

RIKEN

ELECTRIC HYDRAULIC PUMP

MP-5 Series

INSTRUCTION MANUAL



Form : E (with DPS-100)

RIKEN KIKI CO., LTD
RIKEN SEIKI


WELCOME TO THE WORLD OF RIKEN HYDRAULIC POWER EQUIPMENT!!


This operation manual explains operation procedures, warnings and cautions, and trouble shootings for RIKEN motor-driven Hydraulic Pump Model MP-5 series and its peripherals.

Before operation, requested to read this manual carefully, and understand the contents thoroughly. **This manual should be in a safe place but accessible for reference during operation.**

SAFETY INSTRUCTIONS

To use this pump safely, correct operations and periodical checking shall be requested. Do not operate this pump before read and understand safety instructions thoroughly shown in this manual. And follow

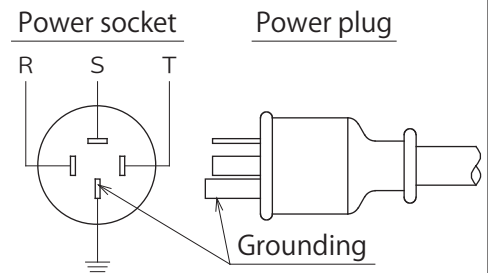
 **“WARNING”** this mark is used to prevent from causing personal injury. Ensure to follow above important warnings for safety. Switch the power off if abnormal condition happens, and contact the sales agent.

 **“CAUTION”** this mark is used to prevent from causing property losses or damages, also follow

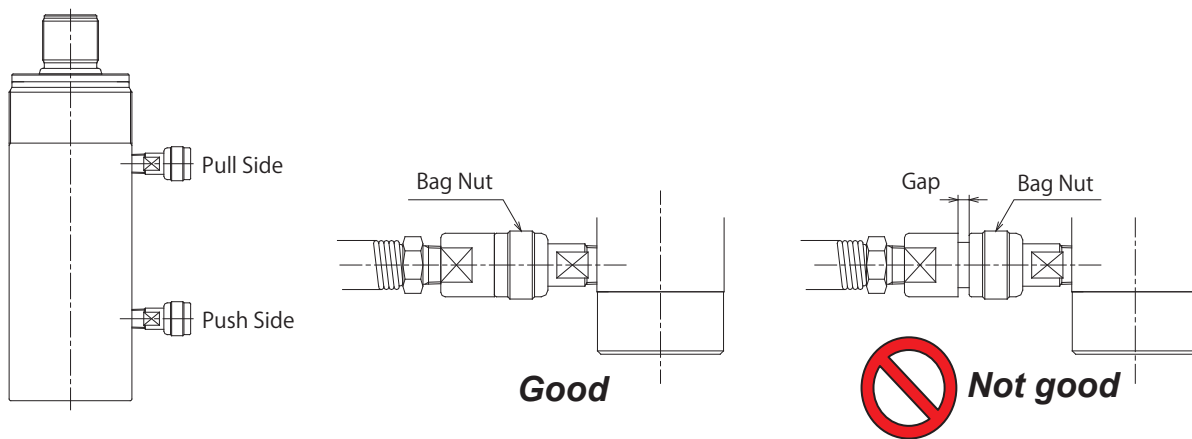
WARNINGS

- Do not use this pump at the place where personal injury or property damage might happen if scattering the hydraulic working oil by any faults. Also do not use this pump close to flammable materials to minimize the risk of injury and fire.
- Before applying pressure, the blind plug of the oil output port should be taken off. Pressure is required to apply after the high pressure fittings and accessories (Hydraulic hose, Coupler) are mounted.
- The maximum output pressure of these pumps is 70MPa. For safety, each pump is factory fitted with a high pressure safety valve adjusted to 73MPa. Do not allow the safety valve to be increased a level higher than 73MPa. Where the pump is fitted with a pressure switch, set this at 70MPa or less.
- When using hydraulic equipments which working pressure is less than 70MPa with this pump, either lower the setting of the high pressure safety valve and adjust the pressure switch to match the working pressure of the equipments. Be warned failure to lower settings could result in the equipment damage. Method of adjustment is referred to page 25 “Adjustment the High Pressure Safety Valve”
- Ensure power is switched off before conducting electrically related maintenance or inspection.
- Ensure to use oil that is between 5° and 60° Celsius. Use oil that exceeds 60° Celsius will shorten the lifespan of the hydraulic equipments and might be cause personal injury if heated oil is touched. Install an oil cooler to lower oil temperature for safety.
- Do not hang the oil tank by the handle with a hooked rope. It may cause serious injury if the pump drops or falls.

- One terminal of an electric plug is ground (earth) terminal. To prevent electric shock, ensure that earth wire (ground) is connected into the plug. Ensure to check if incorrect wiring is set at the electric plug and electric outlet before connecting.



- Tighten the hexagon cap nut of the coupler (S-1, 2, 5) by hand completely until the head of the nut is flush with the lip of the hose coupler. Cylinders will not operate smoothly if a gap is left as shown in the diagram below. When using double acting cylinders, should the pull or retract side coupler not be completely closed, excessive pressure will be generated in the retract or pull side of the cylinder just by a normal pressure on the push cylinder side. This will cause damage either to the coupler, the cylinder, or the high pressure hose, or all three and may also result in a serious bodily injury.



- Do not touch the high pressure hose pressured and around that. Hydraulic oil is being dispersed as high pressure oil may penetrate the skin and cause serious injury.
- If oil enters the eye, thoroughly flush the eye with sterile water immediately for at least 15 minutes before consulting a doctor. Also, if oil contacts the skin, wash thoroughly with water and soap.
- Do not set the setting mode of the pressure switch (DPS-100) during operation of the pump. The motor stops when activating the setting mode, and the motor restarts if E button is pressed. These procedures lead to malfunction may cause any accident or injury.
- In case of MP-5TK, do not use a self-sealed quick coupler, and be sure to use a low pressure rubber hose with a union to reduce resistance at return route piping from a (optional) manual valve mounted independently. A manual valve may be damaged if a self-sealed quick coupler is clogged, it may also result in a bodily injury.
- Do not place hands or other body parts near areas where hydraulic oil is being dispersed as high pressure oil may penetrate the skin and cause serious injury.
- The high pressure hose is a consumable item. Even if the hose exterior appears to be in good condition, it is possible internal damage such as pin holes or scar occurred. Riken recommend periodic replacement based upon how frequently hoses have been used combined with specific application conditions. This might mean replacing the hose even if the life span has not fully expired.

 **CAUTIONS**

- Use ISO VG32 hydraulic working oil (EX.RIKEN POWER OIL) only. Phosphate ester, water-glycol and w/o emulsion oil should not be used---the packing seals occurs to deteriorate and the equipment will be failure. Consult RIKEN or RIKEN's authorized agents if these kinds of unapproved oils required, before start to use. Ensure to check oil capacity not to overflow when oil is applied.
- Do not use the high pressure safety valve as a relief valve. Install a separate relief valve if it is necessary to perform continuous relief.
- If a double-acting cylinder is used with MP-5SB, fix A port is push side and B port is pull side to avoid back pressure due to the valve formation.
- Ensure to screw 4 sets eye bolt (Hanging bolt) into the application thoroughly before hanging the pump. Be sure to be careful to prevent a hanging tool causes a scar or failure on the application when hanging the pump.
- When an air release valve (SV-1000) is installed and air release is performed, hydraulic oil will come out of the discharge holes of the air release valve. Use a cloth or other suitable material to prevent dispersion of the oil.
- Waste oil generated by the pump is classified as an "Industrial Waste Product". Consult the local regulatory agencies and dispose of the oil through a licensed industrial waste collection agency or industrial waste processing agency.

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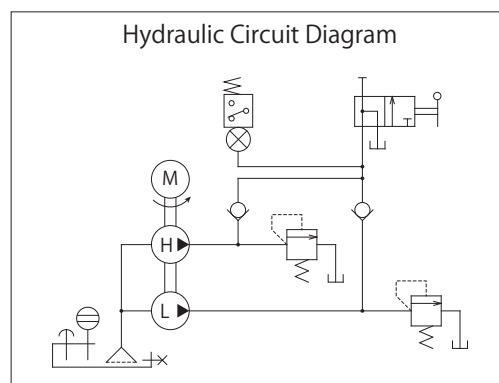
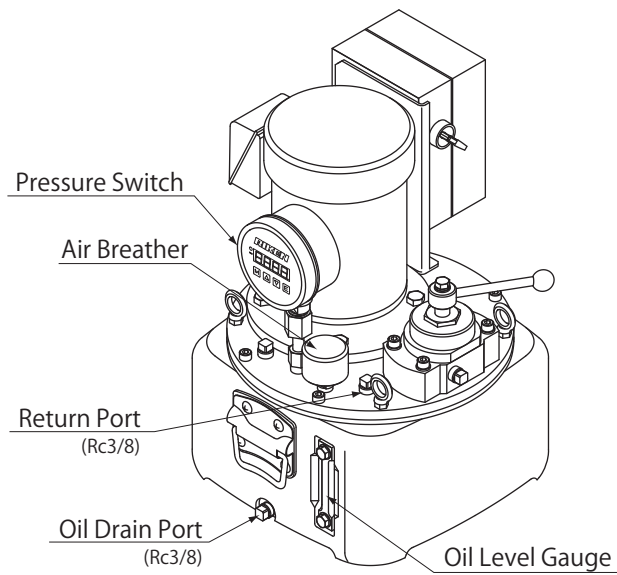
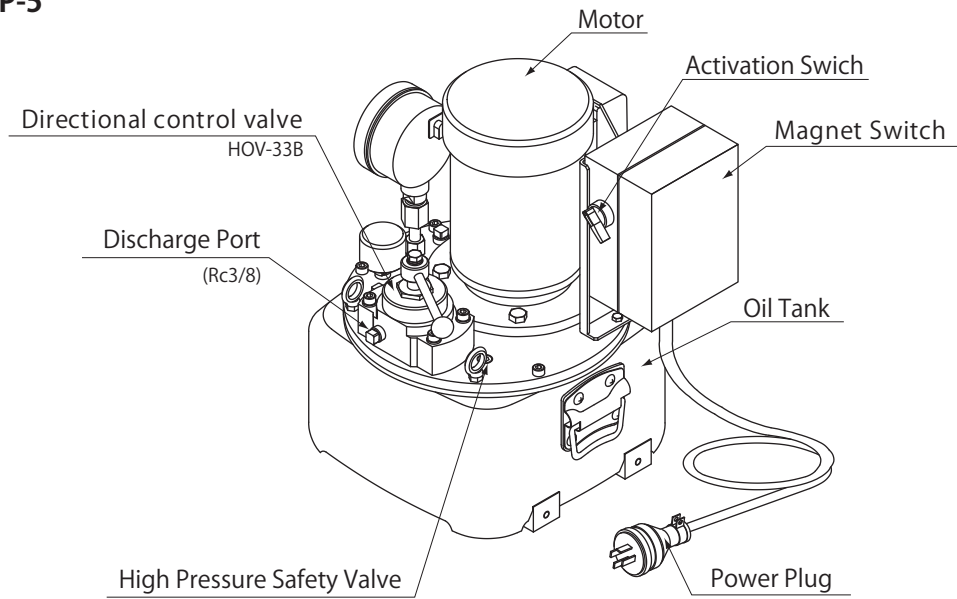
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1. Outlines

- This machine is an electric hydraulic pump which operates an actuator like cylinder.
The pump features automatic changeover between high pressure and low pressure. Once the circuit pressure reaches 3MPa, the low pressure safety valve activates and all oil flow from the low pressure pump is then returned to the tank via the low pressure safety valve, and oil only from the high pressure pump flows to the circuit.
- This pump should be **used indoors**. **Do not use outdoors** or the place where pump is to be **drenched or exposed to precipitation, or other inclement weather conditions**.
- Use in areas where the surrounding temperature is 0 to 40° C.
- Use **RIKEN SEIKI/ KIKI's genuine** peripheral hydraulic power **equipment only**.
- Use RIKEN's genuine high pressure nylon hoses, high pressure pipes and fittings, which maximum operating pressure is 70MPa.
- **Do not use in areas where severe damage may occur** should hydraulic oil leak or escape.
Specifically, **do not use near flammable materials due to the risk of injury and fire**.
- This pump is not spark resistant and therefore should not be used in hazardous areas.
- Standard voltage of the control directional solenoid valve is supplied at AC200V.
Advise RIKEN or RIKEN' s authorized agents if AC100V or other voltage valve is required.
- **Do not modify this pump** for usage other than the intended usage.

