

air Work support

1 MPa



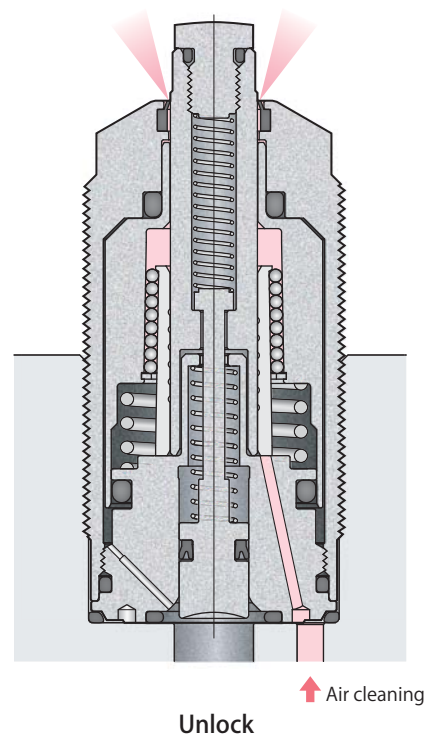
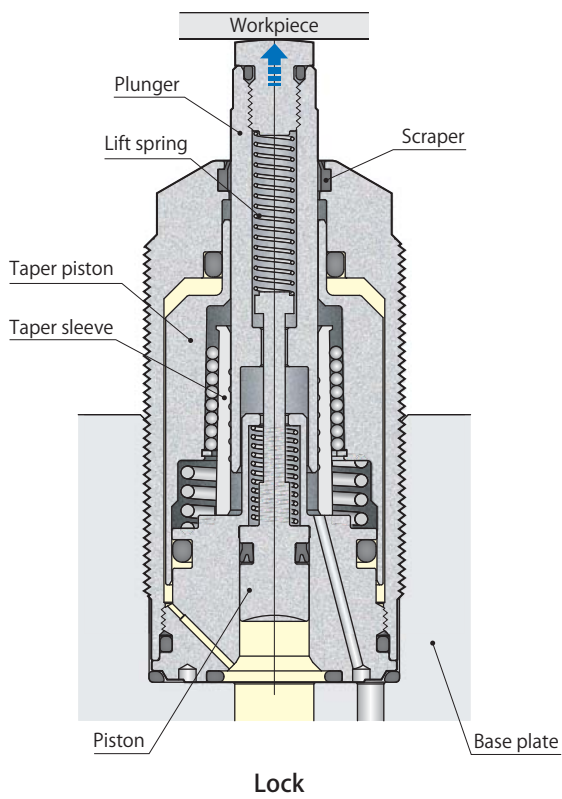
Air lift
model CSS04-L



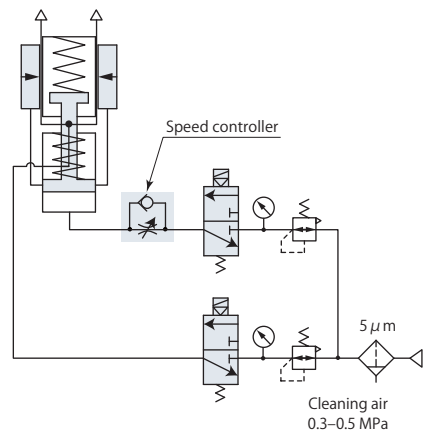
Spring lift
model CSX04-L

Air lift

model CSS □-□



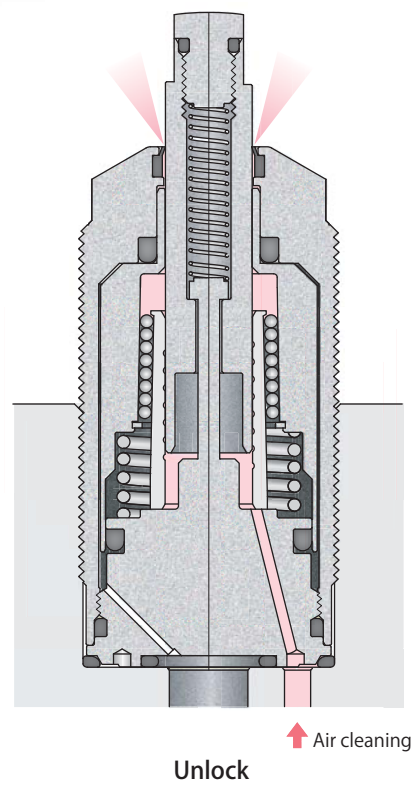
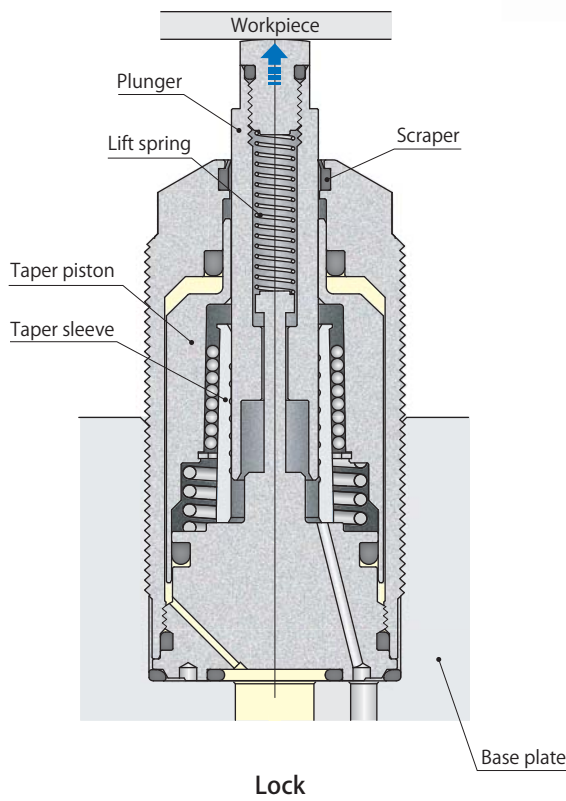
Pneumatic circuit diagram



