



Solenoid Driven Metering Pump
CHEMIPON[®] N Type
NFH Series

Instruction Manual

Recommendation

1. Make sure to read this Instruction Manual before unpacking, installation, wiring, operation and maintenance.
2. Keep this instruction manual in a place that allows for easy access by an actual user.
3. We assume no responsibility in use of this pump outside the contracted specifications.

SHUN EIKO CO., LTD.

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1. Introduction

Thank you for purchasing the NIKKISO EIKO electromagnetic metering pump “CHEMIPON N Type NFH Series.” Although this pump has been designed with significant attention to safety in mind, please master the correct handling method according to this Instruction Manual to operate so that danger does not occur. Particularly important items in this Instruction Manual are described using the following symbols.



DANGER: Imminent danger of death or serious injury is assumed.



WARNING: Possibility of death or serious injury is assumed.



CAUTION: Possibility of serious injury and damage to the product is assumed.

Make sure to read the Instruction Manual for safety to prevent danger to the human body and property.

2. About Safety

In order to safely handle the pump and protect the human body and property from danger, thoroughly read this Instruction Manual for understanding before handling the pump.



CAUTION: Make sure to earth (ground) the power line with a third class ground resistance of 100Ω or less. Unless it is grounded, electrical shock accidents may result.



CAUTION: Make sure to install a leakage breaker with 30mA or less to the power circuit to turn on/off power for the pump. Any leakage may result in bodily injury.



CAUTION: Install an overcurrent protective device in the power circuit. Refer to the section of “Wiring” from page 12 to page 13.



CAUTION: Never use the pump outside the specifications. Accidents and failures may result.



WARNING: This pump is often used to deliver liquid of sodium hypochlorite. Since sodium hypochlorite is a dangerous chemical, thoroughly understand how to handle it and pay careful attention. General precautions for sodium hypochlorite are as follows.

2. About Safety

- 1) Wash sodium hypochlorite with water if it splashes on clothing and body.
- 2) When sodium hypochlorite gets into eyes, immediately rinse eyes with water and immediately seek medical attention.
- 3) If sodium hypochlorite is accidentally swallowed, severe pain will occur in the mouth, leading to diarrhea. Seek medical attention.
- 4) If sodium hypochlorite is mixed into acid liquid, a large quantity of chlorine gas will be generated, which is dangerous.
If chlorine gas is accidentally inhaled, immediately seek medical attention.

Also for other chemicals, thoroughly understand how to handle it and pay careful attention.



WARNING: If there is any liquid leakage from piping, pump or fittings, serious bodily accident or damage to equipment will occur by the liquid. Handle the pump so as to avoid leakage.

3. Unpacking

When you have unpacked, check whether the delivered product is as you ordered by the following. If you have any questions, contact the dealer from which you ordered, or our nearest headquarters, branch or sales office listed on the back cover.

- 1) Is the pump model No. described on the nameplate attached on the side of the pump frame as you ordered?
- 2) Is there any damage caused as a result of an accident during transportation? Are there any loosened bolts? If any damage is confirmed, immediately inform us of the broken or abnormal location with an accident certificate from the related forwarding agency. Please note that we may not grant warranty means if an accident certificate is not attached.

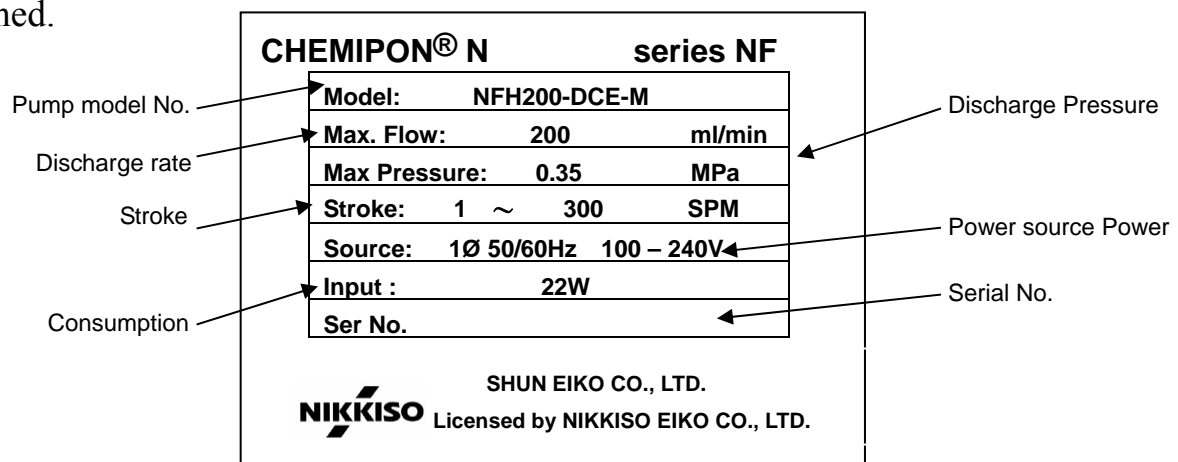


Fig. 3-1: Pump Nameplate

4. Model indication

Pump model **NF H 100** – **D C E** – **M**

(1) (2) (3) (4) (5) (6) (7) (8)

