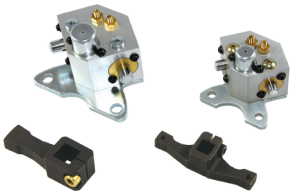
CRN Series

Hydro-cushion
50, 150, 300, 800

Hydraulic cushion specialized for HI-ROTOR
When inertia energy exceeds permissible energy, please use this hydraulic cushion as a supplement.



Ordering Instructions

Hydro-cushion with claw

CRN50 - 90 - 45
① ② ③

Hydro-cushion only

CRN50
①

Switch unit for HI-ROTOR with hydro-cushion

CRN50 - 90 - 45 - T
① ② ③

① Oscillating angle
CRN50 : PRN50
CRN150: PRN150
CRN300: PRN300
CRN800: PRN800

② Oscillating angle
90 : 90°
100: 100°
180: 180°
270: 270°
280: 280°

③ Oscillating reference point
40: 40°
45: 45°

Specific angles
Specify the required oscillating angle, and the hydro-cushion will be delivered with a claw for the specific angle. In this case, the oscillating start point is selectable only between 40° and 45°.

- Select an appropriate hydro-cushion according to the oscil- lating reference point and oscil-lating angle of the HI-ROTOR to be used.

Hydro-cushion with claw

Oscillating reference point	Oscillating angle				
	90°	100°	180°	270°	280°
40°	—	○	—	—	○
45°	○	—	○	○	—

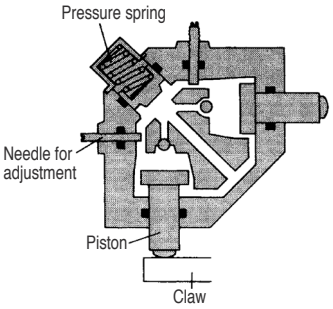
Specifications

Model No.		CRN50	CRN150	CRN300	CRN800
Load range	kg·cm²	981	2942	5884	19613
Max. absorption energy	mJ	2942	9807	19613	58840
Max. collision angular velocity	degree/s	850	750	650	550
Max. energy capacity per minute	mJ/min	19613	70608	137293	353039
Ambient temperature	°C	5～50			
Absorbing angle (one end)	degree	11	12	14	15
Mass	g	240	420	780	1620
Applicable HI-ROTOR		PRN50	PRN150	PRN300	PRN800

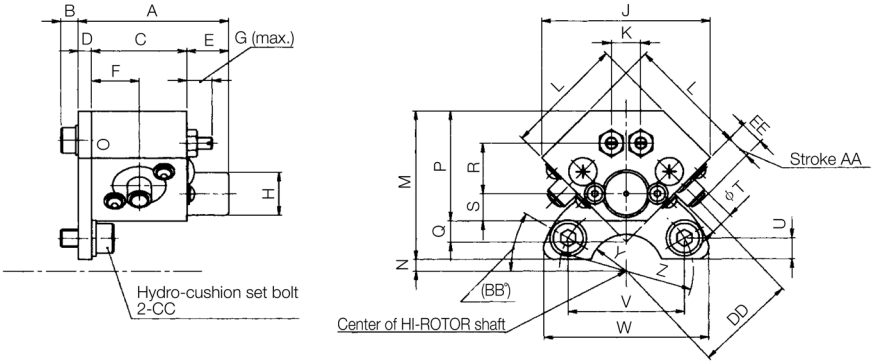
- Energy capacity per minute=Absorbing energy×2 N: Frequency of operation(cycle/min)
- When a HI-ROTOR with a hydro-cushion is used, keep a working pressure of 0.3 MPa or more.

Principle of Operation

When the claw fitted to the HI-ROTOR shaft runs against the piston, the impact is converted into pressure (hydraulic pressure) applied to the back of the piston. This pressure energy changes into thermal energy when it passes through the clearance between the piston and the inside of the cylinder and through orifice of the needle for adjustment and is consumed before the piston stops at the stroke end. On the other hand, the piston on the opposit side is spring loaded and always returns to the origin.



Dimensions



(Unit:mm)

Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	Y	Z	AA	BB	CC	DD	EE
CRN50	50.5	6	32	4.5	14	16	8.5	14.4	56.6	9.9	40	50	4	37	7.1	17	9.2	8	7.2	39	56	R12.5	R45	6.5	30	M6×12ℓ	34	8
CRN150	56.5	7.2	36	4.5	16	18	8.5	18.4	70.7	11.3	50	62	9.5	49	8.4	25.5	11.4	10	8	60.6	80	R15	R70	10	30	M8×16ℓ	46	12
CRN300	62.5	7.2	42	4.5	16	21	12	22.5	91.9	12.7	65	87	8	61	14.2	33.2	14.1	12	12	69.2	95	R22.5	R80	15	30	M10×20ℓ	62	18
CRN800	73	7.2	50	6	17	25	12	32.5	127.0	14.2	90	118	17	82	24.7	46.7	20.6	16	13	103.9	130	R35	R120	24	30	M12×20ℓ	90	27.5

⚠ Individual instruction

Be sure to read the following instructions before use.
Please also refer to "For Safety Use".

