air Work support

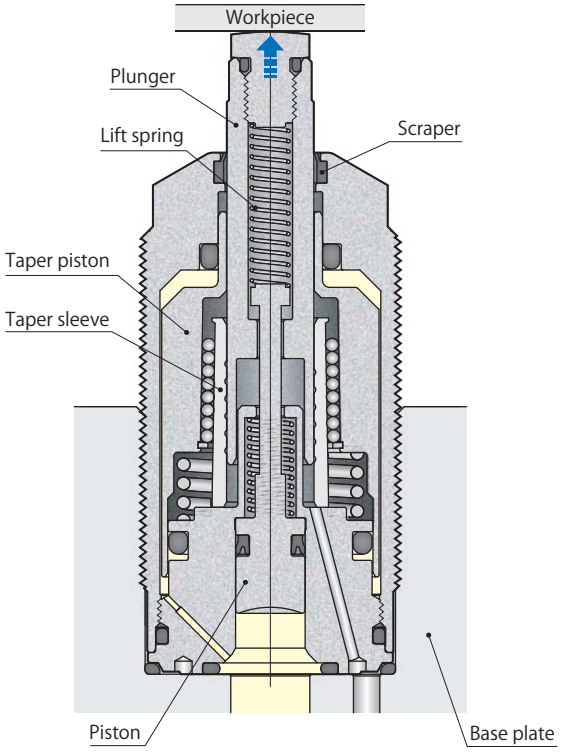
1 MPa

Air lift
model CSS04-L

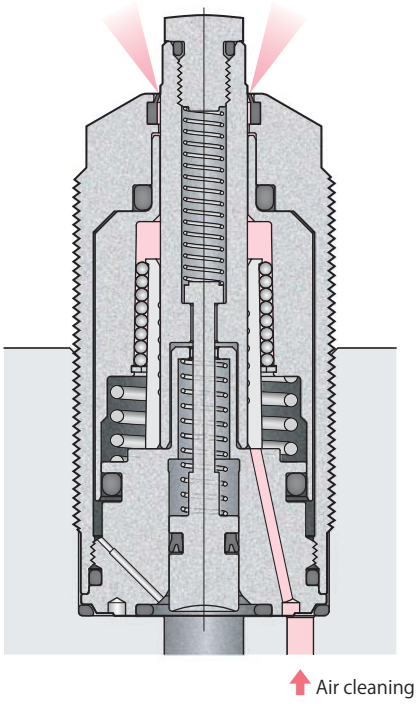
Spring lift
model CSX04-L

Air lift

model **CSS□-□**

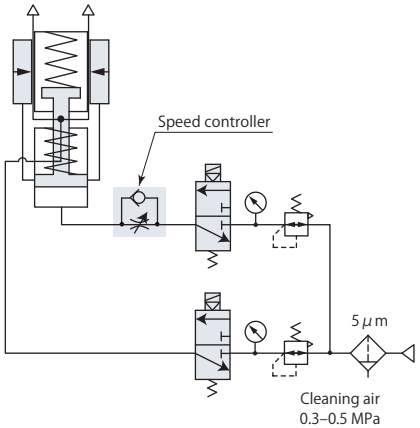


Lock



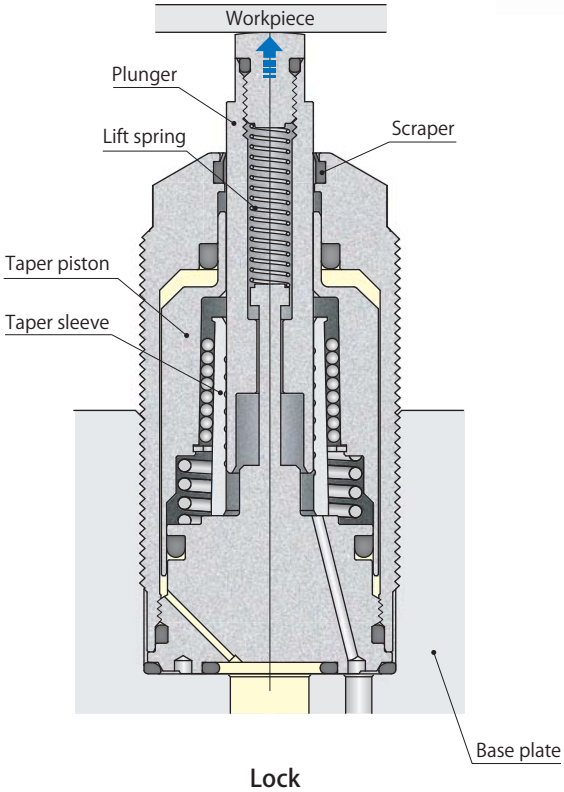
Unlock

Pneumatic circuit diagram



Spring lift

model **CSX□-□**



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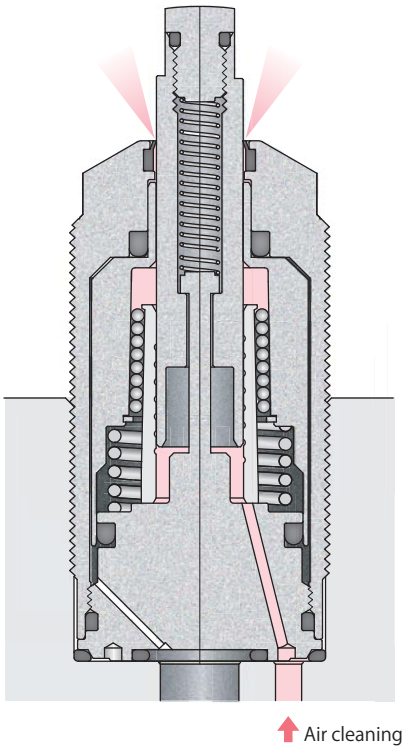
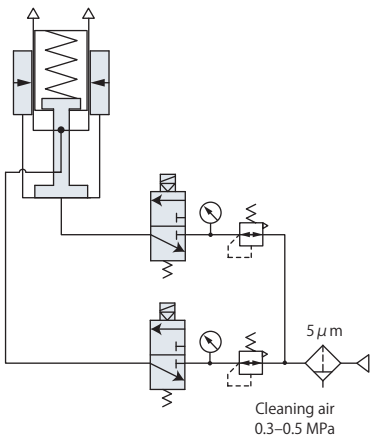


