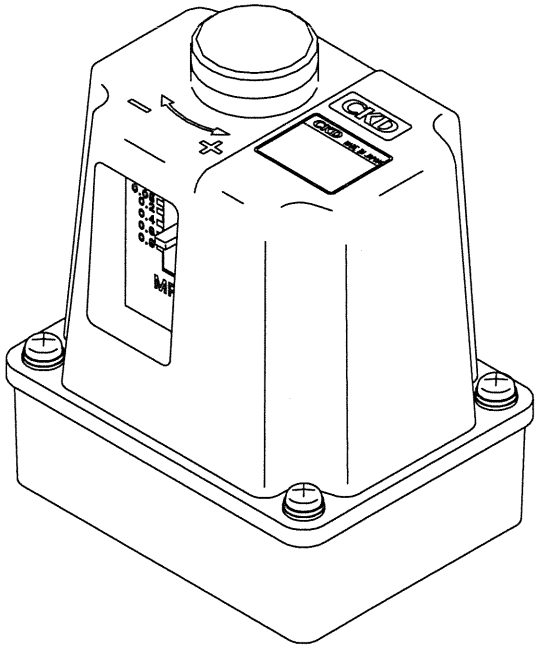
SM-50637-A

CKD

INSTRUCTION MANUAL

Pressure Switch for Coolant

CPE



●Prior to using the Product, it is essential to read this INSTRUCTION MANUAL, especially the description of Safety-use issue.

●For quick reference whenever necessary, keep this INSTRUCTION MANUAL in a good manner

CKD Corporation

Introduction

Thank you for choosing the CKD's Pressure Switch for Coolant "CPE ".

1. Purpose and use of the switch

It is a mechanical pressure switch used for a general industrial machine and equipment.

2. Use of the switch

This is a mechanical pressure switch used to take out a signal for the confirmation of the fluid pressure.

3. General precautions

- This instruction manual describes the basic matters regarding the handling of the product from the unpacking, installation, use, maintenance through withdrawal.
- The instructions for installation given by this manual assume that they will be read by specialist engineers, i.e.mechanics and electricians.
  Thoroughly read this manual before the design and installation in order to assure the safety of the machine or instrument and properly handle the product.

4. Safety precautions

- To avoid injury, fire and damages to the facilities, the warnings shown on the product shall be strictly observed.
  Please observe absolutely.
- Each warning has a heading "Danger?", "Warning" or "Caution" depending on the rating of the possible risk.
  As these switches are used as components of a machine or instrument, all the warning are shown with, the heading "Caution."

Example

【 Contents 】

1. Unpacking

- Check that the model No. shown on the face plate of the product agrees with that you ordered.
- Check that the rated voltage and frequency meet your specification.
- Check that the product has no external damages.
- Attach a seal plug to prevent foreign matter from entering during storage. Remove the seal plug before starting piping.

2. Installation

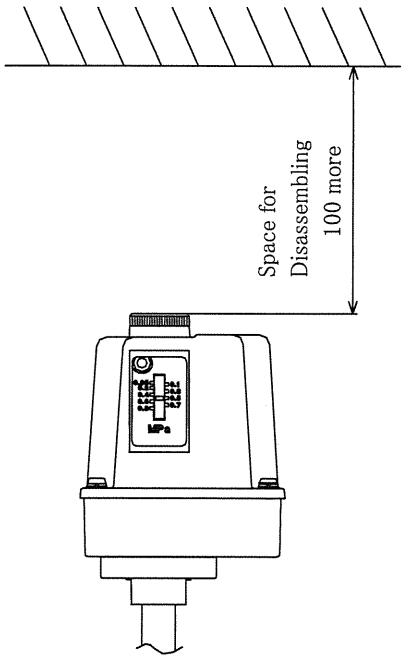
2. 1 Conditions for installation

2. 1. 1 Installation posture

- Mount the valve vertically with the adjusting screw upright
- Install in the place where there is not vibration.

