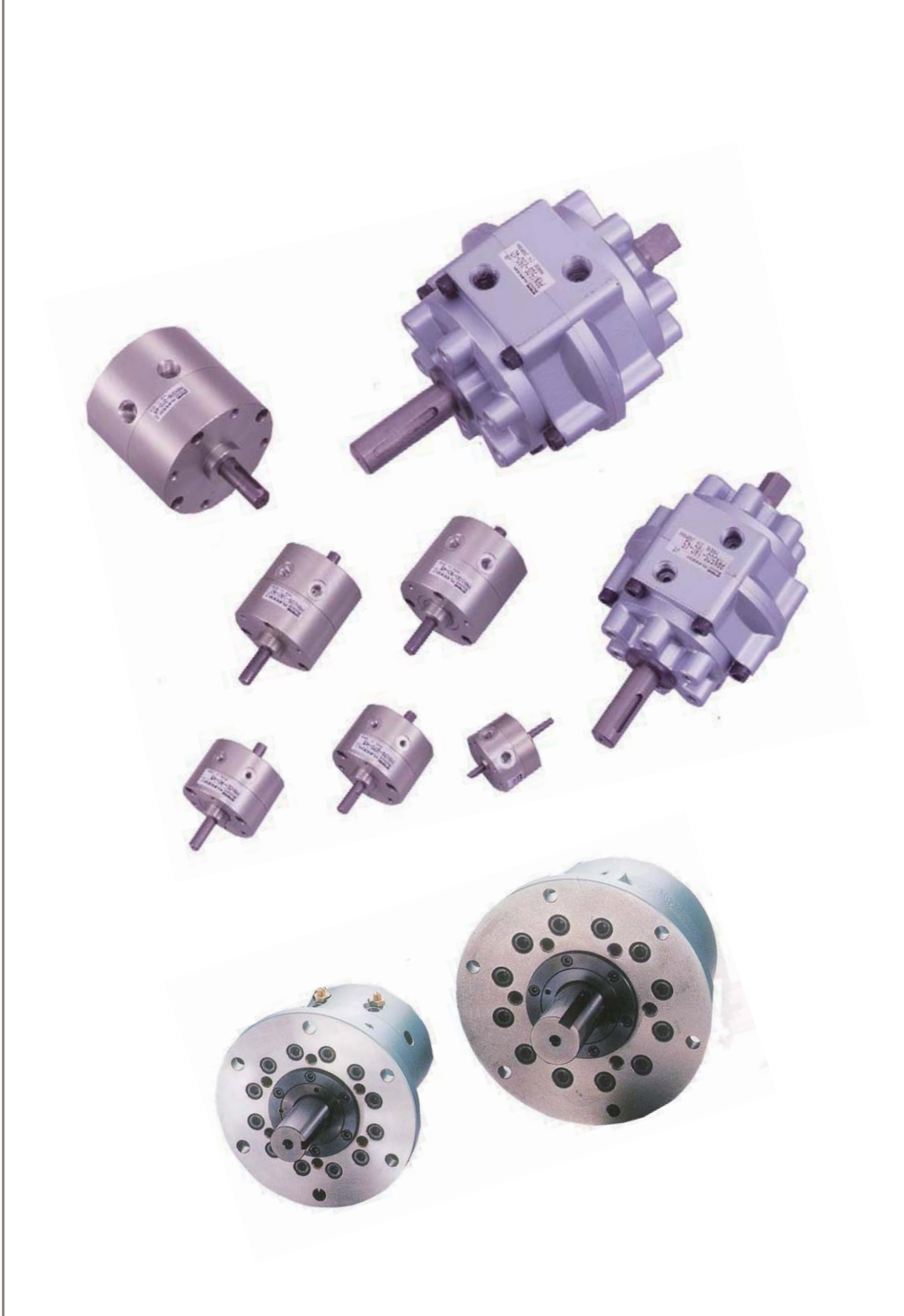
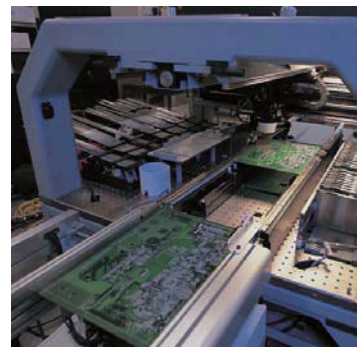


aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



Pneumatic Vane Type Rotary Actuator PRO-PRN Series



ENGINEERING YOUR SUCCESS.

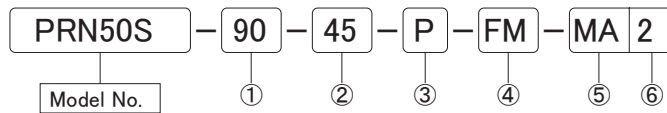
HI-ROTOR/Standard type

PRNseries

50S, 150S, 300S, 800S/50D, 150D, 300D, 800D



ORDERING INSTRUCTIONS



Single vane PRN50S PRN150S PRN300S PRN800S	Double vane PRN50D PRN150D PRN300D PRN800D
--	--

Type of switch

No mark	No switch
MA	MA-1
MB	MD-1
MC	MD-3
MD	MR
MG	MT-3
MH	MT-3U
MJ	MT-2
MK	MT-2U
MP	MTP-3

Oscillating angle

90	90°
100	100°
180	180°
270	270°
280	280°

Mounting hardware

No mark	No mounting hardware
P	With flange plate
L1	With one foot plate
L2	With two foot plates

(Note) P is not available for Models PRN300, 800.

Oscillating reference point

45	45°
40	40°

Option

No mark	Standard
CR	Hydro-cushion
FM	Switch unit
FC	Hydro-cushion + Switch unit

(Note) For FM and FC, be sure to specify the type and quantity of switches.

(Note) MP is made-to-order

Number of switch

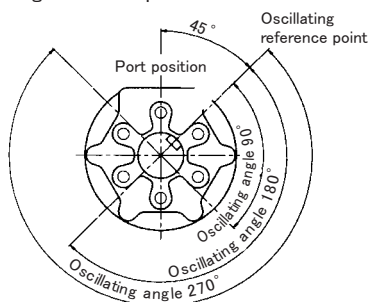
No mark	No switch
1	With one switch
1	With two switches

Custom-made shafts
(Refer to Page 65)

OSCILLATING REFERENCE POINT AND OSCILLATING ANGLE

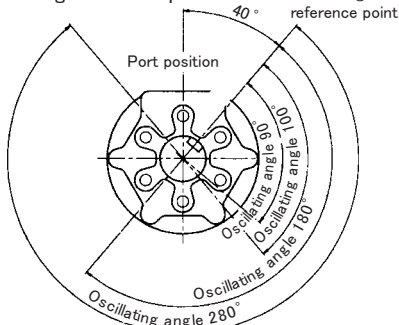
PRN50, 150, 300, 800

Oscillating reference point at 45°



PRN50, 150, 300, 800

Oscillating reference point at 40°



(Note) · Oscillating reference point 40° is made-to-order.

Only oscillating reference point 45° is available with FC option.
(Combination of Hydro-cushion and Switch unit.)

· Two foot plates (L2) is not available with CR, FM, FC option.

· Mounting hardware and Hydro-cushion comes being not fabricated.

Oscillating angle and oscillating reference point

Single vane

Model No.	Oscillating angle				Oscillating reference point	
	90°	180°	270°	280°	45°	40°
PRN50S	○	○	○	—	○	—
PRN150S	○	○	○	—	○	—
PRN300S	○	○	○	—	○	—
PRN800S	○	○	○	—	○	—

Double vane

Model No.	Oscillating angle				Oscillating reference point	
	90°	100°	45°	40°		
PRN50D	○	—	○	—		
PRN150D	○	—	○	—		
PRN300D	○	—	○	—		
PRN800D	○	—	○	—		

Model Nos. of mounting hardware

Applicable HI-ROTOR	Flange plate	Foot plate
PRN50	PRN50-P	PRN50-L
PRN150	PRN150-P	PRN150-L
PRN300	—	PRN300-L
PRN800	—	PRN800-L

(Note) These hardware are provided with set screws.

HI-ROTOR/PRN series

SPECIFICATIONS

Model No.	Unit	PRN50S				PRN150S				PRN300S			
Vane		Single vane											
Fluid		Non-lubricated air (Lubricated air)											
Oscillating angle	Degree	90 ⁺³ ₀	180 ⁺³ ₀	270 ⁺³ ₀	280 ⁺³ ₀	90 ⁺³ ₀	180 ⁺³ ₀	270 ⁺³ ₀	280 ⁺³ ₀	90 ⁺³ ₀	180 ⁺³ ₀	270 ⁺³ ₀	280 ⁺³ ₀
Oscillating reference point	Degree	45	45	45	40	45	45	45	40	45	45	45	40
Port size		Rc1/				Rc1/				Rc3/			
Minimum working pressure	MPa	0.1				0.08				0.08			
Operation pressure range	MPa	0.2 ~ 1											
Proof withstanding pressure	MPa	1.5											
Temperature range		5 ~ 60											
Maximum frequency of use	Hz	3	1.5	1		2	1.3	0.8		1.5	1	0.7	
Internal volume	cm ³	51	51	61	62	146	146	179	185	244	283	352	365
Allowable radial load	N	588				1176				1960			
Allowable thrust load	N	44.1				88.2				147			
Allowable energy	mJ	49				225.4				1078			
Mass	kg	0.82	0.79	0.73	0.7	2.0	1.9	1.7	1.6	3.7	3.7	3.7	3.6

Model No.	Unit	PRN800S				PRN50D		PRN150D		PRN300D		PRN800D	
Vane		Single vane				Double vane							
Fluid		Non-lubricated air (Lubricated air)											
Oscillating angle	Degree	90 ⁺³ ₀	180 ⁺³ ₀	270 ⁺³ ₀	280 ⁺³ ₀	90 ⁺³ ₀	100 ⁺³ ₀	90 ⁺³ ₀	100 ⁺³ ₀	90 ⁺³ ₀	100 ⁺³ ₀	90 ⁺³ ₀	100 ⁺³ ₀
Oscillating reference point	Degree	45	45	45	40	45	40	45	40	45	40	45	40
Port size		Rc1/				Rc1/		Rc1/		Rc3/		Rc1/	
Minimum working pressure	MPa	0.05				0.08		0.06		0.06		0.05	
Operation pressure range	MPa	0.2 ~ 1											
Proof withstanding pressure	MPa	1.5											
Temperature range		5 ~ 60											
Maximum frequency of use	Hz	1.1	0.75	0.5		3		2		1.5		1.1	
Internal volume	cm ³	754	869	1036	1046	42	43	127	123	244	271	754	774
Allowable radial load	N	4900				588		1176		1960		4900	
Allowable thrust load	N	490				44.1		88.2		147		490	
Allowable energy	mJ	3920				49		225.4		1078		3920	
Mass	kg	12.7	12.2	11.2	11.0	0.82	0.8	2.0	1.9	4.3	4.1	12.7	12.5

(Note) • Maximum frequency of use at the supply pressure of 0.5 MPa (Unloaded).

- Make sure to use the HI-ROTOR within allowable energy. Refer to page 68 for the allowable energy calculation.
- HI-ROTORs with keyways are provided with keys.
- For HI-ROTORs other than standard, consult KURODA.