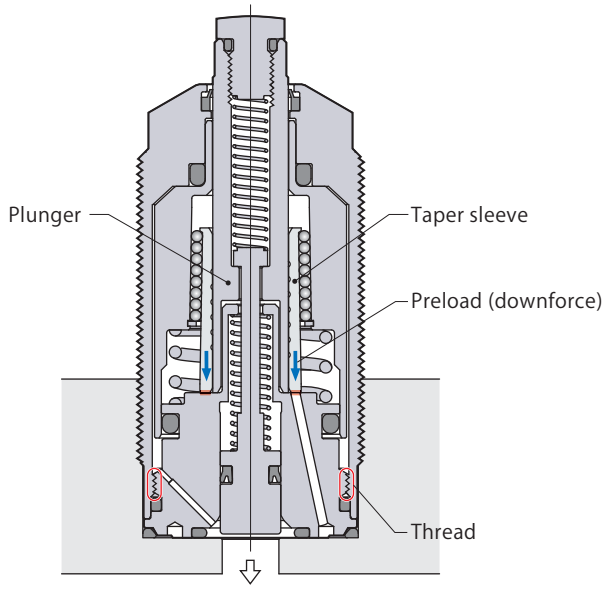
Unlock

Pneumatic circuit diagram



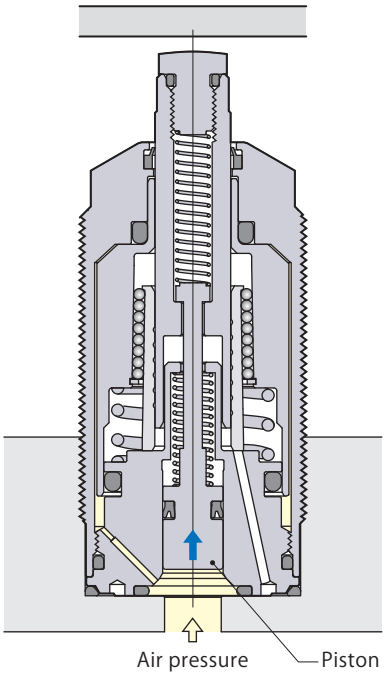
Air lift (model CSS)

Plunger is locked after it stroked by the structure containing sequencetial movement, which enables a workpiece to hold securely.



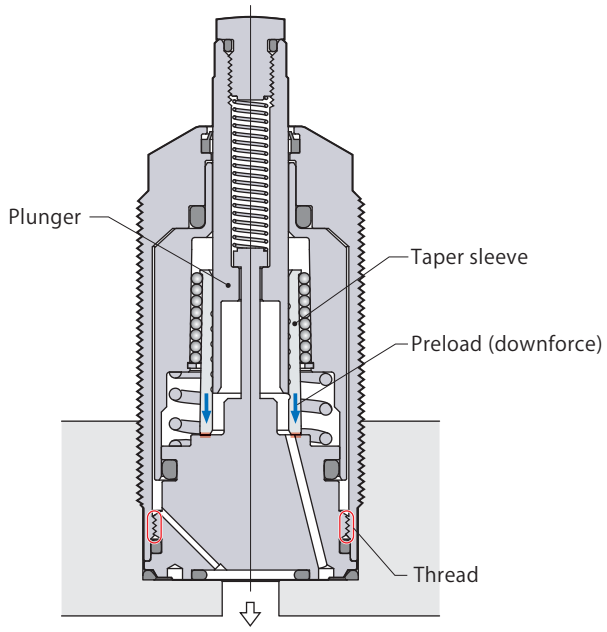
● The taper sleeve is preloaded by the thread and is kept the position lower.

①The piston moves upward



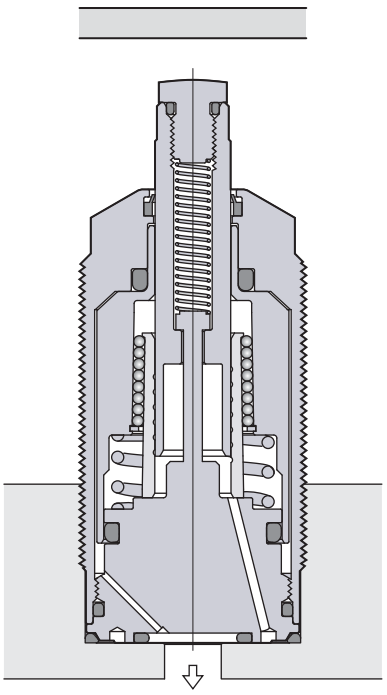
● Piston moves upward by the air force.

Spring lift (model CSX)

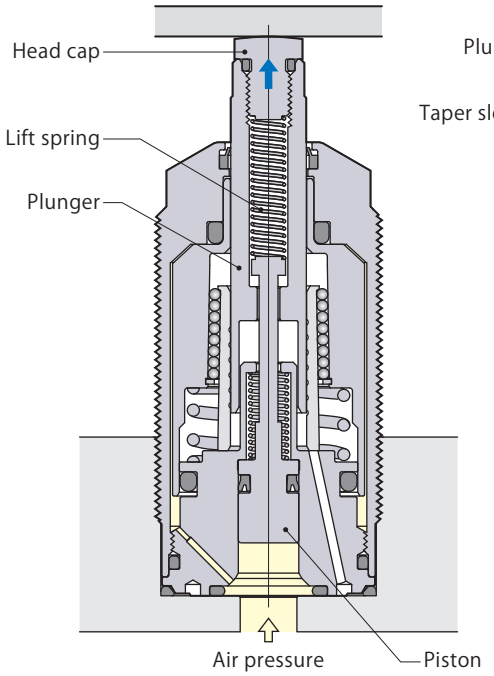


● The taper sleeve is preloaded by the thread and is kept the position lower.