2. 1. 2 Space for maintenance

- An adequate space shall be provided around the switch to assure the safety during the maintenance/troubleshooting work. (Figure 2-1)



(Fig. 2-1)

2. 1. 3 Protection of the product

- When using the switch in a cold district, au adequate provision is required to prevent the freezing of the switch.
- When the switch is used, protect it such as by installing it in a cover or panel, so that it does not come directly in contact with water or coolant.
- The switch cannot be used outdoors. Installing the valves in a cover or panel should protect them.

2. 2 Piping work

● Cleaning the pipes

Confirm that no foreign matter, swarf or burrs are stuck on the piping material before connecting the pipes.

Remove the foreign matter, swarf and burrs from the pipes by blowing with 0.3MPa or higher compressed air.

● Filtration

Dirt and foreign matter in the fluid will cause operation faults and seat leaks.

Install an approx. 80 to 100 mesh strainer in front of the switch.

● Take steps to meet the situation as damper, absorber, accumlator are installed to ease water hammer, plunge pressure or pulsatory motion if necessary.

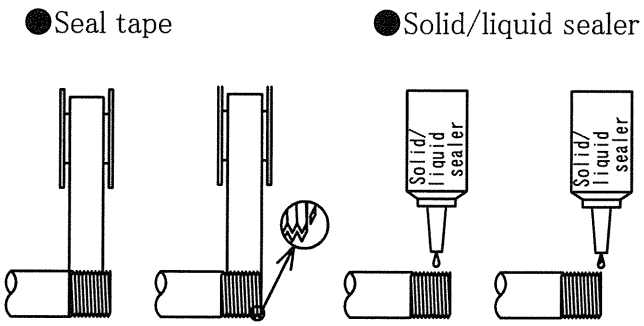
When the switch is under pressure that crosses withstanding pressure" value, even if it is momentary, it sometimes makes damage the switch.

● Sealer

The sealer shall be used with great care to prevent it from entering the pipes or leaking out. When taping a threaded portion, 1～2 threads at the end of the portion shall be exposed. (Figure 2-2)

When using liquid sealer, take care not to apply too much sealer. Similarly to the ease of taping, threads, at the end of the threaded portion shall be exposed.

Do not apply to the female screw of the apparatus.



(Fig. 2-2)

● The recommended tightening torque for piping is 23 to 25N·m.

The width across flats at valve port should be held by a spanner for piping work.

● Atmospheric release port becomes a fluid discharge port for the electronics equipment part protection at the time with the malfunction of the diaphragm damaging and so on.

Do plumbing to the place which doesn't become the problem of the fluid discharge at the atmosphere pressure.

Take appropriate means to prevent coolant or dust from entering the port released to the atmosphere.

2. 3 Wiring work

> ⚠ CAUT I ON : **Turn the power OFF before wiring.**

● Leaked current

The lamp is connected to the microswitch's NC and NO terminals.A fine current flows even when the load(relay,etc.)is not energized,so take care when selecting the load.

Leak current : 1.5 mA for the rated voltage AC100V

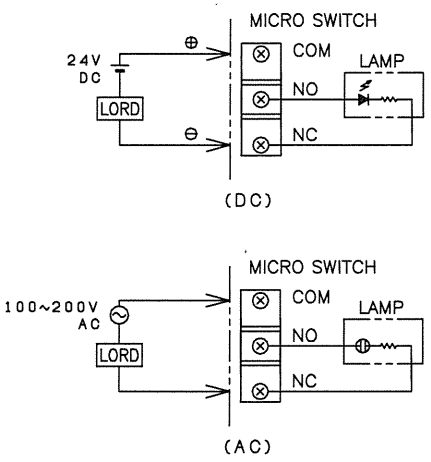
Leak current : 2 mA for the rated voltage AC200V