(1) Series

Symbols	Series
NF	NF Series

(2) Solenoid

Symbols	Average power consumption
H	22 W

(3) Pump size

Symbols	Capacity
80	80 mL/min at 1.0 MPa
100	100 mL/min at 0.6 MPa
200	200 mL/min at 0.35 MPa

(7) Circuit

Symbols	Type
M	Standard type <ul style="list-style-type: none"> ▪ Manual (ON/OFF) control ▪ Timer (Option Function)
P	Multi-function pulse input control type <ul style="list-style-type: none"> ▪ Manual (ON/OFF) control ▪ Interval timer control ▪ Pulse input control ▪ External contact input control
A	Multi-function analog input control type <ul style="list-style-type: none"> ▪ Manual (ON/OFF) control ▪ Interval timer control ▪ Analog input control ▪ External contact input control

(8) Special display

Symbols	Specifications
None	Standard specifications
SP	Special specifications

(4) Diaphragm head

Symbols	Chemical/Specification	Material
D	For general chemical	PVDF
M	Stainless steel	SUS316
T	PTFE	PTFE

(5) Ball valve

Symbols	Material
C	Ceramics
M	SUS316

(6) O-ring/Valve seat material

Symbols	Material
E	EPDM
F	FPM
T	PTFE (Special fluorine-contained rubber)

5. Specifications

Table 5-1: Pump specifications (Specifications for room temperature and clean water)

Pump model	NFH80	NFH100	NFH200
Maximum discharge capacity	80 mL/min	100 mL/min	200 mL/min
Maximum discharge pressure	1.0 MPa	0.6 MPa	0.35 MPa
Suction and discharge connection hose	PVC braided hose		
Number of stroke (digital display)	1 to 300 spm		
Stroke length adjustment range	50 to 100%		
Weight	3.0 kg		
Operating temperature	5 to 40°C		
Relative humidity	≤90%		
Media temperature	5 to 40°C		
Viscosity	50 mPa·s		
Slurry	Cannot be used.		

Note 1: The maximum capacity shown in the table is for a stroke length of 100% and number of stroke of 300 spm at the maximum discharge pressure. If the pressure is low, the flow rate is higher than the rate shown in the table.

Table 5-2: Power supply specifications

Pump model	NFH80	NFH100	NFH200
Power supply	Single phase 100 to 240 V AC ± 10% free power supply		
Frequency	50/60 Hz		
Maximum current (peak current) when the power is ON	3.7 A		
Average power consumption	22 W		
Protection	Equivalent to IP65		

Table 5-3: Operational function specifications

Pump model	NFH80/100/200
Manual (ON/OFF) control mode	Start/Stop with the STOP and START key
Interval timer control mode	ON ↔ OFF interval operation ON ↔ OFF time: 1 to 9999 (second, minute, × 10 minutes)

MEMO

The operational functions of the following specifications are indicated as follows in this manual.

Manual (ON/OFF) control mode: Manual mode

Interval timer control mode: Timer mode

The above specifications may be changed without prior notice to make improvements. We appreciate your understanding.

5. Specifications

Table 5-4 Attachment

Circuit function	M type
Injector	D0AC700
Filter	D0FI064
PVC braided hose for suction, discharge	PVC braided hose $\phi 6 \times \phi 11$ 3m
PVC hose for air vent	PVC hose $\phi 4 \times \phi 6$ 1m

6. Material of liquid ends

Fig. 6-1 Standard type

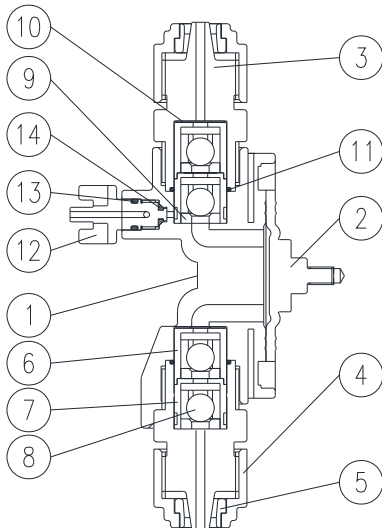


Table 6-1 Material of component in liquid ends of standard type

No	Component name	Material
1	Pump head	PVDF
2	Diaphragm	PTFE/CR
3	Hose joint	PVDF
4	Union nut	PVDF
5	Union nut collar	PVDF
6	Ball Guide A	PVDF
7	Ball Guide B	PVDF
8	Ball valve	CERAMIC or SUS316
9	Valve seat	FPM or EPDM
10	Gasket	PTFE
11	O-ring	FPM or EPDM
12	Air vent valve	PVDF
13	O-ring	FPM or EPDM
14	O-ring	FPM or EPDM