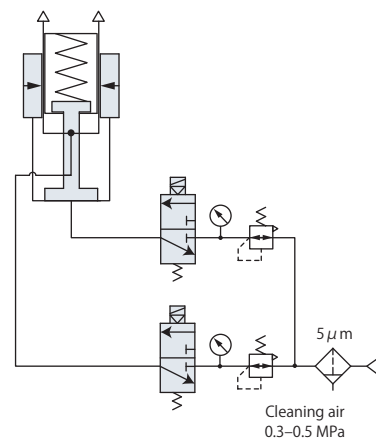
- Specifications page → 104
- Air pressure & support force page → 105
- Applied load & deformation page → 105
- Dimensions page → 106
- Mounting details page → 108

Spring lift

model CSX□-□



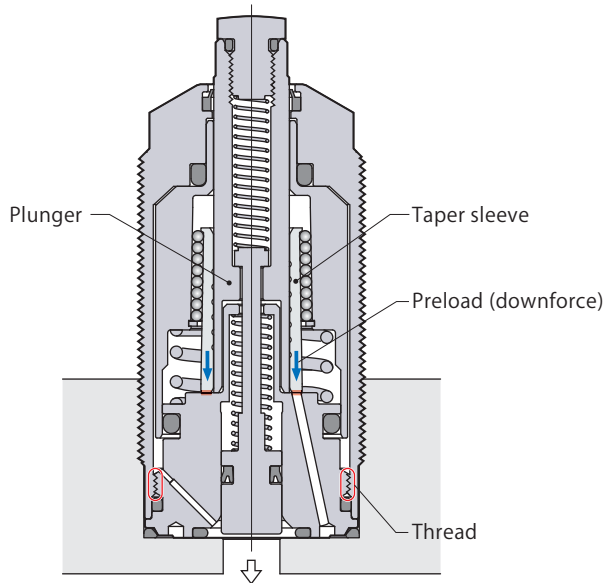
Pneumatic circuit diagram



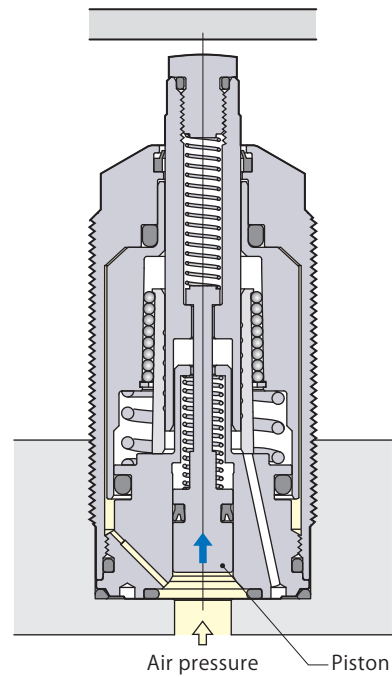
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- Air pressure & support force page → 105
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- Mounting details page → 112

Air lift (model CSS)

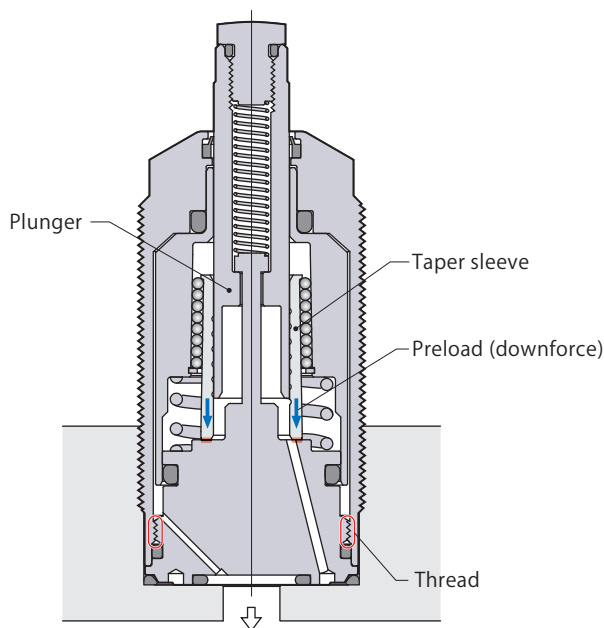
Plunger is locked after it stroked by the structure containing sequential movement, which enables a workpiece to hold securely.



