



FOR SAFETY USE

Be sure to read the following instructions before use.

For common and individual instructions, refer to the text of this catalogue.

The following safety precautions are provided to prevent damage and danger to personnel and to provide instructions on the correct usage of this product. These precautions are classified into 3 categories; “CAUTION”, “WARNING” and “DANGER” according to the degree of possible injury or damage and the degree of impendence of such injury or damage.

Be sure to comply with all precautions along with JIS B8370^(※1) and ISO 4414^(※2), as they include important content regarding safety.

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| ⚠ CAUTION | • Indicates a potentially hazardous situation which may arise due to improper handling or operation and could result in personal injury or property-damage-only accidents. |
| ⚠ WARNING | • Indicates a potentially hazardous situation which may arise due to improper handling or operation and could result in serious personal injury or death. |
| ⚠ DANGER | • Indicates an impending hazardous situation which may arise due to improper handling or operation and could result in serious personal injury or death. |

(※1) JIS B8370 : General Rules for Pneumatic Systems

(※2) ISO 4414 : Pneumatic fluid power-General rules relating to systems

⚠ WARNING

- **The applicability of pneumatic equipment to the intended system should be judged by the pneumatic system designer or the personnel who determined specifications for such system.**

As operating conditions for products contained in this catalogue are diversified, the applicability of pneumatic equipment to the intended system should be determined by the pneumatic system designer or the personnel who determined specifications for such system after conducting an analysis or testing as necessary.

The system designer shall be responsible for assuring the intended system performance and safety.

Before making a system, the system designer should thoroughly examine all specifications for such a system and also take into consideration the possibility of any trouble with the equipment.

- **The pneumatic equipment should be handled by persons who have sufficient knowledge and rich experience.**

Inproper handling of compressed air will result in danger.

Assembling, operation and maintenance of machinery using pneumatic equipment should be performed by persons who have sufficient knowledge and rich experience.

- **Never operate machinery nor remove the equipment until safety is assured.**

- Before checking or servicing machinery and equipment, be sure to check that steps for prevention of dropping or runaway of the driven component have been completely taken.

- When removing the equipment, make sure that the above-mentioned safety measures have been done beforehand.

Then turn off air supply and power to the system and purge compressed air in the system.

- When restarting machinery and equipment, check that proper prevention of malfunction has been provided for and then restart carefully.

- **When using the pneumatic equipment in the following conditions or environments, take the proper safety measures and consult KURODA beforehand.**

- Conditions and environments other than specified and outdoor use.

- Applications to nuclear power equipment, railroads, aircraft, vehicles, medical equipment, equipment connected with food and drink, amusement facilities and safety devices such as emergency interruption devices, clutch/brake circuits for a press and the likes.

- Applications which require extreme safety and will also greatly affect men and property.



HI-ROTOR/COMMON INSTRUCTIONS ①

Be sure to read them before use.

Also refer to Par. "For Safety Use" and instructions mentioned for each series.

DESIGN

WARNING

- **When HI-ROTOR is subject to load fluctuation, up/down movement and fluctuating frictional resistance, make a safty design in due consideration of such factors.**

Operating speed of HI-ROTOR will increase, causing a damage to machine and an injury to human body.

- **Especially when there is the possibility that the human body is endangered, fit a protective cover.**

When there is the possibility that applied load or the moving part of the HI-ROTOR endangers the human body, design the system so that the human body cannot directly touch these parts.

- **Speed-reducing circuit or shock absorber will be required according to circumstances.**

Set inertial energy to less than allowable value. When load speed is high or mass is large, inertial energy of load exceeds allowable value, making it difficult for HI-ROTOR to absorb shocks.

In this case, provide a speed-reducing circuit or a shock absorber on the load side and also thoroughly examine the rigidity of machine.

- **Take into consideration the possibility of pressure failure in the circuit due to outage etc.**

For an HI-ROTOR used in the clamping mechanism, if clamping pressure in the circuit lowers due to outage etc., clamping force will reduce, so that the load may sometimes come off. To avoid such danger, design the system to incorporate a safety device to protect the human body and machine. Also provide the hanger and lift with proper prevention against dropping.

- **Take into consideration the possibility of power failure.**

Take proper countermeasures against equipment controlled by air pressure, electricity, hydraulic pressure, etc. so as to protect the human body and machine even if these power sources are faulty.

- **Use prevention against runaway of load in designing a circuit.**

If compressed air is supplied to one side of vane without residual air in HI-ROTOR, (for example, HI-ROTOR is operated by 3-position exhaust center type solenoid valve or restarted after residual air in circuit is exhausted), HI-ROTOR will suddenly actuate, causing a damage to machine and an injury to human body.

- **Take into consideration the action of HI-ROTOR in an emergency.**

When the machine is stopped by a person in an emergency or stopped by the safety device due to the occurrence of outage, system trouble, etc., the HI-ROTOR may catch the human body or damage the machine according to circumstances. To avoid such an accident, take into consideration the action of HI-ROTORs in designing a system so as to prevent an injury to the human body and a damage to the machine.

DESIGN

WARNING

- **Take into consideration the action of an HI-ROTOR when it restarts from stoppage in an emergency or abnormal state.**

Make a design to prevent an injury to the human body and a damage to the machine when the HI-ROTOR is restarted.

When it is necessary to reset the HI-ROTOR to the starting position, make a design to incorporate a safety manual control unit.

- **Do not use HI-ROTOR as a shock absorber.**

When abnormal pressure is applied or air leak occurs, speed-reducing effect is considerably lost, sometimes resulting in a damage to machine and an injury to human body.

- **Do not stop HI-ROTOR halfway only by means of directional control valve or do not leave HI-ROTOR stopped there.**

HI-ROTOR and directional control valve are designed to tolerate a certain degree of air leak. Even if HI-ROTOR is stopped halfway by shutting in air using directional control valve without an external stopper provided for HI-ROTOR, the stop position cannot be held due to air leak; this may result in a damage to machine and an injury to human body.

- **Firmly tighten fixed part and joint.**

When using HI-ROTOR for heavy-duty purposes such as continuous operation or using in vibratory place, apply a secure tightening method.

- **Remodeling HI-ROTOR**

Do not remodel HI-ROTOR.

CAUTION

- **Use HI-ROTOR within specified oscillation time.**

If used in lower speed range than specified, HI-ROTOR will not smoothly operate due to a stick and slip phenomenon.

- **Do not apply torque exceeding rated output to HI-ROTOR from the outside.**

If HI-ROTOR receives external force over rated output, it may be broken according to circumstances.

- **When repeatability accuracy for oscillating angle is required, provide a stopper on the outside to stop load directly.**

- **When adjusting the driving speed of an HI-ROTOR, install a speed controller.**

Adjust the driving speed on the low speed side and then adjust it gradually until the prescribed speed is attained.



HI-ROTOR/COMMON INSTRUCTIONS ②

Be sure to read them before use.

Also refer to Par. "For Safety Use" and instructions mentioned for each series.

SELECTION

! WARNING

- **Refer to specifications.**

HI-ROTOR listed in this catalogue are designed for compressed air.

When using other fluid than compressed air, contact KURODA beforehand.

Do not use the HI-ROTOR outside the specified pressure and temperature range; this may result in a breakdown or faulty operation.

INSTALLATION

! WARNING

- **Do not start the system before making sure that equipment is properly operated.**

After installing the HI-ROTOR, connect compressed air and power supply.

Perform functional test and leak test properly and check that the system is correctly operated with safety. Then start the system.

- **Coating with paint**

When coating the resin portion with paint, it may be adversely affected by paint and solvent. For the propriety of painting, contact KURODA beforehand.

Do not peel off the nameplate affixed on the HI-ROTOR and do not erase or smear out the letter on it.

- **When adjusting the oscillation angle of HI-ROTOR by applying pressure, take proper means to prevent HI-ROTOR from rotating beyond required level.**

If HI-ROTOR is rotated beyond required level, it will sometimes cause a hazardous situation.

- **Do not loosen the angle adjust screw of HI-ROTOR over adjustable range.**

If it is loosened over adjustable range, the angle adjust screw will come off, causing a damage to machine and an injury to human body.

- **When using a shaft coupling, select one with degree of freedom.**

If a shaft coupling without degree of freedom is used, a kink will occur due to eccentricity, causing a malfunction or damage to products; this sometimes result in a damage to machine and injury to human body.

- **Provide space for maintenance and inspection.**

INSTALLATION

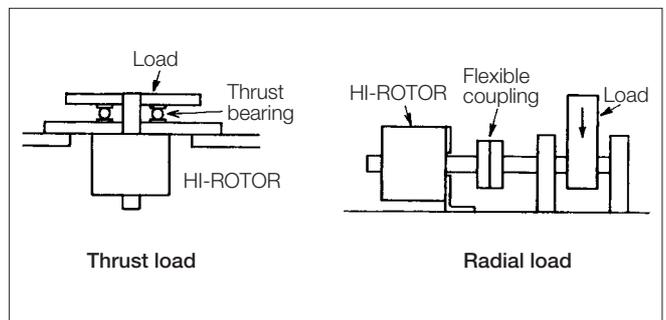
! WARNING

- **Do not apply excessive load to shaft.**

If excessive load over allowable value is applied to shaft, it will cause a malfunction or breakdown, sometimes resulting in a damage to machine and an injury to human body.

HI-ROTOR is capable of receiving up to allowable radial thrust load prescribed in specifications in a state where no inertial load occur. However, avoid using HI-ROTOR in such a manner that load is directly applied to the shaft.

In order to improve operating conditions, it is recommended that no load be directly applied to the shaft by using a method shown in Fig. below:



- **Install an external stopper in a separate place from the shaft.**

If a stopper is located near the shaft, reaction force exerted on the stopper due to torque of HI-ROTOR itself is applied to the shaft and thus damages the shaft and bearing. The reaction force will also break machine and injure human body.

! CAUTION

- **Do not wipe off the model name inscribed on a nameplate etc. with organic solvent.**

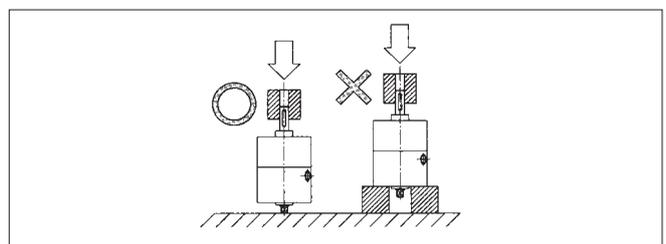
The inscribed indication may be erased.