①Before the workpiece approaches

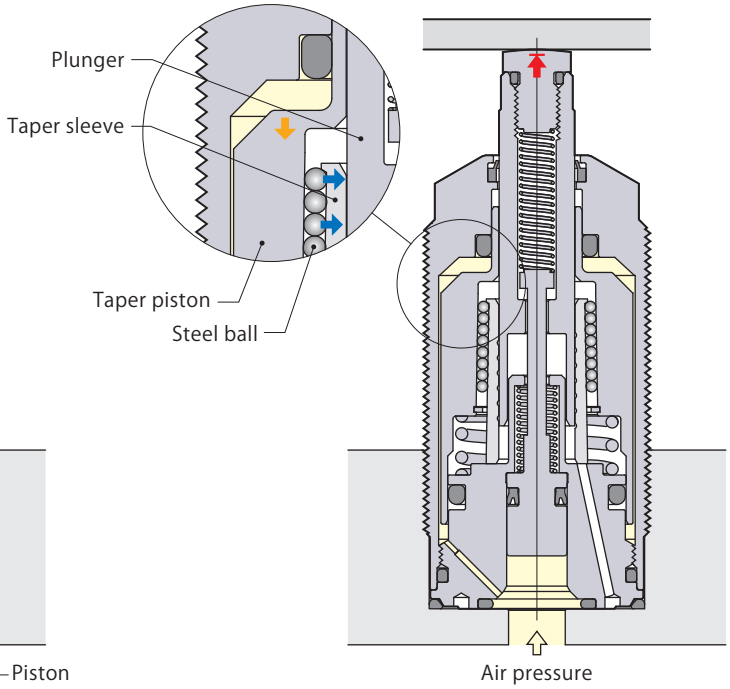


②Contact with the workpiece



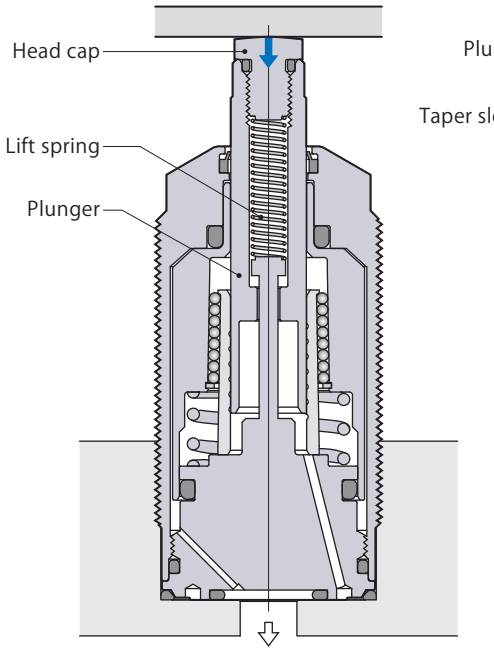
- The plunger with a head cap strokes upward by the lift spring to contact the workpiece. The plunger puts a load on the workpiece since the piston continues to move upward to the end of its stroke.

③Supporting the workpiece



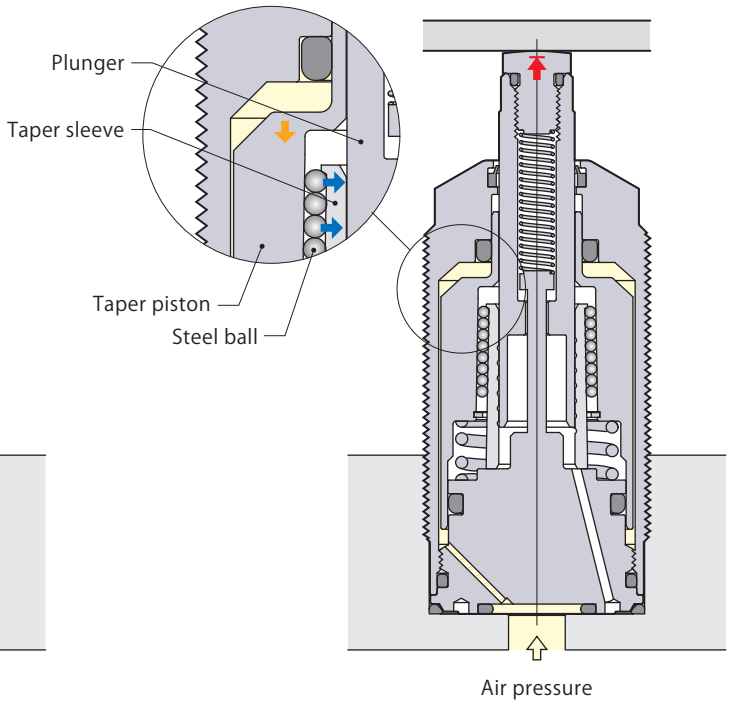
- After piston stroking, the taper piston moves down by the air force to depress the taper sleeve by means of the steel balls. Then the taper sleeve locks the plunger firmly.

②Contact with the workpiece



- The workpiece touches head cap then depresses the plunger until it reaches to the seating surface. The lift spring puts a load onto the workpiece.

③Supporting the workpiece



- The taper piston is pushed down by the air force to depress the taper sleeve by means of the steel balls. Then the taper sleeve locks the plunger firmly.