Operation

⚠ Warning

- Besides the adjust ejector pin can be used for adjustment, do not loosen or disassemble any accessories or parts, otherwise there will be oil leakage.
- Below the ejector pin, the hexagon nut is not for mounting purpose; therefore, please do not adjust such otherwise there will be oil leakage.
- Please do not operate the hydraulic cushion at an environment with dust, water, and oil. If operating in the above-mentioned environment, malfunction may occur or usage life may be shortened.

Installation method

⚠ Caution

① Install hydraulic cushion on the square side of the axis and the port side. Use hydraulic cushion screw to fasten into the mounting hole of the HI-ROTOR. Double check whether the installation is properly done before proceeding.

② Before install cushion claw, assure whether the axis is at the starting reference point before proceeding (Reference set screw are needed).

③ Hydraulic cushion cannot be used as stopper to avoid decrease in usage life or oil leakage. Additionally, adjust the ejector pin to the proper cushion level.

Kinetic Energy

⚠ Caution

① Find the moment of inertia of the loading, and check whether it is within permissible range.

② Check if collision angular velocity is within permissible range.
$\omega_0 \fallingdotseq 1.2\omega$
ω_0: Colliding angular velocity (Degree/s)
ω: Average angular velocity (Degree/s)

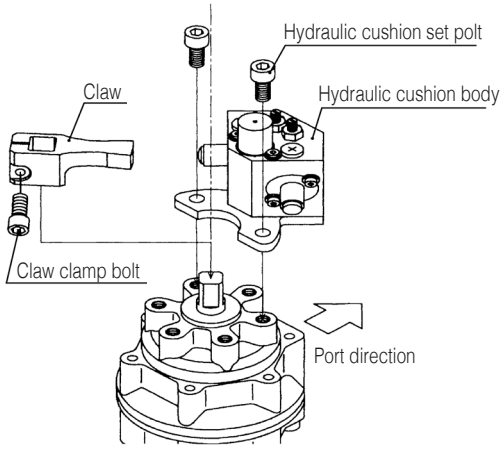
③ Find the colliding energy from loading and colliding angular velocity
$E_1=1/2\times I\times\omega_0^2\times10^{-1}$ (mJ)
I: Moment of inertia ($kg\cdot cm^2$)
ω_0: Colliding angular velocity (Degree/s)

④ Find the energy produced by the torque of HI-ROTOR
$E_2=1/2\times T\times\theta\times10$ (mJ)
T: Torque of HI-ROTOR(N•cm)
θ: Absorption angle(One side)(rad)

⑤ Check whether the summation of E1 and E2 equals or is less than the maximum absorption energy

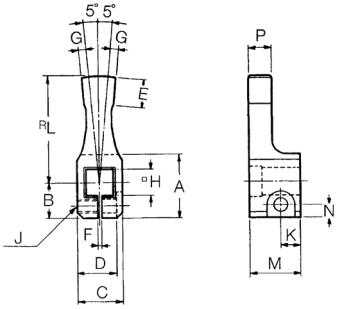
⑥ Find the energy from actuation frequency per minute
$Em=2\times N\times(E_1+E_2)$
N: Actuation frequency (cycle/min)

⑦ Convert degree angle to radian
$1^\circ=0.0174$rad



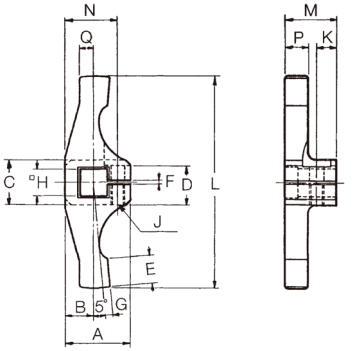
Dimensions of Hydro-Cushion Claws

Oscillating angle 270° (Reference point 45°) (Unit: mm)



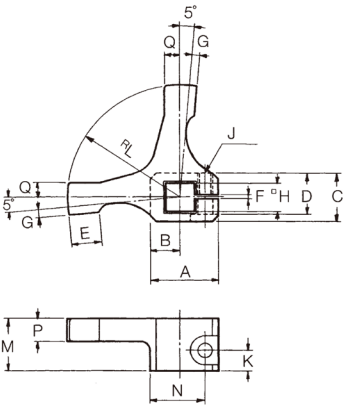
Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P
CRN50	23	13	16	13.7	10	1.2	2.6	10	M5	7	38	18	4.5	8
CRN150	28	16	24	19.5	12	1.2	4.1	13	M6	9	51	20	5	10
CRN300	40	22	35	30.5	14	1.2	5.5	19	M8	11	68	23.5	6.5	12
CRN800	63	34	58	49	18	1.2	8	32	M10	14.5	98	29.5	8	16