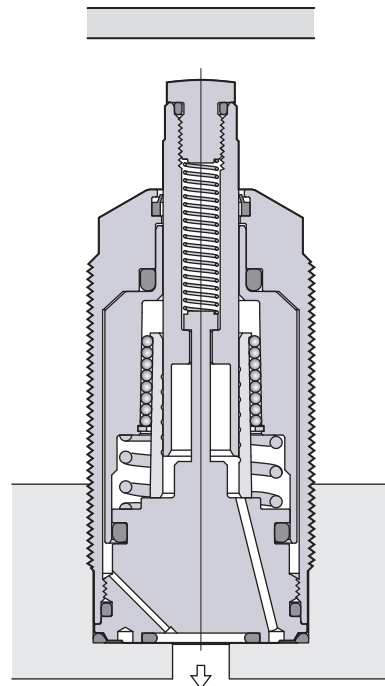
- The taper sleeve is preloaded by the thread and is kept the position lower.

① The piston moves upward

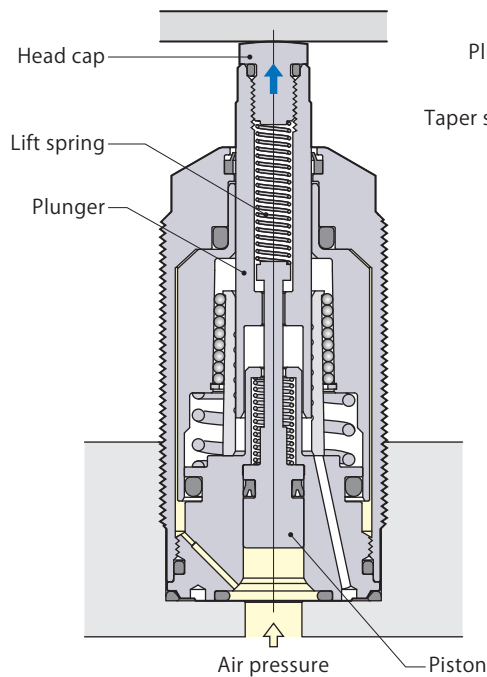
- Piston moves upward by the air force.

Spring lift (model CSX)

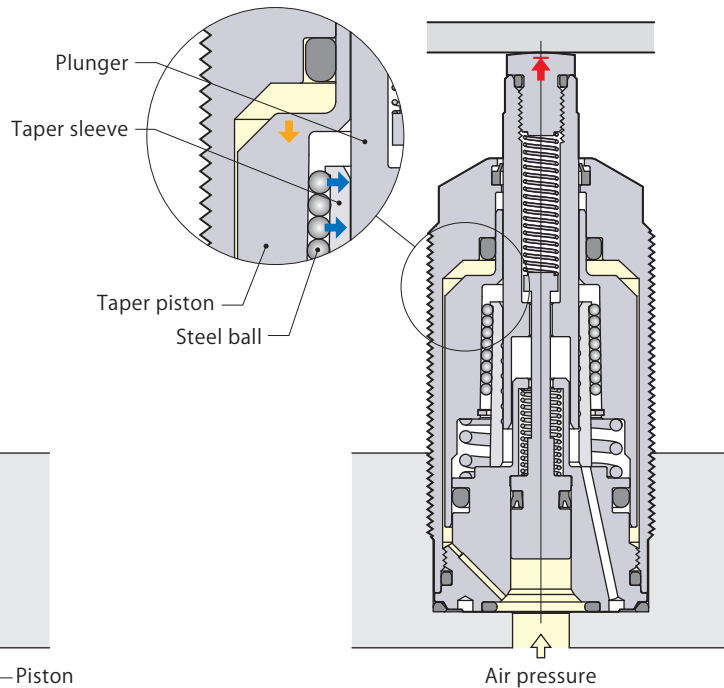
- The taper sleeve is preloaded by the thread and is kept the position lower.