Specifications

CSS : Air lift
CSX : Spring lift

Size: 005, 00, 01, 02, 04, 05

–

Lift spring force
L : Standard
H : Strong

Model			CSS005 / CSX005	CSS00 / CSX00	CSS01 / CSX01	CSS02 / CSX02	CSS04 / CSX04	CSS05 / CSX05
Support force*1	Air pressure 1MPa	kN	0.5	0.8	1.3	1.9	3.5	5.0
	Air pressure 0.5MPa	kN	0.19	0.3	0.5	0.7	1.3	1.9
Cylinder capacity	CSS	cm^3	0.7	1.1	1.7	2.6	4.2	6.2
	CSX	cm^3	0.5	0.8	1.3	2.2	3.6	4.6
Lift spring force*2	L : Standard	N	1–2	1–2	1–2	1–2	2–4	4–7
	H : Strong	N	2–3	2–3	2–3	2–3	3–6	6–11
Plunger stroke		mm	6.5	6.5	6.5	8	8	8
Max. allowable mass of head cap		kg	0.05					
Mass		kg	0.1	0.2	0.3	0.4	0.8	1.1
Recommended tightening torque of body		N·m	20–25	35–45	40–50	45–55	55–65	80–90

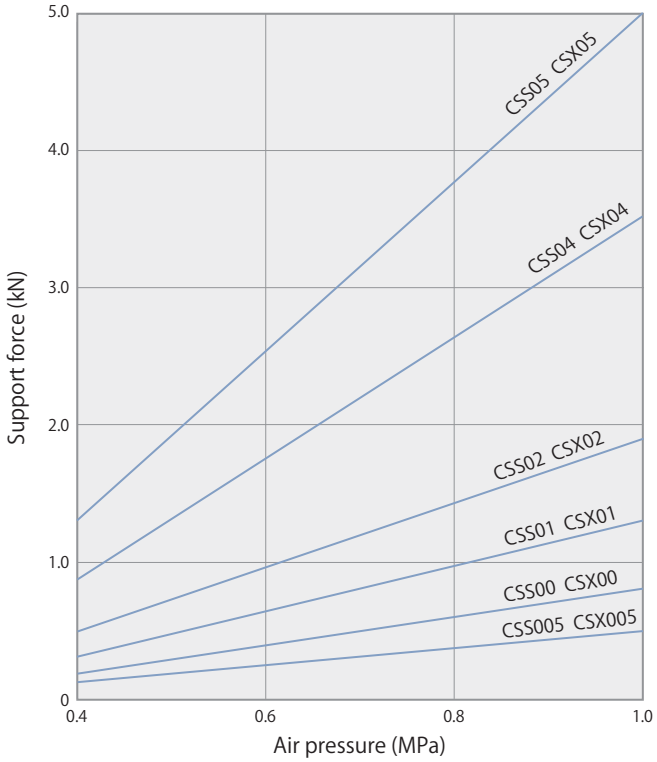
- Air pressure range : 0.4–1 MPa
- Proof pressure : 1.5 MPa
- Operating temperature : 0–70 ℃
- Fluid used : Air*3
- Oil supply : Not required
- Seals are resistant to chlorine-based cutting fluid. (not thermal resistant specification)
- Air sensor operation is unavailable.

*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.

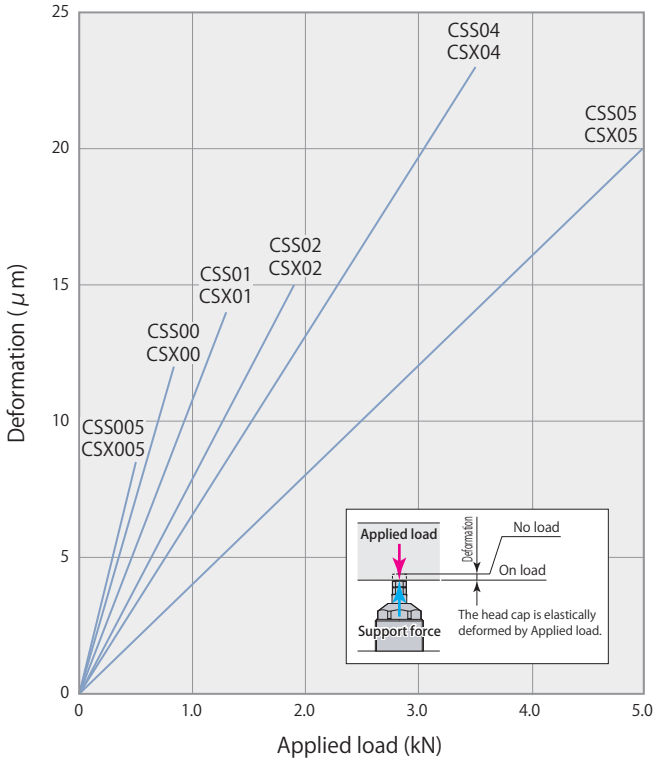
*3 : Supply the dry and filtered air. Particulate size 5 μm or less is recommended.