Output (Effective torque)

(Unit : N·cm)

Model No.	Supply pressure (MPa)									
	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	
PRN50S	125	259	369	479	590	700	829	950	1060	
PRN50D	330	579	829	1040	1280	1510	1760	2010	2250	
PRN150S	550	850	1150	1500	1800	2100	2400	2730	3050	
PRN150D	1250	1900	2700	3500	4150	4800	5500	6200	6900	
PRN300S	1050	1650	2250	2850	3450	4050	4600	5180	5750	
PRN300D	2550	3900	5400	6800	8300	9700	11000	12400	13700	
PRN800S	3780	5910	8100	10200	12300	14400	16600	18600	20500	
PRN800D	7740	12000	16100	20600	24700	28800	33200	37100	41100	

HI-ROTOR/PRN series

OSCILLATING TIME RANGE

(Unit : s)

Model No.	Oscillating angle				
	90°	100°	180°	270°	280°
PRN50	0.08 ~ 0.8	0.09 ~ 0.9	0.16 ~ 1.6	0.24 ~ 2.4	0.25 ~ 2.5
PRN150	0.12 ~ 1.2	0.13 ~ 1.3	0.24 ~ 2.4	0.36 ~ 3.6	0.37 ~ 3.7
PRN300	0.16 ~ 1.6	0.17 ~ 1.7	0.32 ~ 3.2	0.48 ~ 4.8	0.49 ~ 4.9
PRN800	0.22 ~ 2.2	0.24 ~ 2.4	0.44 ~ 4.4	0.66 ~ 6.6	0.68 ~ 6.8

(Note) Use HI-ROTORs within the range of the oscillating time range shown in the above table.

Otherwise, the HI-ROTOR will tend to occur in a stick-slip motion.

When it is necessary to operate a HI-ROTOR at a low speed which is outside the above-mentioned range, use of an air-hydro HI-ROTOR (see page 40) is recommended.

HI-ROTOR with switch / For details, see pages 55.

M TYPE REED SWITCHES

Lead wire type

Type of switch	Load voltage (V)	Load current (mA)	Indicating lamp (Lights up at ON)	Applications
MA-1	AC100	5 ~ 45	○	Relay PLC
	DC24	5 ~ 45		
MD-1	DC24	25 ~ 65	○	Relay
MD-3	DC5, 6	50 or less (Inductive load) 300 or less (Resistance load)	○	IC circuit
MR	AC 5~10 DC	50 or less (Inductive load) 300 or less (Resistance load)	Not provided	Relay

M TYPE PROXIMITY SWITCH

Lead wire type

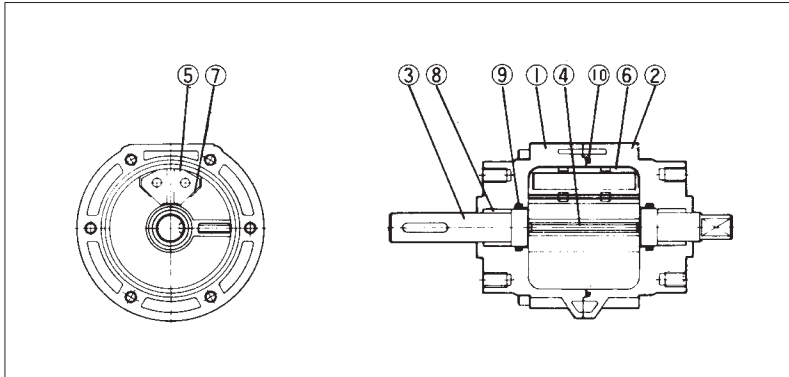
Type of switch	Load voltage (V)	Load current (mA)	Indicating lamp (Lights up at ON)	Applications
MT-2 MT-2U	DC24 (DC10~30)	5 ~ 100	○	Relay PLC
MT-3 MT-3U MTP-3	DC5 ~ 30	5 ~ 200	○	Relay PLC IC circuit

(Note) MTP-3 is made-to-order

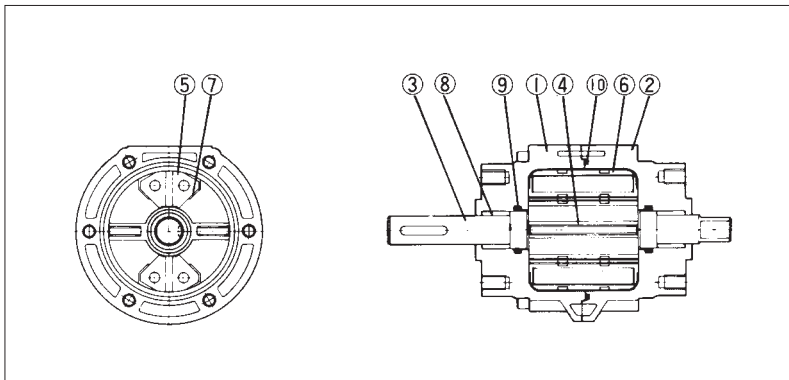
HI-ROTOR/PRN series

STRUCTURE

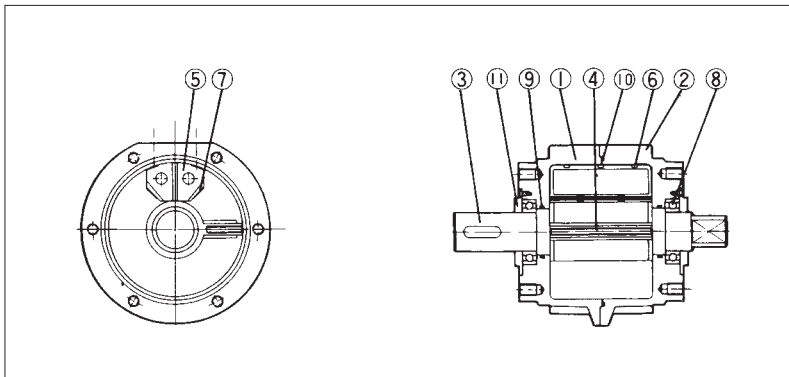
PRN50S, 150S, 300S



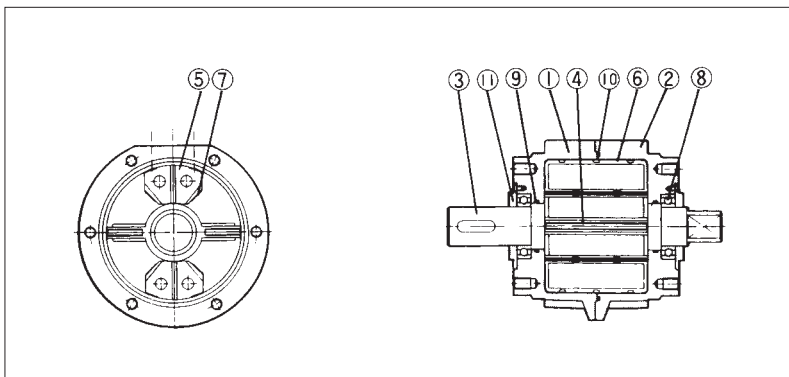
PRN50D, 150D, 300D



PRN800S



PRN800D



MAIN COMPONENTS

No.	Description	Material
	Body A	50, 150 : Aluminum alloy die casting
	Body B	300 : Aluminum alloy casting
	Vane shaft	Structural alloy steel
	Vane seal	Nitrile rubber
	Shoe	Zinc alloy die casting
	Shoe seal	Nitrile rubber
	Damper	Urethane rubber
	Bearing	—
	O-ring	Nitrile rubber
	O-ring	Nitrile rubber

(Note) The vane seal and vane shaft are united in one piece.

MODEL Nos. OF PACKING KIT

Applicable HI-ROTOR	Model No.
PRN50S, PRH50S, PRF50S	PRN50S-PS
PRN50D, PRH50D, PRF50D	PRN50D-PS
PRN150S, PRH150S, PRF150S	PRN150S-PS
PRN150D, PRH150D, PRF150D	PRN150D-PS
PRN300S, PRH300S, PRF300S	PRN300S-PS
PRN300D, PRH300D, PRF300D	PRN300D-PS

(Note) A set of packings consists of part Nos. , , and

PRN800

No.	Description	Material
	Body A	Aluminum alloy casting
	Body B	Aluminum alloy casting
	Vane shaft	Structural alloy steel
	Vane seal	Nitrile rubber
	Shoe	Zinc alloy die casting
	Shoe seal	Nitrile rubber
	Damper	Urethane rubber
	Bearing	Bearing steel
	O-ring	Nitrile rubber
	O-ring	Nitrile rubber
	Cover plate	Structural carbon steel

(Note) The vane seal and vane shaft are united in one piece.

MODEL Nos. OF PACKING KIT

Applicable HI-ROTOR	Model No.
PRN800S, PRH800S, PRF800S	PRN800S-PS
PRN800D, PRH800D, PRF800D	PRN800D-PS

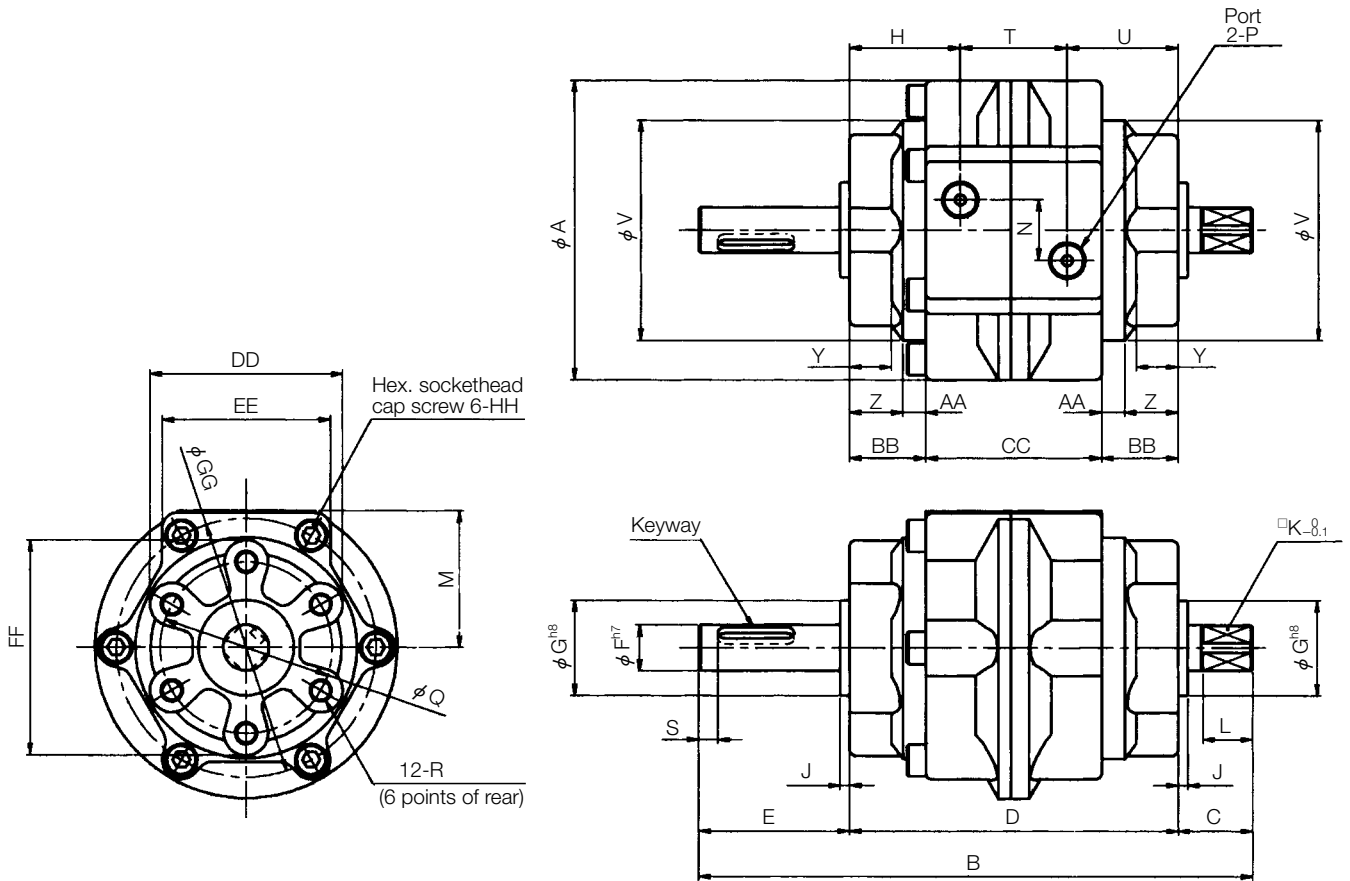
(Note) A set of packings consists of part Nos. , , and