6. Material of liquid ends

Fig. 6-2 Injector(D0AC700)

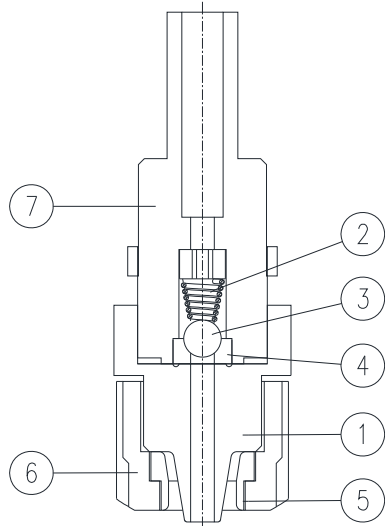


Table 6-2 Material of component in Anti siphon check valve (D0AC700)

No.	Component name	Material
1	Hose joint	PVC
2	Spring	HC
3	Ball valve	CERAMIC
4	Valve seat	FPM/EPDM
5	Union nut collar	PVDF
6	Union nut A	PVC
7	Nozzle	PVC

Fig. 6-3 Filter (D0FI064)

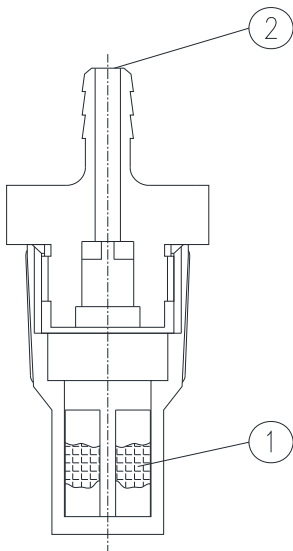


Table 6-3 Filter (D0FI064)

No.	Component name	Material
1	Strainer	PE
2	Hose joint	PVC

6. Material of liquid ends

Fig. 6-4 Anti siphon check valve (Optional accessory)(B55PV)

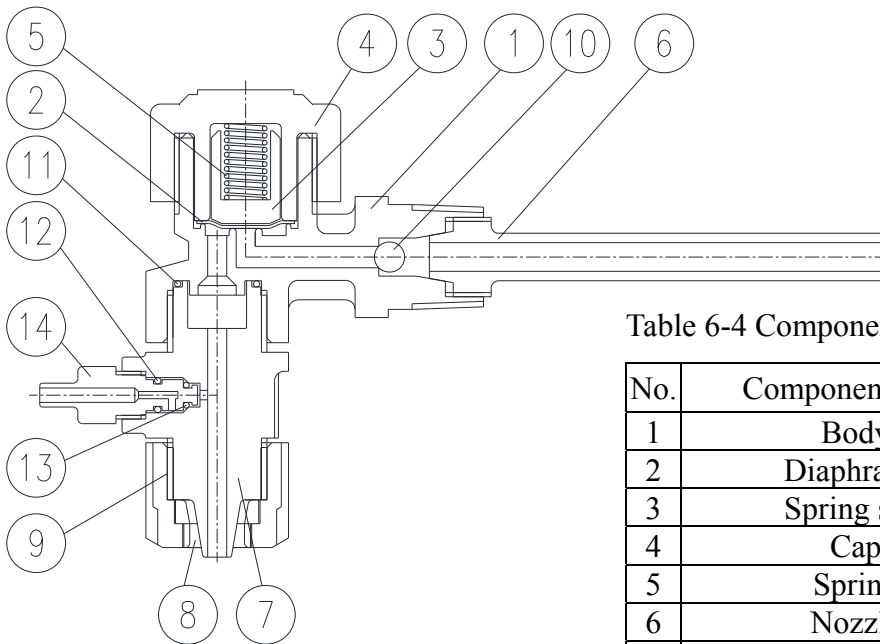


Table 6-4 Component of Anti siphon check valve

No.	Component name	Material
1	Body	PVC
2	Diaphragm	FPM/EPDM
3	Spring seat	PVC
4	Cap	PVC
5	Spring	SUS304
6	Nozzle	PVC
7	Hose joint	PVC
8	Union nut collar	PVDF
9	Union nut A	PVC
10	Ball valve	FPM, CERAMIC
11	O-ring	FPM, EPDM
12	O-ring	FPM, EPDM
13	O-ring	FPM, EPDM
14	Air vent valve	PVC