Air pressure & support force



Air pressure MPa	Support force kN					
	CSS005	CSS00	CSS01	CSS02	CSS04	CSS05
	CSX005	CSX00	CSX01	CSX02	CSX04	CSX05
0.4	0.13	0.2	0.3	0.5	0.9	1.3
0.5	0.19	0.3	0.5	0.7	1.3	1.9
0.6	0.25	0.4	0.7	1.0	1.7	2.5
0.7	0.31	0.5	0.8	1.2	2.2	3.1
0.8	0.38	0.6	1.0	1.4	2.6	3.8
0.9	0.44	0.7	1.1	1.7	3.1	4.4
1.0	0.5	0.8	1.3	1.9	3.5	5.0

Applied load & deformation

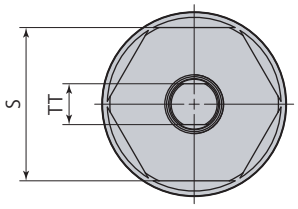


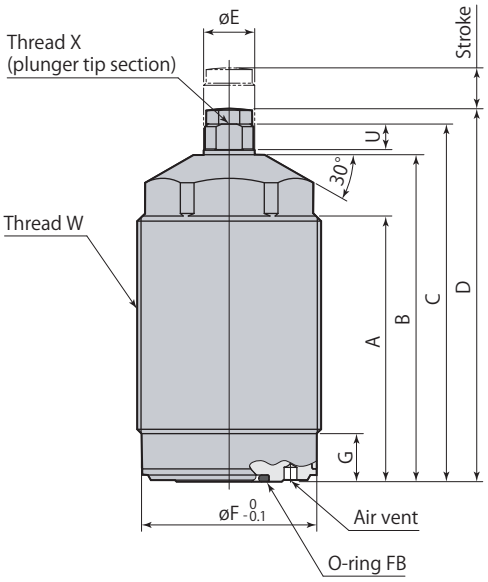
Applied load kN	Deformation μm					
	CSS005	CSS00	CSS01	CSS02	CSS04	CSS05
	CSX005	CSX00	CSX01	CSX02	CSX04	CSX05
0	0.0	0.0	0.0	0.0	0.0	0.0
0.5	8.5	7.5	5.4	3.9	3.3	2.0
1.0			10.8	7.9	6.6	4.0
1.5				11.8	9.9	6.0
2.0					13.1	8.0
2.5					16.4	10.0
3.0					19.7	12.0
3.5			Nonusable range		23.0	14.0
4.0						16.0
4.5						18.0
5.0						20.0

Held with air pressure of 1 MPa.

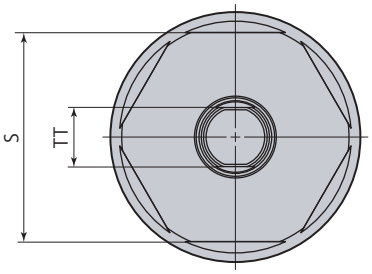
Dimensions

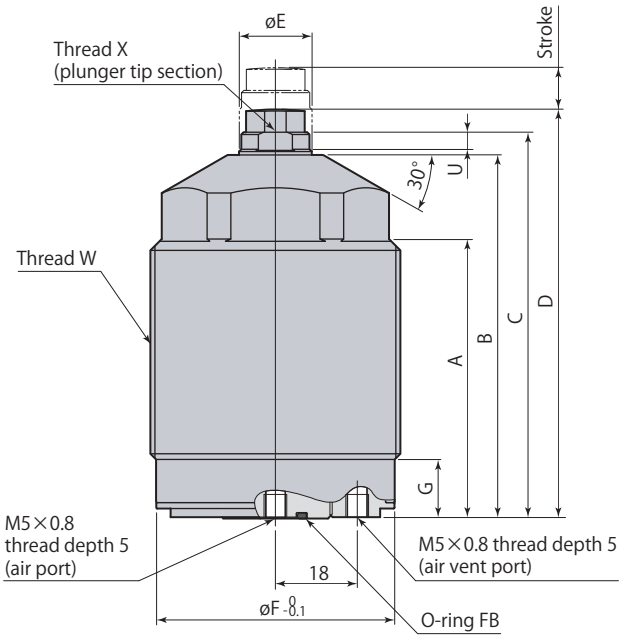
CSS005, CSS00, CSS01, CSS02, CSS04





CSS05

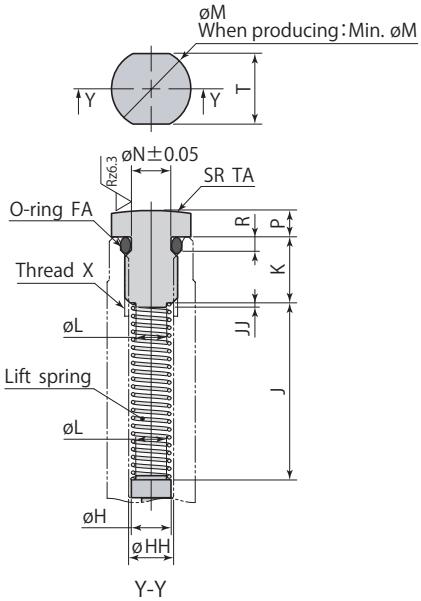




Head cap details

Hardness：HRC52

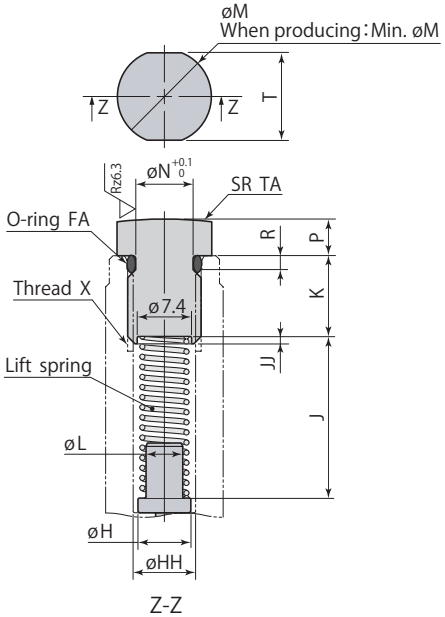
CSS005, CSS00, CSS01, CSS02, CSS04



Y-Y

Rz: ISO4287(1997)