Leak current : 1.5 mA for the rated voltage DC24V

● Electric connection

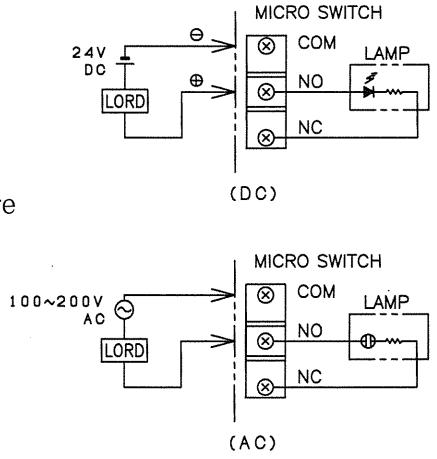
Wire to the internal microswitch after taking a cover by loosening cover setting screw.
In the case for DC,there is polarity.
When making a mistake in the polarity,it changes output but the lamp doesn't light up.

(1) Connect the indicator lamp between Common terminal and NC terminal of microswitch when intending to make the lamp lit with the pressure exceeding the set value and make the lamp goes off when the pressure drops off.
Stick the name plate reading "Lamp lits when pressure exceeds"on the cover.



(Fig. 2-3)

(2) Connect the indicator lamp between Common terminal and NO terminal of microswitch when intending to make the lamp goes off when the pressure exceeding the set value and make the lamp stay on when the pressure goes over the set value.
Stick the name plate reading "Lamp goes off when pressure exceeds"on the cover.



(Fig. 2-4)

● Make sure that the internal wiring does not touch the moving sections as the switch accuracy could be affected.

3. Pre-operation (post-installation) check

3. 1 Appearance check

CAUTION : **●Shut off the fluid flow.(Close the main. shut-off valve)**
●Turn off the power.

- Push the switch by hand to confirm that it is securely fixed onto the pipe.
- Confirm that the screwed parts are not loose.

3. 2 Check for leakage

- Compress the fluid to cheek for leakage at pipe joints.
  It is recommended to check for leakage by supplying compressed air of 0.3 to 0.5MPa with soapy water applied to the joints. Air bubbles will be generated at the leaking joints.

3. 3 Electrical check

CAUTION : **Turn off the power.**

- Check the dielectric resistance.
  Measure the dielectric resistance using a 1000V DC mega ohmmeter between a metallic part such as valve port and the active part of the lead. The measured dielectric resistance shall be 100Mohms or more.
- Check the power voltage.
  Use exceeding the rated voltage will cause damage.

4. Instructions for proper use

4. 1 Pressure adjustment

CAUTION : **Check the surrounding safety so that the system (device) does not malfunction.**

4. 1. 1 Setting with the scale plate

- Remove the cap on the top of the cover, loosen the nut, and set the pressure with the adjustment screw. The set pressure will rise when the nut is turned to the plus (+)side, and will lower when turned to the minus (−) side. (Required tools: 13m/m spanner, flat-tip screwdriver) Fix the nut after setting.
- The scale plate is for reference. (Scale error within ±0.05MPa.) Use a separate pressure gauge for confirmation when an accurate setting is required.
- The pressure displayed with the scale plate is the value when the switch is turned ON(when the pressure is rising).

4. 1. 2 Setting with the pressure gauge

- Remove the cap on the top of the cover, loosen the nut, and set the pressure with the adjustment screw. The set pressure will rise when the nut is turned to the plus (+)side, and will lower when turned to the minus (−) side. (Required tools: 13m/m spanner, flat-tip screwdriver)
- Apply pressure from the switch's fluid pressure supply port, and adjust to the required setting pressure while confirming the pressure gauge.
- Setting the pressure at ON (at pressure rise)

  Increase the setting pressure with the adjustment screw, and then turn the switch OFF once. Then, gradually lower the set pressure, and fix it where the switch turns ON.

  Setting the pressure at OFF (at pressure drop)

  Lower the set pressure with the adjustment screw, and then turn the switch OFF once. Then, gradually increase the set pressure and fix it where the switch turns OFF.