2. Explanation of Components

(1)MP-5



Oil tank

This is a reservoir for the storage of hydraulic oil, and a level gauge to check oil volume is equipped.

Motor

A power source which to operate this hydraulic pump.

Magnet Switch

A switch to start or stop operation of the electric motor by Ⓔ activation switch. The built-in thermal relay prevents the electric motor not to be burnt due to irregular electric current or overloads in hold condition.

Activation Switch

A switch to control opening and shutting of the magnet switch, also controls opening and shutting of the motor.

Power plug

Length of the cord is 2.5 meter. Specification of the insertion plug is 250V. (3P 15A 260V with earth clip).

High Pressure Safety Valve

A valve which to limit the maximum pressure in order to prevent damage to the machine and piping.
Set to 73MPa at the time of shipping.

Low Pressure Safety Valve

A valve which to limit the minimum pressure in order to avoid failure of the equipments and pipes, and it controls limit of low pressure to avoid overload of the motor. Set to 3.8MPa for safety, ensure to NOT TO ADJUST this valve.

Pressure Switch (DPS-100)

The motor stops when pressure rises to the set pressure level at this switch, and the motor automatically restart when pressure drops to the set differential pressure (Set to 5MP at the time of shipping).

Directional Control Valve (HOV-33B)

A 3way manual poppet valve which to control emission and admission the oil. It discharges when the lever is shut, and it returns to the tank when the lever is loosed.

Air Breather

It designed ventilation in the tank and also equipped function of a protector to prevent infiltration of dirt to oil tank. A check valve is equipped inside to avert overflow oil during the transport.

Oil Level Gauge

A gauge for visual check amount of the oil.

Oil Drain Port

A port to drain used hydraulic oil from the tank, port size is taper screw Rc3/8 for pipe.

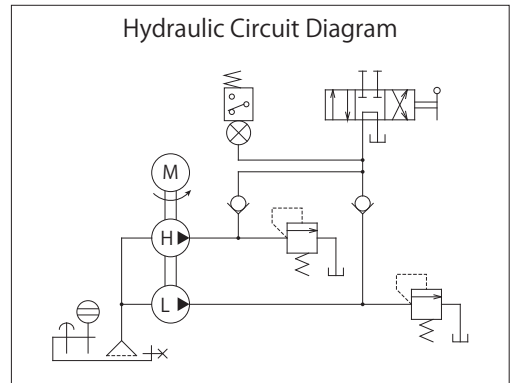
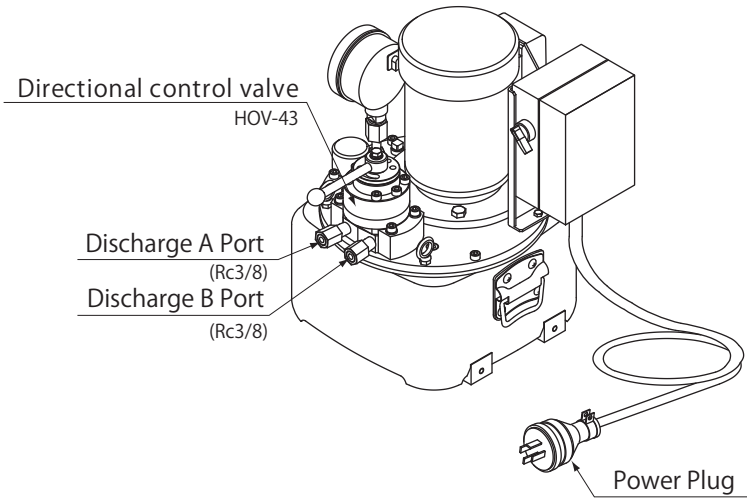
Return Port

A port to return hydraulic oil from the circuit to the tank, port size is taper screw Rc3/8 for pipe.

Discharge Port

A port to discharge hydraulic oil to the circuit, port size is taper screw Rc3/8 for pipe.

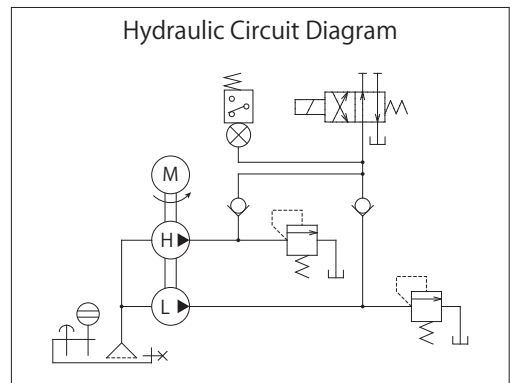
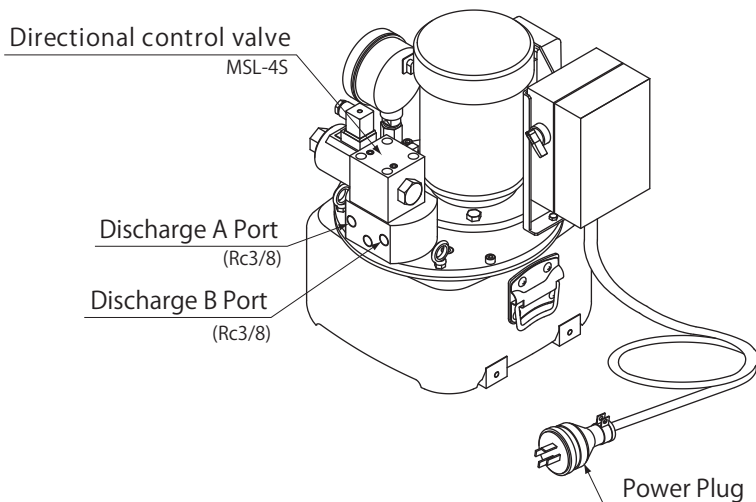
(2) MP-5C



Directional Control Valve (HOV-43 Center Bypass)

A 4-way 3-position manual valve as rotary type which to control direction of emission and admission the oil. It controls the flow direction of the oil by manual operation which shifts right side or left side, oil returns to the tank when this valve is placed at the center position.

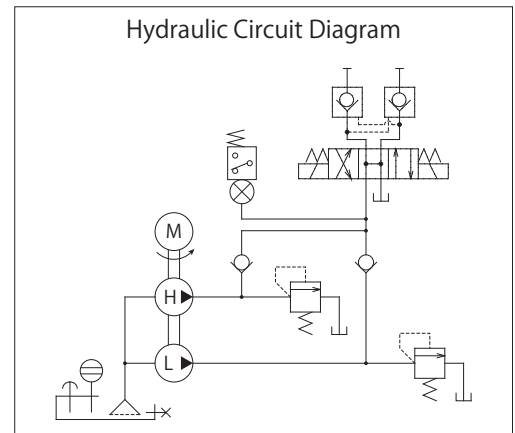
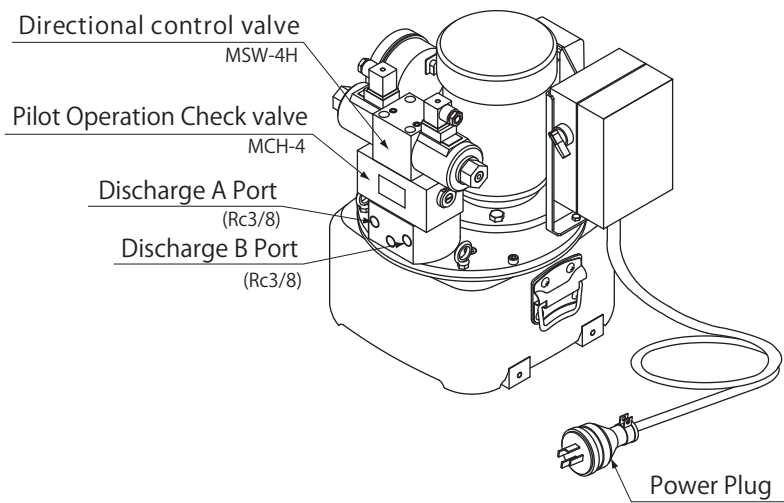
(3) MP-5SL



Directional Control Valve (MSL-4S Normal Straight)

A solenoid 4-way 2-position valve as spool type which to control direction of oil flow by activated solenoid, oil discharges when this valve is placed at the normal position (Non-activated solenoid position).

(4) MP-5SW



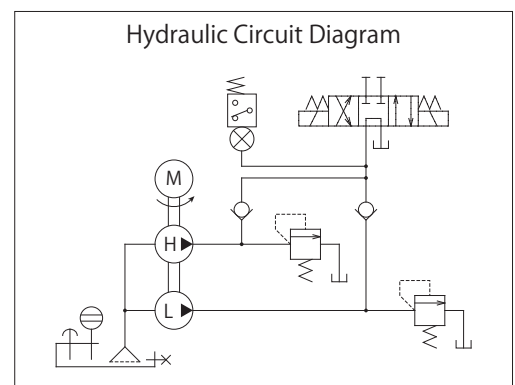
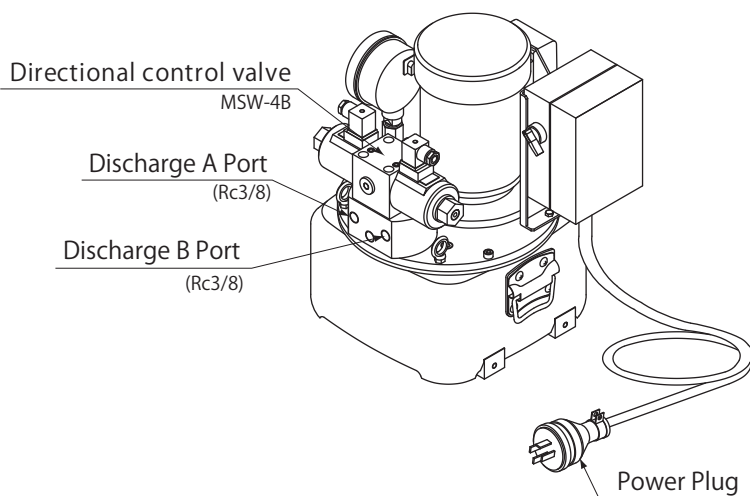
Directional Control Valve (MSW-4H All Port Open)

A 4-way 3-position solenoid valve as spool type which to control direction of oil flow by activated solenoid on right side or left side, oil returns to the tank when this valve is placed at the center position.

25 Pilot Operation Check Valve (MCH-4)

A check valve which is to keep pressure in the circuit, this valve is opened / shut with the pilot pressure. It also designed to freeze the piston of cylinder when the directional control valve is placed at the center position.

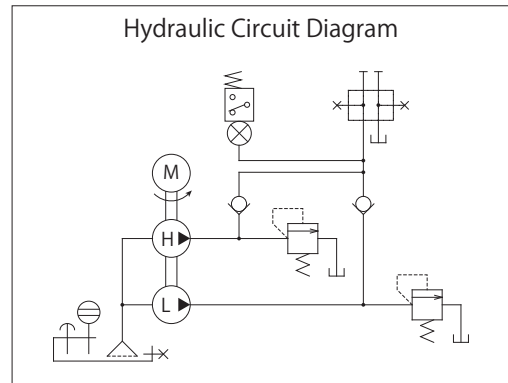
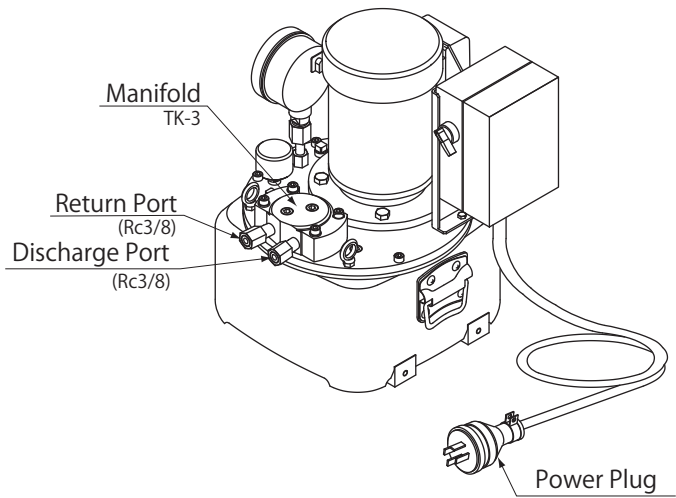
(5) MP-5SB



Directional Control Valve (MSW-4B Center Bypass)

A 4-way 3-position solenoid valve as spool type which to control direction of oil flow by activated solenoid on right side or left side, oil returns to the tank when this valve is placed at the center position.