HI-ROTOR/PRN series

DIMENSIONS

(Unit : mm)

Basic type
PRN50, 150, 300, 800



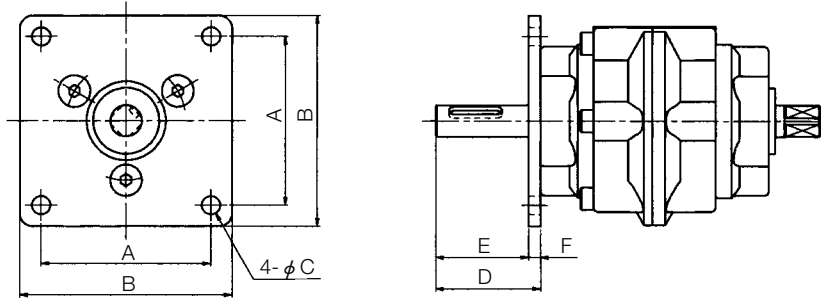
Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T
PRN50	79	145	19.5	86	39.5	12	25	29	2.5	10	13	36	16	Rc1/8	45	M6×1 depth 9	5	28
PRN150	110	180	23.5	103	53.5	17	30	34.5	3	13	16	51	24	Rc1/4	70	M8×1.25 depth 12	5	34
PRN300	141.5	220	30	125	65	25	45	41.5	3.5	19	22	66	32	Rc3/8	80	M10×1.5 depth 15	5	42
PRN800	196	285	44.5	171	69.5	40	70	53.5	4.5	32	35	90	44	Rc1/2	120	M12×1.75 depth 18	10	64

Model No.	U	V	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	Keyway width×depth×length
PRN50	29	58	11	14	6	20	46	51	44	57	68	M5×30ℓ	4 ^{-0.03} × 2.5 ^{+0.1} × 20
PRN150	34.5	85.2	10.5	15.5	8	23.5	56	75	61	85	97	M6×35ℓ	5 ^{-0.03} × 3 ^{+0.1} × 36
PRN300	41.5	110	13	17.5	10	27.5	70	88.5	78	98.5	125	M8×45ℓ	7 ^{-0.036} × 4 ^{+0.2} × 40
PRN800	53.5	152	14.5	21.1	11.4	32.5	106	130	110	145	173	M12×70ℓ	12 ^{-0.043} × 5 ^{+0.2} × 40

DIMENSIONS

(Unit : mm)

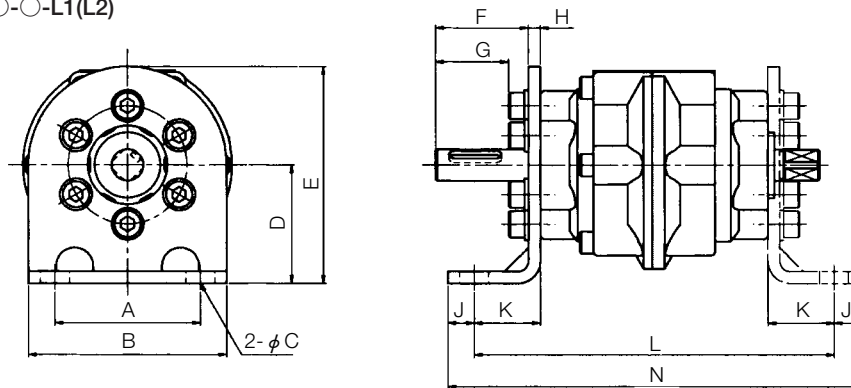
With flange plate
PRN50, 150○-○-○-P



Model No.	A	B	C	D	E	F
PRN50	64	80	7	39.5	35	4.5
PRN150	88	110	9	53.5	47.5	6

(Note) A flange plate can be fitted with it turned in steps of 60° from the original posture.

With foot plate
PRN50, 150, 300, 800○-○-○-L1(L2)

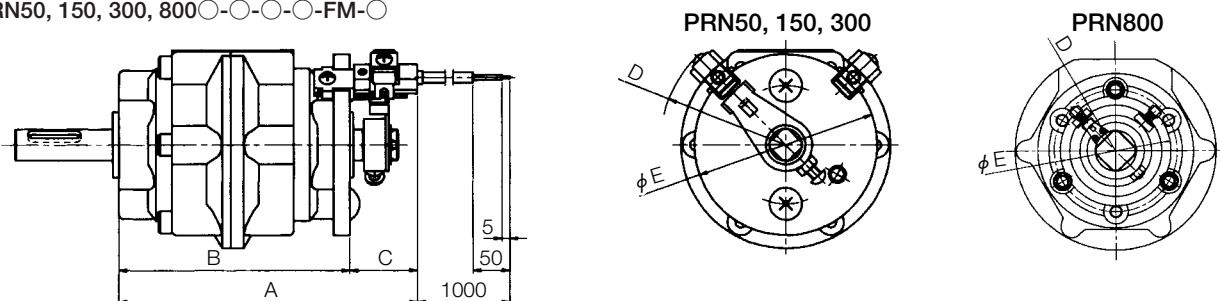


Model No.	A	B	C	D	E	F	G	H	J	K	L	N
PRN50	55	75	11	45	82.5	35	27.5	4.5	10	25	136	156
PRN150	80	110	13	65	115	43.5	33.5	10	12	28	159	183
PRN300	100	140	15	80	135	53	40.5	12	13	32	189	215
PRN800	140	200	15	110	200	54.5	39.5	15	15	35	241	271

(Note) •A foot plate can be fitted with it turned in steps of 60° from the original posture.

•Short shaft side : Example with L2(2 pcs.)

With switch unit
PRN50, 150, 300, 800○-○-○-○-FM-○



Model No.	A	B	C	D	E
PRN50	115	87.2	25.5	R47	69
PRN150	131.7	104.2	27.5	R61	97
PRN300	161.2	126.2	35	R69	113
PRN800	215.5	174.2	41.3	R60	108

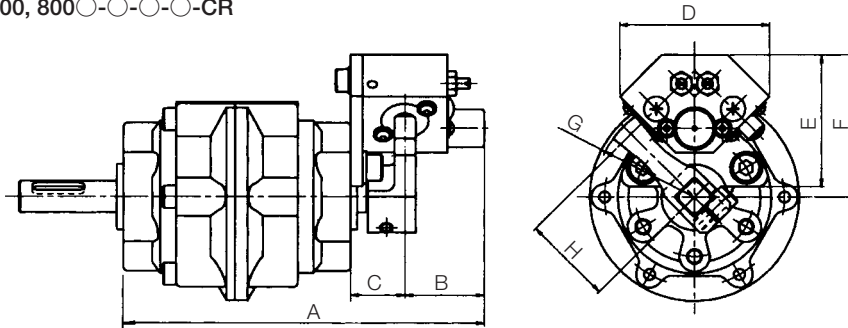
HI-ROTOR/PRN series

DIMENSIONS

(Unit : mm)

With Hydro-cushion

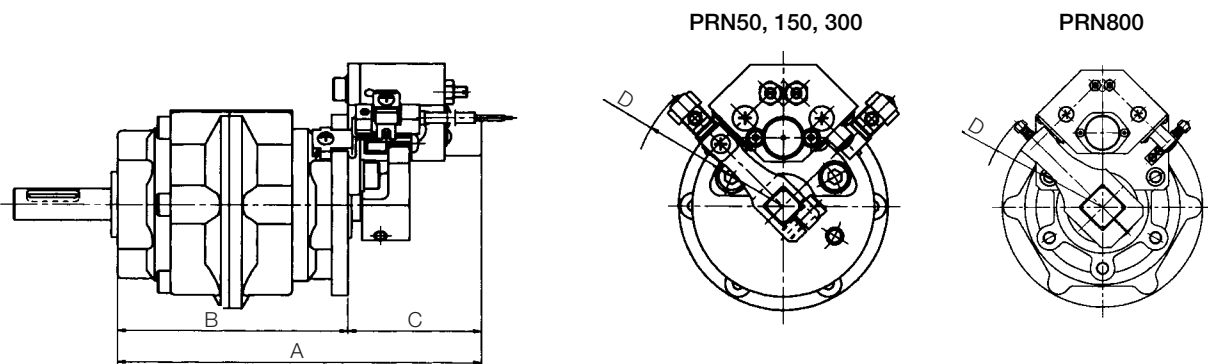
PRN50, 150, 300, 800○-○-○-○-CR



Model No.	A	B	C	D	E	F	G	H
PRN50	136.5	30	20.5	56	50	54	R38	34
PRN150	159.5	34	22.5	80	62	71.5	R51	46
PRN300	187.5	37	25.5	95	87	96	R68	62
PRN800	244	42	31	130	118	135	R78	90

With Hydro-cushion+switch unit

PRN50, 150, 300, 800○-○-○-○-FC



Model No.	A	B	C	D
PRN50	137.7	87.2	50.5	R58.2
PRN150	160.7	104.2	56.5	R72.2
PRN300	188.7	126.2	62.5	R88.2
PRN800	244	174.2	69.8	R118.5

(Note) •Refer on page 37 for the dimensions on basic type HI-ROTOR.

•For switch unit-mounting hardware or hydro-cushion combinations, refer to the required dimensions in each Fig.

Air-hydro HI-ROTOR

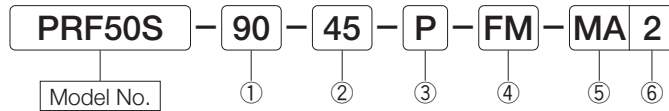
PRFseries (Upon request)

50S, 150S, 300S, 800S, 50D, 150D, 300D, 800D

HI-ROTORS of this series are exclusively used for air-hydro systems and are suitable for operation at low speed.



ORDERING INSTRUCTIONS



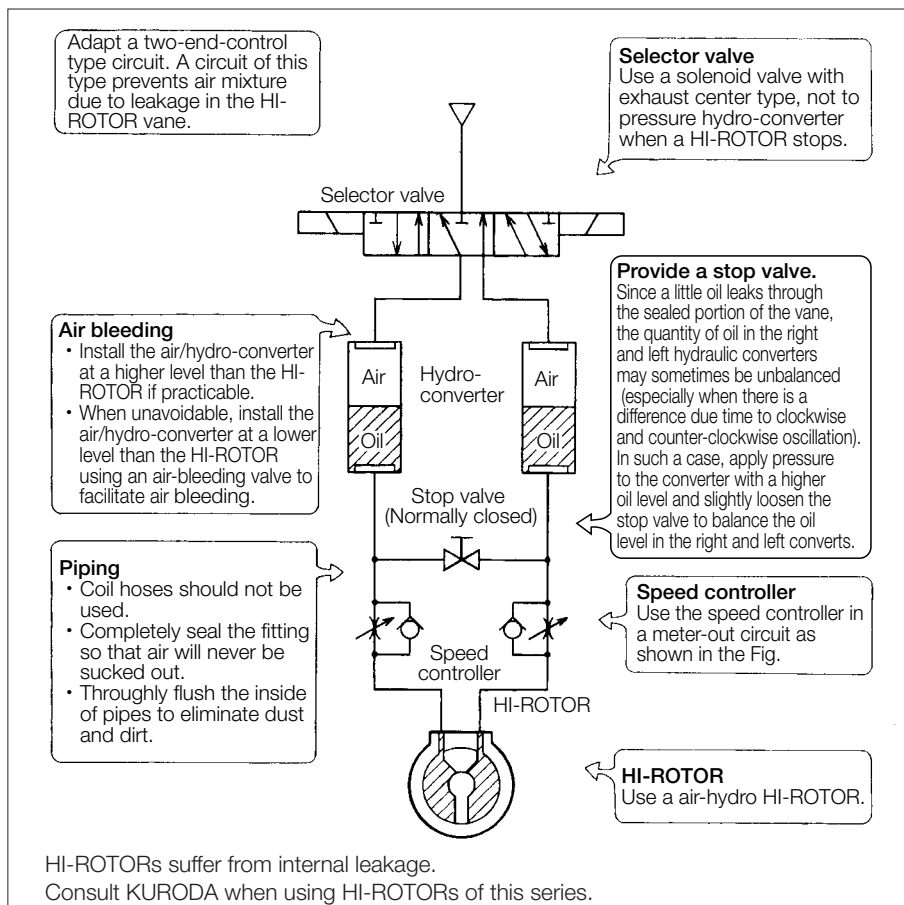
①Oscillating angle, ②Oscillating reference point, ③Mounting head ware, ④Option, ⑤Type of switch, ⑥Number of switches are same as those of the Standard Type PRN series (see Page 33).