4. 2 Precautions

CAUTION :

- Do not use this product in an environment in which corrosive gases could encroach the configuration materials.
- The atmosphere opening port becomes a fluid discharge port for the electronics equipment part protection at the time with the malfunction of the diaphragm damaging and so on.
  Do plumbing to the place which doesn't become the problem of the fluid discharge at the atmosphere pressure.
- Don't touch a hand and a body in the electric wiring part while it is energized.There is fear of the electric shock.
- If there is a possibility that the operator may trip on a power cable, it may lead to an accident.
  Protect the power cable using a conduit or equivalent.
- Use it in the allowable pressure range.

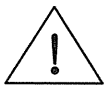
- Do not step on the switch or place heavy objects on it.

- A pressure exceeding the withstanding pressure, even momentarily, could damage this product. Install a damper, absorber or accumulator as necessary if the water hammer, rush pressure or pulsation must be eased.
- The working pressure range and temperature range of the fluid and ambient temperature range shall be satisfied.
- Some types of coolants cannot be used as they could corrode the sealing agent.
  Use an FKM seal for chlorine-based coolant.
  Contact CKD or your dealer for details.
- Do not remove the micro switch. The mounting position is adjusted and the accuracy could be lost or the switch may stop switching.
- Refer to section "7. Troubleshooting" if there are any problems.

5. Disassembly and Assembly

5. 1 Replacement of diaphragm

5. 1. 1 Disassembly procedure



CAUTION : **●Shut off the fluid flow.(Close the main. shut-off valve)**
●Turn off the power.

- The disassembly shall be performed with reference to section 8 "Internal construction drawings".
- Loosen the four small screws mounting the port.
- The diaphragm can be replaced when the port is removed.

5. 1. 2 Assembly procedure

- The assembly shall be performed with reference to section 8 "Internal construction drawings".
- Confirm that the switch is OFF. If it is ON, increase the set pressure with the adjustment screw.
- Align the screw positions on the body and diaphragm, and mount the port onto which the O ring is assembled. The recommended tightening torque for the screw is 1.3 to1.5Nm. Tighten the four screws uniformly.
- Apply the fluid pressure and confirm that the fluid does not leak outward.
- Fluctuate the fluid pressure and confirm that the switch switches correctly.

6. Maintenance

6. 1 Maintenance and Inspection

- In order to use this product in the optimal state, please usually perform a scheduled inspection once in hale a year.
- Refer to "3. Pre-operation check" for the contents of check.

6. 2 Service parts

- Diaphragm

  The diaphragm should be replaced after every 1,000,000 operations.

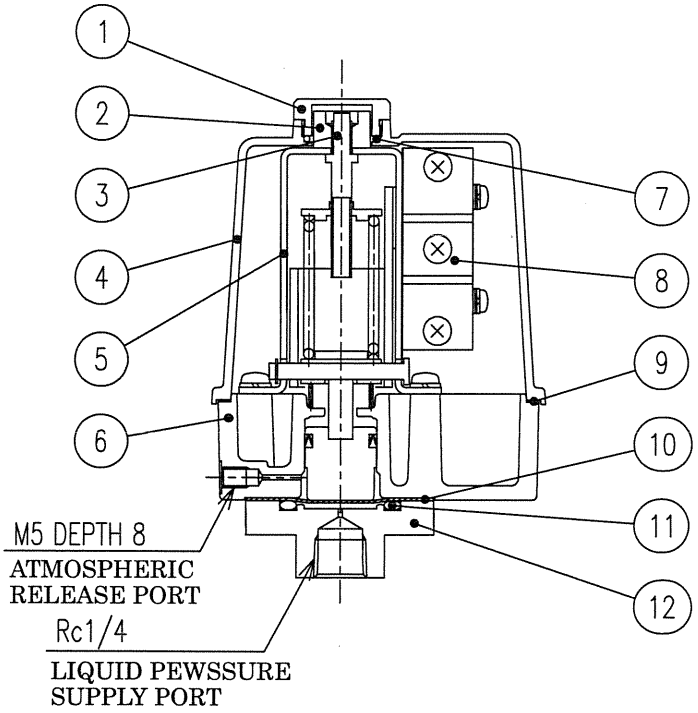
7. Troubleshooting

- If the switch does not operate as intended, refer to the following table and inspect it.