- **Do not step your foot directly on the shaft and equipment fitted to the shaft.**

Stepping on the shaft directly will cause a damage to bearing etc.

- **Do not hit the shaft with the body fixed or do not hit the body with the shaft fixed; otherwise causing to bend the shaft and damage the bearing.**

When mounting a load on the shaft, set HI-ROTOR in such a manner that the body does not receive force as shown in Fig. below:





HI-ROTOR/COMMON INSTRUCTIONS ③

Be sure to read them before use.

Also refer to Par. "For Safety Use" and instructions mentioned for each series.

PIPING

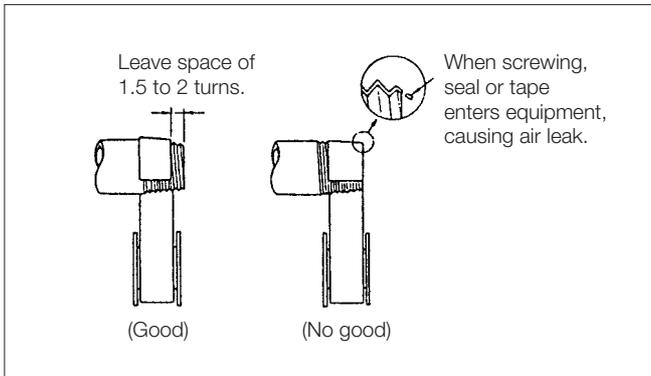
! CAUTION

• Before piping

Thoroughly flush the inside of each pipe to remove chips, coolant, dust, etc. before piping.

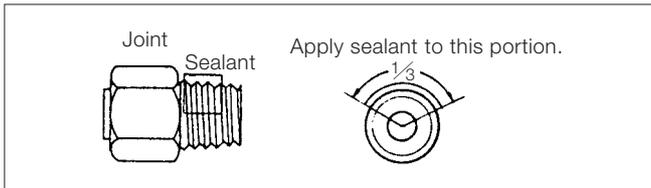
• How to wind a seal tape

When winding a seal tape around the threaded portion, leave space of 1.5 to 2 thread turns.



• How to apply liquid sealant

When applying liquid sealant to the threaded portion, apply a proper amount to about $\frac{1}{3}$ of the periphery of the threaded portion and then screw it.



PIPING

! CAUTION

• Screw of pipe and joint

When screwing the pipe and joint, use care to prevent chips and sealant from entering the pipe and joint.

Tighten them within a proper range of clamping torque.

Port size	Clamping torque (N·m)
M5	1.5~ 2.0
R, Rc $\frac{1}{8}$	7.0~ 9.0
R, Rc $\frac{1}{4}$	12.0~14.0
R, Rc $\frac{3}{8}$	22.0~24.0
R, Rc $\frac{1}{2}$	28.0~30.0

• Avoid wrong piping.

When connecting a pipe to a Rotary Actuator, be careful not to mistake the supply port by referring to the nameplate affixed to the product or the product catalogue.

LUBRICATION

! CAUTION

• HI-ROTOR listed in this catalogue are non-lubrication.

The non-lubricated HI-ROTOR can be used without lubrication, but can be used with lubrication.

When using it with lubrication, do not discontinue supplying oil. Otherwise, the applied lubricant may run off, sometimes resulting in an operation failure.

When using a lubricant, Class 1 turbine oil ISO VG 32 (containing additive) is recommended.

Do not use spindle oil and machine oil. Otherwise, the seal and packing may be damaged.



HI-ROTOR/COMMON INSTRUCTIONS ④

Be sure to read them before use.

Also refer to Par. "For Safety Use" and instructions mentioned for each series.

QUALITY OF AIR

! WARNING

- **Use pure air**

Compressed air containing corrosive gases, chemicals, salt, etc. causes a breakdown or operation ailure. So do not use such air.

! CAUTION

- **Fit an air filter with filtration of 5 μm or fine.**

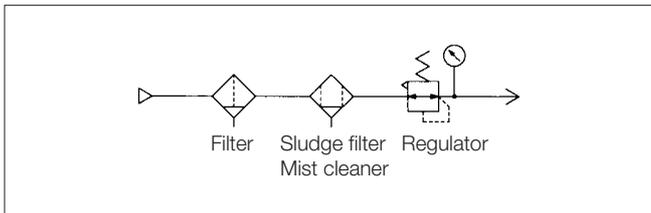
- **Install an air dryer.**

Compressed air containing much drainage causes the operation failure of pneumatic equipment. Install an air dryer, lower the temperature and reduce drainage.

- **Take proper countermeasures against sludge.**

If sludge produced in compressor oil enters pneumatic equipment, it will cause the operation failure of pneumatic equipment.

It is recommendable to use compressor oil (NISSEKI FAIRCALL A68, IDEMITSU DAPHUNY SUPER CS68) featuring minimized sludge production or use a sludge filter or mist cleaner to prevent sludge from entering the pneumatic equipment.



- **Use at low temperature**

When using pneumatic equipment at temperature of 5 °C or below, install an air dryer or take other countermeasures to prevent drainage and moisture in compressed air from freezing or solidifying.

OPERATING ENVIRONMENT

! DANGER

- **Do not use HI-ROTOR in a explosive environment.**

! WARNING

- **Do not use HI-ROTOR in a corrosive environment.**

- **Do not use HI-ROTOR in a place attended with much dust, water drops or oil drops.**

MAINTENANCE AND INSPECTION

! WARNING

- **Inspection before doing maintenance**

Check that proper prevention against drop of load and runaway have been taken, before turning off air and power supply to equipment and discharging air remaining in the system.

For 3-position all port block (closed center) type, compressed air is sealed in between solenoid valve and Rotary Actuator. So purge the residual air.

- **Inspection after finishing maintenance**

When connecting the system to compressed air supply and power supply, HI-ROTOR may sometimes suddenly actuate.

Therefore, when restarting the system, thoroughly check the safety of surrounding conditions before connecting the pneumatic system to compressed air supply and power supply.

Furthermore, perform a proper functional test and a leak test to check that the system normally operates.

- **Disassembling HI-ROTOR**

When disassembling HI-ROTOR, consult our company beforehand.

! CAUTION

- **Draining**

To maintain constant air quality, drain the air filter periodically.



MAGNETIC PROXIMITY SWITCH/Common INSTRUCTIONS ①

Be sure to read them before use.

Also refer to Par. "For Safety Use" and instructions mentioned for each series.

DESIGN AND SELECTION

! WARNING

- Use the switch within the range of specifications described in this catalogue.

Applying load current, voltage, temperature and shock exceeding the range of specifications will cause a damage to the switch and a faulty operation.

Thoroughly read the specifications and use the switch within the range of the specifications.

Especially, be sure to use the switch within the maximum contact capacity and operating current range.

- Be careful of distance between adjacent HI-ROTOR.

When 2 or more HI-ROTORs, each of switch is equipped with a switch are close installed or a magnetic material moves very close to the HI-ROTOR, there is the possibility that the switch malfunctions due to magnetic interference between the switch and magnetic material.

- Pay attention to switch-on time at the center of stroke.

Example : The vane is set at the center of stroke and load is driven when the vane passes the switch. In this case, if oscillating speed is extremely high, operating time is short even when the switch is turned on.

As a result, load cannot be fully moved according to circumstances.

In this case, oscillating speed is expressed as follows :

$$V = \frac{\text{Operating range of switch (mm)}}{\text{Operating time of load (ms)}} \times 1000 \quad (\text{mm/s})$$

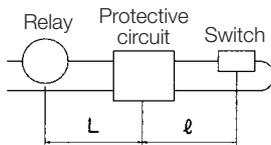
- Reduce the length of wiring as much as practicable.

<Reed switch>

When capacitive load is driven or the wiring from switch to load is long, inrush current increases due to line floating capacity at the time of switch-on ; this results in a damage to the switch or shortens the switch service life.

- In designing a system, provide a distance of more than 40 mm between the HI-ROTOR. (When a permissible distance is specified for each HI-ROTOR, follow the specified distance.)

In case of capacitive load.



When "L" is longer than 10 m, set "l" at 100 to 200 mm.

- Even when using a switch with built-in contact protective circuit and length of wiring is more than 30 m, the protective circuit may not fully absorb inrush current according to circumstances ; this sometimes shortens the switch service life.

For how to connect a protective circuit contact KURODA.

<Proximity switch>

When inrush current caused by line floating capacity occurs, take a proper countermeasure to absorb the rush current.

DESIGN AND SELECTION

! WARNING

- Be careful of leak current.

For a 2-wire proximity switch, current (leak current) flows in it to operate the internal circuit even if the switch is turned off.

When 2 or more switches are connected in parallel, leak current increases corresponding to the number of connected switches.

When leak current is larger than operating current for turning off load, the load is not turned off.

- Be careful of internal voltage drop of switch.

<Reed switch>

When 2 or more switches with LED are connected in series, voltage drop occurs by the number of connected switches due to the resistance of light emitting diode. (Refer to "Internal Voltage Drop" described in "Specifications for Switch".)

Note that load may not be sometimes moved even if the switch operates normally.

When the voltage drop of light emitting diode becomes a problem, use a switch without LED.

<Proximity switch>

When connecting 2-wire proximity switches in series, pay attention to the same points as those for connecting reed switches. However, note that the internal voltage drop is generally larger than that of reed switches.

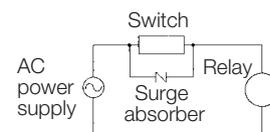
- Do not use load that produces surge voltage.

<Reed switch>

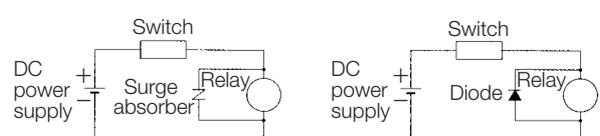
When driving a relay or other load that produces surge voltage, use a switch with built-in contact protective circuit or connect a protective circuit to the switch.

In case of inductive load

Load at 100 V AC



Load at DC



<Proximity switch>

A zener diode for surge protection is connected to the output side of a proximity switch. However, it may be broken if surge is repeatedly applied to it.

When directly driving a relay, solenoid valve or other load that produces surge, use a switch with built-in surge absorbing element.



MAGNETIC PROXIMITY SWITCH / COMMON INSTRUCTIONS ②

Be sure to read them before use.

Also refer to Par. "For Safety Use" and instructions mentioned for each series.

DESIGN AND SELECTION

! WARNING

- **When using the switch in an interlock circuit, pay attention to the following points;**

When a switch for HI-ROTOR is used for interlock signals requiring high degree of reliability, provide the switch with a mechanical protective function against trouble and malfunction or use a double-interlock system by using the switch together with other switch (sensor etc.).