SPECIFICATIONS

Fluid	Unit	Hydraulic oil
Operation pressure range	MPa	0.2~1
Proof withstanding pressure	MPa	1.5
Temperature range	°C	5~60

(Note) •Other specifications are the same as for Standard type PRN series. (see Page 34)
•Use turbine oil Class 1 (ISO VG32) or hydraulic fluid having the equivalent viscosity. Note that some noncombustible hydraulic fluid are not suitable.

HOW TO USE



MINIMUM OSCILLATING TIME

Model No.	Oscillating angle (Unit : s)			
	90°	180°	270°	280°
PRF50S	0.3	0.5	0.7	0.7
PRF150S	0.4	0.7	0.9	1.0
PRF300S	0.4	0.7	1.0	1.0
PRF800S	0.7	1.3	1.8	1.8

Model No.	Oscillating angle (Unit : s)	
	90°	100°
PRF50D	0.6	0.7
PRF150D	1.3	1.4
PRF300D	1.9	2.1
PRF800D	2.4	2.6

(Note) Dimensions are the same as for standard type PRN series. See Page 37.

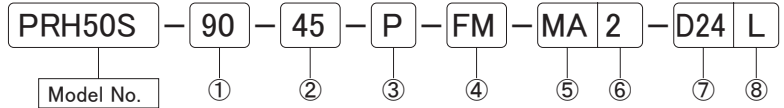
HI-PAL HI-ROTOR/With solenoid valve

PRHseries

50S, 150S, 300S, 800S, 50D, 150D, 300D, 800D



ORDERING INSTRUCTIONS



Single vane	Double vane
PRH50S	PRH50D
PRH150S	PRH150D
PRH300S	PRH300D
PRH800S	PRH800D

⑤ Type of switch

No mark	No switch
MA	MA-1
MB	MD-1
MC	MD-3
MD	MR
MG	MT-3
MH	MT-3U
MJ	MT-2
MK	MT-2U
MP	MTP-3

① Oscillating angle

90	90°
100	100°
180	180°
270	270°
280	280°

④ Option

No mark	Standard
CR	Hydro-cushion
FM	Switch unit
FC	Hydro-cushion + Switch unit

(Note) For FM and FC, be sure to specify the type and quantity of switches.

② Oscillating reference point

45	45°
40	40°

③ Mounting hardware

No mark	No mounting hardware
P	With flange plate
L1	With one foot plate
L2	With two foot plates

(Note) P is not available for Models PRH300, PRH800.

⑥ Number of switch

No mark	No switch
1	With one switch
2	With two switches

(Note) MP is made-to-order

⑧ Solenoid valve wiring specifications

L	Lead wire
SP	Plug-in connector with indicator light & surge suppressor
UP	Plug-in connector with indicator light & surge suppressor

PRH800

L	Lead wire
G	Terminal grommet
C	Terminal conduit

(Note) · Oscillating reference point 40° is made-to-order.

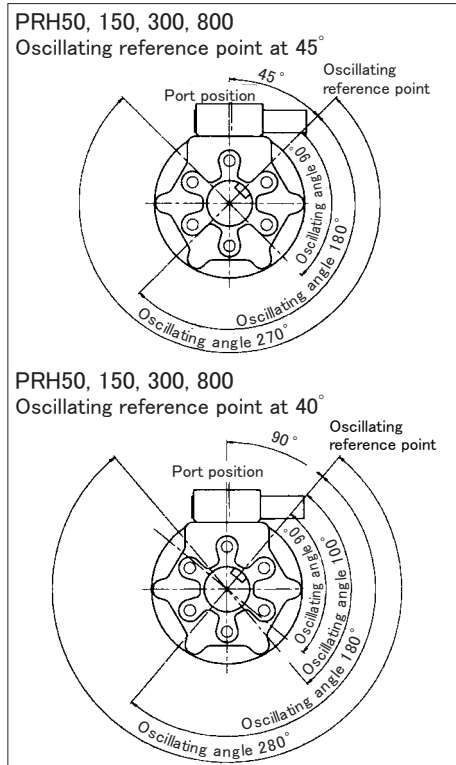
· Only oscillating reference point 45° is available with FC option.

(Combination of Hydro-cushion and Switch unit.)

· Two foot plates (L2) is not available with CR, FM, FC option.

· Mounting hardware and Hydro-cushion come being not fabricated.

OSCILLATING REFERENCE POINT AND OSCILLATING ANGLE



Oscillating angle and oscillating reference point

Single vane

Model No.	Oscillating angle				Oscillating reference point	
	90°	180°	270°	280°	45°	40°
PRH50S	○	○	○	—	○	—
PRH150S	○	○	○	—	○	—
PRH300S	○	○	○	—	○	—
PRH800S	○	○	○	—	○	—

Double vane

Model No.	Oscillating angle			Oscillating reference point
	90°	100°	45°	40°
PRH50D	○	—	○	—
PRH150D	○	—	○	—
PRH300D	○	—	○	—
PRH800D	○	—	○	—

Model Nos. of mounting hardware

Applicable HI-ROTOR	Flange plate	Foot plate
PRH50	PRH50-P	PRN50-L
PRH150	PRH150-P	PRN150-L
PRH300	—	PRN300-L
PRH800	—	PRN800-L

(Note) These hardware are provided with set screws.

HI-PAL HI-ROTOR/PRH series

SPECIFICATIONS

Model No.	Unit	PRH50S				PRH150S				PRH300S			
Vane		Single vane											
Fluid		Non-lubricated air (Lubricated air)											
Oscillating angle	Degree	90 ⁺³ ₀	180 ⁺³ ₀	270 ⁺³ ₀	280 ⁺³ ₀	90 ⁺³ ₀	180 ⁺³ ₀	270 ⁺³ ₀	280 ⁺³ ₀	90 ⁺³ ₀	180 ⁺³ ₀	270 ⁺³ ₀	280 ⁺³ ₀
Oscillating reference point	Degree	45	45	45	40	45	45	45	40	45	45	45	40
Port size		Rc ¹ / ₈				Rc ¹ / ₄				Rc ³ / ₈ (Port 3, 5 : Rc ¹ / ₄)			
Operation pressure range	MPa	0.2 ~ 0.8											
Temperature range	°C	5 ~ 50											
Solenoid valve voltage	V	DC24V, AC100/110V, AC200/220V											
Valve mounted		PCS245				PCS2413							
Mass	kg	0.9	0.9	0.84	0.81	2.2	2.2	2.0	1.9	4.1	4.1	4.1	4.0

Model No.	Unit	PRH800S				PRH50D	PRH150D	PRH300D	PRH800D				
Vane		Single vane				Double vane							
Fluid		Non-lubricated air (Lubricated air)											
Oscillating angle	Degree	90 ⁺³ ₀	180 ⁺³ ₀	270 ⁺³ ₀	280 ⁺³ ₀	90 ⁺³ ₀	100 ⁺³ ₀	90 ⁺³ ₀	100 ⁺³ ₀	90 ⁺³ ₀	100 ⁺³ ₀	90 ⁺³ ₀	100 ⁺³ ₀
Oscillating reference point	Degree	45	45	45	40	45	40	45	40	45	40	45	40
Port size		Rc ¹ / ₂ (Port 3, 5 : Rc ³ / ₈)				Rc ¹ / ₈	Rc ¹ / ₄	Rc ³ / ₈ (Port 3, 5 : Rc ¹ / ₂)		Rc ¹ / ₂ (Port 3, 5 : Rc ¹ / ₂)			
Operation pressure range	MPa	0.2 ~ 0.8											
Temperature range	°C	5 ~ 50											
Solenoid valve voltage	V	DC24V, AC100/110V, AC200/220V											
Valve mounted		PCS2408				PCS245	PCS2413				PCS2408		
Mass	kg	13.2	12.7	11.7	11.5	0.93	0.91	2.3	2.2	4.7	4.5	13.2	13.0

(Note) Other specifications are the same as Standard type PRN series. See Page34.

OUTPUT (Effective torque)

(Unit : N·cm)

Model No.	Supply pressure (MPa)						
	0.2	0.3	0.4	0.5	0.6	0.7	0.8
PRH50S	125	259	369	479	590	700	829
PRH50D	330	579	829	1040	1280	1510	1760
PRH150S	550	850	1150	1500	1800	2100	2400
PRH150D	1250	1900	2700	3500	4150	4800	5500
PRH300S	1050	1650	2250	2850	3450	4050	4600
PRH300D	2550	3900	5400	6800	8300	9700	11000
PRH800S	3780	5910	8100	10200	12300	14400	16600
PRH800D	7740	12000	16100	20600	24700	28800	33200

OSCILLATING TIME RANGE

(Unit :s)

Model No.	Oscillating angle				
	90°	100°	180°	270°	280°
PRH50	0.08 ~ 0.8	0.09 ~ 0.9	0.16 ~ 1.6	0.24 ~ 2.4	0.25 ~ 2.5
PRH150	0.12 ~ 1.2	0.13 ~ 1.3	0.24 ~ 2.4	0.36 ~ 3.6	0.37 ~ 3.7
PRH300	0.16 ~ 1.6	0.17 ~ 1.7	0.32 ~ 3.2	0.48 ~ 4.8	0.49 ~ 4.9
PRH800	0.22 ~ 2.2	0.24 ~ 2.4	0.44 ~ 4.4	0.66 ~ 6.6	0.68 ~ 6.8

(Note) Operate the HI-ROTOR within the oscillating time range prescribed in the above table. Otherwise, the HI-ROTOR will be perform in stick-slip motions.

HI-PAL HI-ROTOR/PRH series

HI-PAL HI-ROTOR with switch / For details, see pages 55.

M TYPE REED SWITCHES

Lead wire type

Type of switch	Load voltage (V)	Load current (mA)	Indicating lamp (Lights up at ON)	Applications
MA-1	AC100	5 ~ 45		Relay PLC
	DC24	5 ~ 45		
MD-1	DC24	25 ~ 65		Relay
MD-3	DC5, 6	50 or less (Inductive load) 300 or less (Resistance load)		IC circuit
MR	AC 5 ~ 100 DC	50 or less (Inductive load) 300 or less (Resistance load)	Not provided	Relay

M TYPE PROXIMITY SWITCH

Lead wire type

Type of switch	Load voltage (V)	Load current (mA)	Indicating lamp (Lights up at ON)	Applications
MT-2 MT-2U	DC24 (DC10 ~ 30)	5 ~ 100		Relay PLC
MT-3 MT-3U MTP-3	DC5 ~ 30	5 ~ 200		Relay PLC IC circuit

(Note) MTP-3 is made-to-order

SOLENOID VALVE

Ordering instructions for solenoid valves

PCS245	-	NB	-	100	SP
Model No.		Without base			

Voltage

D24	DC24V
100	AC100/110V
200	AC200/220V

Wiring specifications

PRH50, 150, 300

L	Lead wire
SP	Plug-in connector with indicator light & surge suppressor
UP	Plug-in connector with indicator light & surge suppressor

PRH800

L	Lead wire
G	Terminal grommet
C	Terminal conduit

The standard solenoid valve is a 2-position solenoid valve with single solenoid.

For specific solenoid valves, consult KURODA.