Symptom	Cause	Action
The load does not operate	Incorrect wiring	Correct the wiring.
	Incorrect pressure setting value	Set the pressure again
	Switch's internal wiring is contacting movable section	Lead the wires so that they do not touch the moving sections.
	Port is clogged	Remove and clean the port
	Electricity is not flowing	Check the wiring and fuses, etc., and turn the power ON.
Load does not stop	Load OFF current value is lower than the switch's leakage current value	Select the load again, or disconnect the lamp wiring.
	Incorrect wiring	Correct the wiring.
	Incorrect pressure setting value	Set the pressure again
	Switch's internal wiring is contacting movable section	Lead the wires so that they do not touch the moving sections.
	Port is clogged	Remove and clean the port
Lamp does not turn ON or is dim	Electricity is not flowing	Check the wiring and fuses, etc., and turn the power ON.
	Voltage is less than the rated voltage	Check the power and input the rated voltage
	Incorrect wiring (DC)	Correct the wiring.
External leaks	Small screws mounting the port are loose	Tighten the small screws (1.3 to 1.5Nm)
	Diaphragm or O ring is damaged	Replace diaphragm or O ring Refer to "5. Disassembly and Assembly"

- Contact CKD or your dealer for any other unclear points.

8. Dimensioned outside drawing



No.	Parts	Q'ty
1	Cap	1
2	Nut	1
3	Adjusting screw	1
4	Cover	1
5	Frame	1
6	Body	1
7	O ring	1
8	Micro switch	1
9	Gasket	1
10	Diaphragm	1
11	O ring	1
12	Port	1

9. Product specifications

9. 1 Model number indication

CPE - 8 – 0 G - 3

① ② ③ ④ ⑤

① Model number indication	
Symbol	Details
CPE	Pressure switch for coolant

② Connection port size	
Symbol	Details
8	Rc 1/4

③ Seal material	
Symbol	Details
0	NBR
B	FKM

④ Switch	
Symbol	Details
G	Standard

⑤ Lamp	
Symbol	Details
1	AC100V / 200V
3	DC24V

9. 2 Product specifications

● Main unit part

Descriptions		CPE
Working fluid		Coolant , compressed air , other non-corrosive gases
Max. working pressure	MPa	1
Withstanding pressure	MPa	1. 5
Pressure adjusting range	MPa	0. 05～0. 8
Fluid temperature	℃	0～50
Ambient temperature	℃	0～50
Port size		Rc1／4
Micro switch type		Z－15GD－B(OMRON)
Contact configuration		1ab
Hysteresis	MPa	0. 04 or ress(at set pressure 0. 05～0. 3)
		0. 1 or ress(at set pressure 0. 31～0. 8)
Repeatability	MPa	±0. 02
Allowable cycle rate	cycle/min.	20
Rated voltage		AC100V, AC200V, DC24V
Insulation resistance	MΩ	100 and over(at DC500V megger)
Mass	kg	0. 58
Installation attitude		Vertical installation facing adjusting screw upward
Protective structure		Equivalent to IP65(dust/jet-proof type)

● Micro switch reted

Lord circuit		Non-inductive load(A)				Inductive load(A)			
		Resistance load		Light lord		Inductive load		Electric motor load	
		NC	NO	NC	NO	NC	NO	NC	NO
Voltage	AC125V	15		3	1. 5	15		3	2. 5
	AC250V	15		2. 5	1. 25	15		3	1. 5
	DC30V	6		3	1. 5	5		5	2. 5