Fig 6-5 Foot valve (optional accessory) (B63PV)

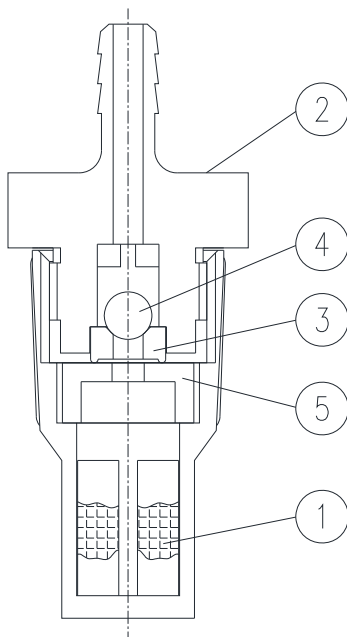
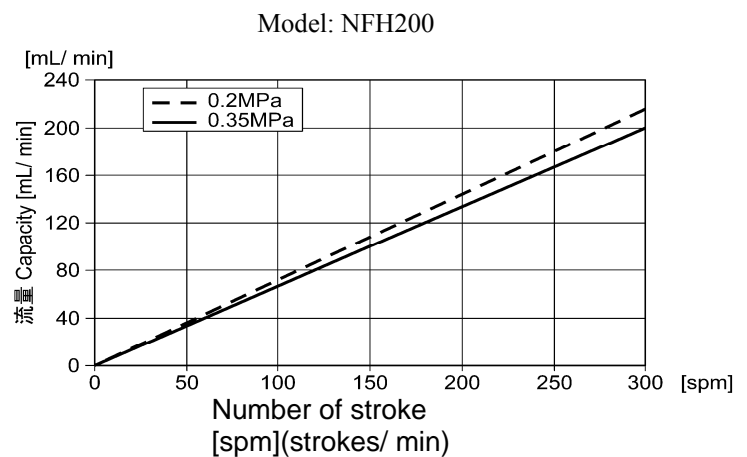
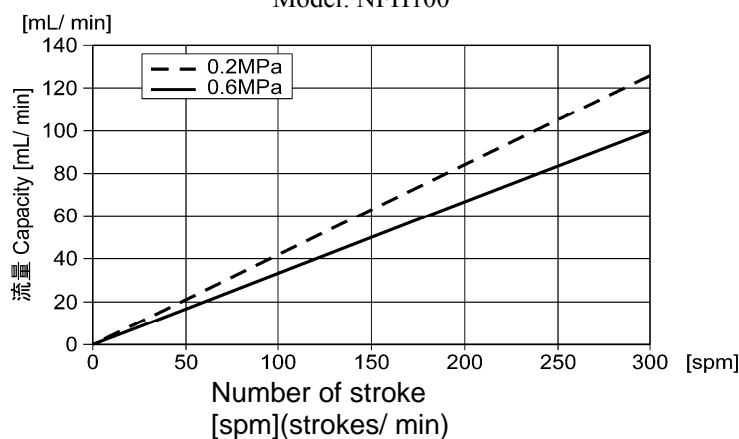
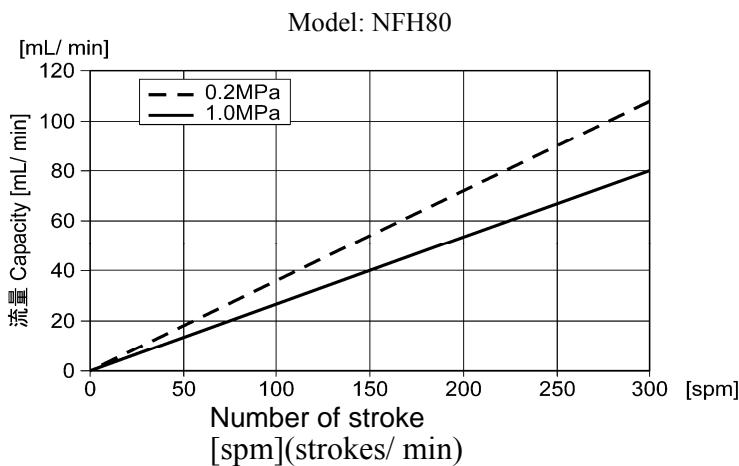


Table 6-5 Component of foot valve

No.	Component name	Material
1	Strainer	PE
2	Hose joint	PVC
3	Valve seat	FPM/EPDM
4	Ball valve	CERAMIC
5	Spacer	PE

7. Performance curve



Condition: Clean water, suction head -1m

(Note) 1. The above performance curve has been measured under certain conditions using our test equipment. Performance at the site may slightly differ from this performance curve due to differences in conditions at the site. Measure the discharge rate under an operating condition to adjust the discharge rate based on the results.