Oscillating angle 90° (Reference point 45°) (Unit: mm)



Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
CRN50	23	10	16	13.7	10	1.2	2.5	10	M5	7	76	18	18.5	8	5
CRN150	28	12	24	19.5	12	1.2	4	13	M6	7.5	102	20	23	10	5
CRN300	40	18	35	30.5	14	1.2	5.4	19	M8	9	136	23.5	33.5	12	9
CRN800	63	29	58	49	18	1.2	8	32	M10	14.5	196	29.5	55	16	14

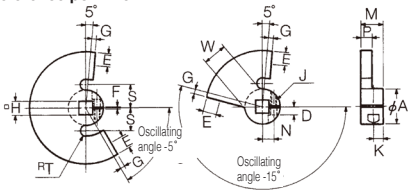
Oscillating angle 180° (Reference point 45°) (Unit: mm)



Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
CRN50	23	10	16	13.7	10	1.2	2.5	10	M5	7	38	18	18.5	8	5
CRN150	28	12	24	19.5	12	1.2	4	13	M6	9	51	20	23	10	5
CRN300	40	18	35	30.5	14	1.2	5.4	19	M8	11	68	23.5	33.5	12	9
CRN800	63	29	58	49	18	1.2	8	32	M10	14.5	98	29.5	55	16	14

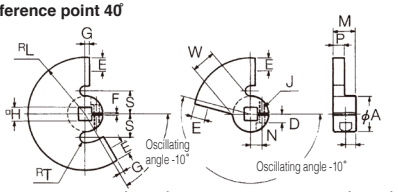
Special angle (Reference point 40°, 45°) (Unit: mm)

Reference point 45°



Oscillating angle 0°~90° Oscillating angle 90°~270°

Reference point 40°



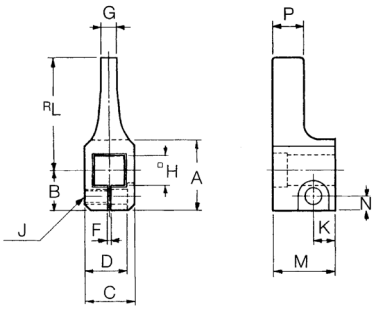
Oscillating angle 0°~100° Oscillating angle 100°~280°

Model No.	A	D	E	F	G ±0.1	H ±0.05 0	J	K	L	M	N	P	S	T	W
CRN50	26	5.5	8	1.5	2.5	10	M5 ↧13	7	37	17.5	8.5	7	18	5	13
CRN150	32	7.5	12	1.5	4	13	M6 ↧16	9	51	20	10.5	10	21	5	16
CRN300	48	13	14	1.5	5.5	19	M8 ↧22	11	68	23.5	15	12	30	6	24
CRN800	78	20	18	1.5	8	32	M10 ↧30	14	98	28.5	26	15.5	45	6	39

- We recommend to harden the claw at HRc ≒ 40 for oscillating angle of 260° or more.
- Material : S45~55C

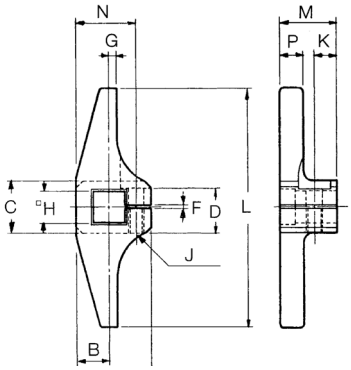
Dimensions of Hydro-Cushion Claws

Oscillating angle 280˚ (Reference point 40˚) (Unit: mm)



Model No.	A	B	C	D	F	G	H	J	K	L	M	N	P
CRN50	23	13	16	13.5	1.2	5	10	M5	7	37	20	4.5	10
CRN150	28	16	24	19.5	1.2	8	13	M6	9	51	20	5	10
CRN300	40	22	35	30.5	1.2	11	19	M8	11	68	24	6.5	12.5
CRN800	63	34	58	49	1.2	16	32	M10	14.5	98	28.5	8	15.5

Oscillating angle 100˚ (Reference point 40˚) (Unit: mm)



Model No.	A	B	C	D	F	G	H	J	K	L	M	N	P
CRN50	23	10	16	13.5	1.2	2.5	10	M5	7	74	17.5	18.5	7
CRN150	28	12	24	19.5	1.2	4	13	M6	9	102	20	23	10
CRN300	40	18	35	30.5	1.2	5.5	19	M8	11	136	23.5	33.5	12
CRN800	63	29	58	49	1.2	8	32	M10	14	196	28.5	55	15.5