Type of solenoid valve	PRH50	PRH150, 300	PRH800
2-position solenoid valve with a double solenoid	PCD245	PCD2413	PCD2408
3-position solenoid valve with a double solenoid(Closed center)	PCD345	PCD3413	PCD3408
3-position solenoid valve with a double solenoid(Exhaust center)	PCE345	PCE3413	PCE3408
3-position solenoid valve with a double solenoid(Pressure center)	PCO345	PCO3413	PCO3408

For solenoid valve specifications, refer to the catalog of PC series.

SPEED CONTROL

Although HI-PAL HI-ROTORs are not provided with a speed control mechanism, the speed can be easily controlled with the metering valve or speed controller. For the metering valve and speed controller, please instruct.

HI-PAL HI-ROTOR	PRH50	PRH150, 300	PRH800
Metering valve	MV-M5	MV-1	MV-3
Speed controller	SPE-H-M5		
Speed controller with push-in fitting	M4R-M5-O	MB4R-M5-O	M6R-01-O
	M6R-M5-O	MB6R-M5-O	MB6R-01-O
	6R-M5SC-O	B6R-M5SC-O	6R-01SC-O
			B8R-01SC-O
			8R-03SC-O
			B8R-03SC-O
			10R-03SC-O
			B10R-03SC-O
			12R-03SC-O
			B12R-03SC-O

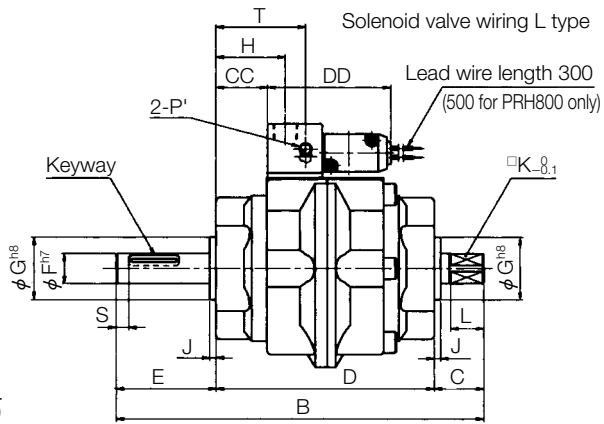
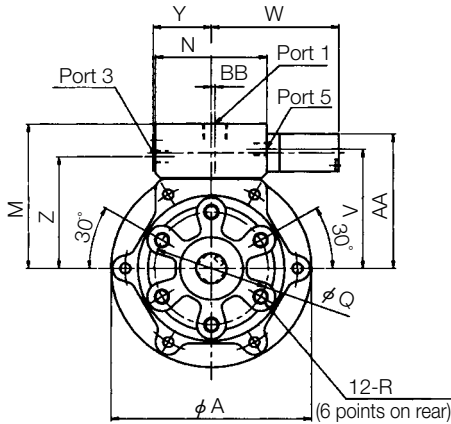
HI-PAL HI-ROTOR/PRH series

DIMENSIONS

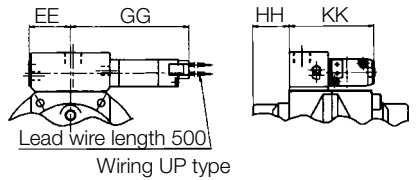
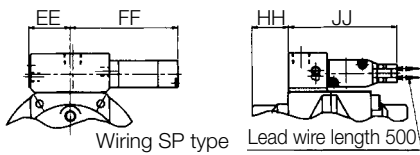
(Unit : mm)

Basic type

PRH50, 150, 300, 800 ○-○-○



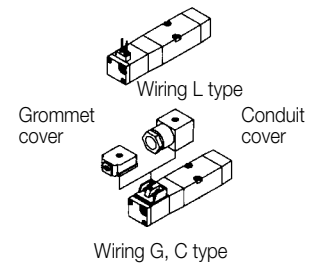
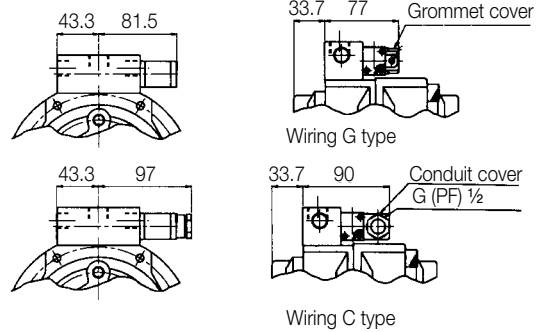
Solenoid valve dimensions PRH50, 150, 300-SP, UP



Model No.	EE	FF	GG	HH	JJ	KK
PRH50	23	60	66	20.3	60.1	47
PRH150	31	69	75	23.7	66.9	53.8
PRH300	36	69	75	27.7	76.9	63.8

(Note) For wiring L type, refer to the top figure.

Solenoid valve dimensions PRH800-G, C



Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	P'	Q
PRH50	79	145	19.5	86	39.5	12	25	27.3	2.5	10	13	57.5	44	Rc1/8	M5	45
PRH150	110	180	23.5	103	53.5	17	30	32	3	13	16	75.8	60	Rc1/4	Rc1/8	70
PRH300	141.5	220	30	125	65	25	45	38.2	3.5	19	22	89	72	Rc3/8	Rc1/4	80
PRH800	196	285	44.5	171	69.5	40	70	49.5	4.5	32	35	127.8	86	Rc1/2	Rc3/8	120

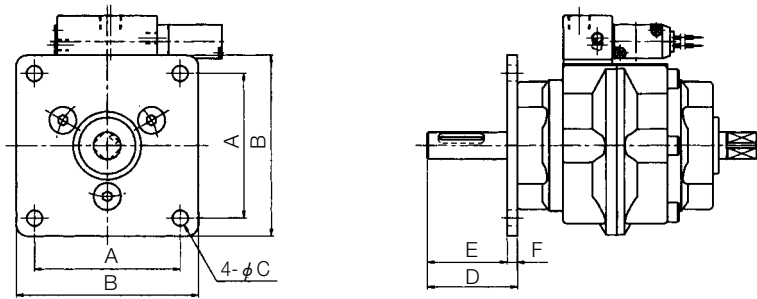
Model No.	R	S	T	V	W	Y	Z	Keyway width×depth×length	AA	BB	CC	DD
PRH50	M6 depth 7	5	35.5	47.5	50.5	23	44.5	4 ^{-0.03} × 2.5 ^{+0.1} × 20	53.5	1.5	20.3	48.5
PRH150	M8 depth 12	5	30.5	63.4	59.5	31	64	5 ^{-0.03} × 3 ^{+0.1} × 36	70.9	1	23.7	55.3
PRH300	M10 depth 10	5	52.5	77	59.5	36	77	7 ^{-0.036} × 4 ^{+0.2} × 40	84.5	0	27.7	65.3
PRH800	M12 depth 18	10	49.5	114	—	43.3	114	12 ^{-0.043} × 5 ^{+0.2} × 40	121.5	0	33.7	71

HI-PAL HI-ROTOR/PRH series

DIMENSIONS

(Unit : mm)

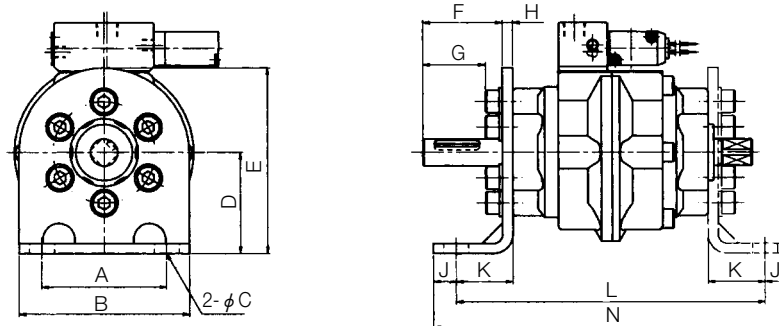
With flange plate
PRH50, 150○-○-○-P



Model No.	A	B	C	D	E	F
PRN50	64	80	7	39.5	35	4.5
PRN150	88	110	9	53.5	47.5	6

(Note) A flange plate can be fitted with it turned in steps of 60° from the original posture.

With foot plate
PRH50, 150, 300, 800○-○-○-L1(L2)

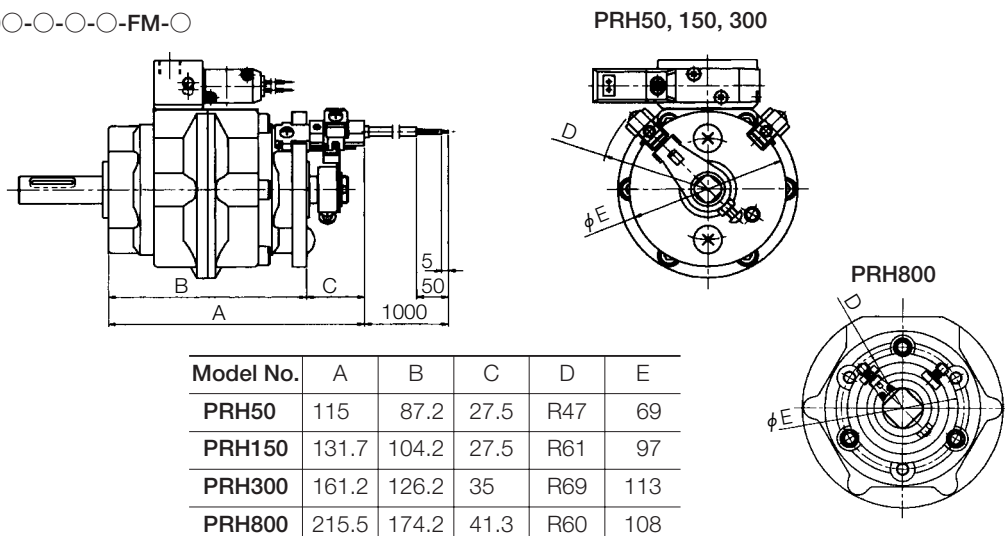


Model No.	A	B	C	D	E	F	G	H	J	K	L	N
PRH50	55	75	11	45	82.5	35	27.5	4.5	10	25	136	156
PRH150	80	110	13	65	115	43.5	33.5	10	12	28	159	183
PRH300	100	140	15	80	135	53	40.5	12	13	32	189	215
PRH800	140	200	15	110	185	54.5	39.5	15	15	35	241	271

(Note) • A foot plate can be fitted with it turned in steps of 60° from the original posture.

• Short shaft side : Example with L2 (2 pcs.)