In addition, check the switch periodically to make sure that it works normally.

- **Provide space for maintenance.**

In designing a system, take into account space for maintenance and inspection.

INSTALLATION AND ADJUSTMENT

! WARNING

- **Do not drop or hit the switch.**

When handling the switch, do not drop or hit it or do not apply an excessive shock to it (refer to specification for each switch).

- **Do not swing around the switch while holding the lead wire.**

If excessive tensile force is applied to the lead wire, the inside wire may be broken or the internal mechanism of the switch may suffer a damage.

- **Fix the switch with prescribed clamping torque.**

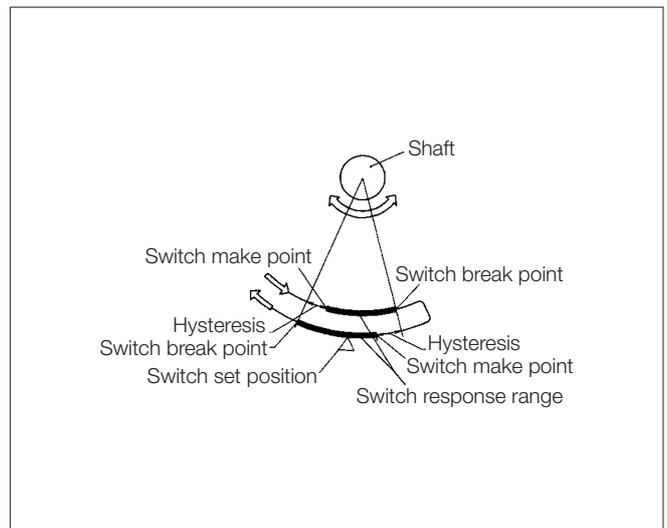
When the switch is fixed with clamping torque exceeding the prescribed value, the set screw, metal fixture, switch, etc. may be broken.

- **Set switch to center of working range.**

When magnet on the shaft rotates in one direction to a point at which the switch is turned on and then rotates in opposite direction to a point at which the switch is turned off, the angle of shaft rotation between these two points is called hysteresis.

When the switch is installed within this range, operation may be unstable according to circumstances.

Install the switch so that magnet is located at the center of working range (within which the switch is turned on.).



! CAUTION

- **Do not wipe off the model name inscribed on a nameplate etc. with organic solvent.**

The inscribed indication may be erased.



MAGNETIC PROXIMITY SWITCH/Common INSTRUCTIONS ③

Be sure to read them before use.

Also refer to Par. "For Safety Use" and instructions mentioned for each series.

WIRING

! WARNING

- **Properly wire in accordance with each lead wire color or terminal No.**

In this case, be sure to turn off power to the electric circuit on the connection side.

- **Do not make wrong wiring.**

As DC current has polarity, do not confuse (+) with (-).

<Reed switch>

When the connection of wiring is reversed, the switch is operated but the lamp is not on.

If current exceeding the prescribed operating range flows to the switch, the lamp will be broken and the switch fails.

<Proximity switch>

Even if the connection of wiring of a 2-lead wire switch is reversed, the protective circuit prevents the breakdown of the switch. In this case, however, the switch is left turned on. Note that, if the connection of wiring of a 2-lead wire switch is reversed with load short-circuited, the switch will be broken.

If the power line of a 3-lead wire switch is reversely wired ("+" replaces with "-"), the protective circuit will protect the switch. However, note that, if the power line is replaced with the output line by mistake, the switch will be broken.

- **Do not wire the switch together with the power line and high voltage line.**

Wire the switch by keeping away from the power line and high voltage line.

Otherwise, the control circuit including the switch may malfunction due to noise.

- **Avoid applying repetitive bending stress and tensile force to the lead wire.**

When setting the switch in a moving part, sag the wiring so that repetitive stress and tensile force will not be applied to the lead wire.

Wiring that produces repetitive bending stress and tensile force cause the breaking of wire.

- **Check for poor insulation.**

Check lead wire connection, extension cable and terminal base for poor insulation. If poor insulation occurs, excess current will flow to the switch, sometimes resulting in a damage to the switch.

- **Be sure to connect load before turning on power supply.**

When a 2-lead wire switch is turned on without connecting load such as relay, PLC, etc., excess current will momentarily flow to the switch, resulting in a damage to the switch.

- **Do not turn on the switch with load short-circuited.**

If the switch is turned on with load short-circuited, excess current will flow to the switch, sometimes resulting in a damage to the switch.

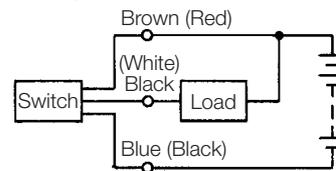
WIRING

! WARNING

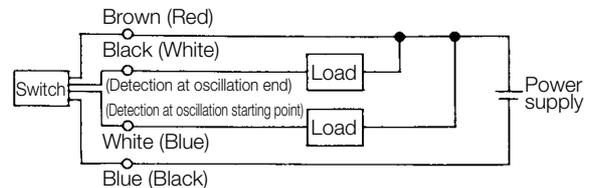
- **It is possible to provide power supply to load and power supply to switches individually and also to use them in common.**

When power supplies are individually provided, they should have the same voltage.

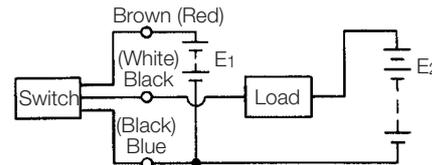
Where power supply to load and power supply to switch are commonly used :



(SR type switch unit)



Where power supply to load and power supply to switch are not commonly used :



E₁ and E₂ should be the same voltage.

Bracketed () color is former color.



MAGNETIC PROXIMITY SWITCH/COMMON INSTRUCTIONS ④

Be sure to read them before use.

Also refer to Par. "For Safety Use" and instructions mentioned for each series.

OPERATING ENVIRONMENT

DANGER

- **Never use the switch in an explosive or ignitable atmosphere.**

As the switch is not proof against explosion, never use it in an explosive gas atmosphere or ignitable atmosphere ; otherwise causing an explosion or fire.

WARNING

- **Do not use the switch in a place where there is a strong magnetic field or a large current.**

If the switch is used in a place where there is a strong magnetic field or a large current (large magnet, spot welding machine, etc.), the switch will malfunction or the magnet will be demagnetized.

- **Do not use the switch in a place where it is always splashed with water.**

Excepting some type of switch, these switches meet structural specifications IP65 prescribed by IEC Standard (refer to specifications for each switch). However, do not use the switch in a place where water is always poured on it; otherwise causing insulation failure and malfunction.

- **Do not use the switch in an environment containing oil and chemicals.**

When the switch is used in an environment containing coolant, washings, oils and chemicals, the inside of the switch is adversely affected even if it is used for a short period of time. When it is necessary to use the switch in such an environment, contact KURODA.

- **Do not use the switch in a place where an extreme temperature change occurs.**

Using the switch in a place attended with an unusual temperature change will adversely affect the inside of the switch. When it is necessary to use the switch in such an environment, contact KURODA.

- **Do not use the switch in a place where an excessive shock occurs.**

〈Reed switch〉

For a reed switch, if an excessive shock (over 980m/s²) is applied to it during operation, the contact may malfunction according to circumstances.

When a proximity switch is used in place of a reed switch, the deficiency can be reduced. In this case, check shock resistance given in specifications.

- **Do not use the switch in a place where surge is produced.**

〈Proximity switch〉

When there is a large surge source around the proximity switch, the circuit element in the switch may be adversely affected.

OPERATING ENVIRONMENT

WARNING

- **Be careful of adjacent magnetic material. Keep the switch away from magnetic material by more than 3.5 mm.**

When there is magnetic material such as iron close to the HI-ROTOR with a built-in magnet is absorbed and thus the switch may not operate according to circumstances.

Note that, when chips and iron powder such as weld spatters accumulate during operation, the same situation as above-mentioned will also occur.

MAINTENANCE AND INSPECTION

DANGER

Perform the following maintenance and inspection periodically.

- **Check the switch set screw and metal fixture for looseness and retighten as necessary.**

If the switch set screw and metal fixture are loosened, the switch set position will shift, resulting in an unstable operation or malfunction.

Readjust the set position and tighten the set screw and fixture.

- **Check the lead wire for damage.**

A damage to the coating of the lead wire may lead to insulation failure and breaking of wire.

When a damage is found, change the switch and repair the lead wire immediately.

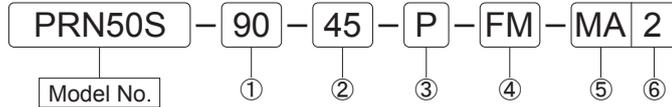
HI-ROTOR/Standard type

PRNseries

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



ORDERING INSTRUCTIONS



Single vane PRN50S PRN150S PRN300S PRN800S	Double vane PRN50D PRN150D PRN300D PRN800D
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Type of switch	
No mark	No switch
MA	MA-1
MB	MD-1
MC	MD-3
MD	MR
ME	MA-2L
MF	MA-2H
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.

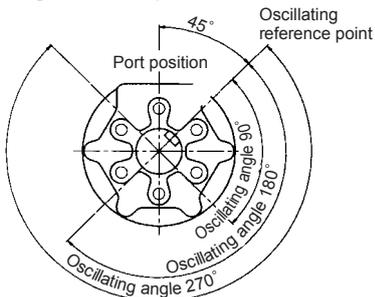
(Note) MP is made-to-order

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

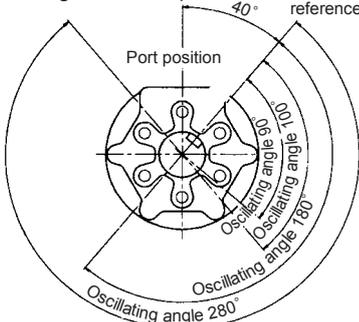
Custom-made shafts
(Refer to Page 65)

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	○	—	○	—	—

○: Standard △: Custom-made

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	180 ⁺³	270 ⁺³	280 ⁺³	90 ⁺³	180 ⁺³	270 ⁺³	280 ⁺³	90 ⁺³	180 ⁺³	270 ⁺³	280 ⁺³
Oscillating reference point	Degree	45	45,40	45	40	45	45,40	45	40	45	45,40	45	40
Port size		Rc1/8				Rc1/4				Rc3/8			
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	°C	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	180 ⁺³	270 ⁺³	280 ⁺³	90 ⁺³	100 ⁺³						
Oscillating reference point	Degree	45	45,40	45	40	45,40	40	45,40	40	45,40	40	45,40	40
Port size		Rc1/2				Rc1/8	Rc1/4		Rc3/8		Rc1/2		
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	°C	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 a 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
MA-2L	AC100/110	5~150	○	Relay
MA-2H	AC200/220	5~150	○	Relay

(Note) • The MA-2L is the same as the MA-1 except that it is provided with a surge suppressor SS-2L.
• The MA-2H is the same as the MA-1 except that it is provided with a surge suppressor SS-2H.