8. Precautions for use

- 8.1 If the pump is dropped or given a strong impact, it may be broken or its performance may be impaired. Carefully handle the pump.
- 8.2 Avoid installing the pump in places where the ambient temperature is not lower than 40°C and relative humidity is not lower than 90%. And furthermore, when using the pump outdoors, install an outdoor cover(option) in order to avoid rain and direct sunlight.
- 8.3 Secure a necessary space for maintenance (1m and more around the pump) so as to easily disassemble.
- 8.4 Securely and horizontally install the pump so as not to be subject to vibrations.
- 8.5 Avoid common use of an electrical power outlet with strong electrical equipment of

200V or more, and avoid using the pump near strong electrical equipment. Use under such an environment will allow noise to enter the power line of the pump, causing the pump to malfunction or to be broken. If the power line must be commonly used, avoid noise using a surge absorbing element, noise cut transducer or filter, etc.

- 8.6 Securely connect hoses so as to avoid liquid leakage and air suction. Use the attached hoses.
- 8.7 Place the chemical tank in an easily accessible place in order to refill chemicals and carry out maintenance. If the chemical tank is subject to direct sunlight, temperature of the chemical abnormally rise, which may cause the chemical to be dissolved and the liquid composition to change.

8. Precautions for use

And furthermore, there may occur a problem of an increase in corrosion in the pump. It is recommended that the chemical tank should be installed in the sunshade to avoid direct sunlight.

9. Installation

- 9.1 Avoid installing the pump in places where the ambient temperature is not lower than 40°C and relative humidity is not lower than 90%. And furthermore, when using the pump outdoors, install an outdoor cover (option) in order to avoid rain and direct sunlight. Install the pump in airy places with less dust and less humidity.



CAUTION: When the pump is used outdoors, an outdoor cover is required.

When the pump is used without an outdoor cover, it may be broken due to deterioration in light resistance of resin and intrusion of rain, etc.

- 9.2 Install the pump near the chemical pump.
- 9.3 Securely fix the pump horizontally with four M5 screws so as not to be vibrated. Installing the pump obliquely may decrease the discharge rate or stop discharge.
- 9.4 Liquids (such as sodium hypo chlorite and hydrazine water solution) which easily generate foam, may not be delivered due to air lock. Furthermore, liquids, which easily generate foam, have strong corrosiveness and may break the pump. Install the chemical pump in places, which are not subject to direct sunlight in order to prevent foam from occurring.

10. Piping

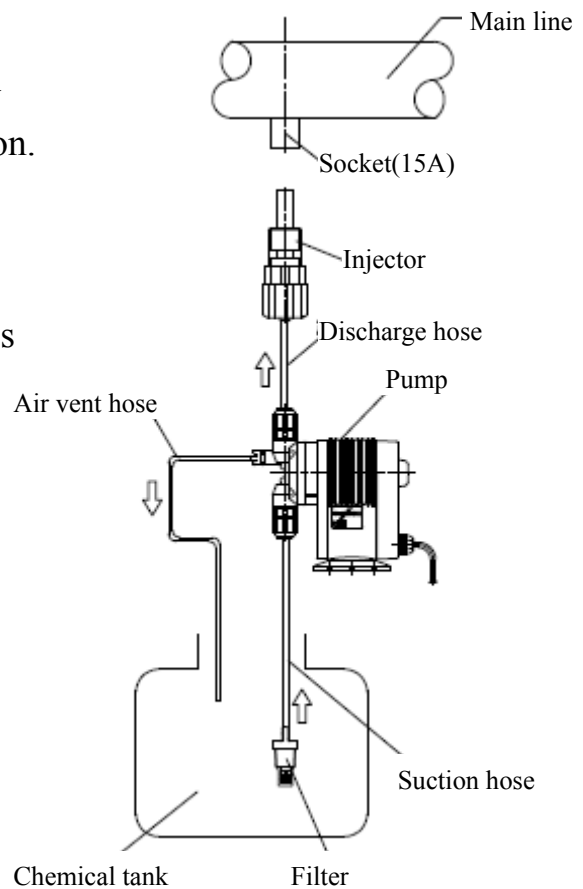
10.1 PVC hose piping

- 1) A hose of 3m is attached. Cut the hose by 1m for suction hose and by 2m for discharge hose. Perform piping securely so as to avoid liquid leakage and air suction.
- 2) Stand the discharge hose as vertically as possible in order to avoid air retention.
- 3) If the suction hose is long, air is easily retained in the hose. Take countermeasures to install a gas vent pipe in the piping near the pump suction valve.