① Before the workpiece approaches

② Contact with the workpiece



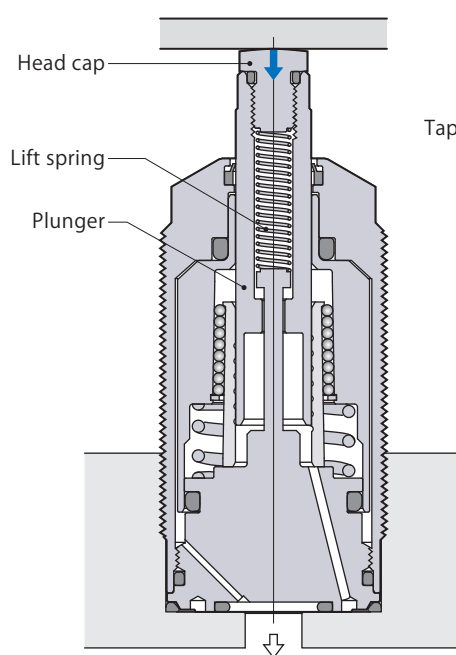
③ Supporting the workpiece



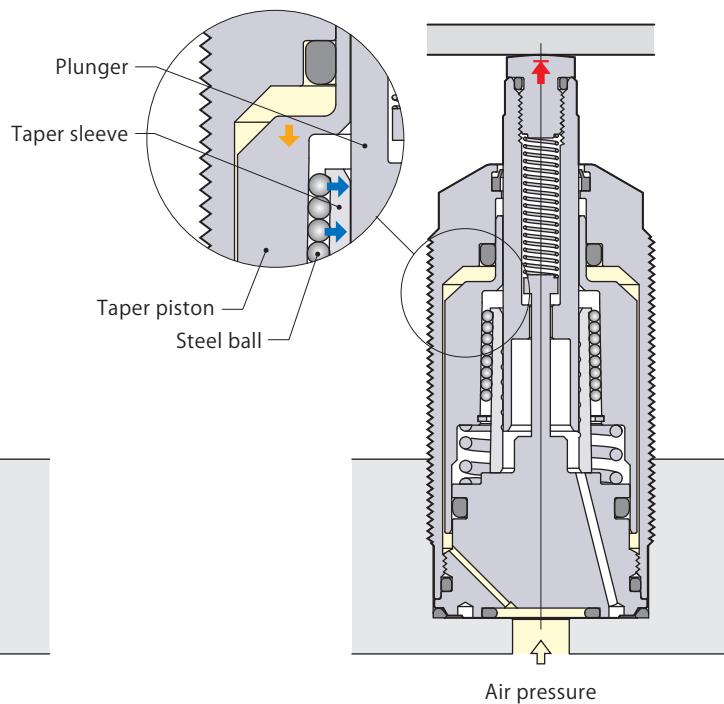
- The plunger with a head cap strokes upward by the lift spring to contact the workpiece. The plunger puts a load on the workpiece since the piston continues to move upward to the end of its stroke.

- 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.

② Contact with the workpiece



③ Supporting 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.

- 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

	Size	Lift spring force
CSS : Air lift CSX : Spring lift	005	L : Standard
	00	
	01	
	02	H : Strong
	04	
05		

Model			CSS005	CSS00	CSS01	CSS02	CSS04	CSS05
			CSX005	CSX00	CSX01	CSX02	CSX04	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

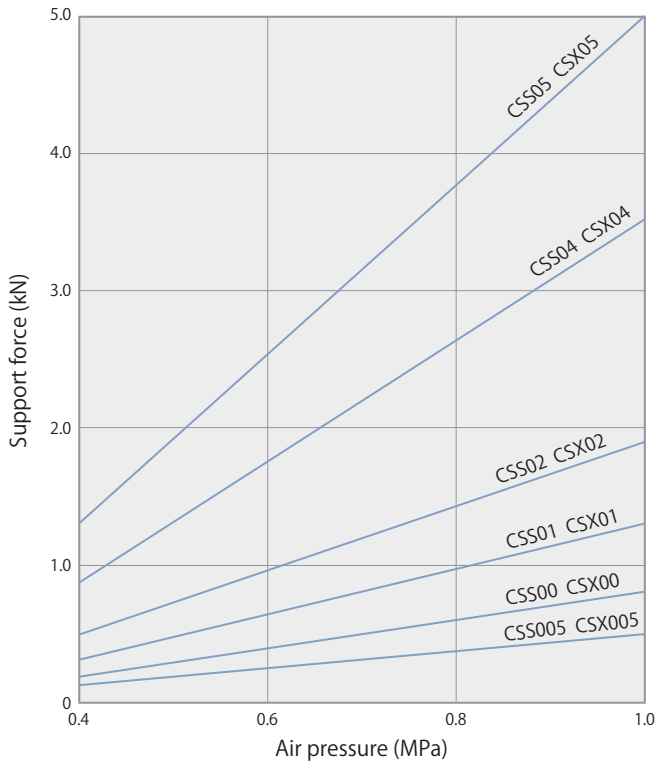
- Air pressure range:0.4-1 MPa
- Proof pressure:1.5 MPa
- Operating temperature:0-70 °C
- Fluid used:Air*3
- Oil supply:Not required
- Seals are resistant to chlorine-based cutting fluid. (not thermal resistant specification)
- Air sensor operation is unavailable.

*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.