M TYPE PROXIMITY SWITCH

Lead wire type

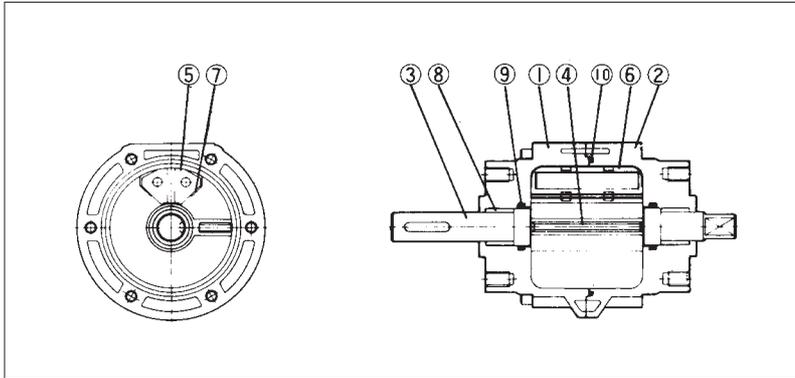
Type of switch	Load voltage (V)	Load current (mA)	Indicating lamp (Lights up at ON)	Applications
MT-2 MT-2U	DC24 (DC10~30)	5~100	○	Relay PLC
MT-3 MT-3U MTP-3	DC5~30	5~200	○	Relay PLC IC circuit

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

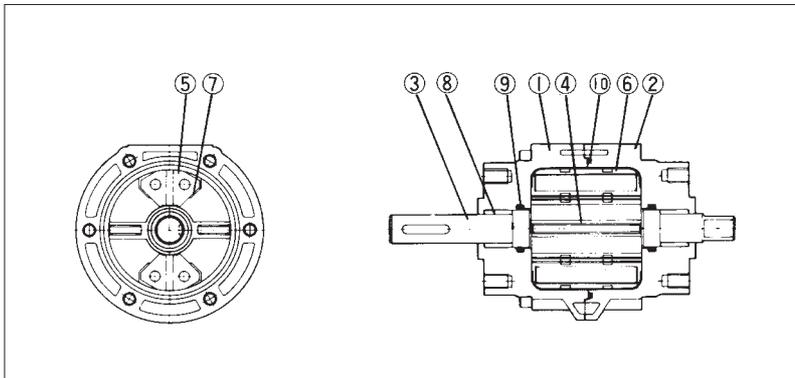
HI-ROTOR/PRN series

STRUCTURE

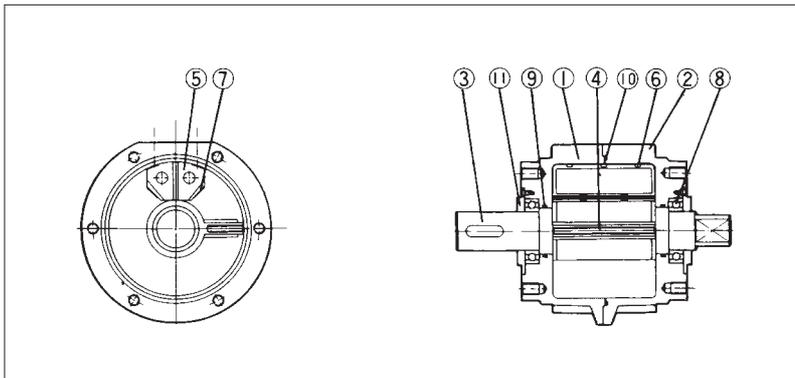
PRN50S, 150S, 300S



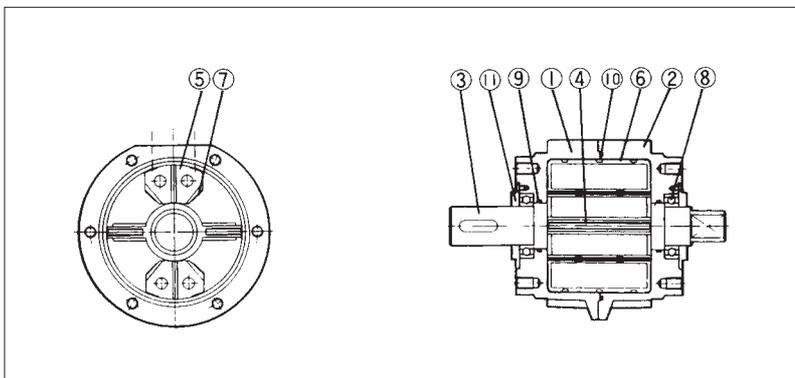
PRN50D, 150D, 300D



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

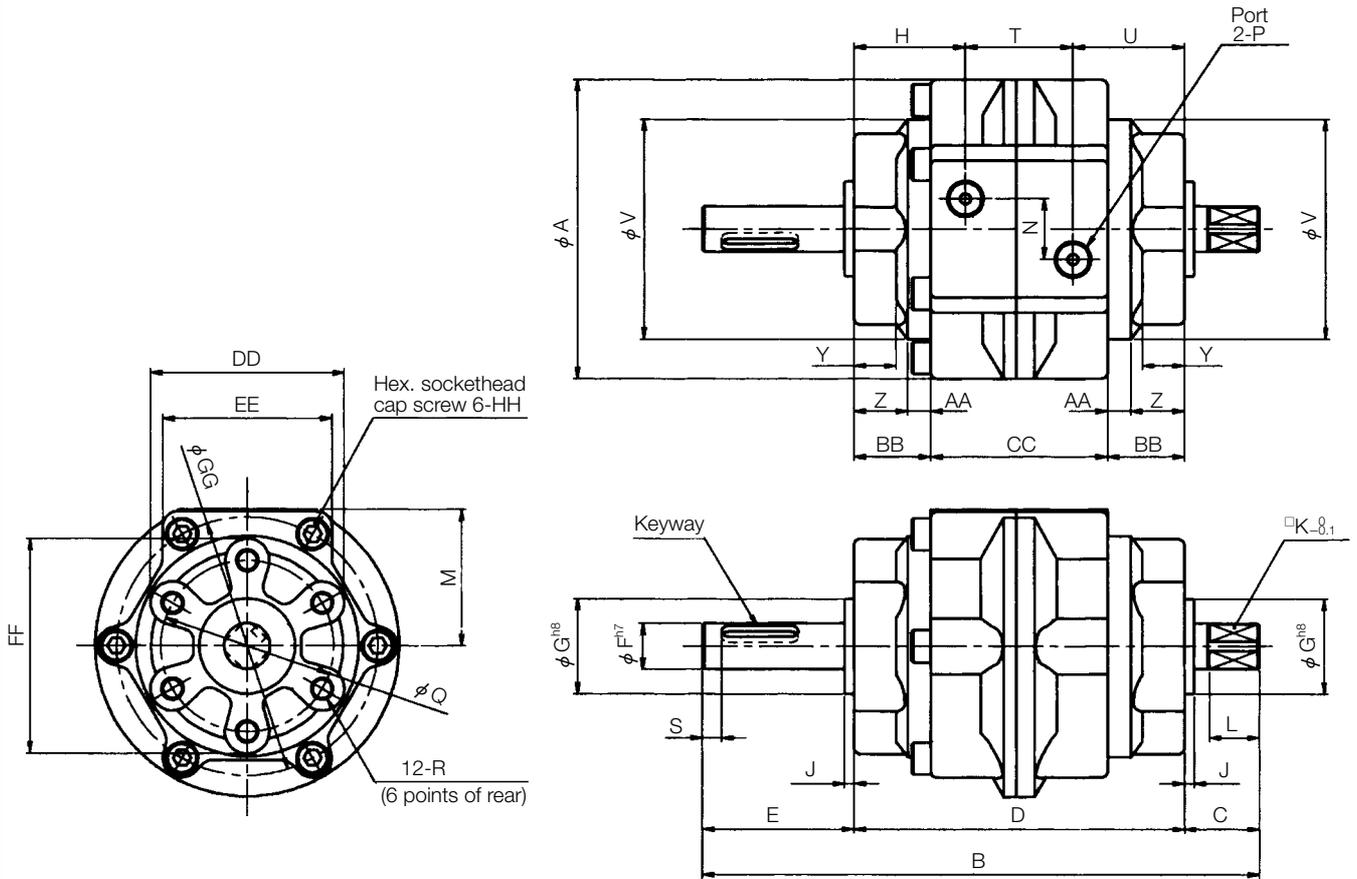
(Note) A set of packings consists of part Nos. , , and

HI-ROTOR/PRN series

DIMENSIONS

(Unit : mm)

Basic type
PRN50, 150, 300, 800



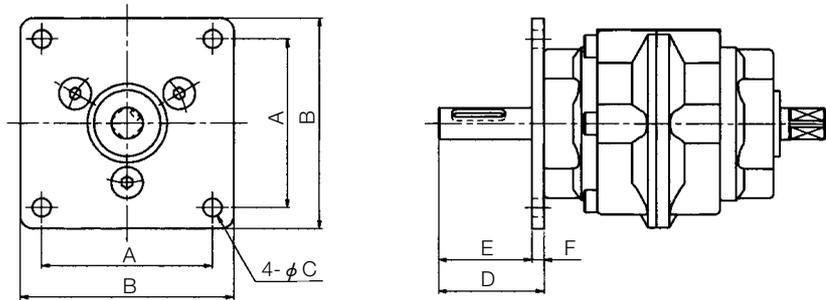
Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T
PRN50	79	145	19.5	86	39.5	12	25	29	2.5	10	13	36	16	Rc1/8	45	M6×1 depth 9	5	28
PRN150	110	180	23.5	103	53.5	17	30	34.5	3	13	16	51	24	Rc1/4	70	M8×1.25 depth 12	5	34
PRN300	141.5	220	30	125	65	25	45	41.5	3.5	19	22	66	32	Rc3/8	80	M10×1.5 depth 15	5	42
PRN800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

