

# Work support

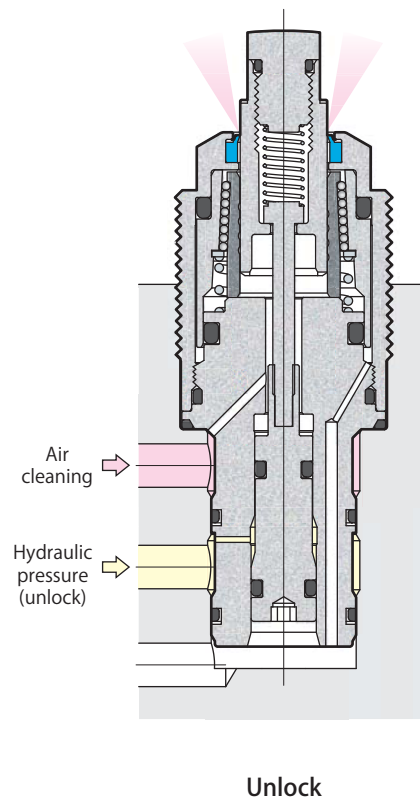
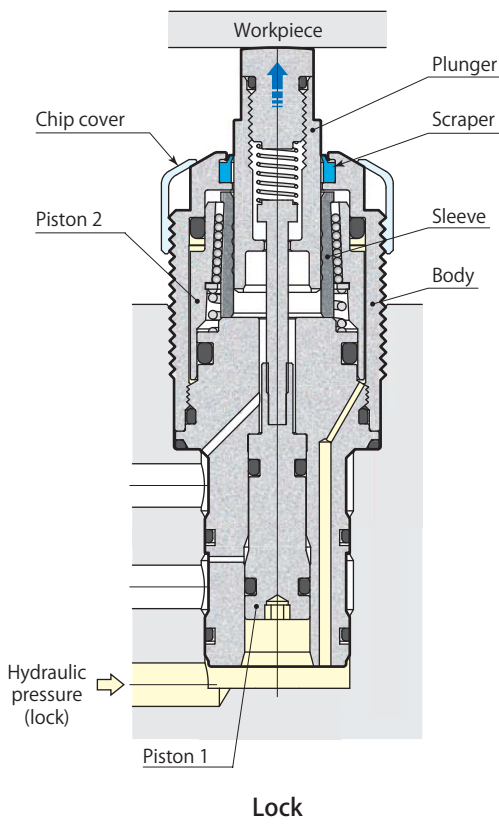
Double acting 7 MPa

model **CSN-D**



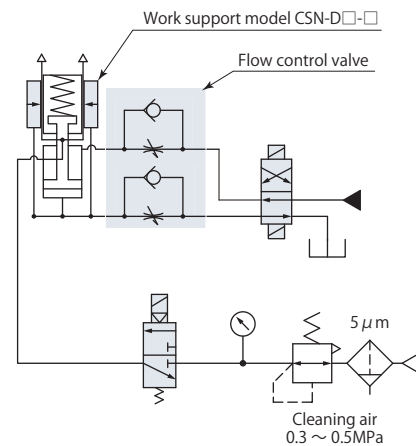
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**Double acting**  
model CSN-D□-□

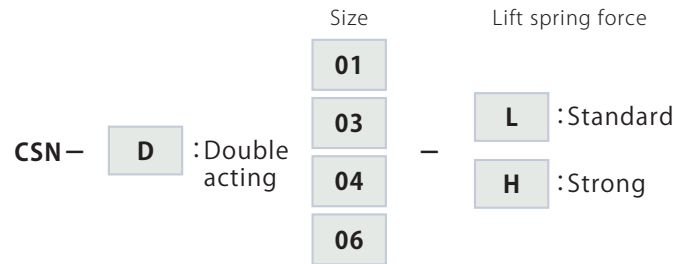


Hydraulic and air circuit diagram

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**Specifications**



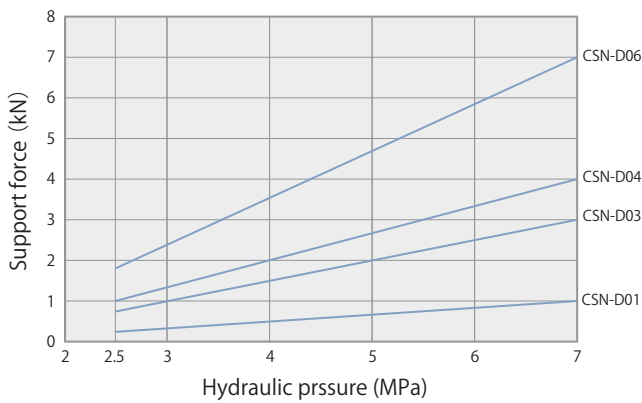
Model			CSN-D01	CSN-D03	CSN-D04	CSN-D06
Support force (hydraulic pressure 7 MPa)*1		kN	1	3	4	7
Cylinder capacity	Lock	cm <sup>3</sup>	0.4	0.8	1.2	2.0
	Unlock	cm <sup>3</sup>	0.1	0.1	0.2	0.2
Lift spring force*2	L:Standard	N	2 ~ 4		3 ~ 6	
	H:Strong	N	3 ~ 6		5 ~ 8	
Plunger stroke		mm	6	8	8	10
Max. allowable mass of head cap		kg	0.05		0.1	
Mass		kg	0.3	0.4	0.5	0.8
Recommended tightening torque of body		N·m	40 ~ 50	40 ~ 50	45 ~ 55	55 ~ 65