CAUTION It is necessary to pay attention to excessive tightening of the union nut because it is made of resin. Excessive tightening may cause the union nut to be broken. Never tighten it more than necessary. As a guide, tighten it by hand and further tighten it with a spanner by 1/4 turn.

Fig. 10-1 Piping for standard type pump



10.2 Connection of air vent hose

- 1) A transparent PVC hose is attached as an air vent hose. Insert the transparent PVC hose into a hose port of the air vent valve to carry out piping. Since the pump in which SUS316 is used as the material of the diaphragm has no air vent valve, it is unnecessary to connect the air vent hose.
- 2) Return the end of the air vent hose to the chemical tank or a receiving pan.

10.3 Installation of Anti siphon check valve

- 1) Install the Anti siphon check valve at the chemical injection point of the main line as shown in Fig. 10-2. Since the Anti siphon check valve has a PT1/2 thread, make a thread of PT1/2 on the main line or weld a socket to screw it in. A seal tape is wound around the thread portion of the Anti siphon check valve. Securely screw it in, and connect so as to avoid liquid leakage.
- 2) Cut the nozzle end of Anti siphon check valve so that the end is at the center of the injection pipe.
- 3) The Anti siphon check valve prevents reverse flow in the pump discharge piping if the main line is pressurized. If the injection line is negatively pressurized, the Anti siphon check valve will prevent chemical from the chemical tank from unlimitedly flowing out to the injection line through the pump. (When the chemical is injected

10. Piping

into the suction side of the circulation pump and when the chemical is directly injected into the open tank located at a place lower than the chemical tank or the main line, it is considered that the injection line is negatively pressurized.)

- 4) It is recommended that a source valve should be installed between the socket and the Anti siphon check valve for maintenance. Select the source valve in consideration of anti-corrosiveness of liquid to be used.

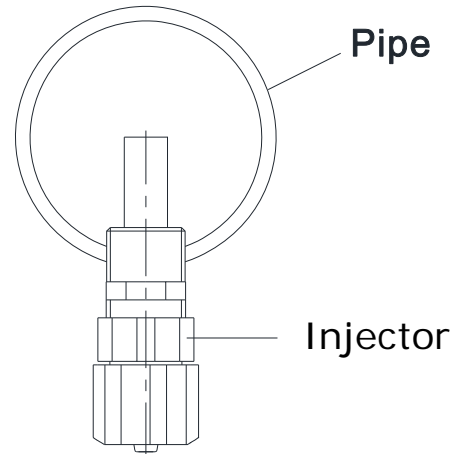


CAUTION

Never operate the pump with the shut off valve closed.

High pressure is generated in the pump and piping, causing liquid leakage and damage to the hoses.

Fig. 10-2 Anti siphon check valve



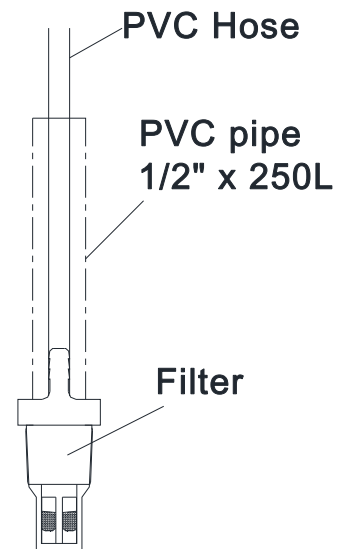
10.4 Installation of filter

Since the suction hose tends to bend when it is delivered, it may not submerge into liquid only by weight of the filter. The dissolved air is retained in the filter and hose when it is hot in summer, causing the hose to float.

Therefore, take the following countermeasures.

- 1) Put a PVC pipe on the outside of the hose.
Refer to Fig. 10-3.
- 2) Run a PVC rod along the outside of the hose.
- 3) Install a weight to the filter.
(The material is preferably PVC.)

Fig. 10-3 Installation of filter



11. Wiring

11.1 Wiring

Wiring of power line

Check voltage of the power source and carry out wiring according to the electrical equipment technology standard and electrical association code. This machine does not incorporate an ON/OFF switch, therefore, install an ON/OFF switch in the middle of the wiring. The pump has lead lines. The black and white lines are power lines, and the green line is an earth line. Securely carry out wiring. Make sure to ground the earth line in order to prevent electrical shock.