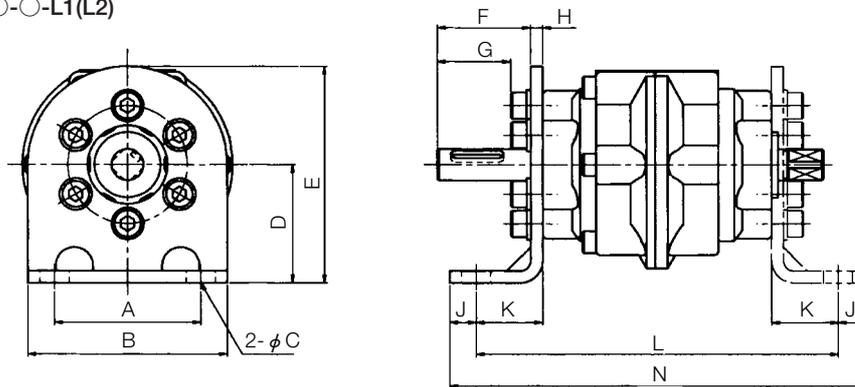
With flange plate
PRN50, 150○-○-○-P



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)

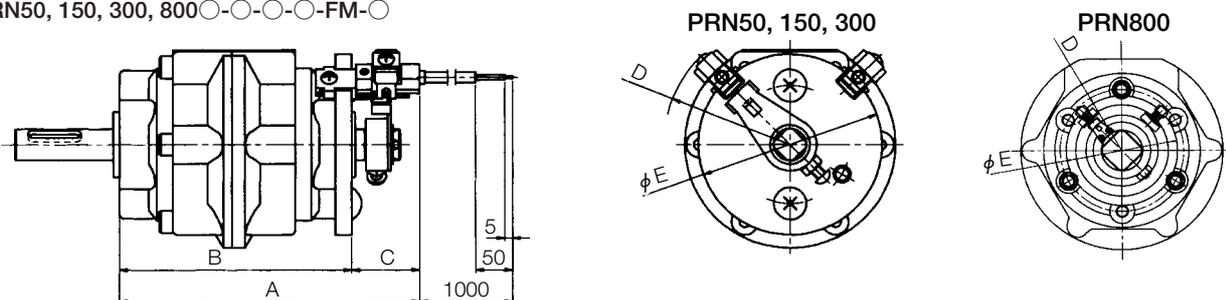


Model No.	A	B	C	D	E	F	G	H	J	K	L	N
PRN50	55	75	11	45	82.5	35	27.5	4.5	10	25	136	156
PRN150	80	110	13	65	115	43.5	33.5	10	12	28	159	183
PRN300	100	140	15	80	135	53	40.5	12	13	32	189	215
PRN800	140	200	15	110	200	54.5	39.5	15	15	35	241	271

(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

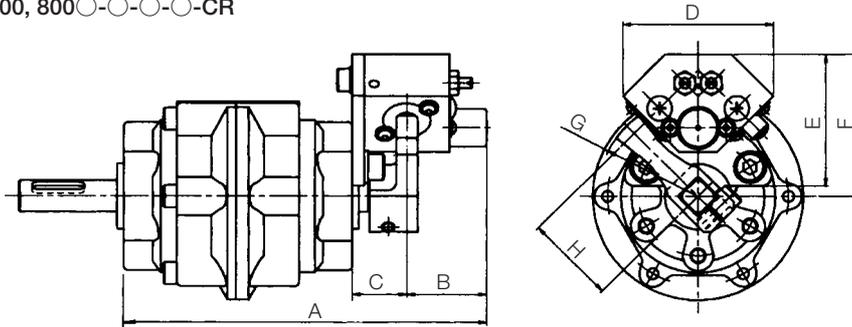
HI-ROTOR/PRN series

DIMENSIONS

(Unit : mm)

With Hydro-cushion

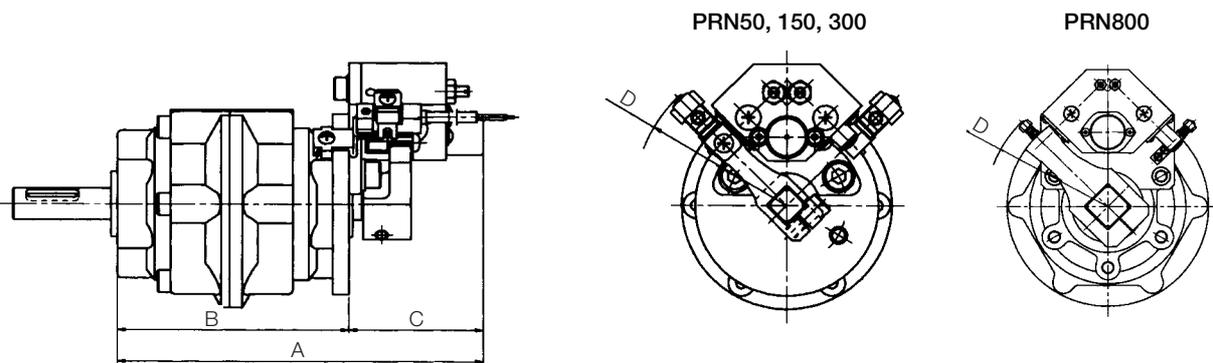
PRN50, 150, 300, 800○-○-○-○-CR



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

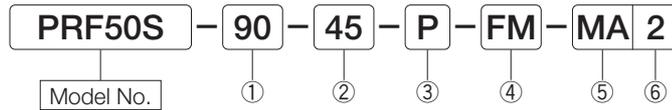
PRFseries (Upon request)

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



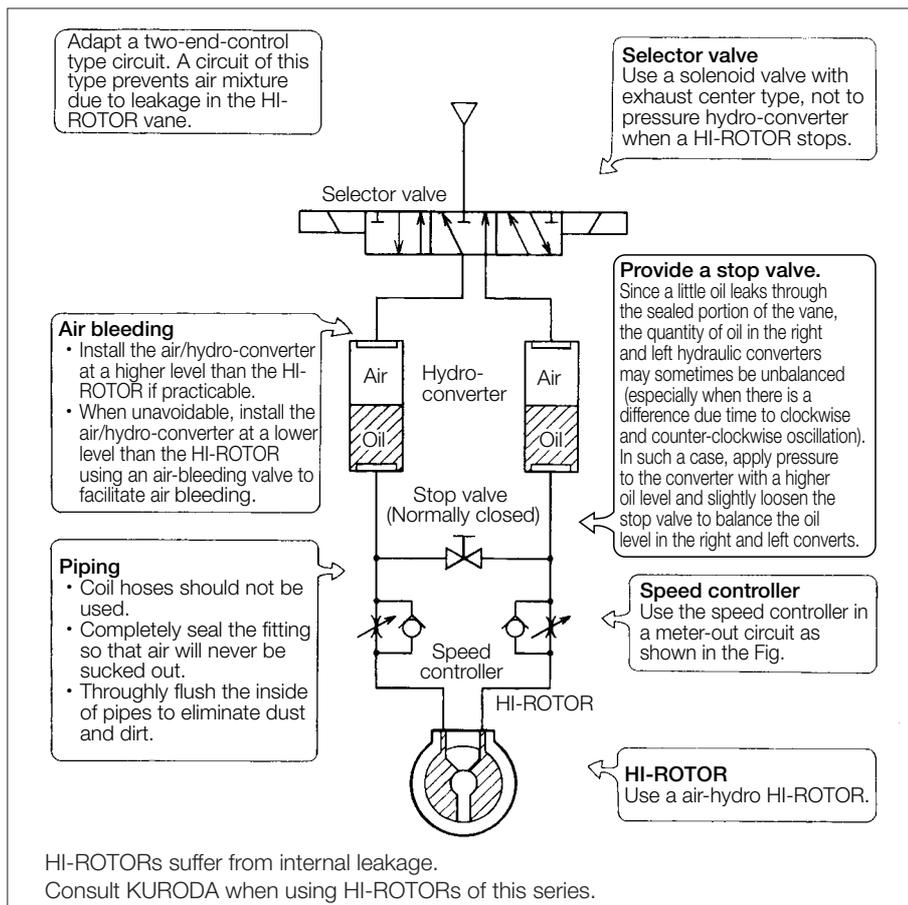
①Oscillating angle, ②Oscillating reference point, ③Mounting head ware, ④Option, ⑤Type of switch, ⑥Number of switches are same as those of the Standard Type PRN series (see Page 33).

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

Single vane (Unit : s)

Model No.	Oscillating angle			
	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

Double vane (Unit : s)

Model No.	Oscillating angle	
	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

PRH50S - 90 - 45 - P - FM - MA 2 - D24 L

Model No.

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

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
ME	MA-2L
MF	MA-2H
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°

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
PRH50, 150, 300

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

③ Mounting hardware

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

⑦ Solenoid valve voltage

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

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

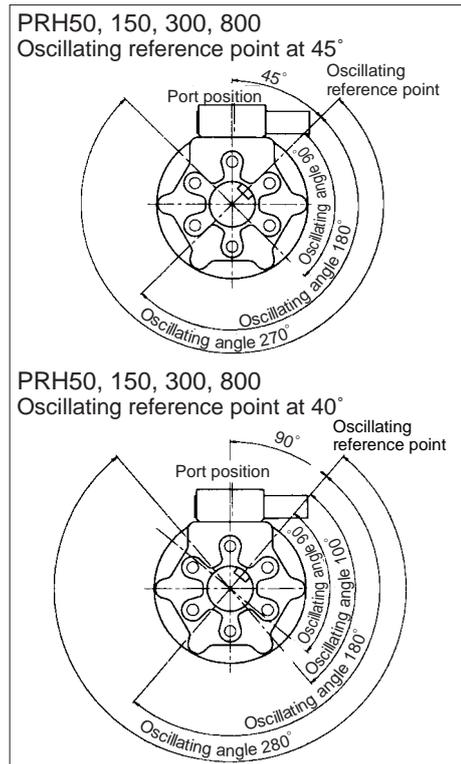
PRH800

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°
PRH 50S	○	○	○	—	○	—
	—	—	—	△	—	○
PRH 150S	○	○	○	—	○	—
	—	—	—	△	—	○
PRH 300S	○	○	○	—	○	—
	—	—	—	△	—	○
PRH 800S	○	○	○	—	○	—
	—	—	—	△	—	○

Double vane

Model No.	Oscillating angle		Oscillating reference point	
	90°	100°	45°	40°
PRH 50D	○	—	○	—
	○	○	—	○
PRH 150D	○	—	○	—
	○	○	—	○
PRH 300D	○	—	○	—
	○	○	—	○
PRH 800D	○	—	○	—
	○	○	—	○

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	40	45	40	45	45,40	45	40	45	45,40	45	40
Port size		Rc1/8				Rc1/4				Rc3/8(Port 3, 5 : Rc1/4)				
Operation pressure range	MPa	0.2~0.8												
Temperature range	℃	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						
Oscillating reference point	Degree	45	45,40	45	40	45,40	40	45,40	40	45,40	40	45,40	40
Port size		Rc1/2(Port 3, 5 : Rc3/8)				Rc1/8	Rc1/4	Rc3/8 (Port 3, 5 : Rc1/4)		Rc1/2 (Port 3, 5 : Rc3/8)			
Operation pressure range	MPa	0.2~0.8											
Temperature range	℃	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 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
MA-2L	AC100/110	5~150	○	Relay
MA2H	AC200/220	5~150	○	Relay

(Note) •The MA-2L is the same as the MA-1 except that it is provided with a surge suppressor SS-2L.