(6) MP-5TK



Manifold (TK-3)

A block equips a discharge port and a return port, and also used for an independent valve setting. A discharge port is on the right side, a return port is on the left side.

3. Shared Explanation

Model:	MP-5 (Form E)
Pressure rating:	Low pressure side - 3MPa High pressure side - 70MPa
Oil output/min:	Low pressure side - 2.0/2.4 L/min. at 50/60Hz High pressure side - 0.4/0.48 L/min. at 50/60Hz
Electric motor:	Totally enclosed fan-cooled type, 0.75KW, 3phase, AC200V, 50/60Hz, AC220V, 60Hz, 4P, Class E insulation
Voltage allowance:	from -5 to +10% at Regulation Voltage
Atmosphere temperature:	from 0° C to 40° C
Reservoir capacity:	8 L
Usable oil:	4.5 L
Dimensions:	403(W) x 340(L) x 425 mm(H) approx.
Weight approx.:	60kgs.
Working oil:	Hydraulic working oil ISO VG32 (RIKEN POWER OIL)
Life time:	Some parts shall be changed after 500 hours continuous operation at 70MPa.

4. Safety Cautions for Usage

⚠ WARNING Before applying pressure, the blind plug of the oil output port should be taken off. Pressure is required to apply after the high pressure fittings and accessories (Hydraulic hose, Coupler) are mounted.

⚠ WARNING The maximum output pressure of these pumps is **70MPa**. For safety, each pump is factory fitted with a high pressure safety valve adjusted to 73MPa. **Do not allow the safety valve to be increased** a level **higher than 73MPa**. Where the pump is fitted with a pressure switch, set this at 70MPa or less.

⚠ WARNING When using hydraulic equipments which working pressure is **less than 70MPa** with this pump, **either lower the setting of the high pressure safety valve and adjust the pressure switch to match the working pressure** of the equipments. Be warned failure to lower settings could result in the equipment damage. Method of adjustment is referred to page 25 "Adjustment the High Pressure Safety Valve"

⚠ WARNING Ensure power is switched off before conducting electrically related maintenance or inspection.

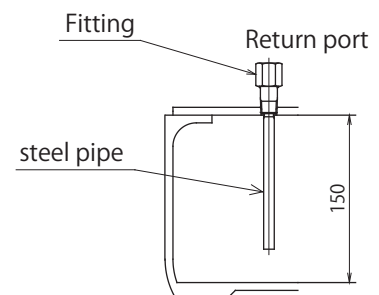
⚠ WARNING Ensure to use oil that is between 5° and 60° Celsius. Use oil that exceeds 60° Celsius will shorten the lifespan of the hydraulic equipments and might be cause personal injury if heated oil is touched. Install an oil cooler to lower oil temperature for safety.

⚠ CAUTION Use **ISO VG32 hydraulic working oil** (RIKEN POWER OIL) only. Phosphate ester, water-glycol and w/o emersion oil should not be used---the packing seals occurs to deteriorate and the equipment will be failure. Consult RIKEN or RIKEN's authorized agents if these kinds of unapproved oils required, before start to use. Ensure to check oil capacity not to overflow when oil is applied.

⚠ CAUTION Do not use the high pressure safety valve as a relief valve. Install a separate relief valve if it is necessary to perform continuous relief.

⚠ CAUTION If a double-acting cylinder is used with MP-5SB (with Directional control valve MSW-4B), fix A port is push side and B port is pull side to avoid back pressure due to the valve formation.

- The most prevalent reason for pump malfunction is infiltration of dirt and other foreign objects. The pump and other auxiliary equipment should be kept clean to prevent the infiltration of such foreign objects.
- Hydraulic **oil** should be **changed at least once a year**.
- Do not magnetize two coils(MSW-4H, MSW-4B) of solenoid valves simultaneously. Ensure to magnetize one of coils after another one is magnetized off. Do not magnetize continuously longer than 1 minute. The spool of solenoid valves will stick strongly due to hydraulic locking phenomenon.
- Switching frequency of the solenoid valves (MSW-4H, MSW-4B) is should be less than 20 cycles/1 minute. (1 cycle means 1set operation of "Switch on" and "Switch off" at both "right" and "left" sides of solenoid)
- Consult RIKEN KIKI or an authorized agent by RIKEN KIKI if high voltage specification or different voltage specification of power supply is required.
- To prevent hydraulic oil dispersion, do not hit or damage the oil level gauge.
- Ensure to install a gauge damper (GD-70) to protect a pressure gauge when a pump which a solenoid valve is equipped requires a pressure gauge.
- When hydraulic oil is returned through the return port on the oil tank, attach the fitting and the pipe there to pour oil into the tank as almost equal amount as low limit level of the oil level gauge. The pipe is required to avoid air infiltration into oil, the pump will stop pressure increase if air is mixed with oil. Consult RIKEN or an authorized agent by RIKEN KIKI should the fitting and the pipe is necessary to use.



5. Fixed Installation Method

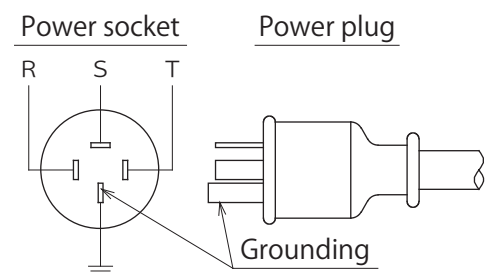
⚠ WARNING Do not hang the oil tank by the handle with a hooked rope. It may cause serious injury if the pump drops or falls.

⚠ CAUTION Ensure to screw 4 sets eye bolt (Hanging bolt) into the application thoroughly before hanging the pump. Be sure to be careful to prevent a hanging tool causes a scar or failure on the application when hanging the pump.

● Install the pump in a level and safe location. Ensure to utilize the screw holes on the bottom of the oil tank to fix the pump thoroughly with the screws when a high pressure pipe is connected.

⚡ Ensure that the power voltage matches the voltage of the motor.

⚠ WARNING One of electric plug is earth (ground) plug. To prevent electric shock, ensure the pump earth wire is connected to ground. Inspect the wiring if it is irregular connecting before applying electricity.



● Connection to the Cylinder

Connect the pump and the cylinder using a high pressure hose or a high pressure pipe.

(A) When Connecting With a High Pressure Hose

Use the high pressure hose by directly screwing it into the normal pump side and using a coupler to connect it to the cylinder side. Ensure that the taper screw area before for the piping of the high pressure hose has been wrapped with a tape seal before screwing it in.

<*Method for Wrapping the Tape Seal>

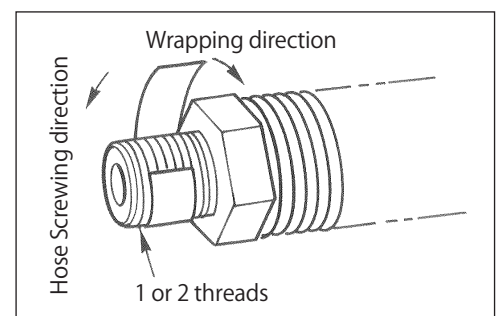
Leave 1 to 2 threads exposed at the tip of the screw for the metal fixture (R3/8) on one side of the high pressure hose. Wrap tape around 1 or 2 times in the opposite direction of the screwing direction (counter-clockwise).

Screw torque is ;

R3/8-----79 to 98 N·m.

R1/2-----118 to 142 N·m.

Ensure that not dirt or foreign objects are adhered to the coupler when connecting.



● Refer to page 33 to check handling of the high pressure hose.

(B) When Connecting With a High Pressure Pipe

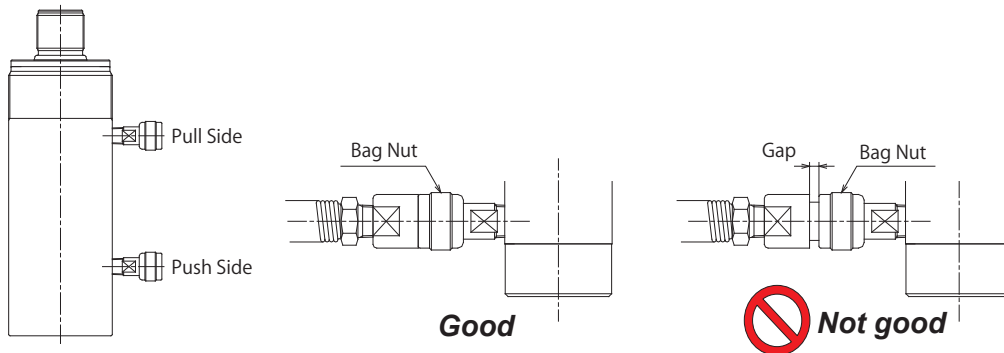
Refer to pages for steel piping or wedge connectors in the general catalog, or request an instruction manual for wedge connectors from a sales office.

Or, attach an air release valve to the tip of the pipe.

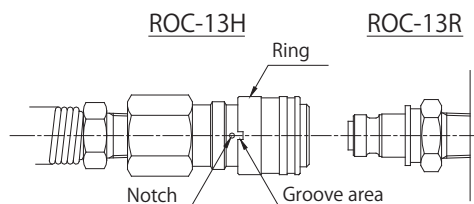
● Any wiring for a solenoid valve is not provided on standard type of MP-5SL, MP-5SW and MP-5SB .

Arrange wiring to follow the purpose of operation referring to the operation method on page 20 to 23.

⚠ WARNING: Tighten the hexagon cap nut of the coupler (S-1, 2, 5) by hand completely until there is no gap between the male and the female couplers and the edge of the hexagon nut is flush with the face of the male coupler. The cylinder will not operate smoothly if a gap exists as shown in the diagram below. When using double acting cylinders, should the pull or retract side coupler be not completely closed, excessive pressure will be generated in the retract or pull side of the cylinder by a normal pressure on the push cylinder side. This will cause damage either to the coupler, the cylinder, or the high pressure hose, or all three and may also result in a serious bodily injury.



⚠ WARNING: When using the ROC-13 Series one-touch coupler, **align the ring groove area of the ROC-13H and with the position of the notch.** Then, with the ring in a pulled back position, push until contact is made with the ROC-13R coupler and then release the ring. The coupler will connect after automatically locking. Finally, complete the connection by turning the ring to move the position of the notch and the groove area. Also, ensure that connection has been performed properly by pulling the ROC-13H coupler forward and **checking that it does not come loose.** When using double acting cylinders, should the pull or retract side coupler be not completely closed, excessive pressure will be generated in the retract or pull side of the cylinder by a normal pressure on the push cylinder side. This will cause damage either to the coupler, the cylinder, or the high pressure hose, or all three and may also result in a serious bodily injury



6. Preparation before Use

- The rotation direction of the pump is adjustable to only one direction. Follow to advised direction that indicates on side of the motor (counter-clockwise direction, look from the upper part of motor). Turn on the activation switch with no load for a few second, and check the rotation of the fan. Replace 2 phases within 3 phases of the motor if the direction is reverse, and check the rotation of the fan again.
- The cylinder will not operate smoothly with air inside the hose or piping. Air should be released from within the high pressure hose and the high pressure pipe using the method shown below.

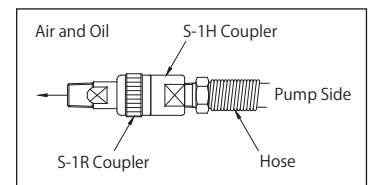
In case of MP-5

(A) When Using a High Pressure Hose

- a) Attach a matching coupler to the coupler on the high pressure hose from which air is to be released.

