | 12.5 | 12.5 | 16 | 21 | 21 |
| øN | 7.8 | 7.8 | 8.9 | 13.3 | 13.3 |
| P | 4 | 4 | 4 | 6 | 7 |
| R | 1.9 | 1.9 | 3 | 2.4 | 2.4 |
| S | 24 | 24 | 30 | 41 | 55 |
| T (width across flats) | 12 | 12 | 14 | 19 | 24 |
| TA | 70 | 70 | 90 | 110 | 140 |
| TT (plunger width across flats) | 13 | 13 | 17 | 24 | 32 |
| U | 4 | 4 | 5 | 5 | 5.7 |
| UU | 15.5 | 15.5 | 15.5 | 15.5 | 20 |
| øV | 28.5 | 28.5 | 33.5 | 48.5 | 63.5 |
| VA | 11 | 11 | 12 | 18 | 23.5 |
| W | M30×1.5 | M30×1.5 | M35×1.5 | M50×1.5 | M65×1.5 |
| WW | 6.5 | 6.5 | 6.5 | 6.5 | 7 |
| X (recommended tightening torque) | M10×1.5 depth 13 (30 N·m) | M10×1.5 depth 13 (30 N·m) | M12×1.75 depth 16 (50 N·m) | M16×2 depth 20 (100 N·m) | M16×2 depth 20 (100 N·m) |
| O-ring FA (fluorocarbon hardness Hs70) | S8 | S8 | P9 | AS568-014 | AS568-014 |
| O-ring FB (fluorocarbon hardness Hs90) | AS568-014 | AS568-014 | AS568-015 | AS568-019 | AS568-022 |
| O-ring FC (fluorocarbon hardness Hs90) | AS568-022 | AS568-022 | AS568-025 | S45 | AS568-036 |

mm

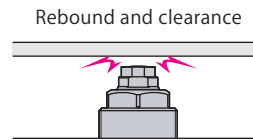
Work support

CSW
Hydraulic lift

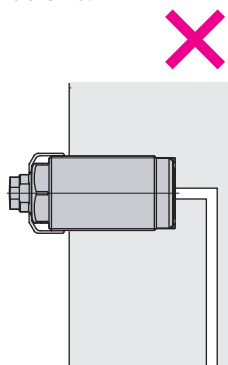
Caution in use

- The lift spring in the plunger may push the workpiece upward if it is light weight and seating detection cannot be complete. Review the weight of workpiece or lift spring force and make it appropriate to seat the workpiece perfectly and acutate the work support.
- Set the plunger lifting time to 0.2 seconds or longer by adjusting the flow control valve with check valve (meter-in). Reasonable plunger ascending speed can prevent the parts from breakage also curbs plunger contact false. Use a flow control valve with cracking pressure of 0.05MPa or less, in order to shorten plunger descending speed.

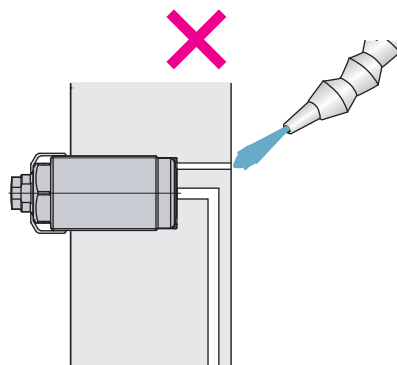
If the plunger ascends to reach a workpiece too fast, it rebounds after hitting the workpice and will create a small clearance between the two. The clearance may cause a supporting fault of the workpiece.



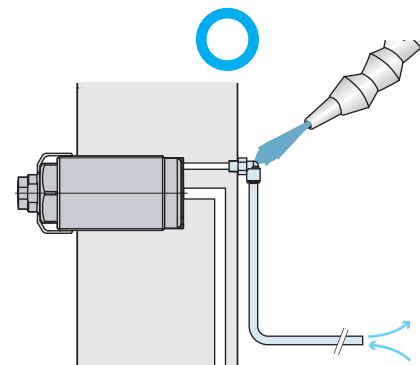
- Avoid following usages. These may cause sleeve deformation that could lead to malfunction of plunger or decreased support force.
 - ✗ Applying eccentric load on plunger.
 - ✗ Applying load that exceeds rated support force.
 - ✗ Rotating plunger when locked.
- Air vent must be opened to atmosphere. Any blockage on the vent results in malfunction. Provide the piping if there is a risk of coolant or metal chips intrusion. Allowing intrusion of cutting fluid may cause rusting and other problems.



Air vent is blocked



Cutting fluid intrusion from air vent



Piping to metal chips or coolant free area

- Air (oil free) must be fed through a $5\ \mu\text{m}$ filter that is connected to an air vent port for air cleaning. Perform air cleaning only when replacing workpiece. Plunger will rise during air cleaning.