CAUTION

- Carry out wiring after confirming that the power source has been turned off.
- Never carry out wiring with the power turned on. Otherwise, electrical shock accidents will result.
- Never connect a power line of voltage other than the rated voltage described on the pump nameplate. Otherwise, the operating circuit will be broken.
- Make sure to ground the earth line. Unless it is grounded, an electrical shock will result.
- Never operate with wet hands. Otherwise, an electrical shock will result.

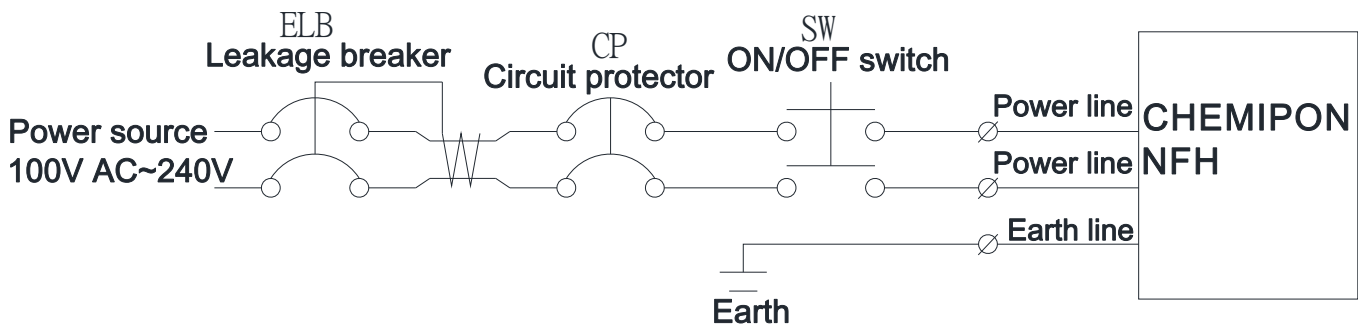


Fig. 11-1 Wiring example of the power supply line

(NOTE) As an over current protecting device, a circuit protector is best suited in terms of operating time and shut-off current characteristics. Thermal relay for the motor is unsuitable.

11. Wiring

11.2 About noise

The operating circuit section may malfunction or be broken by a large noise. Avoid using the pump around strong electrical equipment of 200V or more which becomes a noise generating source. If inevitably using it around strong electrical equipment, take any of the measures described below. Some methods are considered noise countermeasures depending on incoming noise and peripheral conditions.

Consult a technician to determine the noise method.

- 1) Install a surge absorbing element (such as a varistor with a surge tolerance 2000A or more) to the pump power connecting part.
- 2) Install a noise cut transducer.
- 3) Install a noise filter to the pump power connecting part.
- 4) Put the signal line into a metal tube.
- 5) Never wire the signal line parallel to the wiring of strong electrical equipment such as a motor, and never put the signal line into the same duct for wiring of the strong electrical equipment.

12. Operation, setting

12.1 Preparation before operation

- 1) Confirm that there is no liquid leakage and no clogging in the piping line.
- 2) Confirm whether the power is the rated voltage described on the pump nameplate. Confirm that electrical wiring has been properly carried out.
- 3) If any valve is installed in the piping on the suction side and discharge side, confirm that the valve is “opened.”
- 4) Turn on the power if there is no problem after completing confirmation of all. Then, set the operation mode.



WARNING:

When handling chemicals, wear rubber gloves, a protective mask and protective glasses for safety.



WARNING:

If any liquid leakage occurs, the liquid will cause a serious bodily accident and damage to the equipment. Make sure to prevent liquid leakage.

12. Operation, setting

12.2 Stroke length adjusting dial

Stroke length of the pump can be adjusted in a range from 50 to 100% by turning the dial.

Furthermore, the stroke length can be adjusted down to 0%, however, the discharge quantity may be unstable for a stroke length of less than 50%.

Adjust the number of strokes at the beginning by setting the stroke length to 100%.