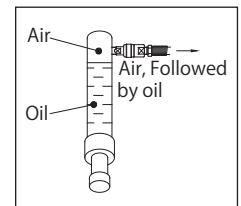
Example: For **S-1H** Coupler...**S-1R** Coupler

For **ROC-13H** Coupler...**ROC-13R** Coupler



- b) Take the plug of the pump return port off, and screw coupler there slightly.
 c) Tighten the lever of the manual valve.
 d) Perform inching of the motor. (Refer to page 18 "Operation Method")
 e) Air release is completed when hydraulic oil comes out of the coupler.

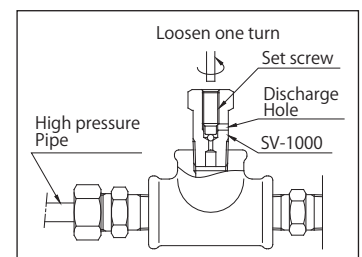
If cylinder piston is attached in an opposite position, or the cylinder is not fixed and light-weight, invert the cylinder and run the pump several times to send hydraulic oil. Perform this procedure a few times in order to remove air from within the cylinder and the high pressure hose.



(B) When Using High Pressure Pipe

When installing the high pressure pipe, attach an air release valve (SV-1000) to the tip of the pipe.

- a) Loosen the set screw of the air release valve by one turn.
 b) Tighten the lever of the directional control valve.



⚠ CAUTION Hydraulic oil will flow out of the discharge holes of air release valve.

Use a cloth or other suitable material to prevent dispersion of the oil.

- c) Perform inching for the motor.
 d) Air release is completed when hydraulic oil comes out of the discharge holes of the air release valve.
 e) Tighten the set screw of the air release valve.

※ In the case of other type, perform same procedure with control of a directional control valve.

7. Preventive Maintenance

(1) Inspection of Items before Operation

⚠ CAUTION

- (A) Turn off power, and inspect the cable for loose connections. Tighten the connection if it is loosen.
- (B) With the cylinder piston fully retracted, check the amount visually from the oil level gauge to ensure the level of hydraulic oil is normal. Replenish oil if the amount of oil is low. Refer to (4) (C) "Changing Hydraulic Oil" listed as below.
- (C) Run the motor with no load. Keep running longer than 5 minutes and check if any irregular noise or irregular vibration causes.
- (D) Operate the directional control valve and operate the cylinder. Exert pressure if possible, and inspect for malfunction.
- (E) Inspect for any leakage of oil from piping or machine. Repair any leaks that are found after check the source of leakage.
- (F) Confirm the other cautions points listed in "Safety Cautions for Usage" on page 10.

(2) Inspection of Items during Operation

Perform inspection for the items listed below. In the case of any malfunctions, **stop operation immediately** and **perform appropriate maintenance**.

- (A) Inspect for valve malfunctions or abnormal rises in pressure.
- (B) Inspect for oil leaks from both within piping or the motor pump.
- (C) Listen for loud or abnormal sounds, check for vibrations or unusual odors.
- (D) Ensure the oil temperature does not exceed 60 degree Celsius and also fall lower than 5 degree Celsius.

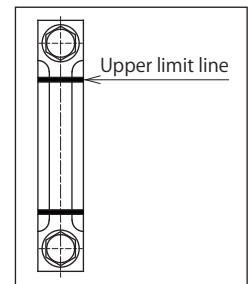
⚠ **WARNING** Do place hands or other body parts near areas where hydraulic oil is being dispersed as high pressure oil may penetrate the skin and cause serious injury.

(3) Inspection of Items after Operation

- (A) Ensure that power is turned off.
- (B) Inspect for leakage of oil and other abnormalities. Check the source and perform maintenance as necessary.

(4) Changing Hydraulic Oil

- (A) **As a general rule, hydraulic oil should be changed once a year.** However, oil should be changed more frequently in situations as listed below.
 - a) Dust is found to be mixed in the oil.
 - b) A strange odor is emitted.
 - c) Water has mixed with the oil which turns a milky-white color.
 - d) The oil has deteriorated and has become a brownish-black color.
- (B) Clean and flush out the oil tank and clean the suction filter when hydraulic oil is changed.
- (C) Method for Supplying Hydraulic Oil
Remove the plug from the oil tank return port and supply appropriate hydraulic oil. Use a level gauge to ensure that the amount of oil is in an appropriate range.



⚠ WARNING

- (D) If oil enters the eye, thoroughly flush the eye with sterile water immediately for at least 15 minutes before consulting a doctor. Also, if oil contacts the skin, wash thoroughly with water and soap.

⚠ CAUTION

- (E) Waste oil generated by the pump is classified as an "Industrial Waste Product". Consult the local regulatory agencies and dispose of the oil through a licensed industrial waste collection agency or industrial waste processing agency.

8. Explanation of Pressure Switch

(1) Specification

MODEL:	DPS-100
Max. Operating pressure:	100MPa
Pressure adjustment range:	0.0 to 100MPa
Power source:	AC90 to 240V
Display:	4 Digits Red Color LED
Non linearity:	1% R.C. (at 25 degree Celsius)
Hysteresis:	1% R.C. (at 25 degree Celsius)
Indication speed:	2.5 times/second
Sampling speed:	50 times/second
Contact capacity:	AC250V/8A (Resistance Load)
Differential pressure set range:	0 to 99.9MPa
Surrounding temperature Humidity:	0 to 50 degree Celsius, 35 to 85% R.H. No Condensation
Connection screw:	G1/2 (Metal seal)

(2) Set at the time of shipping

Set pressure:	70MPa
Differential pressure:	5MPa
Contact activity:	B Contact

Setting is performed as listed as above at the time of shipping.

Follow the procedure listed below on item (5) Set Adjustment Method when adjusting the switch again.

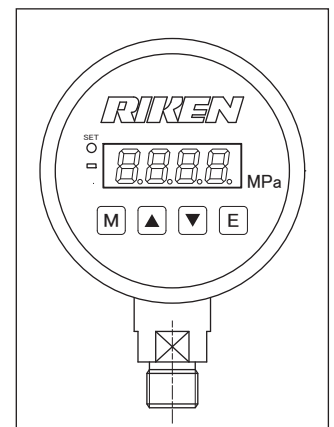
(3) Method of Use

The motor stops when pressure rises to the set pressure level.

The motor automatically starts again when pressure falls to set differential pressure (Set 5MPa at the time of shipping).

Ensure to set the pressure 3 to 5MPa higher than operating pressure when this switch is used as the safety equipment.

Be sure to set the pressure switch to the correct level for the application, before operation the pump.



(4) Zero Adjustment

Zero adjustment is required if Display 【0.0】 is not shown with no load. Press key longer than 3 seconds to adjust the display to 【0.0】. Check if any left pressure does not exist before adjustment, the left pressure will be added if it exists.

(5)Set Adjustment Method

Press **[M]** key while **[E]** key is pressed to display the set mode. Each set items are displayed each time **[M]** key is pressed, choose an item to be operated. Press **[E]** key after all changes are completed.

The mode is returned and items change performed are saved.

Set mode continues unless **[E]** key is pressed.

(A) Set Pressure

When **[M]** key is pressed while **[E]** key is pressed, [**SET**] is displayed for a few seconds, then the set pressure at this moment is displayed. Select **[▲]** **[▼]** key if change is required.

(B) Differential Pressure

Press **[M]** key again after the set pressure is displayed, [**HYS**] is displayed for a few seconds, then the current differential pressure is displayed. Select **[▲]** **[▼]** key if change is required.

※If DPS-100 is used with the set pressure is less than 5MPa, the differential pressure should be set at less than the set pressure. The motor will stop at the set pressure and keep being at a standstill if the differential pressure is larger than the set pressure.

(C) Contact

Press **[M]** key again after the differential pressure is displayed, [**LOC**] is displayed for a few seconds, then the current contact is displayed.

[**H.C.N.P**] B Contact

[**H.C**] A Contact

Press **[▲]** key several times till the contact is displayed if change is required.

(6)Set Confirmation

Press **[M]** key continuously for 3 seconds, the set pressure will be displayed. Then, the differential pressure, the contact, and the set pressure are displayed each time **[M]** key is pressed, ensure to check each items displayed. Press **[E]** key after all items are confirmed.

⚠ WARNING Do not display the setting mode during pump operation. The motor stops when the setting mode is activated and it restarts if **[E]** key is pressed. Be warned failure these situation could result in serious equipment damage and serious injury.

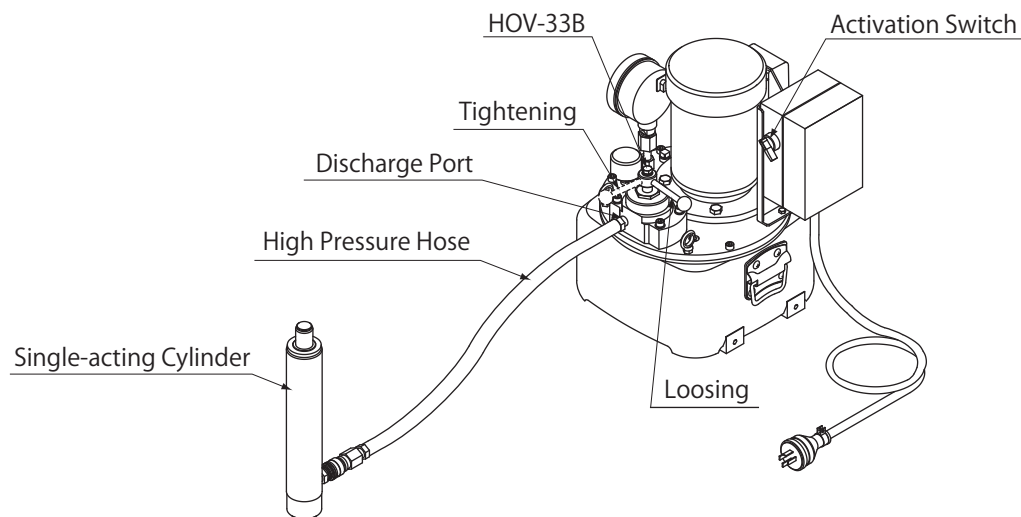
(7)Noise influence

There is possibility that noise influences if displayed pressure sometimes change or wrong pressure value is displayed. Check the source of noise and eliminate influence of noise.

9. Operating Method

(1) MP-5

Manual 3 directional poppet valve (HOV-33B) is mounted. The tank port is shut when the lever is tightened, then hydraulic oil is discharged. On the contrary, the tank port is opened when the lever is loosened, then oil returns to the oil tank.



Example of Use: For a single-acting cylinder (spring return type)

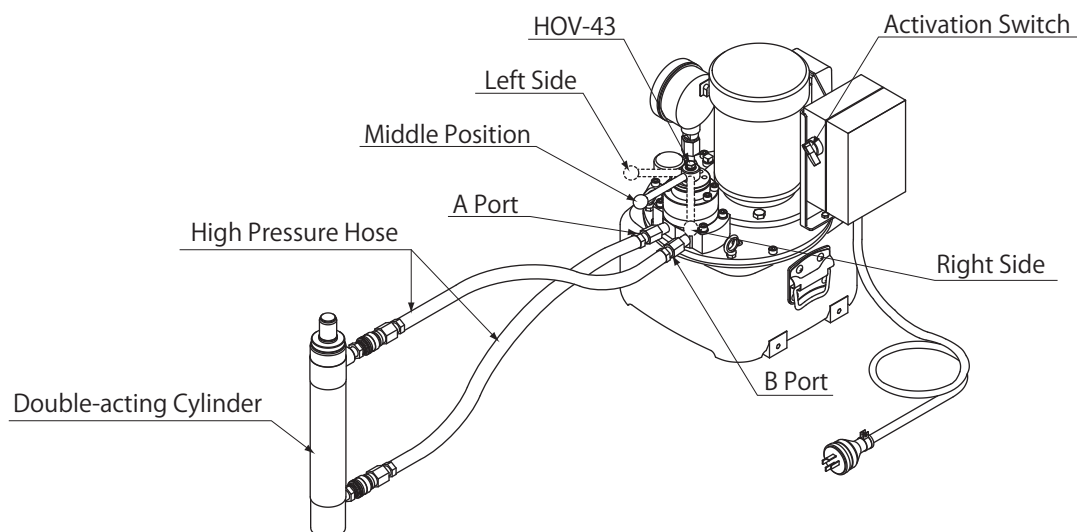
Connect the high pressure hose connected to the cylinder to the discharge port as shown in the diagram above.