•The MA-2H is the same as the MA-1 except that it is provided with a surge suppressor SS-2H.

M TYPE PROXIMITY SWITCH

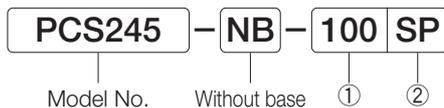
Lead wire type

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



①Voltage

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

②Wiring 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		SPE-2H-2		SPE-10-3	
Speed controller with push-in fitting	M4R-M5-O	MB4R-M5-O	M6R-01-O	MB6R-01-O	8R-03SC-O	B8R-03SC-O
	M6R-M5-O	MB6R-M5-O	6R-01SC-O	B6R-01SC-O	10R-03SC-O	B10R-03SC-O
	6R-M5SC-O	B6R-M5SC-O	8R-01SC-O	B8R-01SC-O	12R-03SC-O	B12R-03SC-O

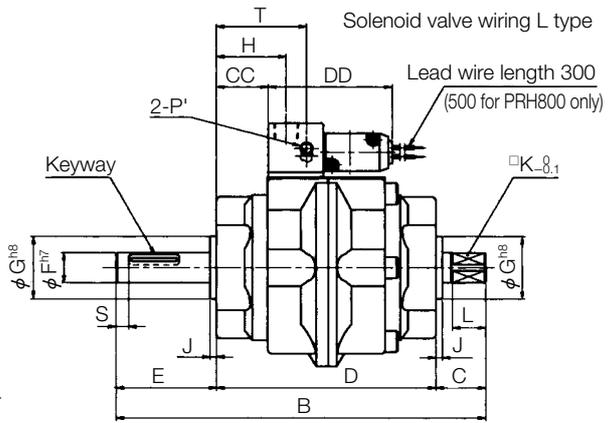
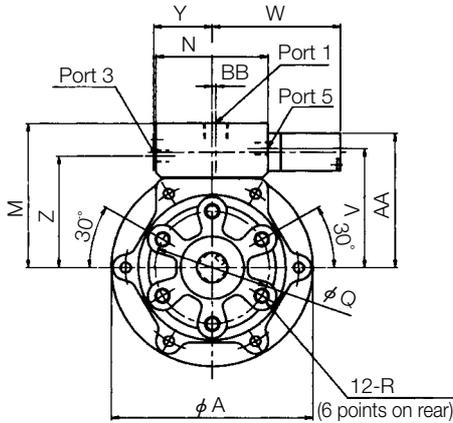
HI-PAL HI-ROTOR/PRH series

DIMENSIONS

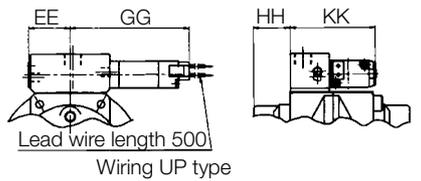
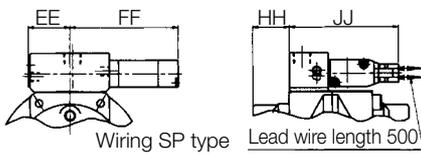
(Unit : mm)

Basic type

PRH50, 150, 300, 800 ○-○-○



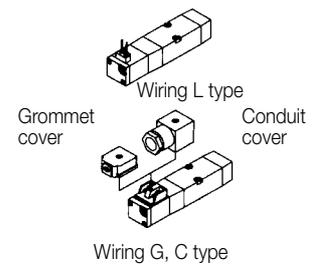
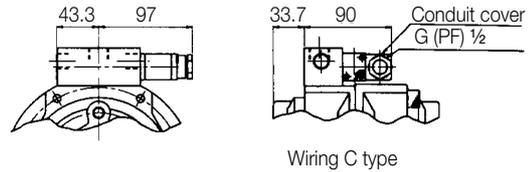
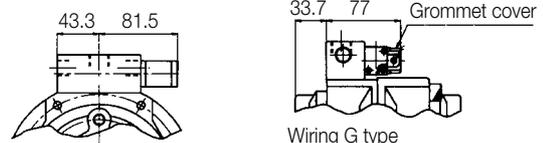
Solenoid valve dimensions PRH50, 150, 300-SP, UP



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

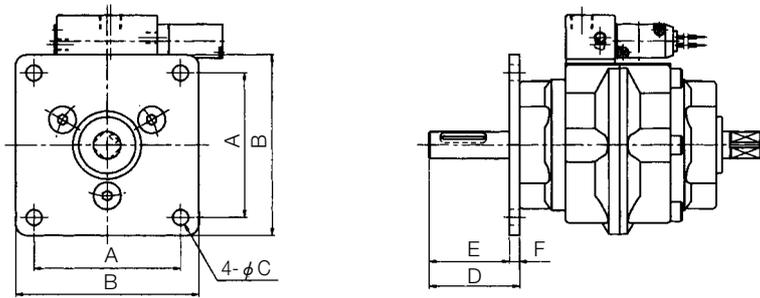
Model No.	R	S	T	V	W	Y	Z	Keyway width×depth×length	AA	BB	CC	DD
PRH50	M6 depth 7	5	35.5	47.5	50.5	23	44.5	4 ^{-0.03} × 2.5 ^{+0.1} × 20	53.5	1.5	20.3	48.5
PRH150	M8 depth 12	5	30.5	63.4	59.5	31	64	5 ^{-0.03} × 3 ^{+0.1} × 36	70.9	1	23.7	55.3
PRH300	M10 depth 10	5	52.5	77	59.5	36	77	7 ^{-0.036} × 4 ^{+0.2} × 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)

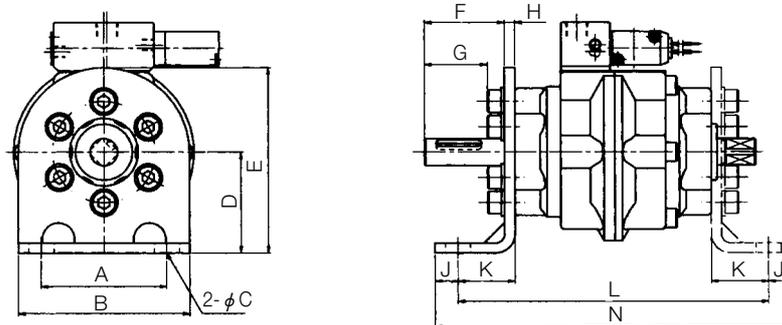
With flange plate
PRH50, 150○-○-○-P



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)

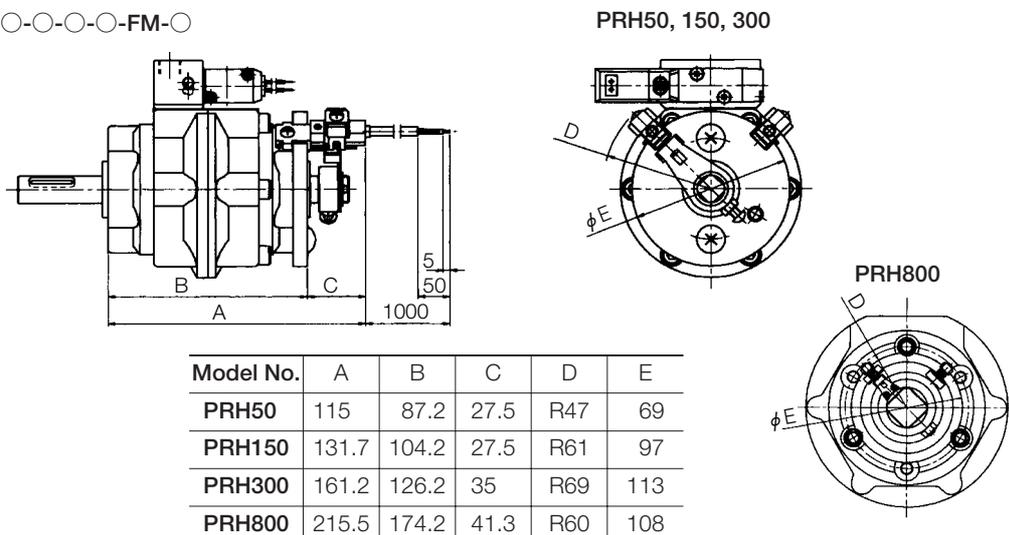


Model No.	A	B	C	D	E	F	G	H	J	K	L	N
PRH50	55	75	11	45	82.5	35	27.5	4.5	10	25	136	156
PRH150	80	110	13	65	115	43.5	33.5	10	12	28	159	183
PRH300	100	140	15	80	135	53	40.5	12	13	32	189	215
PRH800	140	200	15	110	185	54.5	39.5	15	15	35	241	271

(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

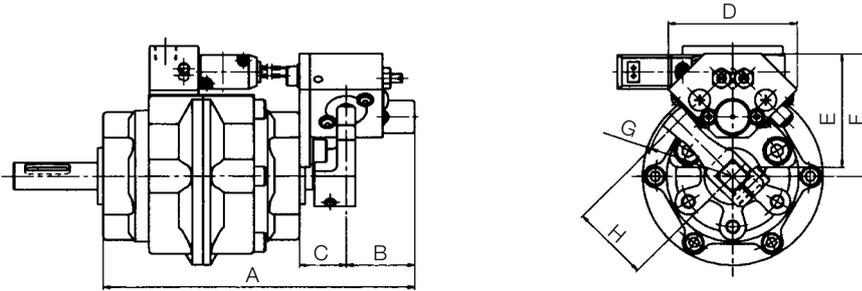
HI-ROTOR/PRH series

DIMENSIONS

(Unit : mm)