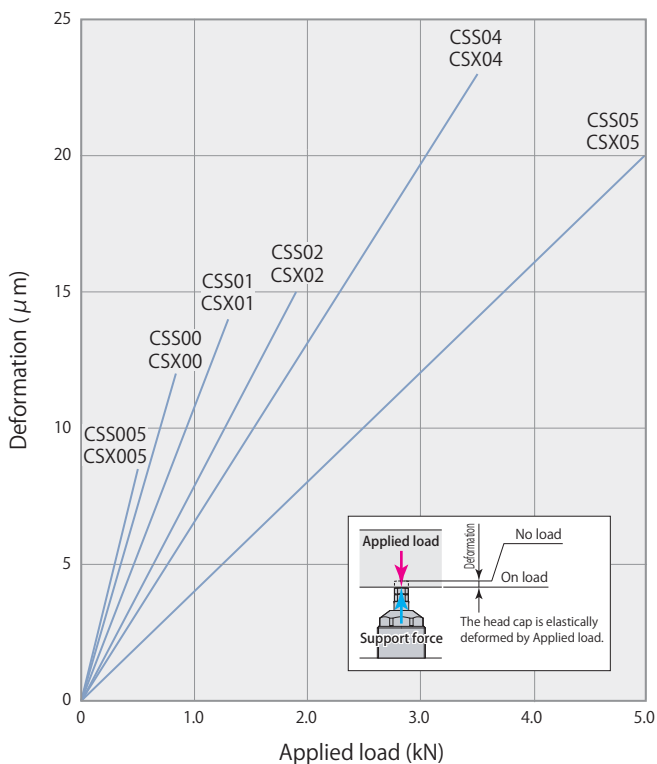
*3:Supply the dry and filtered air. Particulate size 5 μm or less is recommended.

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



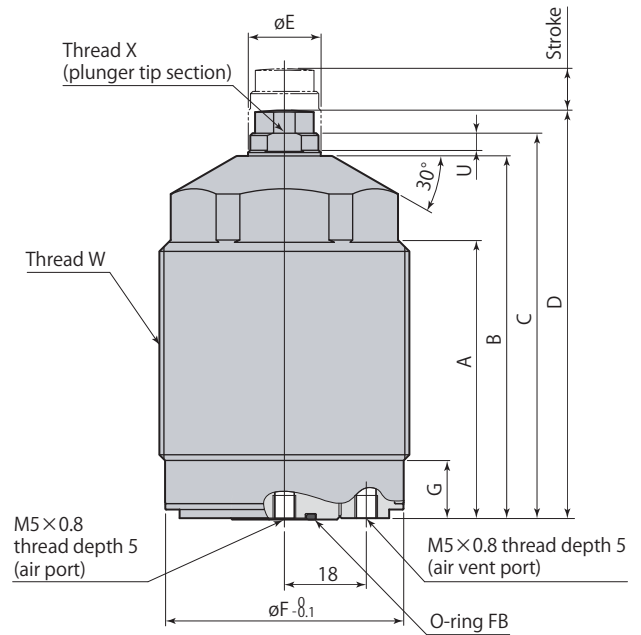
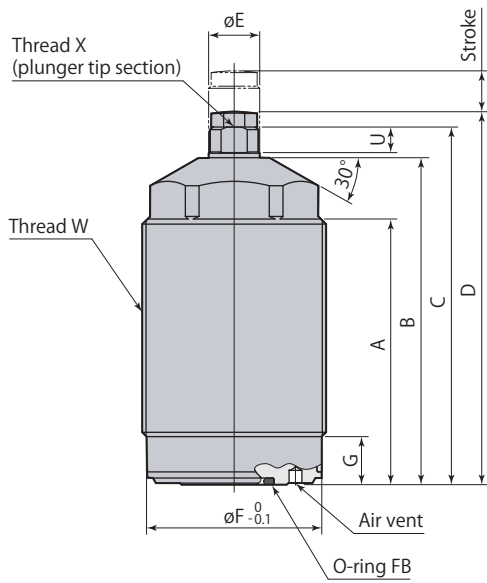
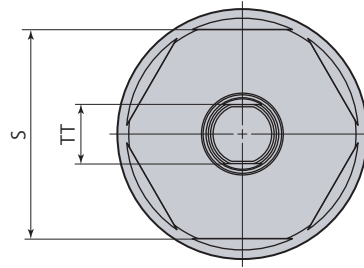
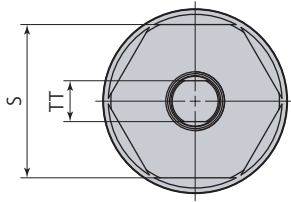
Applied load kN	Deformation μm					
	CSS005	CSS00	CSS01	CSS02	CSS04	CSS05
	CSX005	CSX00	CSX01	CSX02	CSX04	CSX05
0	0.0	0.0	0.0	0.0	0.0	0.0
0.5	8.5	7.5	5.4	3.9	3.3	2.0
1.0			10.8	7.9	6.6	4.0
1.5				11.8	9.9	6.0
2.0					13.1	8.0
2.5					16.4	10.0
3.0					19.7	12.0
3.5					23.0	14.0
4.0						16.0
4.5			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

Held with air pressure of 1 MPa.