- (A) Loose the lever of the directional control valve.
- (B) Turn the activation switch (SW) "ON" and run the motor.
- (C) Tighten the lever of the directional control valve.
- (D) Piston starts coming out and pressure of the pump rises relevantly.
- (E) When pressure reaches the pressure set on the pressure switch, the motor will stop.
The motor starts again when pressure falls lower than the set pressure level as the differential pressure.
- (F) Loose the lever of the directional control valve to retract the piston.
- (G) Retract the piston when operation is completed. Turn off the activation switch (SW) and stop the motor.

If a malfunction occurs, immediately turn off the activation switch (SW) to stop the motor.

(2) MP-5C

The direction control valve has a 4-way, 3-position manual change valve (HOV-43) is equipped. When the valve handle is in the middle position, hydraulic oil discharged to the oil tank. Seen from the front of the pump, oil discharges from A port when changed to the left side, and discharges from B port when changed to the right side.



Example of Use: For a double-acting cylinder.

In the case connect the high pressure hose shown in the diagram above, assuming A port is push side and B port is pull side.

(There is no distinction which A port = Push side, B = Pull side, inversion is allowable.)

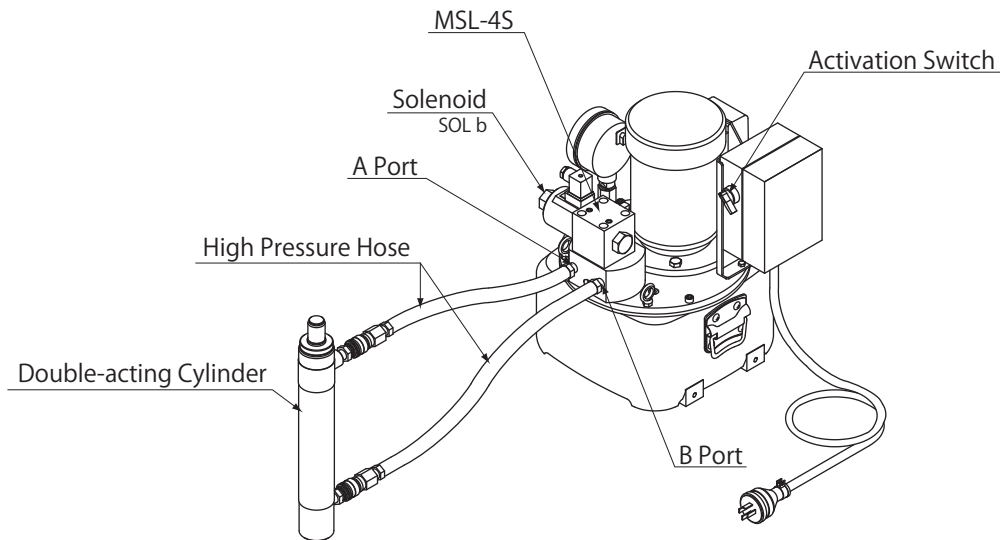
- (A) Place the handle of the direction control valve in the middle position.
- (B) Turn the activation switch (SW) "ON" and run the motor.
- (C) Move the handle of the direction control valve to the left side.
- (D) Piston starts coming out and pressure of the pump rises relevantly.
- (E) When pressure reaches the pressure set on the pressure switch, the motor will stop.
The motor starts again when pressure falls lower than the set pressure level as the differential pressure.
- (F) Pressure falls and motor starts running when the handle of the directional control valve is placed in the middle position.
- (G) Change the handle of the direction control valve to the right side to retract the piston.
- (H) When retraction of piston is completed, change the handle of the direction control valve to the middle position.
- (I) Pull the piston and place the handle of the direction control valve in the middle position when operation is completed. Turn off the activation switch (SW) and stop the motor. Repeat shifting the handle of the direction control valve to the right side and the left side to release the pressure left in the high pressure hoses.

※In transitional period of shifting the handle which HOV-43 manual direction, pressure in A and B port falls to zero due to structural reason.

⚠ If a malfunction occurs, immediately shift the handle of direction control valve to the middle position and turn off the activation switch (SW) to stop the motor.

(3) MP-5SL

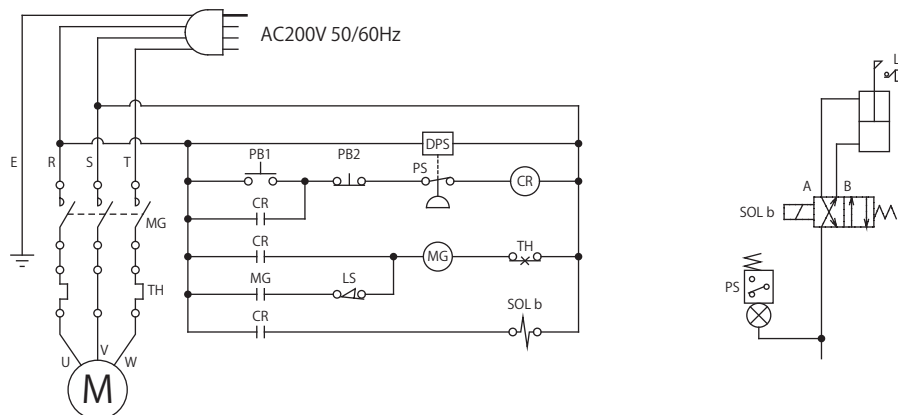
The direction control valve has a 4-way, 2-position solenoid switch valve (MSL-4S) is equipped. When the shift is in the normal position, hydraulic oil from the tank is discharged to A port. Oil is discharged to B port when solenoid (SOL b) coil is magnetized.



Example of Use: For a double-acting cylinder.

An example the automatic operation to operate 1 cycle retraction and pushing of a double-acting cylinder is shown. Ensure to connect B port for "Push" side and A port for "Retract" side, and structure electric diagram shown as below.

Note : Ensure to connect hoses to B Port for "Push" side and A Port for "Retract" side.



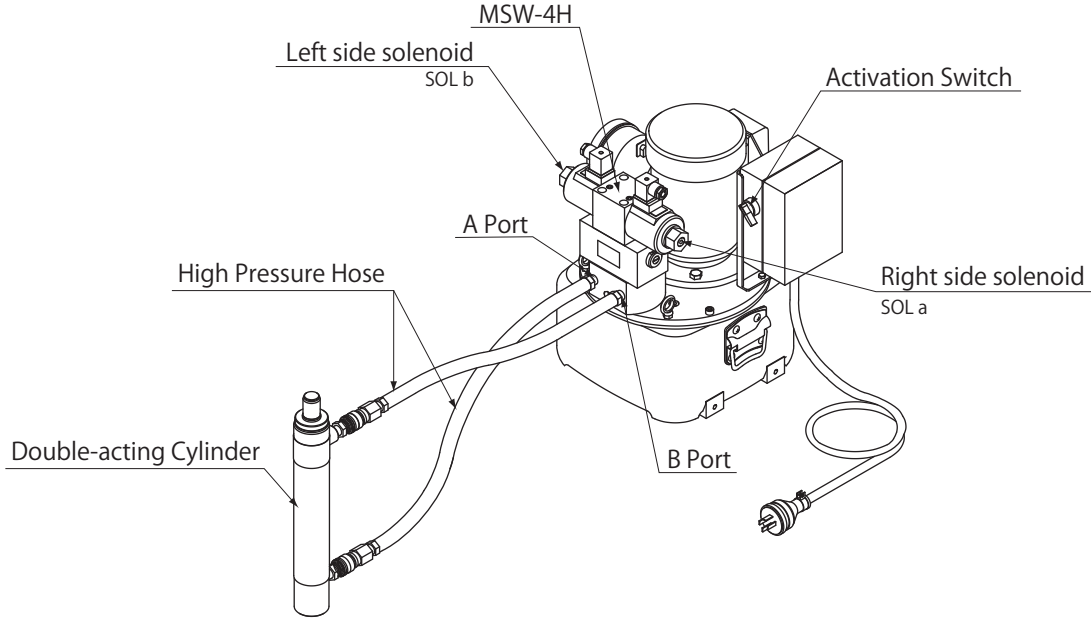
- (A) Before operation, set the pressure switch (PS) to the required pressure.
- (B) Push the "Push" button of the operation switch (PB1).
- (C) The motor starts and the solenoid coil is magnetized. The cylinder piston will advance.
- (D) When pressure reaches the level set on the pressure switch, the solenoid coil is released from magnetic force, causing the cylinder piston to retract.
- (E) The motor stops due to signal of the limit switch to perceive return end, and the cylinder piston stops also.

※The direction control valve (MSL-4S, Spool type) cannot maintain pressure due to inner oil leakage.

- 🔴 If a malfunction occurs, immediately push the "Push" button of the operation switch (PB2). The cylinder piston retracts and the motor will stop.

(4) MP-5SW

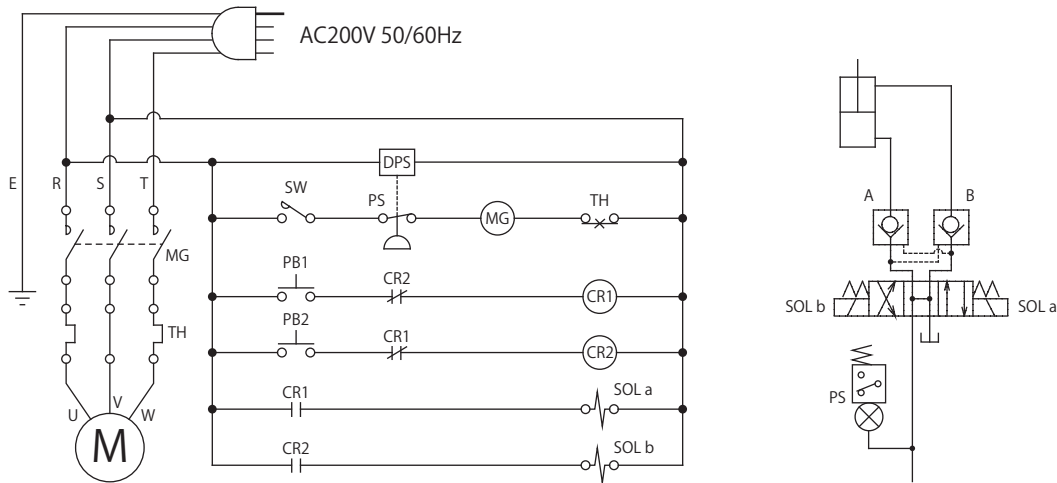
The direction control valve has a 4-way, 3-position solenoid switch valve (MSW-4H) is equipped. When the solenoid valve is in the middle position, hydraulic oil discharges to the oil tank. Seen from the front of the pump, oil is discharged to A port when the right side solenoid (SOL a) coil is magnetized, and oil is discharged to another B port when the left side solenoid (SOL b) coil is magnetized.



Example of Use: For a double-acting cylinder.

An example the operation to control a double-acting cylinder by 2pcs of the "Push" button of the operation switch is shown, piston moves while the "Push" button of the operation switch is pushed. Ensure to connect A port for "Push" side and B port for "Retract" side, and structure electric diagram shown as below.

Note : Ensure to connect hoses to A Port for "Push" side and B Port for "Retract" side.