With Hydro-cushion

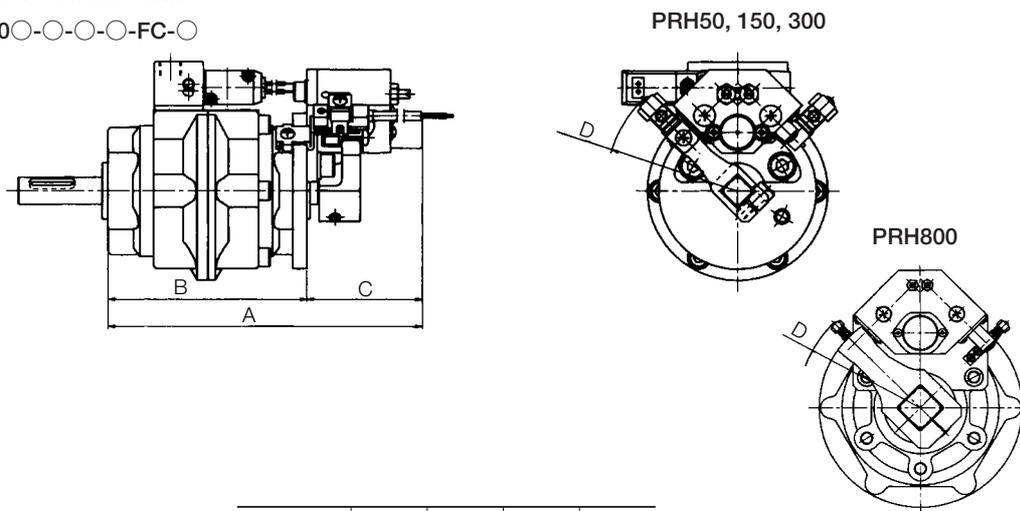
PRH50, 150, 300, 800○-○-○-○-CR



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

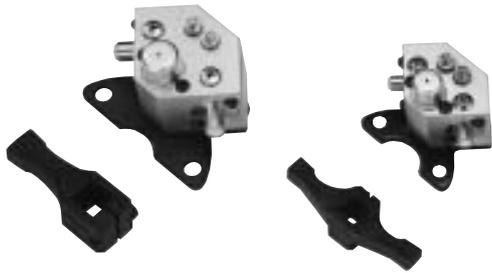
(Note) •Refer on page 49 for the dimensions on HI-ROTOR.

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

Hydro-cushion CRNseries

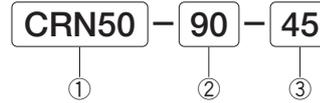
50, 150, 300, 800

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

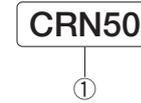


ORDERING INSTRUCTIONS

Hydro-cushion with claw



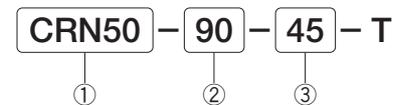
Hydro-cushion only



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

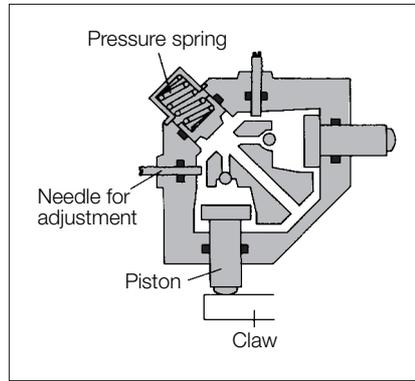
(Note) •Energy capacity per minute=Absorbing energy×2 N : Frequency of operation (cycle/min)

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

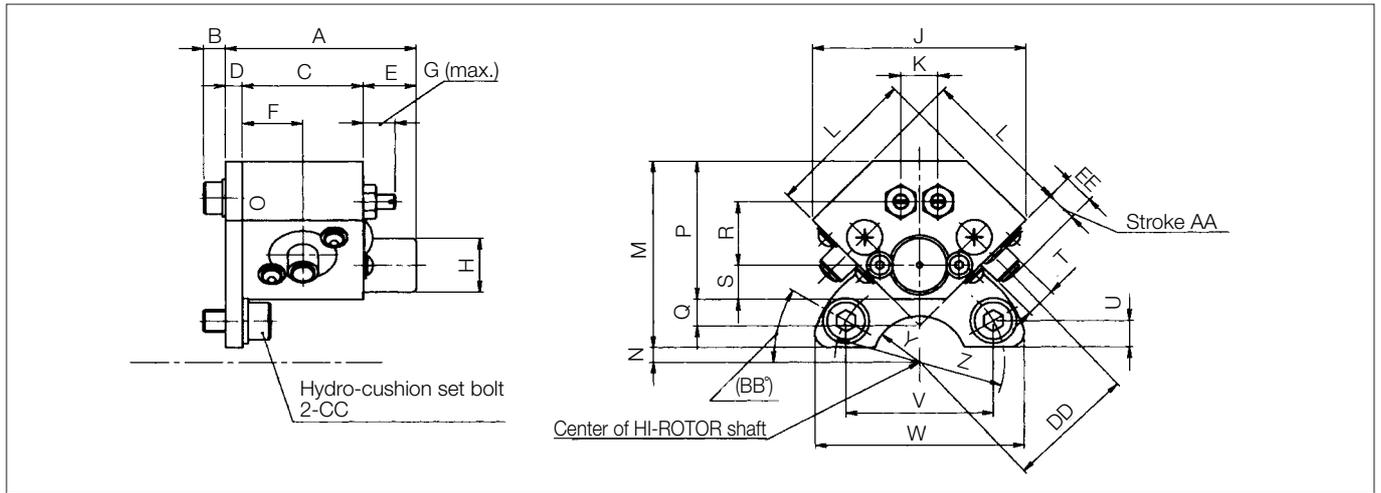
Hydro-cushion/CRN series

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



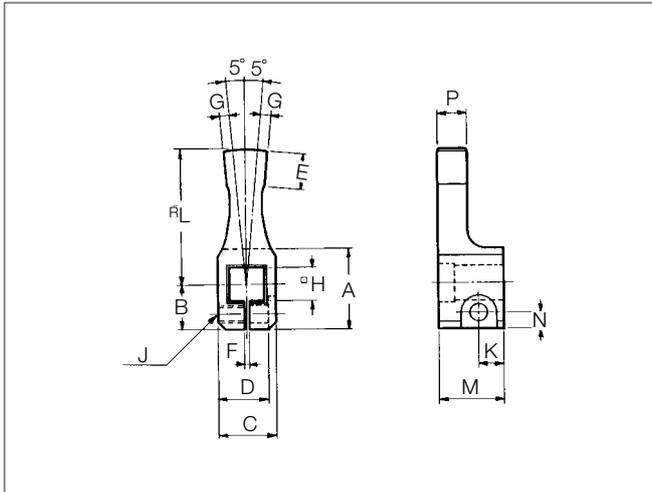
(Unit : mm)

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

Hydro-cushion/CRN series

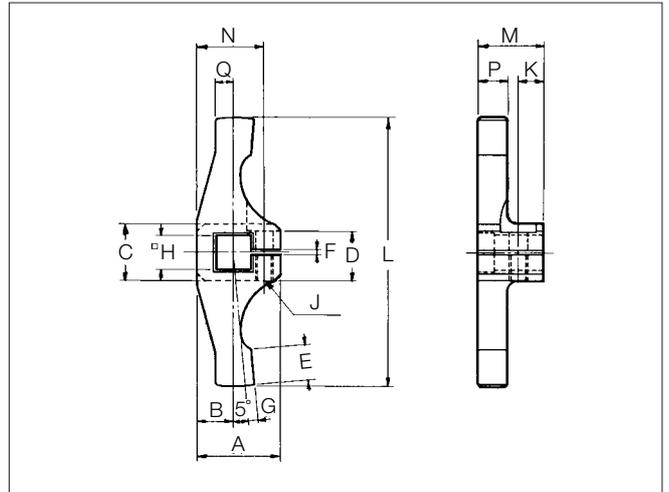
DIMENSIONS OF HYDRO-CUSHION CLAWS

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



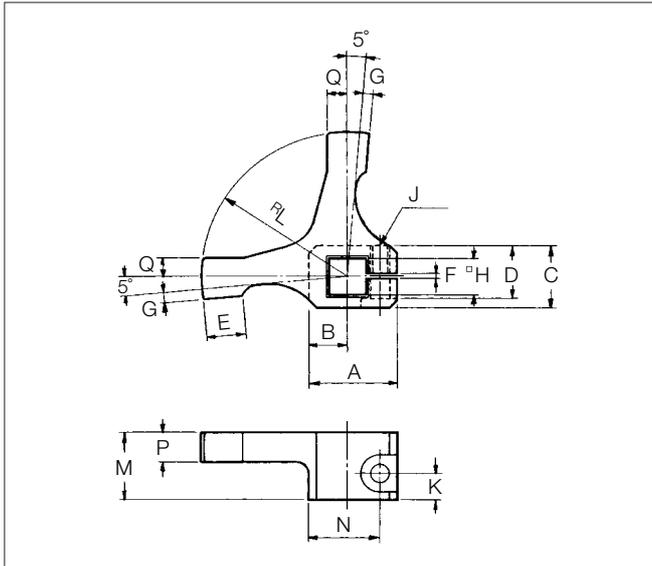
Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P
CRN50	23	13	16	13.7	10	1.2	2.6	10	M5	7	38	18	4.5	8
CRN150	28	16	24	19.5	12	1.2	4.1	13	M6	9	51	20	5	10
CRN300	40	22	35	30.5	14	1.2	5.5	19	M8	11	68	23.5	6.5	12
CRN800	63	34	58	49	18	1.2	8	32	M10	14.5	98	29.5	8	16

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



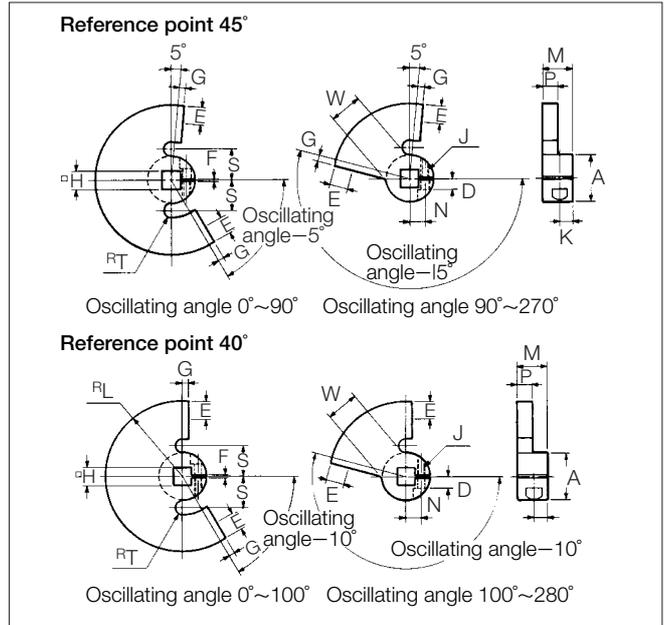
Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
CRN50	23	10	16	13.7	10	1.2	2.5	10	M5	7	76	18	18.5	8	5
CRN150	28	12	24	19.5	12	1.2	4	13	M6	7.5	102	20	23	10	5
CRN300	40	18	35	30.5	14	1.2	5.4	19	M8	9	136	23.5	33.5	12	9
CRN800	63	29	58	49	18	1.2	8	32	M10	14.5	196	29.5	55	16	14