Dimensions

CSS005, CSS00, CSS01, CSS02, CSS04

CSS05

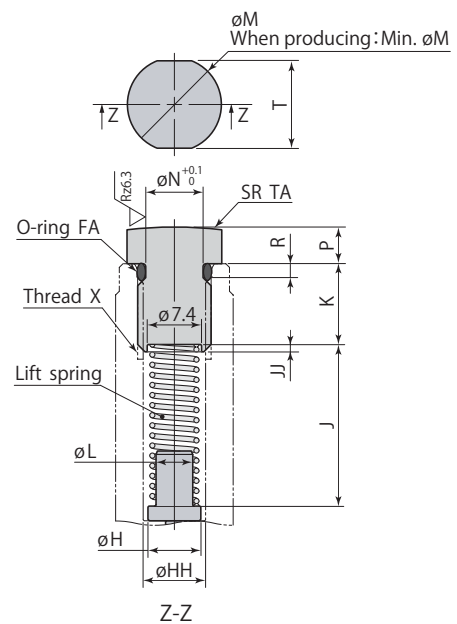
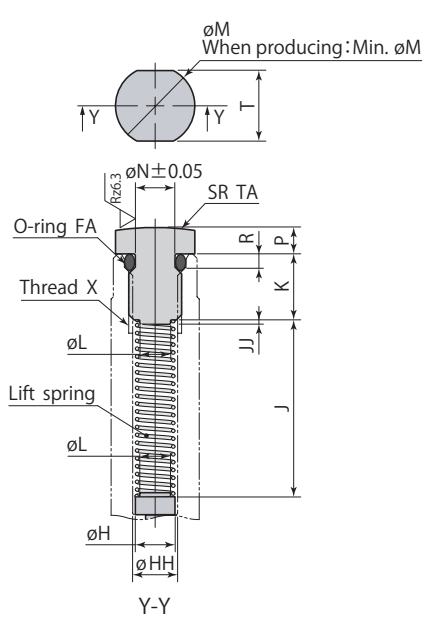


Head cap details

Hardness: HRC52

CSS005, CSS00, CSS01, CSS02, CSS04

CSS05



Rz: ISO4287(1997)

Air work support
CSS
Air lift

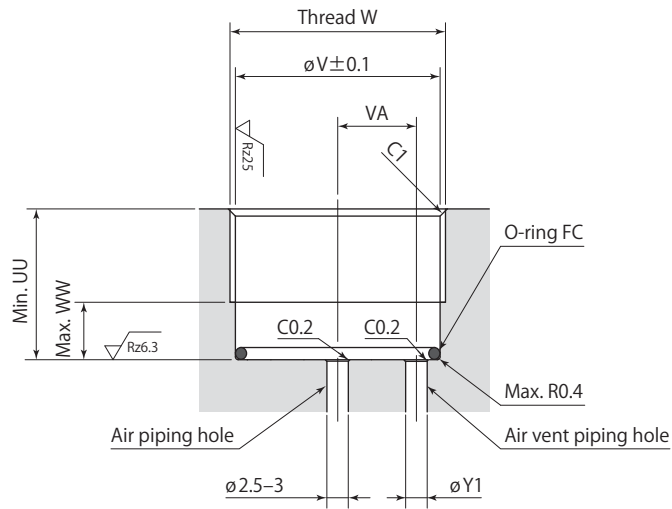
CSS □-□	Air work support Air lift	air
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Model	CSS005-□	CSS00-□	CSS01-□	CSS02-□	CSS04-□	CSS05-□
A	39	44	51	52	61	61
B	47	53	60	64	76	80
C	51.5	59	66	70	83	85
D	54	62	69	73	87	90
øE	8	10	10	10	12	16
øF	20.3	24.3	28.3	34.3	43.3	52.5
G	8.4	9.4	9.4	9.4	9.4	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	1.5	1.5	1.5	1.5	1.9	2
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).
- Refer to table above when connecting fitting to CSS05 body.
- This diagram indicates a situation where head cap has been fitted into plunger with no pressure applied.

Mounting details



Rz: ISO4287(1997)

mm

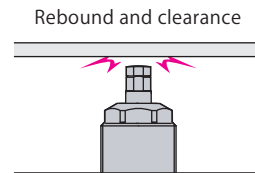
Model	CSS005-□	CSS00-□	CSS01-□	CSS02-□	CSS04-□	CSS05-□
UU	19	20	20	20	20	27
øV	20.5	24.5	28.5	34.5	43.5	53
VA	7	9	11	13	15	21
W	M22×1.5	M26×1.5	M30×1.5	M36×1.5	M45×1.5	M55×2
WW	8	9	9	9	9	12
øY1	2	2.5-3	2.5-3	2.5-3	2.5-3	2.5-3
O-ring FC (fluorocarbon hardness Hs90)	AS568-017	AS568-020	AS568-022	AS568-026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