With switch unit
PRH50, 150, 300, 800○-○-○-○-FM-○



Model No.	A	B	C	D	E
PRH50	115	87.2	27.5	R47	69
PRH150	131.7	104.2	27.5	R61	97
PRH300	161.2	126.2	35	R69	113
PRH800	215.5	174.2	41.3	R60	108

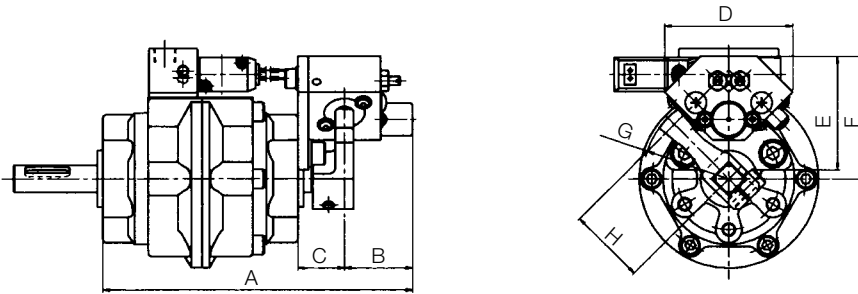
HI-ROTOR/PRH series

DIMENSIONS

(Unit : mm)

With Hydro-cushion

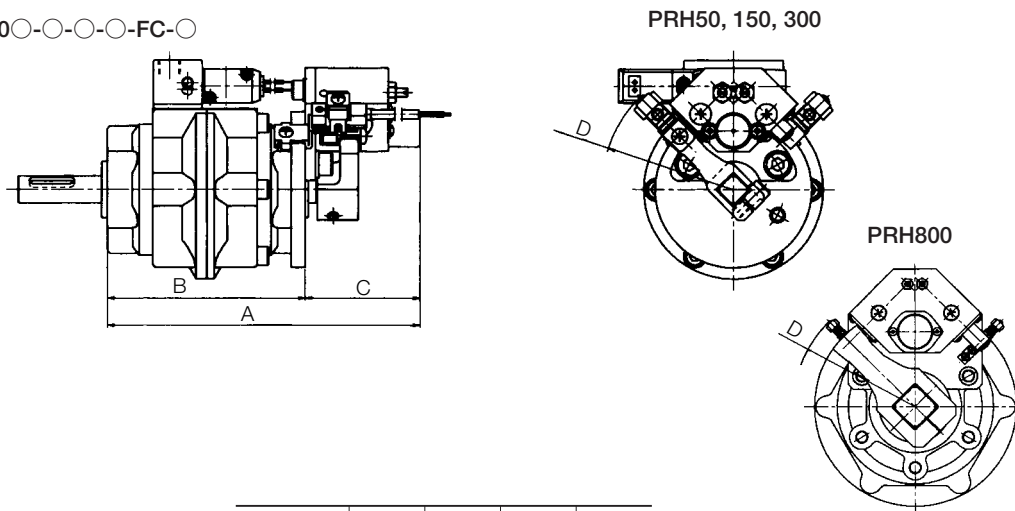
PRH50, 150, 300, 800○-○-○-○-CR



Model No.	A	B	C	D	E	F	G	H
PRH50	136.5	30	20.5	56	50	54	R38	34
PRH150	159.5	34	22.5	80	62	71.5	R51	46
PRH300	187.5	37	25.5	95	87	96	R68	62
PRH800	244	42	31	130	118	135	R98	90

With Hydro-cushion+switch unit

PRH50, 150, 300, 800○-○-○-○-FC-○



Model No.	A	B	C	D
PRH50	137.7	87.2	50.5	R58.2
PRH150	160.7	104.2	56.5	R72.2
PRH300	188.7	126.2	62.5	R88.2
PRH800	244	174.2	69.8	R118.5

(Note) •Refer on page 49 for the dimensions on HI-ROTOR.

•For switch unit-mounting hardware or hydro-cushions, refer to the required dimensions in each Fig.

For HI-ROTORs

Switch unit

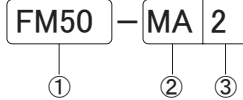
(Variable switch position type)

Compact switch unit with M type switches. These switch units are available in both reed type and proximity types, thereby covering wide field of applications.

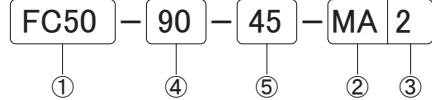


ORDERING INSTRUCTIONS

Switch unit for basic type HI-ROTOR



Switch unit for HI-ROTOR with hydro-cushion



① Applicable HI-ROTOR

FM50	PRN50, PRH50
FM150	PRN150, PRH150
FM300	PRN300, PRH300
FM800	PRN800, PRH800

③ Number of switches

1	With one switch
2	With two switches

② Type of switch

MA	Reed type	MA-1	Common to 100V AC and 24V DC (Low current type)
MB		MD-1	DC24V
MC		MD-3	DC5/DC6V
MD	Proximity type	MR	AC/DC5~100V (Without indicator light)
MG		MT-3	DC5 ~30V
MH		MT-3U	DC5 ~30V
MJ		MT-2	DC24V
MK		MT-2U	DC24V
MP		MTP-3	DC5 ~30V

④ Oscillating angle

90	90°
180	180°
270	270°

⑤ Oscillating reference point

45	45°
----	-----

(Note) · The switch unit for a HI-ROTOR with hydro-cushion is fitted on the cushion.

· Adjust the oscillating angle and oscillating reference point according to the HI-ROTOR used.

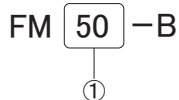
(Note) MP is made-to-order

SWITCH UNIT COMPONENTS ORDERING INSTRUCTIONS

Switch unit for basic type HI-ROTOR

For FM50, 150 and 300

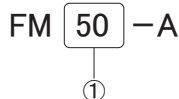
Base bracket



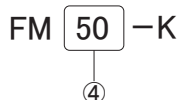
① Applicable switch unit

50	FM50
150	FM150
300	FM300

Magnet arm



Switch mounting hardware



④ Applicable switch unit

50	FM50, FM150
300	FM300

For FM800

Base bracket

FM800-B

Magnet arm

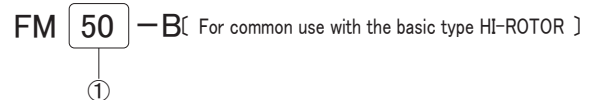
FM800-A

(Note) For M type switch, refer to "Type of switch" shown in the ordering instructions for switch units.

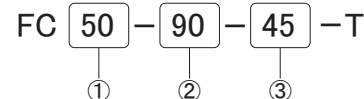
Switch unit for HI-ROTOR with hydro-cushion

For FC50, 150 and 300

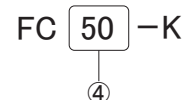
Base bracket



Magnet arm



Switch mounting hardware



① Applicable switch unit

50	FM50
150	FM150
300	FM300

② Oscillating angle

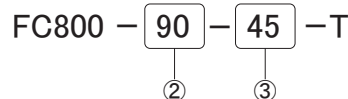
③ Oscillating reference point

For FC800

Hydro-cushion for switch mounting

CRN800-FC

Magnet arm

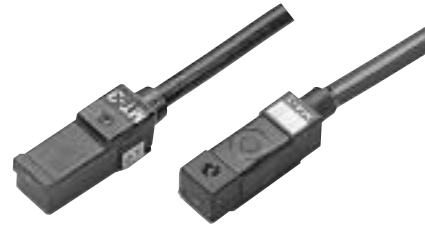


(Note) Adjust the oscillating angle and oscillating reference point according to the HI-ROTOR used.

Switch unit / Variable switch position type

M type reed switch

M type proximity switch



REED SWITCH SPECIFICATIONS

Model No.		Unit	MA-1	MD-1	MD-3	MR	
Applications			Relay, PLC		Relay	IC circuit	Relay
Load voltage		V	AC100	DC24	DC24	DC5 ~6	AC/DC5~100
Max. contact capacity	Inductive load		4.5VA	1W	1.5W	0.3W	1.5VA 1.5W
	Resistance load					1.8W	10VA 10W
Load current	Inductive load	mA	5~45		25~65	50 or less	50 or less
	Resistance load					300 or less	300 or less
Internal voltage drop		V	2 or less			0	
Surge suppressor			Not provided				
Mean response time		ms	1.0				
Shock resistance		m/s ²	294				
Ambient temperature		°C	5~60				
Indicator light			Red LED (Lights up at on)			Not provided	
Lead wire	Color		Black 2-core cord (Blue line)	Black 2-core cord	Black 3-core cord	Black 2-core cord	
	Length	m	1				

(Note) · The MA-1 cannot be used at 200V AC.

· When using the MR, the specified maximum contact capacity and load current should be both satisfied.

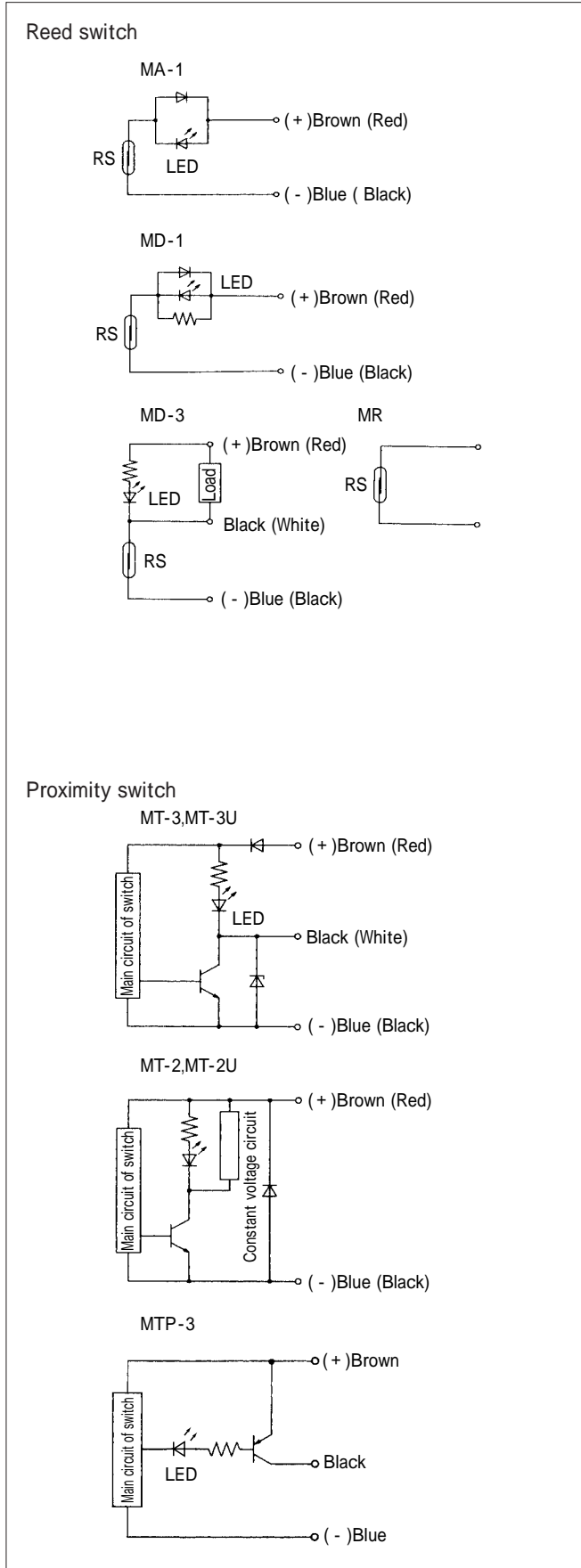
PROXIMITY SWITCH SPECIFICATIONS

Model No.		Unit	MT-3	MT-3U	MTP-3	MT-2	MT-2U
Applications			Relay, PLC, IC circuit			Relay, PLC	
Output method			NPN		PNP	NPN	
Load voltage		V	DC5 ~30		DC10 ~30	DC24 (DC10 ~30)	
Load current		mA	5~200			5~100	
Max. power consumption of switch control		mA	max.20 (at 24V) max.10 (at 12V) max. 4 (at 5V)		max.20 (at 24V) max.10 (at 12V)	—	
Max. leak current		μA	10			1	
Internal voltage drop		V	1.5 or less			3 or less	
Mean response time		ms	1			1	
Shock resistance		m/s ²	490			490	
Ambient temperature		°C	5~60			5~60	
Protection grade			IP67			IP67	
Indicator light			Red LED (Lights up at on)		Yellow LED (Lights up at on)	Red LED (Lights up at on)	
Lead wire	Color		Oil resistance black 3-core cord			Oil resistance black 2-core cord	
	Length	m	1			1	