- Pressure range : 10 ~ 35 MPa    ● Proof pressure : 52.5 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).

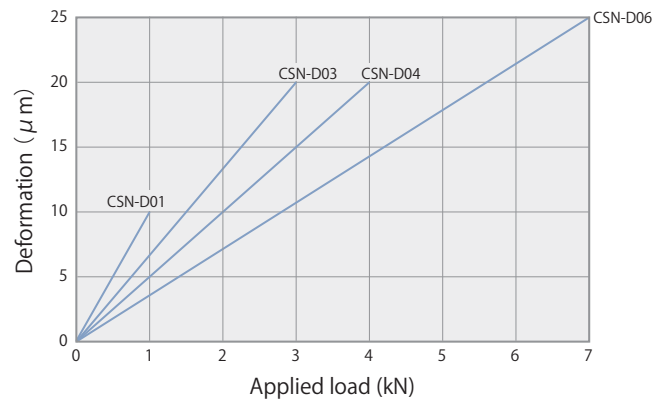
\*2 : Figures are for " upper end ~ lower end " of plunger action.

**Hydraulic pressure & support force**



Hydraulic pressure MPa	Support force kN			
	CSN-D01	CSN-D03	CSN-D04	CSN-D06
2.5	0.3	0.8	1.0	1.8
3.0	0.3	1.0	1.3	2.3
3.5	0.4	1.3	1.7	3.0
4.0	0.5	1.5	2.0	3.5
4.5	0.6	1.8	2.3	4.1
5.0	0.7	2.0	2.7	4.7
5.5	0.8	2.3	3.0	5.3
6.0	0.8	2.5	3.3	5.9
6.5	0.9	2.8	3.6	6.4
7.0	1.0	3.0	4.0	7.0

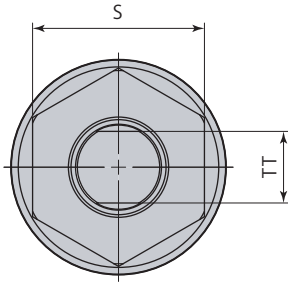
**Applied load & deformation**



Applied load kN	Deformation μm			
	CSN-D01	CSN-D03	CSN-D04	CSN-D06
0	0	0	0	0
1	10	6.7	5	3.6
2		13.3	10	7.1
3		20	15	10.7
4			20	14.3
5				17.9
6				21.4
7				25

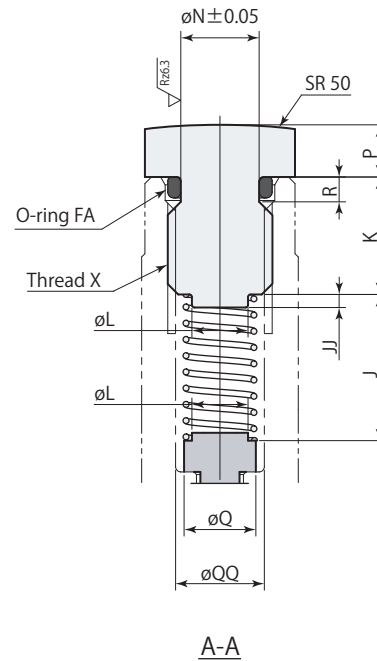
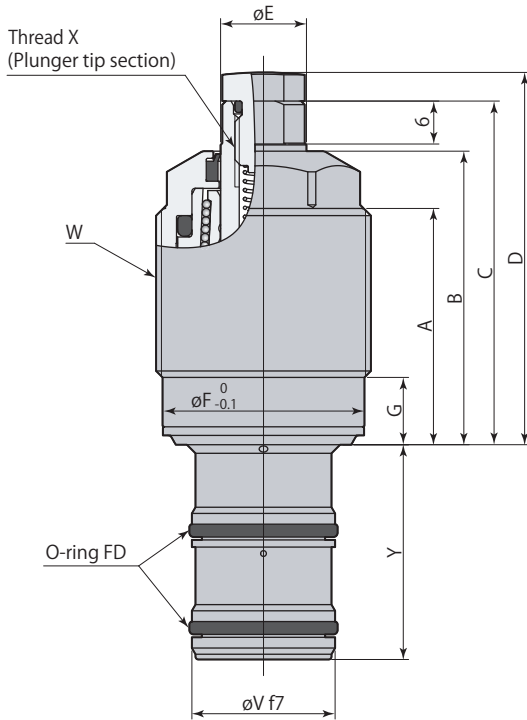
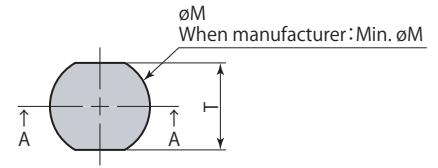
Held with hydraulic pressure of 7 MPa.