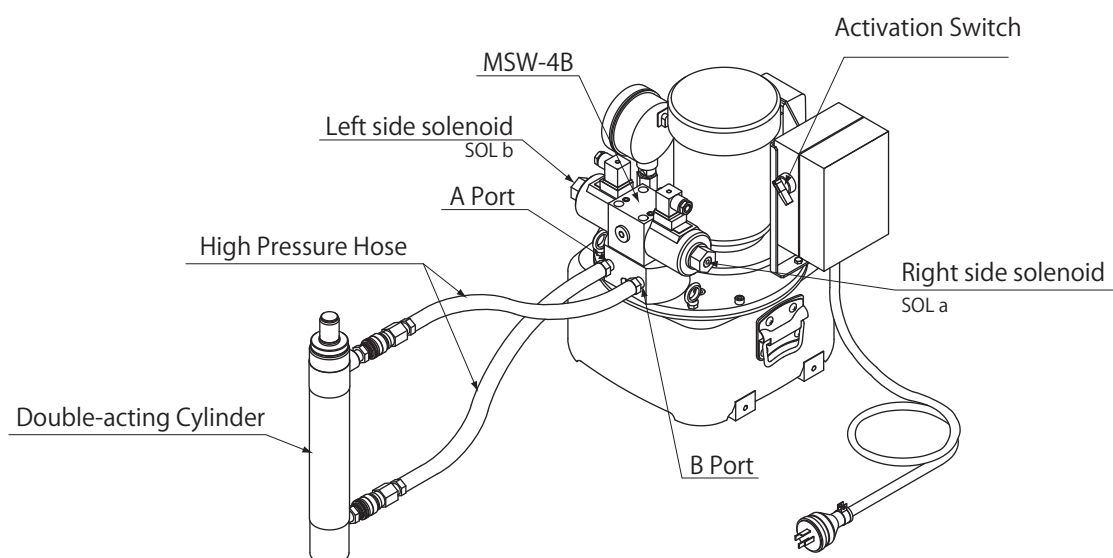


- (A) Shift the solenoid switch valve in the middle position.
- (B) Turn the activation switch (SW) "ON" and run the motor.
- (C) Push the "Push" button of the operation switch (PB1) and allow the right side solenoid (SOL a) magnetized. The cylinder piston advances while the "Push" button of the operation switch is pushed. The piston will stop if the "Push" button is detached, and pressure is maintained due to the pilot control check valve.
- (D) While the "Push" button of the operation switch (PB2) is pressed, the left side solenoid (SOL b) is magnetized and the piston retracts. Retraction can be stopped by detaching the push button and starts again when the push button is pressed.
- (E) When operation is completed, retract the cylinder fully. The right side solenoid (SOL a) is required to be magnetized if pressure is left in the hose of B port side (Return side). And, advance the piston for a several millimeters, release pressure left inside the hose. Turn the activation switch (SW) "off" and stop the motor.

⚠ If a malfunction occurs, immediately shift the solenoid switch valve to the middle position and press the activation switch (SW) "off" to stop the motor.

(5) MP-5SB

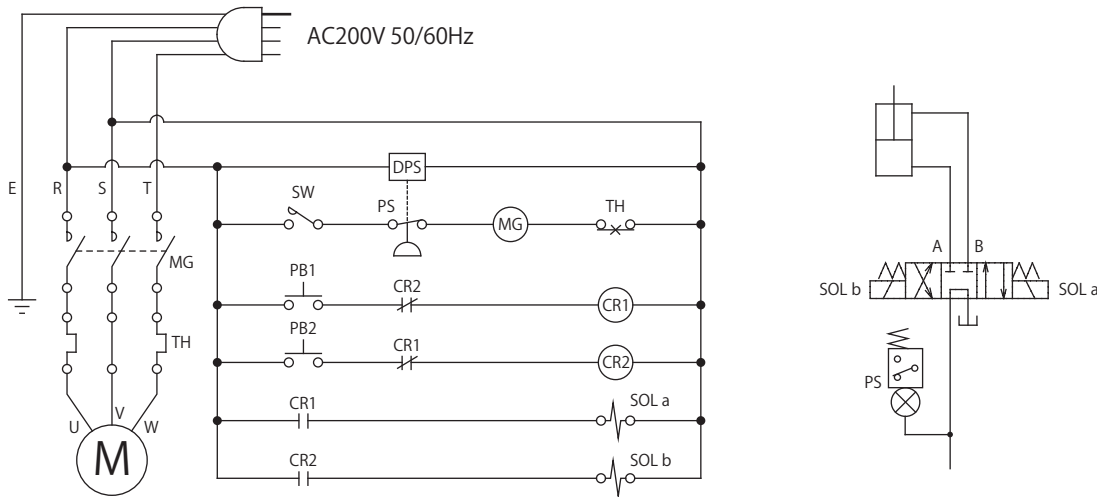
The direction control valve has a 4-way, 3-position solenoid switch valve (MSW-4B) is equipped. When the solenoid valve is in the middle position, hydraulic oil discharges to the oil tank. Seen from the front of the pump, oil is discharged to A port when the right side solenoid (SOL a) coil is magnetized, and oil is discharged to another B port when the left side solenoid (SOL b) coil is magnetized.



Example of Use: For a double-acting cylinder.

An example the operation to control a double-acting cylinder by 2pcs of the "Push" button of the operation switch is shown, piston moves while the "Push" button of the operation switch is pushed. Ensure to connect A port for "Push" side and B port for "Retract" side, and structure electric diagram shown as below.

Note : Ensure to connect hoses to A Port for "Push" side and B Port for "Retract" side.



- (A) Shift the solenoid switch valve in the middle position.
- (B) Turn the activation switch (SW) "ON" and run the motor.
- (C) Push the "Push" button of the operation switch (PB1) and allow the right side solenoid (SOL a) magnetized. The cylinder piston advances and pressure rises while the "Push" button of the operation switch is pushed. The piston will stop if the "Push" button is detached, and pressure is not maintained.
- (D) While the "Push" button of the operation switch (PB2) is pressed, the left side solenoid (SOL b) is magnetized and the piston retracts. Retraction can be stopped by detaching the push button and starts again when the push button is pressed.
- (E) When operation is completed, retract the cylinder fully. The right side solenoid (SOL a) is required to be magnetized if pressure is left in the hose of B port side (Return side). And, advance the piston for a several millimeters, release pressure left inside the hose. Turn the activation switch (SW) "off" and stop the motor.

CAUTION Ensure to connect A port for "Push" side, and B port for "Retract" side when a double-acting cylinder is used to avoid back pressure due to the structural reason of valve.

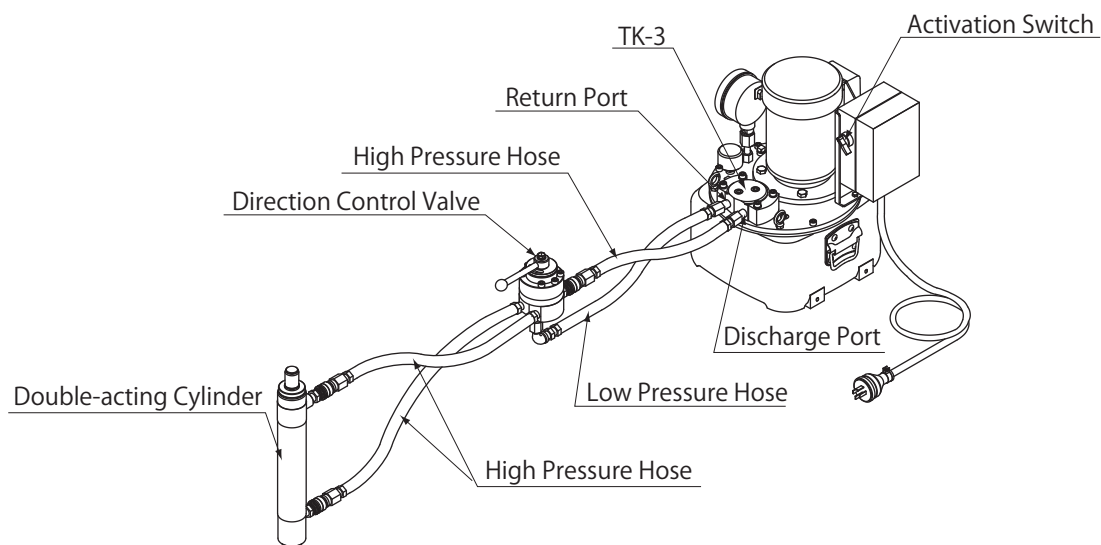
※ The direction control valve (MSW-4B, Spool type) cannot maintain pressure due to inner oil leakage.

If a malfunction occurs, immediately shift the solenoid switch valve to the middle position and press the activation switch (SW) "off" to stop the motor.

(6) MP-5TK

The pump provides remote direction control valve, manifold (TK-3) is equipped as an outlet port. Right side port of the drawing port is equipped to discharge, and left side one is to return.

⚠ WARNING Do not use self-sealing quick coupler in the piping from a direction control valve to a return port, and ensure to use a low pressure hose with a union there to decrease resistance. It may cause bodily injury if self-sealing quick coupler is blocked and causing the direction control valve damaged.



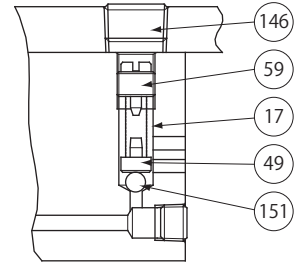
- (A) Shift the direction control valve set remote in the middle position.
- (B) Turn the activation switch (SW) "ON" and run the motor.
- (C) Control the piston operated with the direction control valve, and perform the operation.
Refer to the page of MP-5C, MP-5SL, MP-5SW and MP-5SB to check the control method of the direction control valve.
- (D) When operation is completed, retract the cylinder fully. Turn the activation switch (SW) "off" and stop the motor. If pressure still exists in the high pressure hose, control the direction control valve to release pressure left inside. (Refer to the page of MP-5C, MP-5SL, MP-5SW and MP-5SB to check the control method of the direction control valve.)

🔧 If a malfunction occurs, immediately shift the handle of direction control valve to the middle position and turn off the activation switch (SW) to stop the motor.

10. Adjusting the High Pressure Safety Valve

The high pressure safety valve is adjusted to 73MPa at the time of shipping. Follow the procedure listed below when adjusting the valve again.

- (1) Stop the motor and loosen the lever of the direction control valve (or, stop the solenoid valve magnetized).
- (2) Remove “#146 Hexagon socket head plug” , and turn “#59 Adjustment screw” by a screw driver in a counter-clockwise direction to loosen.
- (3) Remove the high pressure hose (Or, the fitting) mounted on the discharge port, and set a hexagon socket head plug (AP-3/8 or LP-3/8) to blind there.
- (4) Set the pressure of the pressure switch to 75MPa.
- (5) Turn the motor on.
- (6) Tighten the lever of the direction control valve (or, allow the solenoid valve magnetized).
- (7) Turn “#59 Adjustment screw” gradually in a clockwise direction to increase pressure meanwhile checking the display of the pressure switch. Set from 3 to 5MPa higher than the working pressure.
- (8) Loosen the lever of the direction control valve (or, stop the solenoid valve magnetized).
- (9) Repeat shifting of the lever of the direction control valve from 2 to 3 times to increase pressure, and check if the correct pressure is reliably achieved.
- (10) Calibrate the pressure switch to the working pressure.
- (11) Remove the blind plug (AP-3/8 or LP-3/8) of the discharge port, and connect the high pressure hose (Or, the fitting).
- (12) Set “#146 Hexagon socket head plug” .



Internal drawing of the High Pressure Safety Valve

- ※ **Do not allow the high pressure safety valve** to be adjusted **to a level higher than 73MPa.**
- ※ Set **the pressure switch from 3 to 5MPa lower** than the pressure value of the high pressure safety valve to avoid continued functioning.
- ※ Ensure that **the taper screw area** of the high pressure hose or the hexagon socket head plug has been **wrapped with a tape seal** before screwing it in to pipe. Refer to page12 “Method for Wrapping the Tape Seal” .
- ※ **Do not allow** the high pressure safety valve set **lower than 20MPa** to avoid the malfunction like causing a slackness of the “#59 Adjustment screw” . Consult the sales agent if any malfunction causes.

11. Air Release Method

(Refer to Internal drawing of the High Pressure Safety Valve on page before)

An irregular vibration causes or pressure does not increase if air enters in the pump, air may enter when oil volume is short or oil replacement. Air should be released by following procedure listed as below.