CSS05



Z-Z

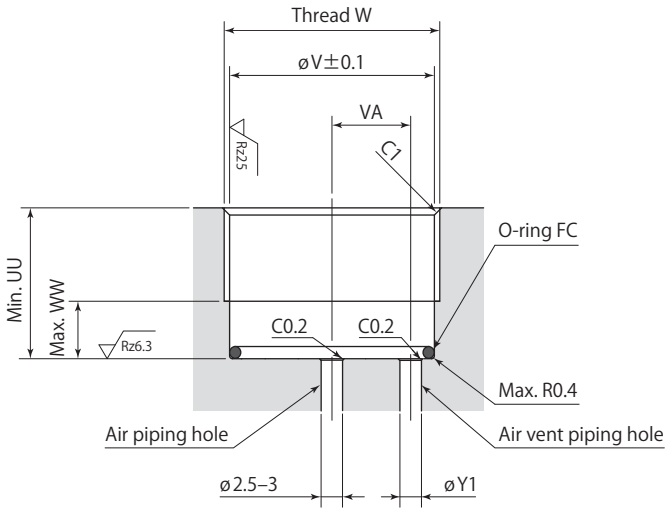
mm

Model	CSS005-□	CSS00-□	CSS01-□	CSS02-□	CSS04-□	CSS05-□
A	39	44	51	52	61	61
B	47	53	60	64	76	80
C	51.5	59	66	70	83	85
D	54	62	69	73	87	90
øE	8	10	10	10	12	16
øF	20.3	24.3	28.3	34.3	43.3	52.5
G	8.4	9.4	9.4	9.4	9.4	13
øH	3.8	4.5	4.5	4.5	5.5	7.2
øHH	4.3	5.1	5.1	5.1	6.8	8.5
J	15.5	20.5	20.5	20	20.1	22
JJ	0.5	0.5	0.5	0.5	1	1
K	7	7.5	7.5	7.5	9	11
øL	2.8	3.5	3.5	3.5	4.3	5
øM	8	9	9	9	11.5	12.9
Min. øM	7.5	8.5	8.5	8.5	10	12.5
øN	4	4.5	4.5	4.5	6	7.8
P	2.5	3	3	3	4	5
R	1.0	1.5	1.5	1.5	1.9	1.9
S (hex width across flats)	19	22	24	30	36	46
T (width across flats)	7	8	8	8	10	12
TA	30	30	30	30	50	55
TT (plunger width across flats)	7	8	8	8	10	13
U	3.5	5	5	5	6	4
W	M22×1.5	M26×1.5	M30×1.5	M36×1.5	M45×1.5	M55×2
X (recommended tightening torque)	M5×0.8 depth 8 (6 N·m)	M6×1 depth 9 (10 N·m)	M6×1 depth 9 (10 N·m)	M6×1 depth 9 (10 N·m)	M8×1.25 depth 12 (20 N·m)	M10×1.5 depth 13 (30 N·m)
O-ring FA (fluorocarbon hardness Hs70)	SS4.5 (4.0×1.0)*	S5	S5	S5	S6	S8
O-ring FB (fluorocarbon hardness Hs90)	AS568-011	AS568-013	AS568-014	AS568-014	AS568-015	AS568-013

*: Inner diameter × Thickness

- 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).
- A pipe fitting (M5) is mountable at the bottom of the body. (CSS05 only) Refer to the diagram shown in **page →118** for details.
- This diagram indicates a situation where head cap has been fitted into plunger with no pressure applied.

Mounting details



Rz: ISO4287(1997)

mm

Model	CSS005-□	CSS00-□	CSS01-□	CSS02-□	CSS04-□	CSS05-□
UU	19	20	20	20	20	27
øV	20.5	24.5	28.5	34.5	43.5	53
VA	7	9	11	13	15	21
W	M22×1.5	M26×1.5	M30×1.5	M36×1.5	M45×1.5	M55×2
WW	8	9	9	9	9	12
øY1	2	2.5–3	2.5–3	2.5–3	2.5–3	2.5–3
O-ring FC (fluorocarbon hardness Hs90)	AS568-017	AS568-020	AS568-022	AS568-026	AS568-030	AS568-134

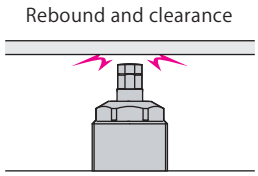
● Install O-ring FC at the bottom of the hole. The O-ring FC is packed with a work support.

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.

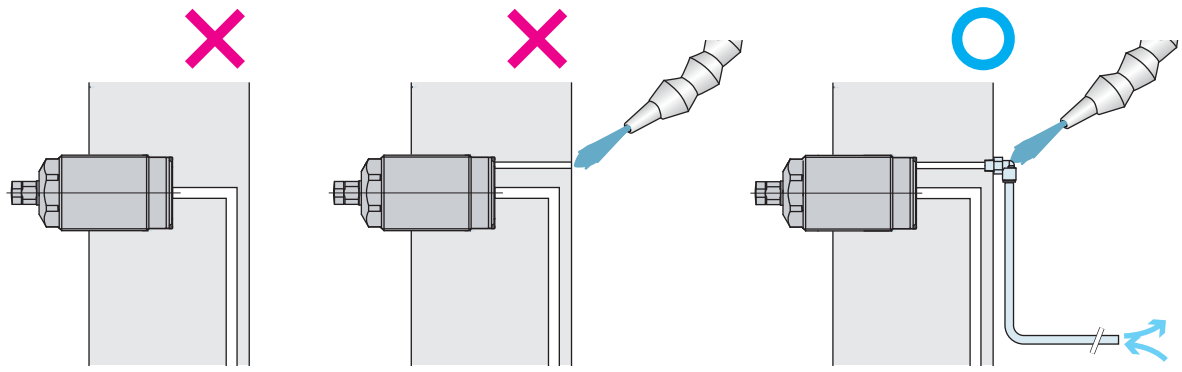
- Set the plunger lifting time to 0.5 seconds or longer by adjusting the speed controller (meter-in). Reasonable plunger ascending speed can prevent the parts from breakage also curbs plunger contact false.