(Note) MTP-3 is made-to-order

Switch unit / Variable switch position type

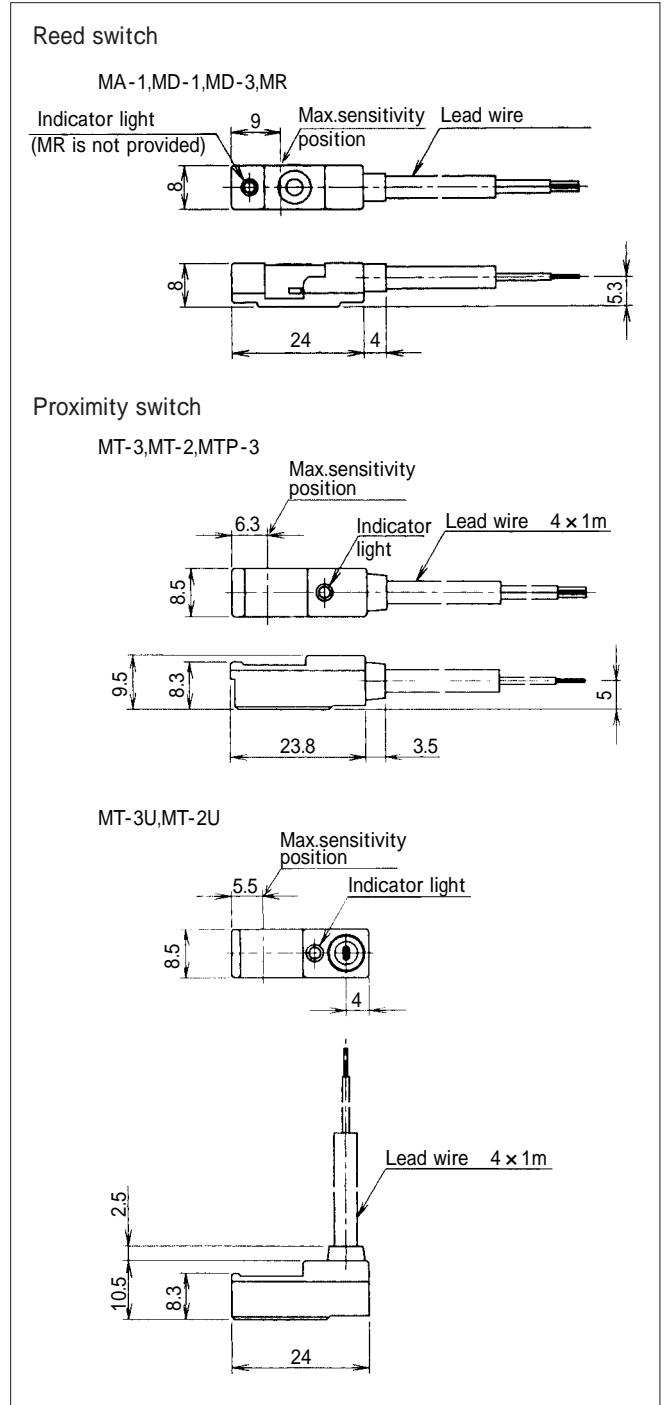
INTERNAL CIRCUIT DIAGRAM OF SWITCH



Bracketed () color is former color.

DIMENSION OF SWITCH

(Unit : mm)



SWITCH LEAD WIRE LENGTH

The standard lead wire length of M type switches is 1 m. However, lead wire length of 2 m, 3 m, 4 m and 5 m are optionally available.

Ordering instructions

MT-2 - L30

Lead wire length

No mark : 1m (Standard)

L20 : 2m

L30 : 3m

L40 : 4m

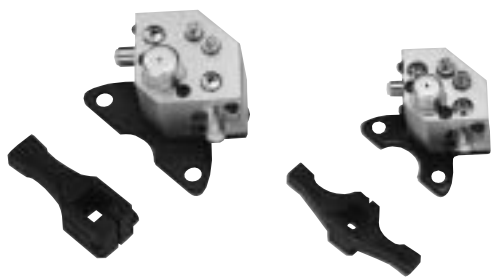
L50 : 5m

Type of switch

Hydro-cushion CRNseries

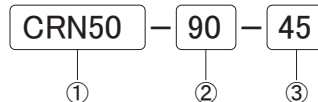
50, 150, 300, 800

Special hydraulic cushion for HI-ROTORS.
Use these cushions when the inertia energy exceeds the allowable energy of the HI-ROTOR.

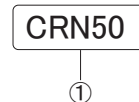


ORDERING INSTRUCTIONS

Hydro-cushion with claw



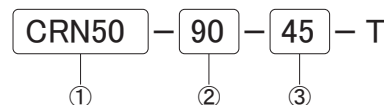
Hydro-cushion only



① Applicable HI-ROTOR

CRN50	PRN50, PRH50
CRN150	PRN150, PRH150
CRN300	PRN300, PRH300
CRN800	PRN800, PRH800

Switch unit for HI-ROTOR
with hydro-cushion



② Oscillating angle

90	90°
100	100°
180	180°
270	270°
280	280°

③ Oscillating
reference point

40	40°
45	45°

Specific angles (made-to-order)
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°.

Relationship between oscillating angle
and oscillating reference point

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

(Note)

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

SPECIFICATIONS

Model No.	Unit	CRN50	CRN150	CRN300	CRN800
Load range	kg · cm ²	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, PRH50	PRN150, PRH150	PRN300, PRH300	PRN800, PRH800

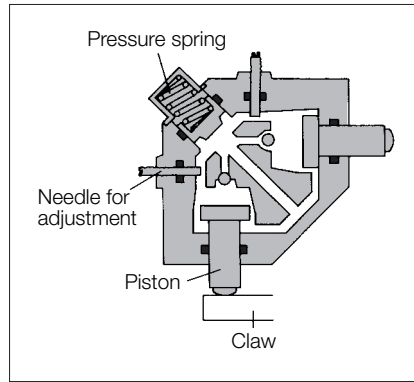
(Note) · Energy capacity per minute = Absorbing energy × 2 N: Frequency of operation (cycle/min)

· When a HI-ROTOR with a hydro-cushion is used, keep a working pressure of 0.3 MPa or more.

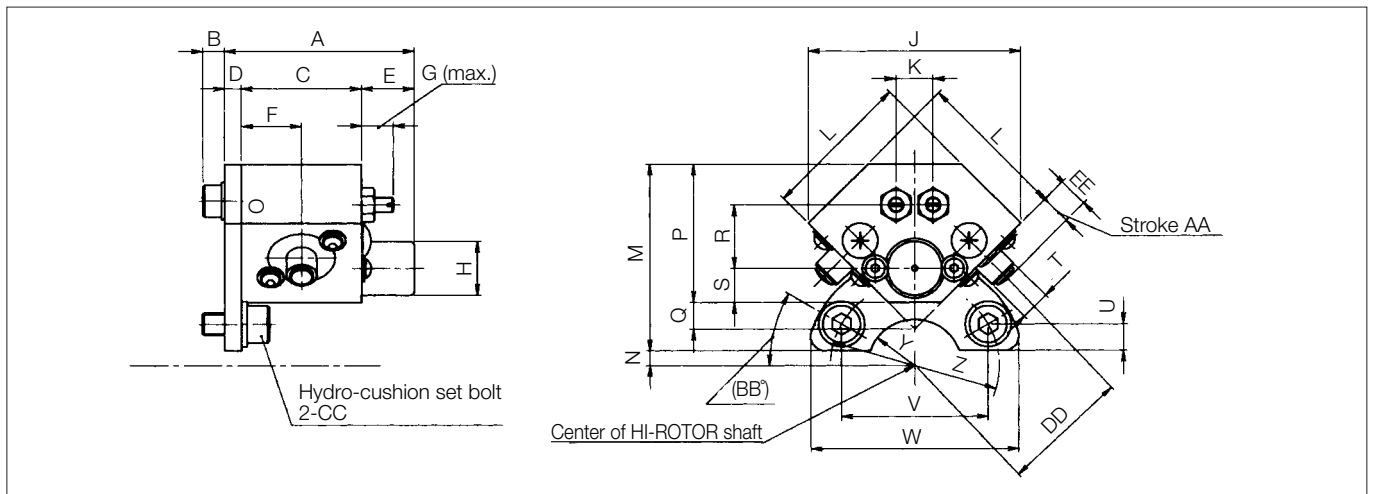
Hydro-cushion/CRN series

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 opposite 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 INSTRUCTIONS

Be sure to read them before use.

Also refer to Par. "For Safety Use" and common instructions.

HANDLING



WARNING

- Do not loosen nor disassemble parts other than the needle for adjustment.

Otherwise, oil will leak.

- The hexagon nut located on the base of the needle for adjustment is not a locknut. Never rotate it.

Otherwise, oil will leak.

- Do not use the hydro-cushion in places where it may be subject to dust, chips and liquid like water or oil.

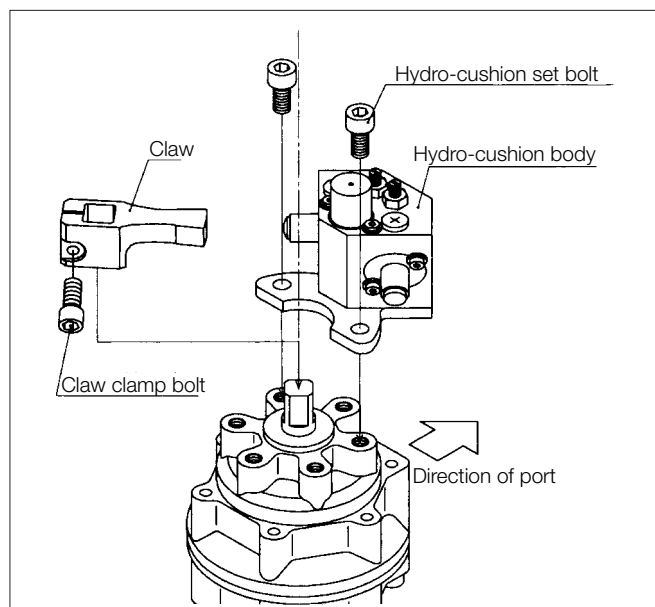
Such elements will cause the hydro-cushion to malfunction and will reduce the service life.

HOW TO MOUNT THE HYDRO-CUSHION



CAUTION

- ①Mount the hydro-cushion on the end with a square shaft of the HI-ROTOR using the clamp holes on the cushion body.
- ②Place the cushion body just above the port of the HI-ROTOR when mounting. Make sure that the cushion body is securely mounted on the HI-ROTOR.
- ③Before fitting the cushion claw, check if the HI-ROTOR shaft is located at the oscillating reference point, (Refer to the description on the oscillating reference point.)
- ④At the oscillating reference point, the cushion claw depresses the piston of the cushion body into body. So, turn the square shaft counterclockwise until the claw is fitted into the square shaft.
- ⑤Note that the hydro-cushion cannot be used as a stopper.



KINETIC ENERGY



CAUTION

- ①Find the moment of inertia from the size of the load and check if it is within the allowable range.

- ②Check if the collision angular velocity is within the allowable range.

$$\omega_0 \leq 1.2\omega$$

ω_0 : Collision angular velocity (Degree/s)

ω : Mean angular velocity (Degree/s)

- ③Find the collision energy from the load and collision angular velocity.

$$E_1 = \frac{1}{2} \times I \times \omega_0^2 \times 10^{-1} \quad (\text{mJ})$$

I : Moment of inertia ($\text{kg} \cdot \text{cm}^2$)

ω_0 : Collision angular velocity (Degree/s)

- ④Find the energy generated from the torque of the HI-ROTOR.

$$E_2 = \frac{1}{2} \times T \times \theta \times 10 \quad (\text{mJ})$$

T : Torque of HI-ROTOR ($\text{N} \cdot \text{cm}$)

θ : Absorption angle (One side) (rad)

- ⑤Check if the value obtained by adding E_1 to E_2 is equal to or less than the maximum absorption energy.

- ⑥Find the energy per minute from the frequency of operation.

$$E_m = 2 \times N \times (E_1 + E_2)$$

N : Frequency of operation (cycle/min)

Make sure that "Em" is equal to or less than the maximum energy capacity per minute.