- (1) Stop the motor and loosen the lever of the direction control valve
(or, stop the solenoid valve magnetized).
- (2) Remove “#146 Hexagon socket head plug” , and turn “#59 Adjustment screw” by a screw driver in a counter-clockwise direction to loosen.
- (3) Remove the high pressure hose (Or, the fitting) mounted on the discharge port, and set a hexagon socket head plug (AP-3/8 or LP-3/8) to blind there.
- (4) Perform inching the motor with repeating activation and stop for 10 times approximately by the activation switch. Carefully check if the motor is a standstill reliably before activation.
- (5) Set pressure of the pressure switch to 75MPa.
- (6) Turn the motor on.
- (7) Tighten the lever of the direction control valve (or, allow the solenoid valve magnetized).
- (8) Turn “#59 Adjustment screw” gradually in a clockwise direction to increase pressure meanwhile checking the display of the pressure switch. Set from 3 to 5MPa higher than the working pressure.
- (9) Air release is complete if pressure increases smoothly by a few times shifting the lever of the direction control valve. Air release should be continued if pressure pulsates.
Loosen “#59 Adjustment screw” again and perform all procedures from (4) to (8) listed above.
- (10) Calibrate the pressure switch to the working pressure.
- (11) Remove a blind plug (AP-3/8 or LP-3/8) of the discharge port, and connect the high pressure hose (Or, the fitting).
- (12) Set the “#146 Hexagon socket head plug”

※ **Do not allow the high pressure safety valve to be adjusted to a level higher than 73MPa.**

※ Set the pressure switch from **3 to 5MPa** lower than the pressure value of the high pressure safety valve to avoid continued functioning.

※ Ensure that the taper screw area of the high pressure hose or the hexagon socket head plug has been wrapped with a tape seal before screwing it in to pipe.

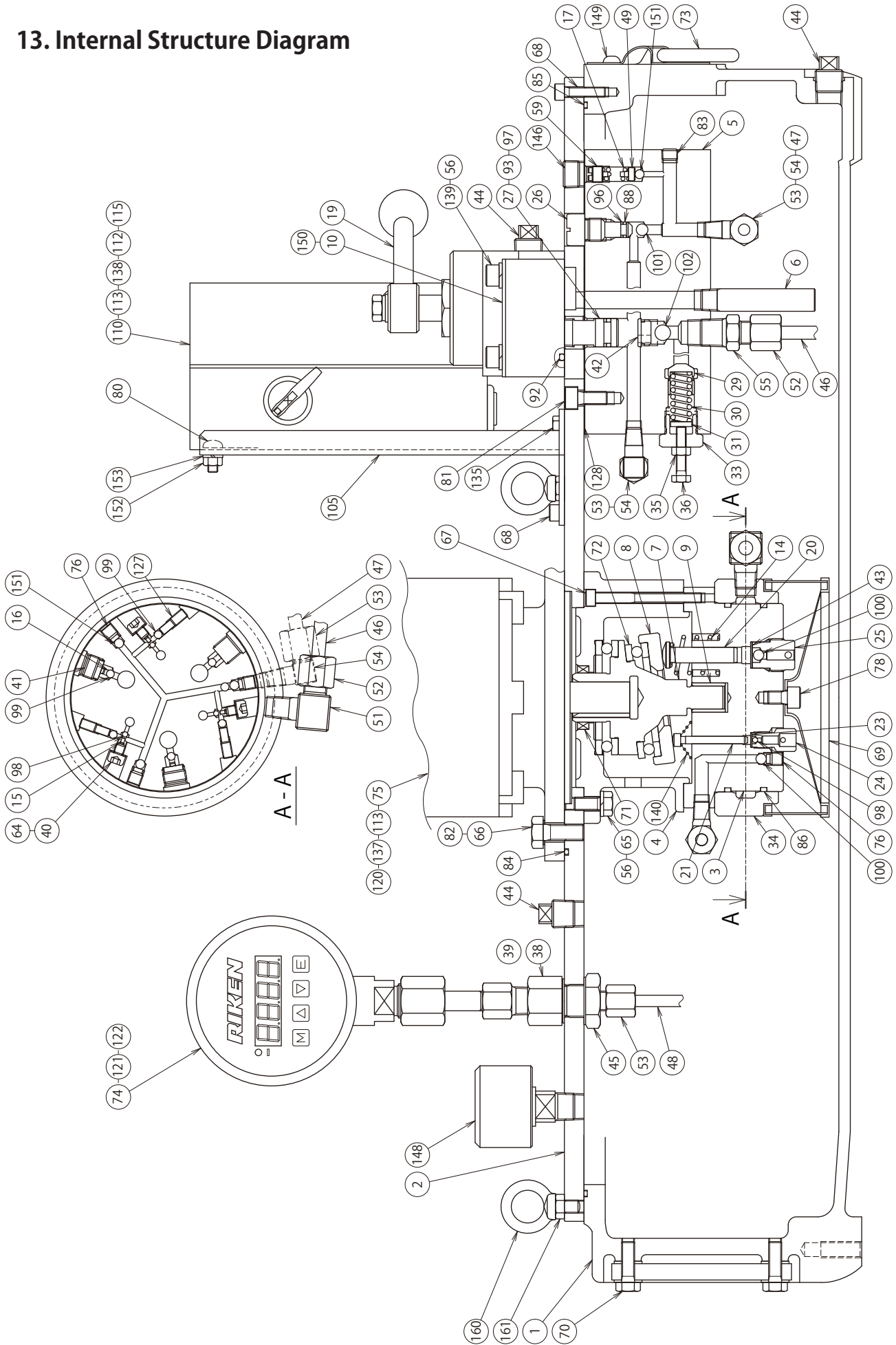
Refer to page 12 “Method for Wrapping the Tape Seal” .

12. COMMON FAULTS AND SOLUTIONS

Condition	Cause	Measure
The motor does not operate.	The power plug is not inserted correctly, or electricity is not flowing to the outlet. Ground (earth) wire in 4 electric cords is inserted to the power supply side incorrectly.	Turn the power supply off immediately to avoid electric shock. Confirm that electricity is flowing to the outlet. Ensure the power plug is properly and fully inserted.
	Looseness of the terminal screws, improperly contact to the magnet switch.	Use a tester to check if proper voltage achieves to the switch part, and find the part of trouble source.
	Damage to the power plug or switch, or severing of the cord or connection to either the power source or the remote control. Damage to the activation switch.	Repair the parts or retighten the screw parts required if necessary.
	Incorrect isolation of the power wiring or connected contacts.	Cut off the power source, and check the isolation resistance of primary power source, the motor and connected contacts. (Ensure to perform higher than 100MΩ at DC500M)
	Over-load relay functions due to unallowable electricity causing by continues over-load operation, single-phase wiring, or operation with voltage depression.	Perform adequate measures after trouble source is found. Then, press the reset button of the over-load relay.
	Improper setting of the pressure switch, or damage of the pressure switch.	Check the setting of the switch. Replace to new one if malfunction still cause even proper setting has been performed.
The motor does not run enough, or runs irregularly.	Voltage depression. Voltage may drop when motor is run, even normal voltage is supplied to the pump at a standstill.	This malfunction may cause if a long and thin cord is used from the power source to the pump, replace to a wider code. Voltage depression should be less than 5% of the regular voltage.
	The level of oil in the reservoir is not enough.	Check oil level in reservoir and add more hydraulic oil if necessary.
	Air is inside the pump. It may cause after oil replacement or pump relocation is performed.	Perform the air release of the pump. (See page 26.)
	Blinding of the suction filter. It leads to irregular noise in the pump operation and decrease the discharge oil volume.	Flush the suction filter and change the oil.

Condition	Cause	Measure
The motor does not run enough, or runs irregularly.	Set pressure of the high pressure safety valve lower than the working pressure.	Set the high pressure safety valve to 73MPa. Set pressure from 3 to 5MPa higher than the working pressure for usage in low pressure.
	Damage of the high pressure pump. This pump malfunction leads to irregular noise within the pump and pressure pulsation.	Consult the sales agent to repair.
	Malfunction of the direction control valve. • A scar exists on the valve. • Damage of kind of packing.	Consult the sales agent to repair.
The direction control valve (MSW-4H, MSW-4B, and MSL-4S) does not function.	The spool sticks due to a scar of the spool or a hydraulic locking phenomenon.	Consult the sales agent to repair.
	Damage of the coil caused by wrong voltage.	Replace to proper coil matched the power supply.
	Disconnection of coil or incorrect wiring.	Check the continuity of coils and terminals. Replace them if disconnection is found.
	Damage of diode.	The rectifier of AC/DC switching type is used. Replace the rectifier (in the terminal parts).
The cylinder does not extend quickly and is jerky in operation.	Couplers are not fully connected. The bag nut of coupler is loose, and it causes narrow oil flow line.	Tighten the bag nut thoroughly to the end.
	Low pressure oil does not discharge causing too large piping resistance.	Change to wider piping.
The pressure of cylinder does not increase to retract and push.	Damage of the piston packing.	Consult the sales agent to repair.
Oil temperature increases intensely.	Too much working. Working where the surrounding temperature is higher than allowable temperature.	Install a oil cooler, and ensure to work in cooler than 60° Celsius.
	Leakage within the pump inside.	Consult the sales agent to repair.

13. Internal Structure Diagram



MP-5(E) PARTS LIST

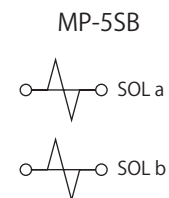
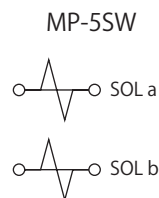
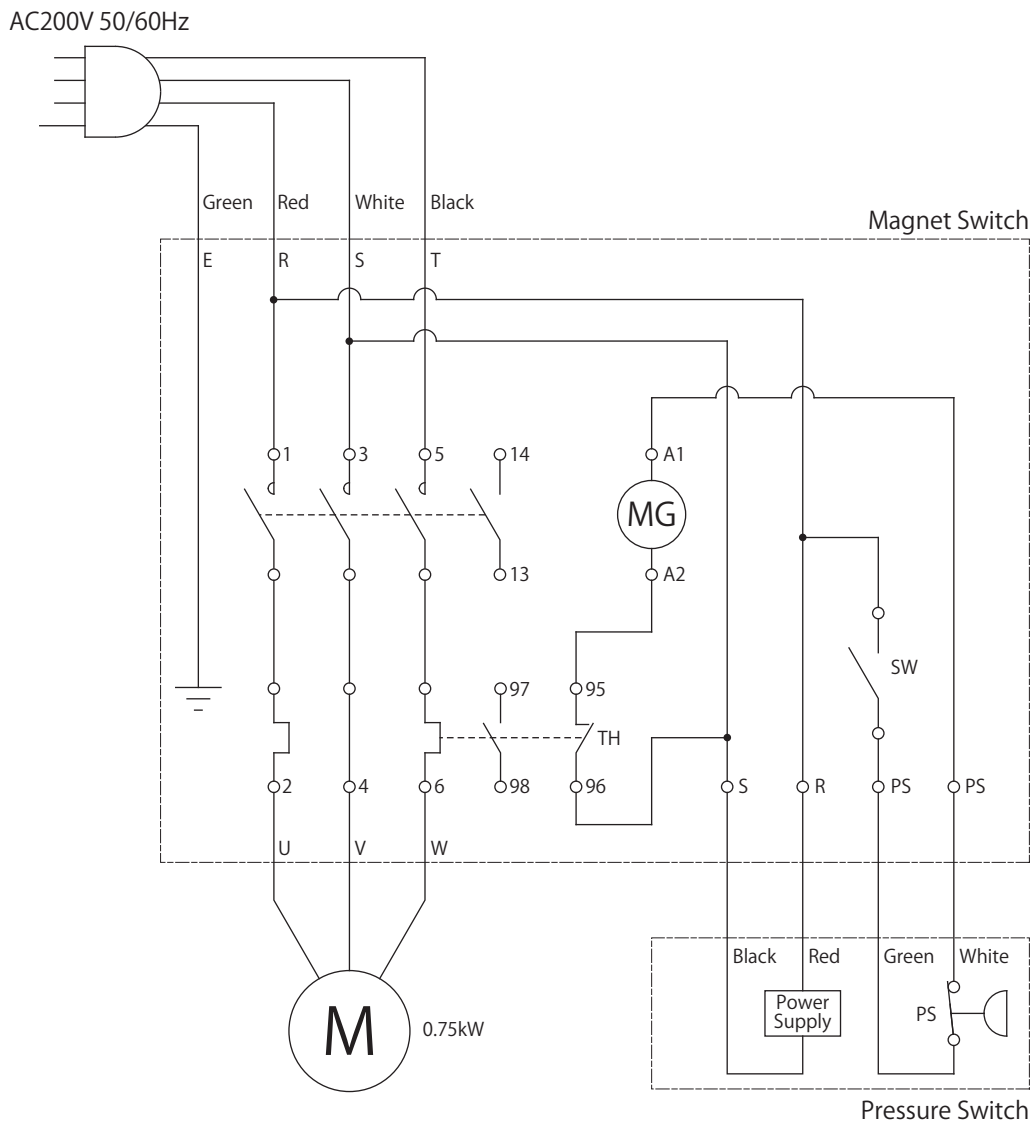
No.	Drawing No.	Name	Q'ty	Note
1	MP-5(III) #1	Oil tank	1	
2	MP-5(III) #2	Set plate	1	
3	MP-5(III) #3	Pump main body	1	
4	MP-5(III) #4	Flange	1	
5	MP-5(III) #5	Valve main body	1	
6	MP-5(III) #6	Return pipe	1	
7	MP-5(III) #7	Cam shaft	1	
8	MP-5(III) #8	Cam plate	1	
9	MP-4(B) #9	Bush	1	
10	MP-8(II) #3	Hold metal	1	
14	MP-5(III) #14	Spring	3	
15	MP-4(B) #20	Spring	3	
16	MP-5(III) #16	Spring	3	
17	MP-4(B) #23	Spring	1	
19		Direction control valve	1	
20	MP-5(III) #20	Low pressure piston	3	
21	MP-5(III) #21	Piston	3	
23	MP-4(B) #16	Ball holder	3	
24	MP-5(III) #24	High pressure check valve main body	3	
25	MP-5(III) #25	Low pressure check valve main body	3	
26	MP-8(II) #26	Ball set screw	1	
27	MP-8(II) #21	Connecting pipe	1	
29	MP-8(II) #141	Valve	1	
30	MP-8(II) #142	Spring	1	
31	MP-5(III) #31	Collar	1	
33	MP-8(II) #144	Spacer	1	
34	MP-5(III) #34	Gathering oil pipe	1	
35		Hexagon nut	1	M6
36		Hexagon bolt	1	M6x30
38	MP-5(III) #38	Socket	1	
39		Copper washer	1	Φ20 x Φ27 x 1
40	MP-5(III) #40	High pressure spring set screw	3	
41	MP-5(III) #41	Low pressure spring set screw	3	
42	MP-5(III) #42	Ball set screw	1	
43	MP-5(III) #43	Ball holder	3	
44		Square socket head iron plug	4	R3/8
45	MP-5(III) #45	Nut	1	
46	MP-5(III) #46	Low pressure piping	1	
47	MP-5(III) #47	High pressure piping	1	
48	MP-5(III) #48	High pressure piping	1	
49	MP-4(B) #86	Ball strike plate	1	
51	MP-5(III) #51	Φ8-R1/4 Elbow	1	
52	MP-8(II) #86	Φ8 Nut	2	
53	MP-8(II) #30	Φ7 Nut	4	
54	MP-8(II) #29	Φ7-R1/8 Elbow	3	
55	MP-8(II) #85	Φ8-R3/8 Connector	1	
56		Spring washer	8	For M8
59	MP-8(II) #22	Spring adjustment screw	1	
64		Blass washer	3	Φ6.5 x Φ10.8 x 1
65		Hexagon bolt	4	M8x18
66		Hexagon bolt	4	M10x25
67		Hexagon socket head cap screw	4	M6x65