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.

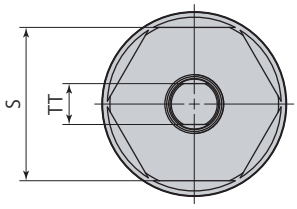


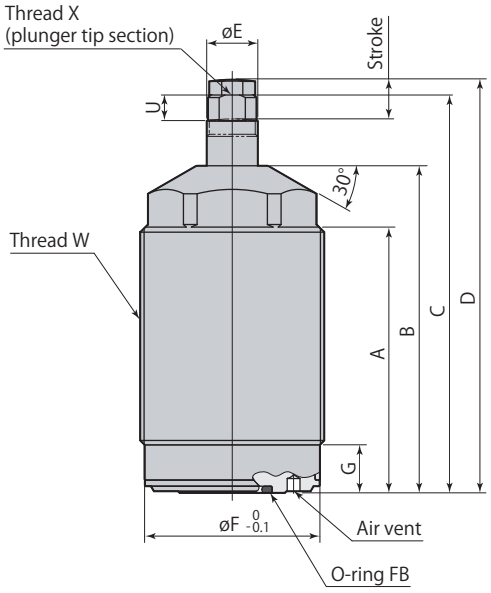
Air vent is blocked | Cutting fluid intrusion from air vent | Piping to metal chips or coolant free area

- Air (oil free) must be fed through a 5 μm 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.

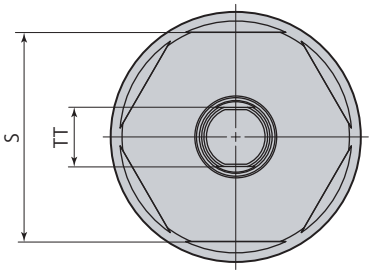
Dimensions

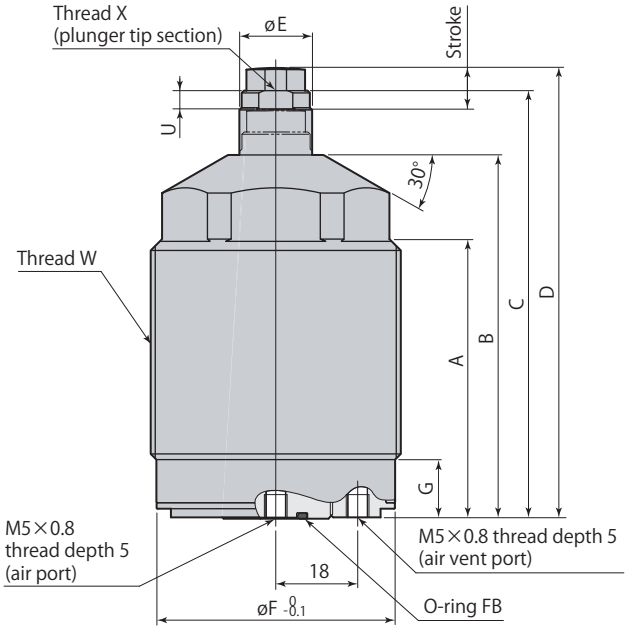
CSX005, CSX00, CSX01, CSX02, CSX04





CSX05

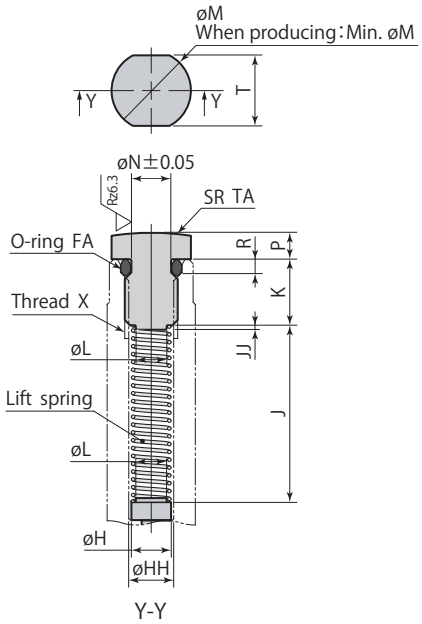




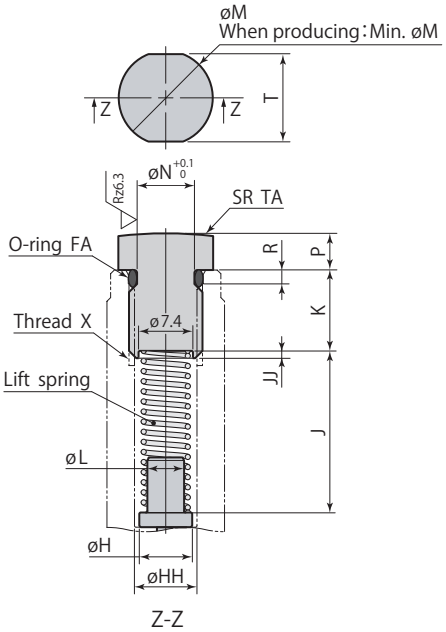
Head cap details

Hardness：HRC52

CSX005, CSX00, CSX01, CSX02, CSX04



CSX05



Rz: ISO4287(1997)