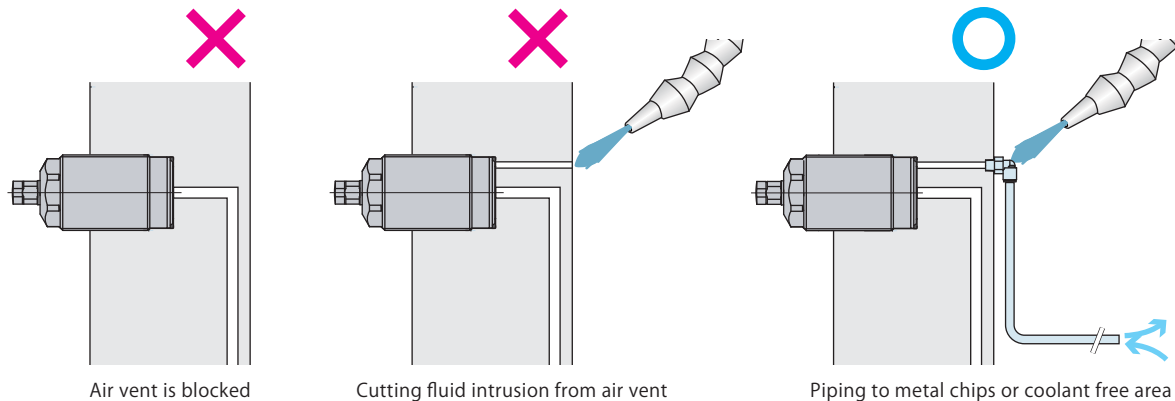
- The lift spring in the plunger may push the workpiece upward if it is light weight and seating detection cannot be complete. Review the weight of workpiece or lift spring force and make it appropriate to seat the workpiece perfectly and acutate the work support.
- Set the plunger lifting time to 0.5 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.

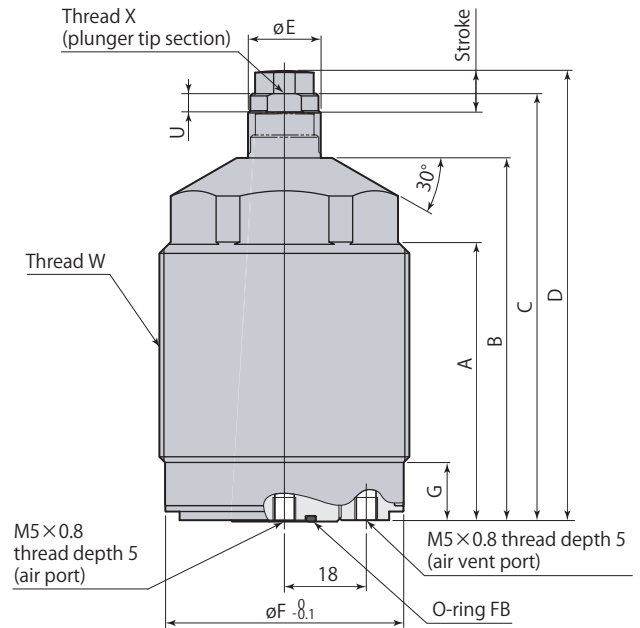
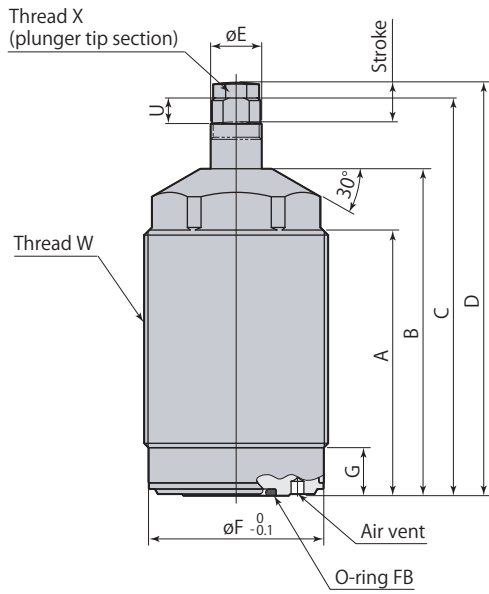
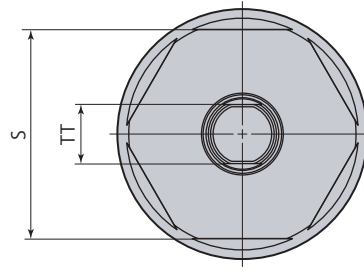
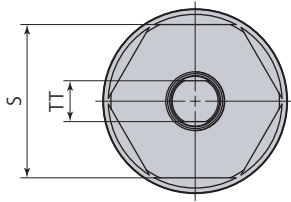


- Air (oil free) must be fed through a $5\ \mu\text{m}$ filter that is connected to an air vent port for air cleaning. Perform air cleaning only when replacing workpiece. Plunger will rise during air cleaning.