Dimensions

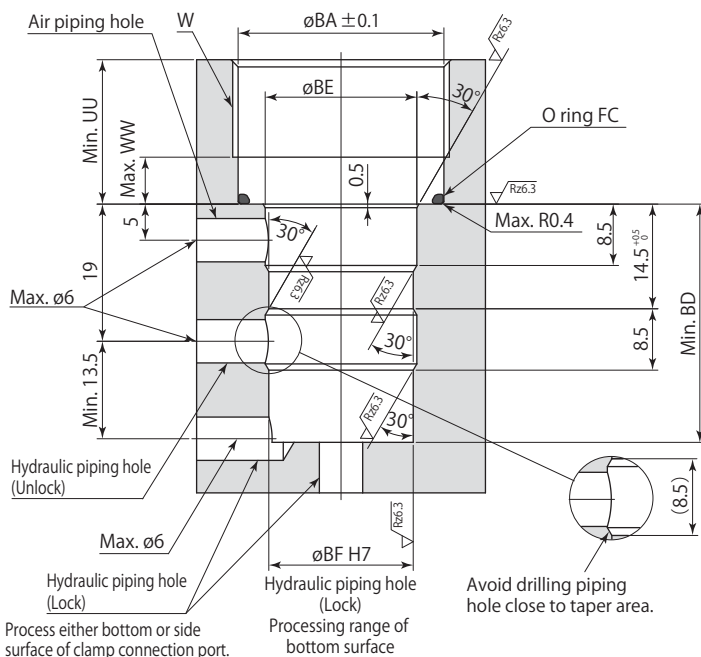


Head cap details

Hardness : HRC52



Mounting details



- 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 (workpiece contact 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.

<b>CSN-D</b> □-□	<b>Work support Hydraulic lift</b>	<b>7MPa</b>	<b>Double acting</b>
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Model	CSN-D01	CSN-D03	CSN-D04	CSN-D06
A	33	54	48	60
B	41	62	58	71
C	48	69	65	78
D	52	73	69	82
øE	12	12	15	16
øF	28.2	28.2	34.2	43.2
G	9.4	9.4	9.4	9.4
J	11.2	23.2	24.1	32.5
JJ	1	1	1	1
K	9	9	9	9
øL	4.3	4.3	5	5
øM	11.5	11.5	12.5	12.5
Min. øM	10	10	12.5	12.5
øN	6	6	7.8	7.8
P	4	4	4	4
øQ	5.5	5.5	7	7
øQQ	6.8	6.8	8.5	8.5
R	1.9	1.9	1.9	1.9
S	24	24	30	36
T (width across flats)	10	10	11	11
TT (plunger width across flats)	10	10	13	13
UU	20	20	20	20
øV	20 <sup>-0.020</sup> <sub>-0.041</sub>	20 <sup>-0.020</sup> <sub>-0.041</sub>	22 <sup>-0.020</sup> <sub>-0.041</sub>	25 <sup>-0.020</sup> <sub>-0.041</sub>
W	M30×1.5	M30×1.5	M36×1.5	M45×1.5
WW	9	9	9	9
X (recommended tightening torque)	M8×1.25 depth 12 (20 N·m)	M8×1.25 depth 12 (20 N·m)	M10×1.5 depth 11 (30 N·m)	M10×1.5 depth 11 (30 N·m)
Y	30	32	32	34
O-ring FA (FKM-70)	S6	S6	S8	S8
O-ring FC (FKM-90)	AS568-022	AS568-022	AS568-026	AS568-030
O-ring FD (FKM-90)	AS568-017	AS568-017	AS568-018	AS568-020
øBA	28.5	28.5	34.5	43.5
BD	31	33	33	35
øBE	21	21	23	26
øBF	20 <sup>+0.021</sup> <sub>0</sub>	20 <sup>+0.021</sup> <sub>0</sub>	22 <sup>+0.021</sup> <sub>0</sub>	25 <sup>+0.021</sup> <sub>0</sub>

### Caution in use

- Set the plunger lifting time to 0.2 seconds or longer by adjusting the flow control valve with check valve. Use flow control valve with cracking pressure of 0.05 MPa or less, in order to shorten descending action time of plunger.
  
- 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. 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  $\mu$  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.



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