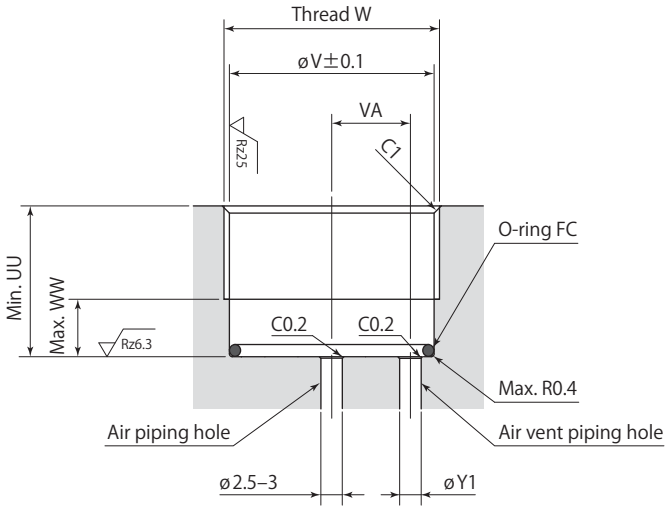
mm

Model	CSX005-□	CSX00-□	CSX01-□	CSX02-□	CSX04-□	CSX05-□
A	39	44	51	52	61	61
B	47	53	60	64	76	80
C	58	65.5	72.5	78	91	93
D	60.5	68.5	75.5	81	95	98
øE	8	10	10	10	12	16
øF	20.3	24.3	28.3	34.3	43.3	52.5
G	8.4	9.4	9.4	9.4	9.4	13
øH	3.8	4.5	4.5	4.5	5.5	7.2
øHH	4.3	5.1	5.1	5.1	6.8	8.5
J	15.5	20.5	20.5	20	20.1	22
JJ	0.5	0.5	0.5	0.5	1	1
K	7	7.5	7.5	7.5	9	11
øL	2.8	3.5	3.5	3.5	4.3	5
øM	8	9	9	9	11.5	12.9
Min. øM	7.5	8.5	8.5	8.5	10	12.5
øN	4	4.5	4.5	4.5	6	7.8
P	2.5	3	3	3	4	5
R	1.0	1.5	1.5	1.5	1.9	1.9
S (hex width across flats)	19	22	24	30	36	46
T (width across flats)	7	8	8	8	10	12
TA	30	30	30	30	50	55
TT (plunger width across flats)	7	8	8	8	10	13
U	3.5	5	5	5	6	4
W	M22×1.5	M26×1.5	M30×1.5	M36×1.5	M45×1.5	M55×2
X (recommended tightening torque)	M5×0.8 depth 8 (6 N·m)	M6×1 depth 9 (10 N·m)	M6×1 depth 9 (10 N·m)	M6×1 depth 9 (10 N·m)	M8×1.25 depth 12 (20 N·m)	M10×1.5 depth 13 (30 N·m)
O-ring FA (fluorocarbon hardness Hs70)	SS4.5 (4.0×1.0)*	S5	S5	S5	S6	S8
O-ring FB (fluorocarbon hardness Hs90)	AS568-011	AS568-013	AS568-014	AS568-014	AS568-015	AS568-013

*: Inner diameter × Thickness

- 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).
- A pipe fitting (M5) is mountable at the bottom of the body. (CSX05 only) Refer to the diagram shown in **page →122** for details.
- This diagram indicates a situation where head cap has been fitted into plunger with no pressure applied.

Mounting details



Rz: ISO4287(1997)

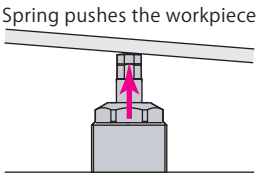
mm

Model	CSX005-□	CSX00-□	CSX01-□	CSX02-□	CSX04-□	CSX05-□
UU	19	20	20	20	20	27
øV	20.5	24.5	28.5	34.5	43.5	53
VA	7	9	11	13	15	21
W	M22×1.5	M26×1.5	M30×1.5	M36×1.5	M45×1.5	M55×2
WW	8	9	9	9	9	12
øY1	2	2.5–3	2.5–3	2.5–3	2.5–3	2.5–3
O-ring FC (fluorocarbon hardness Hs90)	AS568-017	AS568-020	AS568-022	AS568-026	AS568-030	AS568-134

● Install O-ring FC at the bottom of the hole. The O-ring FC is packed with a work support.

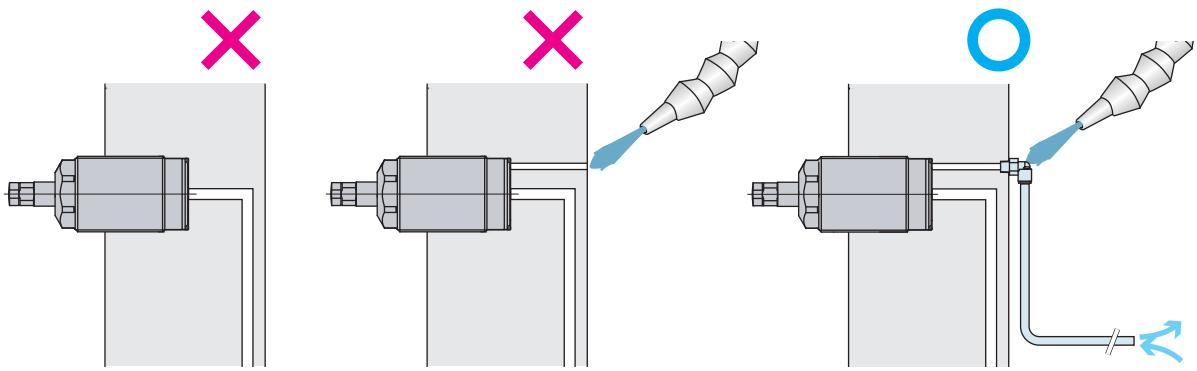
Caution in use

- If the workpiece is light weight, the plunger cannot be pressed down by the weight of workpiece and seating detection cannot be complete. Review the weight of workpiece or lift spring force to make the workpiece seat perfectly, and lock the work support.



- 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 μm filter that is connected to an air vent port for air cleaning. Perform air cleaning only when replacing workpiece.