MP-5(E) PARTS LIST

No.	Drawing No.	Name	Q' ty	Note
68		Hexagon socket head cap screw	7	M6x25
69		Suction filter	1	
70	MP-5(III) #70	Oil level gauge	1	
71		Oil seal	1	SC30397
72		Thrust bearing	2	51110
73		Trunk grip	2	
74	MP-5(E) #74	Pressure switch	1	DPS-100
75		Motor	1	0.75kW
76		Hexagon socket set screw	4	M8x10 Point
78		Hexagon socket head cap screw	1	M8x12
80		Cross-recessed pan head machine screw	3	M6x15
81		Hexagon socket head cap screw	4	M8x18
82		Copper washer	4	Φ10.2 x Φ15 x 1
83		Hexagon socket head plug	5	R1/8
84		Rubber string	1	
85		Rubber string	1	
86		O ring	2	G110
88		O ring	1	AN6227-5
92		O ring	1	AN6230-6
93		O ring	1	AN6227-10
96		Back up ring	1	For AN6227-5
97		Back up ring	1	For AN6227-10
98		Steel ball	6	3.17
99		Steel ball	6	4.76
100		Steel ball	4	6.35
101		Steel ball	1	7.14
102		Steel ball	1	9.52
105	MP-5(E) #105	Magnet switch set plate	1	
110		Magnet switch	1	
112	MP-5(E) #112	Nylon cabtire cable	1	
113		Terminal	6	
115		Water-proof type rubber cap	1	Panasonic WF7415
120		Terminal	3	
121		Terminal	4	
122		Mark tube	1	
127	MP-5(E) #127	Hexagon socket set screw	3	
128	MP-5(E) #128	Packing of valve main body	1	
135		Hexagon bolt	1	M6x25
137	MP-5(E) #137	Nylon cabtire cable	1	
138		Terminal	1	
139		Hexagon socket head cap screw	4	M8x50
140	MP-4(B) #128	Spring	3	
146		Hexagon socket head plug	1	R3/8
148		Air breather	1	
149		Cross-recessed pan head machine screw	8	M6x10
150		Die thread seal	4	For M8
151		Steel ball	4	5.56
152		Hexagon nut	3	For M6
153		Spring washer	3	For M6
160		Eye bolt	4	M8
161		Hexagon nut	4	For M8

14. Electric Wiring

To prevent electric shock, ensure that **earth (ground) wire** is connected into the **ground**.



Operation Method

- ※ The activation and stop of motor operation are controlled by the activation switch(SW).
- ※ When pressure reaches the pressure set on the pressure switch (PS), the motor will stop. The motor starts again when pressure falls lower than the set pressure level as the differential pressure (5MPa is set in the shipping).
- ※ Wiring to set a direction control valve is not equipped on MP-5SL, MP-5SW, and MP-5SB standard type. Set wiring properly refer to page 20-23 Operation Method.

15. Handling the High Pressure Hose

*SAFETY PRECAUTIONS

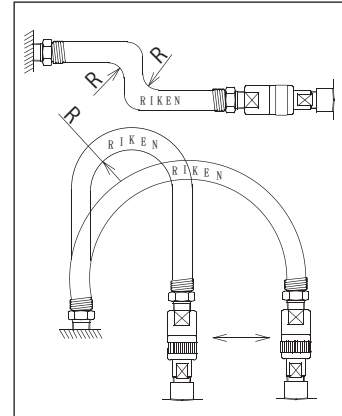
- Only use high pressure hoses designed for a working pressure of 70 MPa, manufactured by RIKEN.
- Use a hose equal to or greater the rated minimum curve radius (R). Also, install the hose so that the rated minimum curve radius is maintained even when internal pressure causes the hose to move.
- RIKEN manufacture 2 types of flexible high pressure hose, one made from rubber and the other from nylon.
- RIKEN can also supply an anti-spatter hose designed to prevent the adherence of welding spatter.

Rubber hose	Minimum curve radius (R)
H3/8-※S	120 mm
H3/8-※D	
H3/8-※T	

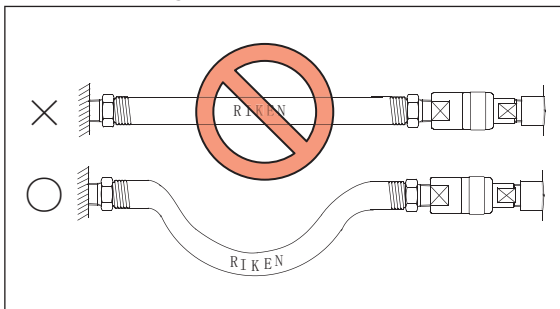
The asterisk(*) represents hose length.

Nylon hose	Minimum curve radius (R)
NH3/8-※S	60 mm
NH3/8-※D	
NH3/8-※T	

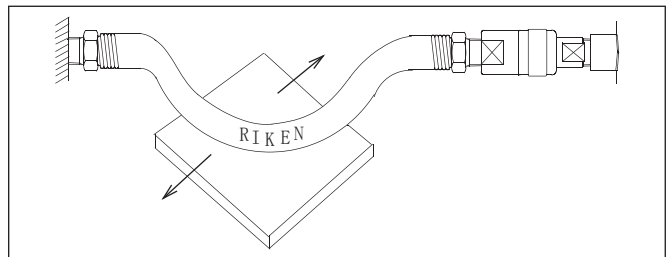
The asterisk(*) represents hose length.



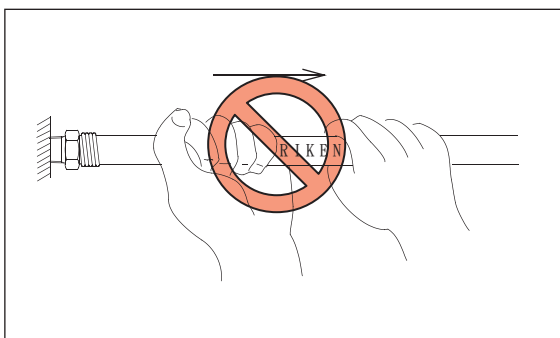
The hose will expand and contract due to internal pressure, so ensure slack exists when installing the hose.



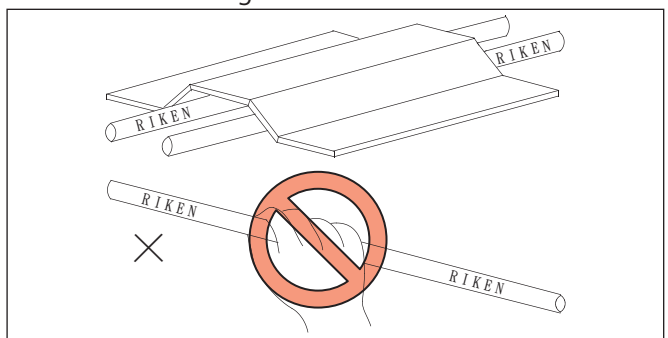
Should the high pressure hose contact the floor or another surface, it could suffer from frictional damage caused by the expansion, contraction, and vibration that occurs when the hose internal pressure is applied. Protect the hose using a support or cushion.



Do not move the pump or cylinder around by pulling the high pressure hose.



Do not run over the hose with a cart or other vehicle. Also do not drop heavy items onto the high pressure hose. Ensure the high pressure hose is protected from all conceivable dangers.



⚠ "WARNING" Do not grip the hose when pressure is being applied to the hose. Should the high pressure hose burst while being gripped, high pressure hydraulic oil will suddenly be dispersed, which could penetrate the hand or other bodily part, causing serious injury or even death to occur.

*MAINTENANCE

⚠ WARNING The high pressure hose is consumable item. Even if the hose exterior appears to be in good condition, it is possible internal damage such as pin holes have occurred. **RIKEN recommend periodic replacement** based upon how frequency hoses have been used combined with specific application conditions. This might mean replacing the hose even if the lifespan has not fully expired. Consult RIKEN or RIKEN' s authorized agents if there are any questions regarding the hose condition.

Do check dairy condition of the High Pressure Hose during using with this pump, also check external appearance of hose once a week. Stop all operations immediately if any malfunctions such as below occurs, change the hose to new one or repair to remove the malfunction.

- ※ Retighten the taper screw parts connecting pipe with appropriate torque if any oil leakage occurs there because that part is loosen. Replace new one if oil leakage still occur after retightening up.
- ※ Be sure to **replace** to new appropriate hose **immediately** if the malfunction such as below occurs---**Oil leakage** occurs around the port cap or the external surface, **Dent** occurs on the external surface, or **any damage and swelling** is found.

After Sales Service and Repair

Before contacting your sales representative or sales agent to request service or repair to your Riken pump, **read the contents of this manual thoroughly** and inspect the fault again.

If the problem persists, please contact either your sales agent or your local service representative who will arrange for repairs to be carried out.

Do not disassemble or repair the pump themselves, RIKEN SEIKI/KIKI will assume no responsibility for that cases without RIKEN SEIKI/KIKI' s permission.

Consult RIKEN or RIKEN' s authorized agents when any drawing of each pumps or other information are necessary.

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