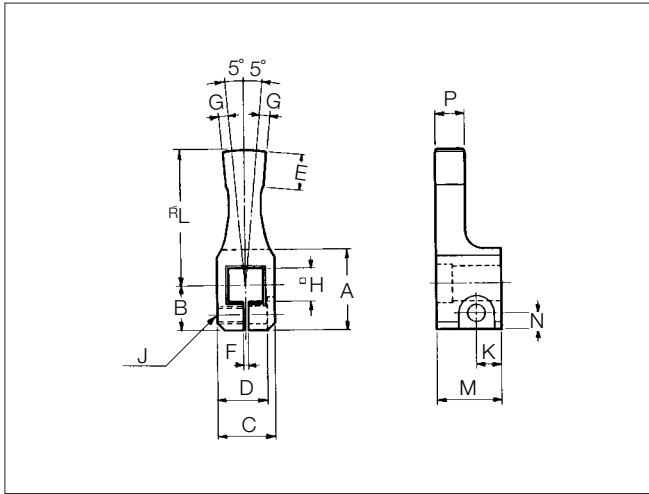
- ⑦Use radian instead of degree.

$$1^\circ = 0.0174 \text{rad}$$

Hydro-cushion/CRN series

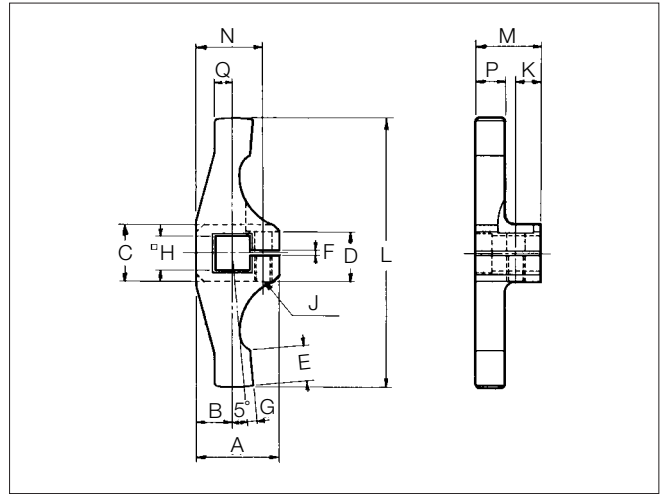
DIMENSIONS OF HYDRO-CUSHION CLAWS

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



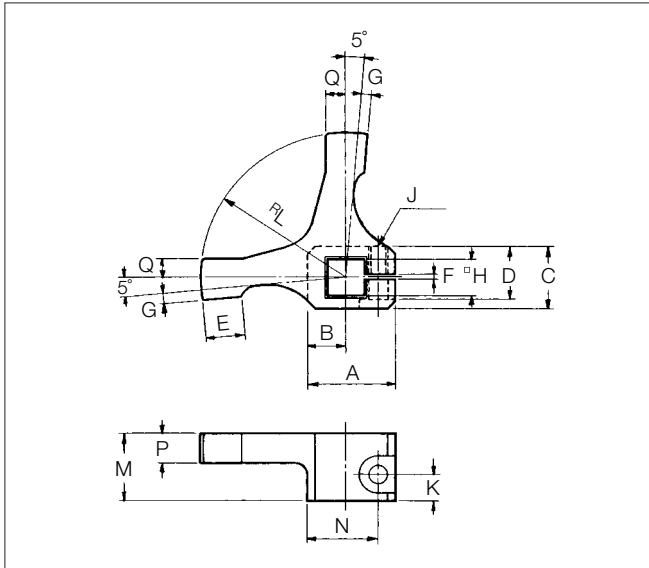
Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P
CRN50	23	13	16	13.7	10	1.2	2.6	10	M5	7	38	18	4.5	8
CRN150	28	16	24	19.5	12	1.2	4.1	13	M6	9	51	20	5	10
CRN300	40	22	35	30.5	14	1.2	5.5	19	M8	11	68	23.5	6.5	12
CRN800	63	34	58	49	18	1.2	8	32	M10	14.5	98	29.5	8	16

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



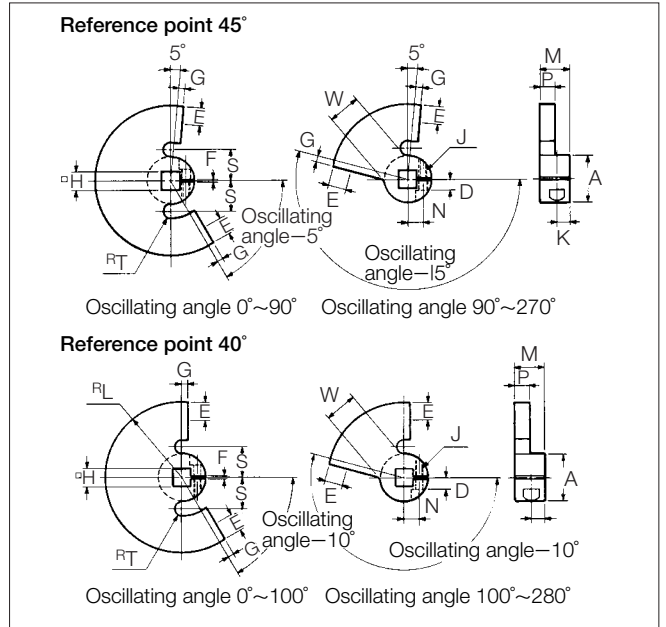
Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
CRN50	23	10	16	13.7	10	1.2	2.5	10	M5	7	76	18	18.5	8	5
CRN150	28	12	24	19.5	12	1.2	4	13	M6	7.5	102	20	23	10	5
CRN300	40	18	35	30.5	14	1.2	5.4	19	M8	9	136	23.5	33.5	12	9
CRN800	63	29	58	49	18	1.2	8	32	M10	14.5	196	29.5	55	16	14

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)



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 depth 13	7	37	17.5	8.5	7	18	5	13
CRN150	32	7.5	12	1.5	4	13	M6 depth 16	9	51	20	10.5	10	21	5	16
CRN300	48	13	14	1.5	5.5	19	M8 depth 22	11	68	23.5	15	12	30	6	24
CRN800	78	20	18	1.5	8	32	M10 depth 30	14	98	28.5	26	15.5	45	6	39

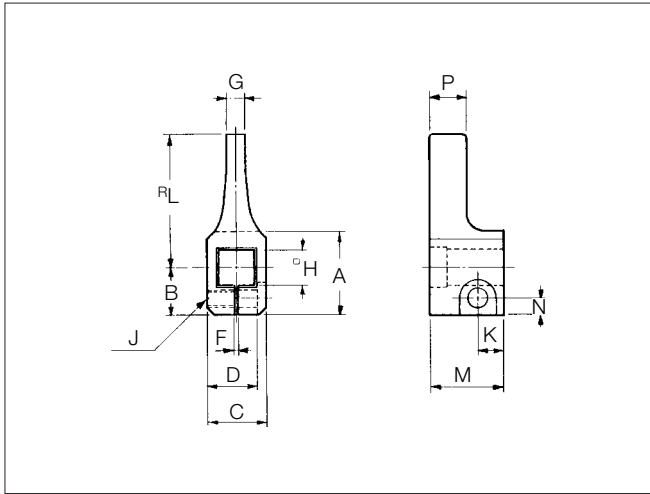
(Note) •Material : S45~55C

•We recommend to harden the claw at H_{RC} ≒ 40 for oscillating angle of 260° or more.

Hydro-cushion/CRN series

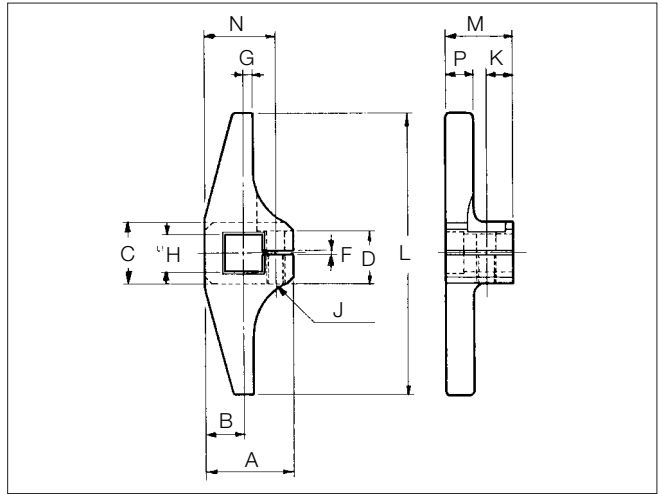
DIMENSIONS OF HYDRO-CUSHION CLAWS

Oscillating angle 280°(Reference point 45°) (Unit : mm)



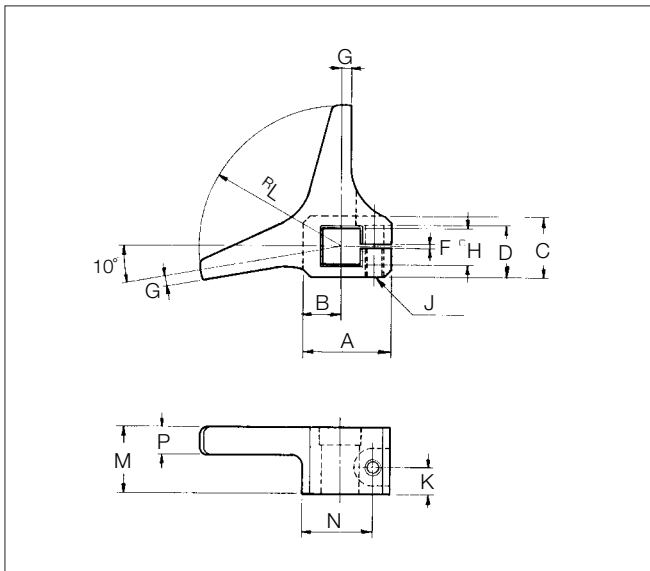
Model No.	A	B	C	D	F	G	H	J	K	L	M	N	P
CRN50	23	13	16	13.5	1.2	5	10	M5	7	37	20	4.5	10
CRN150	28	16	24	19.5	1.2	8	13	M6	9	51	20	5	10
CRN300	40	22	35	30.5	1.2	11	19	M8	11	68	24	6.5	12.5
CRN800	63	34	58	49	1.2	16	32	M10	14	98	28.5	8	15.5

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



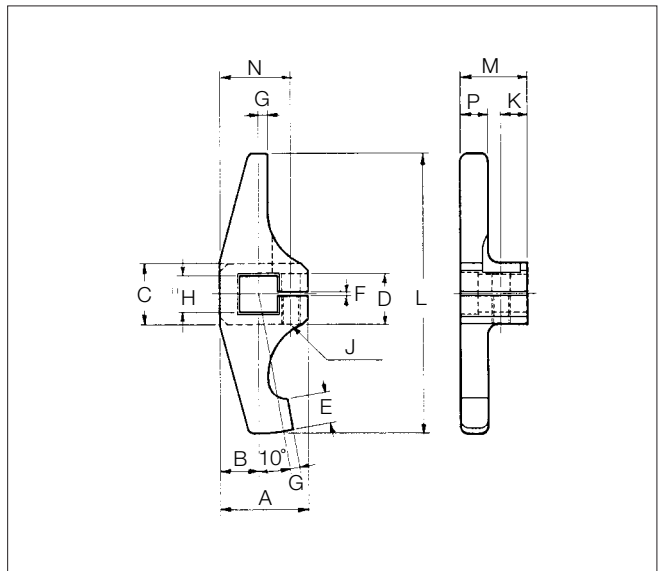
Model No.	A	B	C	D	F	G	H	J	K	L	M	N	P
CRN50	23	10	16	13.5	1.2	2.5	10	M5	7	74	17.5	18.5	7
CRN150	28	12	24	19.5	1.2	4	13	M6	9	102	20	23	10
CRN300	40	18	35	30.5	1.2	5.5	19	M8	11	136	23.5	33.5	12
CRN800	63	29	58	49	1.2	8	32	M10	14	196	28.5	55	15.5

Oscillating angle 180°(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	37	17.5	18.5	7
CRN150	28	12	24	19.5	1.2	4	13	M6	9	51	20	23	10
CRN300	40	18	35	30.5	1.2	5.5	19	M8	11	68	23.5	33.5	12
CRN800	63	29	58	49	1.2	8	32	M10	14.5	98	29.5	55	16

Oscillating angle 90°(Reference point 40°) (Unit : mm)



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

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