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

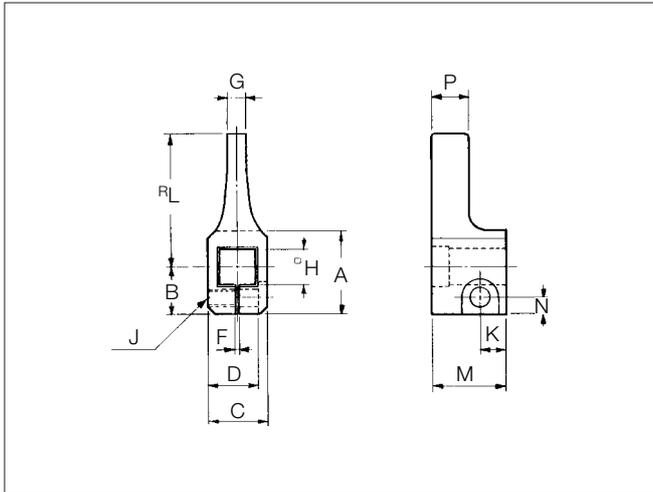
(Note) •Material : S45~55C

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

Hydro-cushion/CRN series

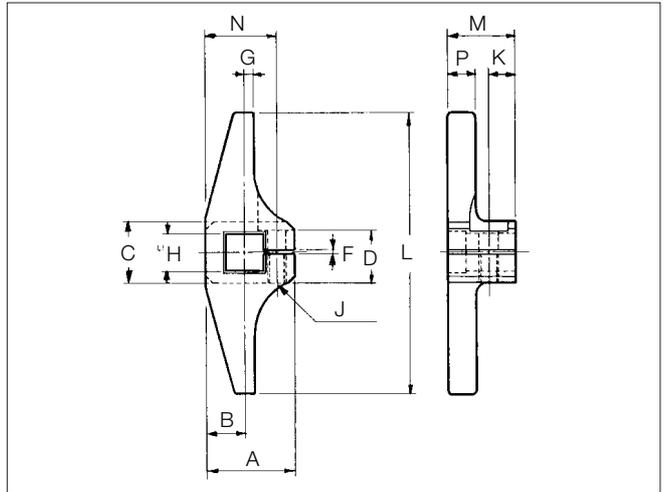
DIMENSIONS OF HYDRO-CUSHION CLAWS

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



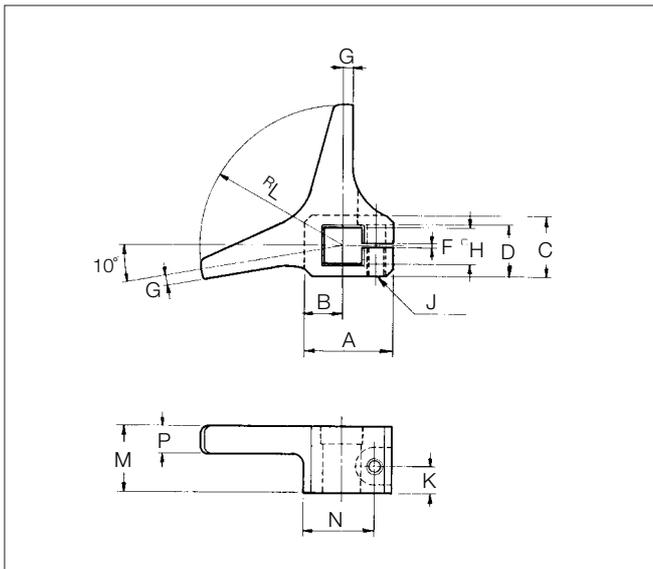
Model No.	A	B	C	D	F	G	H	J	K	L	M	N	P
CRN50	23	13	16	13.5	1.2	5	10	M5	7	37	20	4.5	10
CRN150	28	16	24	19.5	1.2	8	13	M6	9	51	20	5	10
CRN300	40	22	35	30.5	1.2	11	19	M8	11	68	24	6.5	12.5
CRN800	63	34	58	49	1.2	16	32	M10	14	98	28.5	8	15.5

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



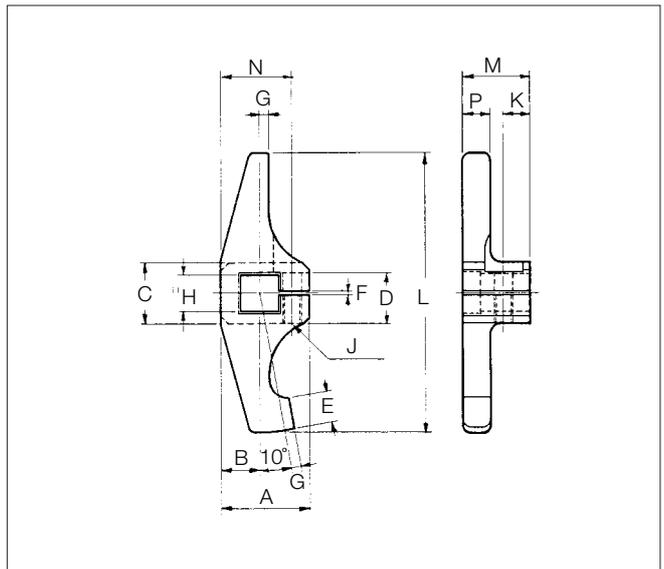
Model No.	A	B	C	D	F	G	H	J	K	L	M	N	P
CRN50	23	10	16	13.5	1.2	2.5	10	M5	7	74	17.5	18.5	7
CRN150	28	12	24	19.5	1.2	4	13	M6	9	102	20	23	10
CRN300	40	18	35	30.5	1.2	5.5	19	M8	11	136	23.5	33.5	12
CRN800	63	29	58	49	1.2	8	32	M10	14	196	28.5	55	15.5

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)

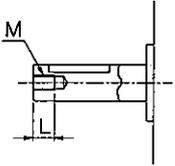
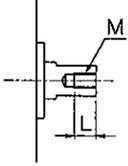
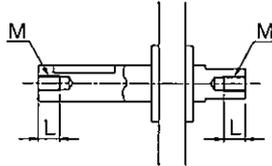
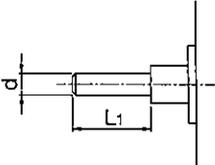
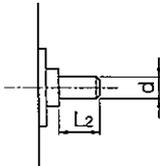
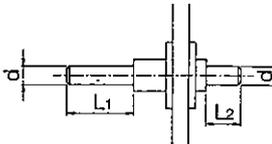
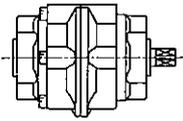
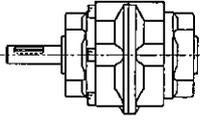
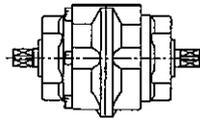
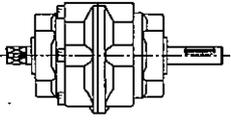
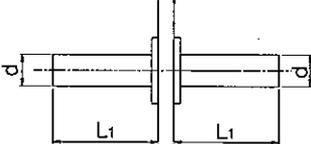
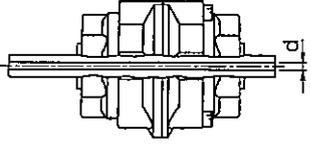
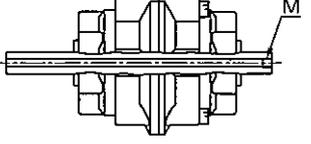


Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P
CRN50	23	10	16	13.5	8	1.2	2.5	10	M5	7	74	17.5	18.5	7
CRN150	28	12	24	19.5	12	1.2	4	13	M6	9	102	20	23	10
CRN300	40	18	35	30.5	14	1.2	5.5	19	M8	11	136	23.5	33.5	12
CRN800	63	29	58	49	32	1.2	8	32	M10	14	196	28.5	55	15.5

HI-ROTOR with special shape of shaft (Made-to-order)

HI-ROTOR/ PRN50, PRN150, PRN300, PRN800

For detailed specifications, size and time of delivery, contact KURODA.
For other models than listed below, consult with KURODA.

<p>Symbol : X1 Long shaft side : Female screw</p> 	<p>Symbol : X2 Short shaft side : Female screw</p> 	<p>Symbol : X3 Both sides : Female screw</p> 
<p>Symbol : X7 Long shaft side : Round bar</p> 	<p>Symbol : X8 Short shaft side : Round bar</p> 	<p>Symbol : X9 Both sides : Round bar</p> 
<p>Symbol : X10 Long shaft side : Cut</p> 	<p>Symbol : X11 Short shaft side : Cut</p> 	<p>Symbol : X12 Both sides : Short shaft</p> 
<p>Symbol : X13 Long shaft and short shaft contrary position</p> 	<p>Symbol : X14 Both sides : Round bar</p> 	
<p>Symbol : Y1 Hollow shaft (Through-hole alone)</p> 	<p>Symbol : Y2 Hollow shaft (Through-hole, Short shaft side : Female screw)</p> 	

Model No.	M(Female screw)	L
PRN50	M4	8
PRN150	M5	10
PRN300	M6	12
PRN800	M8	16

(Note) •Thread pitch : Metric coarse thread
•Long shaft side is provided with keyway according to circumstances.

Model No.	φ d	L ₁	L ₂
PRN50	7	25	13
PRN150	11	41	16
PRN300	17	45	22
PRN800	30	50	35

Model No.	φ d	L ₁
PRN50	12	39.5
PRN150	17	53.5
PRN300	25	65
PRN800	40	69.5

Model No.	φ D	φ d	M(Female screw)
PRN50	12	4	M5
PRN150	17	7	Rc1/8
PRN300	25	8	Rc1/8
PRN800	40	8	Rc1/8

(Note) •Thread pitch : Metric coarse thread
•Long shaft side is provided with keyway according to circumstances.