Dimensions

CSX005, CSX00, CSX01, CSX02, CSX04

CSX05

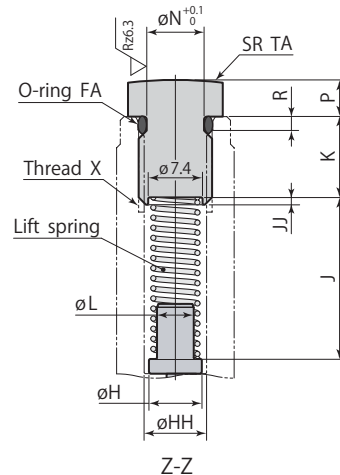
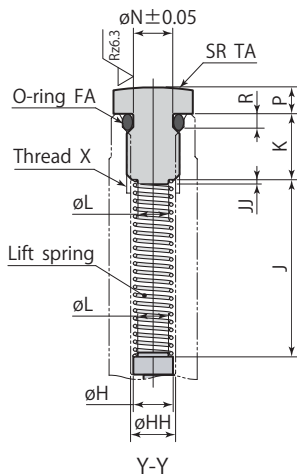
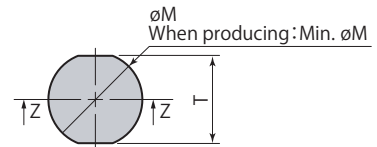
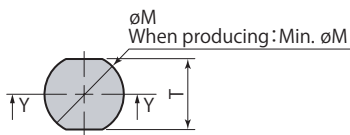


Head cap details

Hardness: HRC52

CSX005, CSX00, CSX01, CSX02, CSX04

CSX05



Rz: ISO4287(1997)

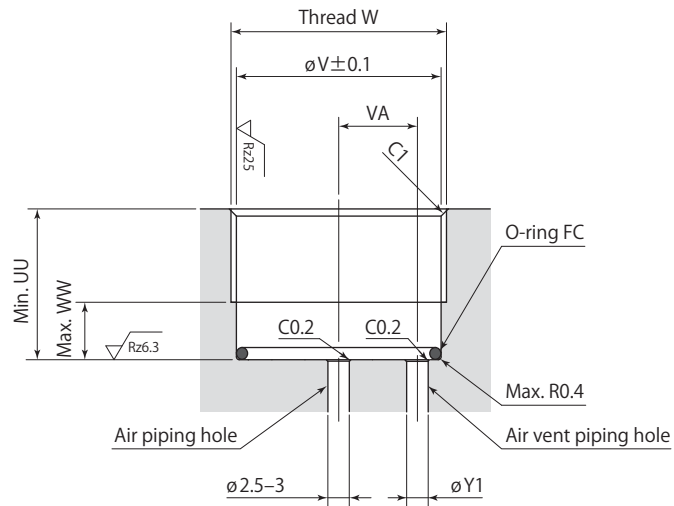
Air work support
CSX
Spring lift

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	1.5	1.5	1.5	1.5	1.9	2
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).
- Refer to table above when connecting fitting to CSX05 body.
- This diagram indicates a situation where head cap has been fitted into plunger with no pressure applied.

Mounting details



Rz: ISO4287(1997)

mm

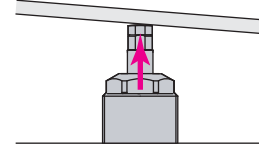
Model	CSX005-□	CSX00-□	CSX01-□	CSX02-□	CSX04-□	CSX05-□
UU	19	20	20	20	20	27
ϕV	20.5	24.5	28.5	34.5	43.5	53
VA	7	9	11	13	15	21
W	M22×1.5	M26×1.5	M30×1.5	M36×1.5	M45×1.5	M55×2
WW	8	9	9	9	9	12
$\phi Y1$	2	2.5-3	2.5-3	2.5-3	2.5-3	2.5-3
O-ring FC (fluorocarbon hardness Hs90)	AS568-017	AS568-020	AS568-022	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.

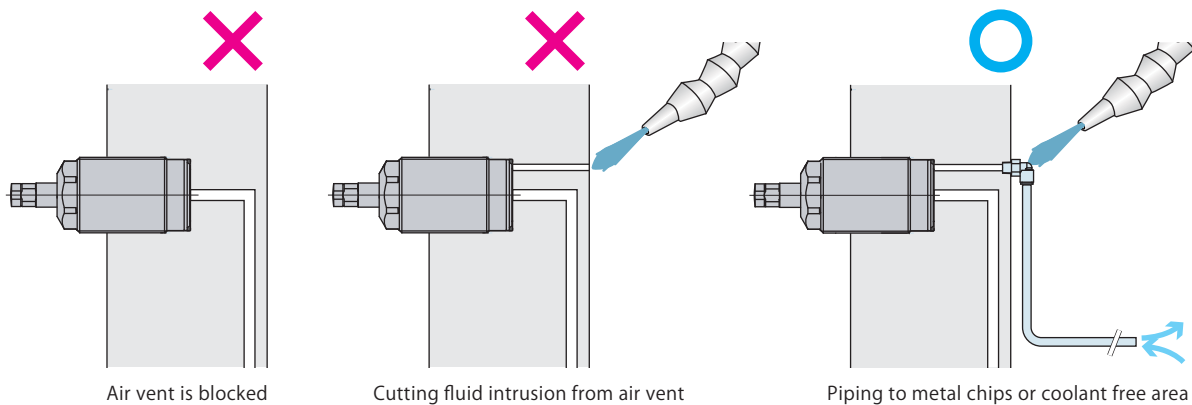
Spring pushes the workpiece



- 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 (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.