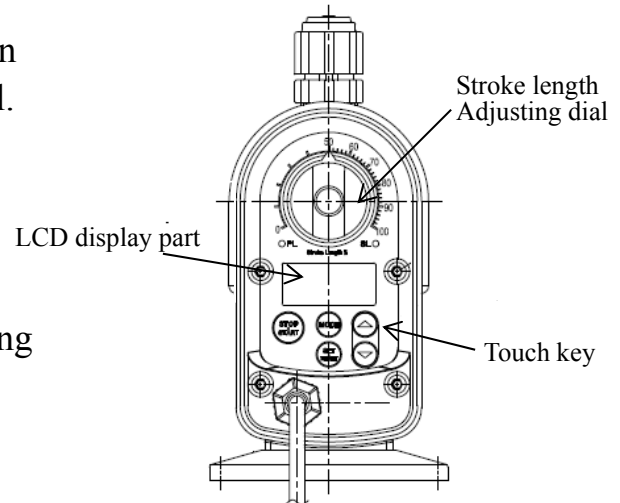


Fig. 12-1 Operating panel

12.3 LCD display

- | | |
|--|--|
| 1) STP | This is displayed when the pump stops. |
| 2) ON | This is displayed when the pump is operating. |
| 3) MAN | This is displayed when the pump is in the manual mode operation. |
| 4)INT | This is displayed when the pump is in the pulse dividing mode operation. |
| 5) %, SPM, mL/min indication | The indication can be switched to %, SPM or mL/min. |
| 6) LCD 7 segment display | The set value is displayed when the pump is operated in each mode. |
| 7) TOUCH KEY stop, star | Operates and stops the pump. |
| 8) TOUCH KEY mode | Use this when switching the operation mode. |
| 9)TOUCH KEY \triangle / ∇ (up/down) | Sets each set value. |
| 10) TOUCH KEY set, reset | Use this when starting to set and confirming the set value. |
| (M type is not suitable) | |
| 11) OPT | Unit indication : seconds |
| 12) min | Unit indication : minutes |
| 13) OPT+min | Unit indication : minutes x10 |

12.4 Manual mode(M type is not suitable)

Set number of strokes in advance to operate the pump in this mode. The first indication on the LCD when the power for the LCD is turned on, is as shown at the left of Fig. 12-2, and the indication on the LCD when operation is performed after setting is as shown at the right of Fig.12-2.

12. Operation, setting

Set the number of strokes with the pump stopped.

- 1) Set the number of strokes with the Pump stopped. Turn on power for the pump, then if the pump stops and STP is indicated on the upper left of the display, setting is prepared.

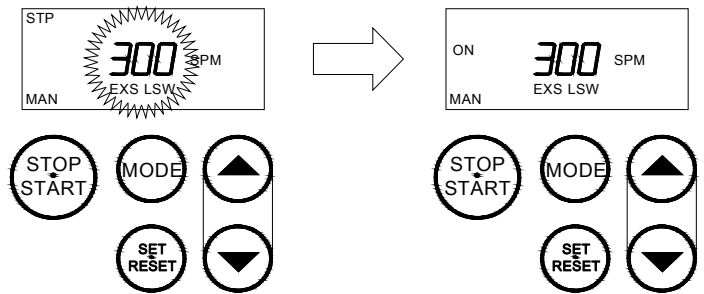


Fig. 12-2 Manual mode setting

- 2) Press the TOUCH KEY set, reset.
- 3) LCD indication 300 flashes and a part to Fig.12-2 Manual mode setting be_set is highlighted.

(The default setting is 300 strokes.)

Press the TOUCH KEY $\triangle \nabla$, and set to the determined number of strokes.

The right of Fig.12-2 shows that 300 strokes are set.

- 4) Press the TOUCH KEY set, reset.
Here, the flashing LCD indication disappears and the set value is confirmed.
- 5) Press the TOUCH KEY stop, start. The pump is started to be operated.

Set the number of strokes with the pump operated

Set the number of strokes with the pump operated. Press the TOUCH KEY $\triangle \nabla$, and set to the determined number of strokes. The set value is confirmed if I separate touch key $\triangle \nabla$.

Max. Number of the strokes driving at a moment

When stroke setting is low, push and hold touch key $\triangle \nabla$ for a few seconds at the same time; the number of the pump's max. stroke 300spm, the pump operated.

This function is effective with a manual mode, a simple timer function mode entirely.

12.5 Simple timer function mode(M type is not suitable)

Intermittent operation is performed in the set range from 1 to 99990 minutes.

This function is effective when a small amount of raw liquid is injected.

The simple timer function setting is deactivated for the default setting to enable the simple operation of pump stop/start. To activate the setting, set P-44 in Table 12-1 Parameter setting to 1 and the timer mode to ON.

Parameter setting(unit of setting time)

Before setting the ON/OFF time for the simple timer, set the parameters and decide the unit for the time setting.

- 1) Press the TOUCH KEY stop, start. Pump operation stops. The indication on the LCD is as shown at the upper stage of Fig.12-3.(The parameters can be set in any operation mode.)
- 2) Unit setting for ON time and setting for OFF time.
Press the TOUCH KEY set, reset and the TOUCH key \triangle simultaneously,

12. Operation, setting

then “P-XX” is displayed on the LCD.

Press the TOUCH KEY \triangle / ∇ to adjust the ON time to the parameter No. “P-42”, or the OFF time to the parameter No. “P-43”.

(The indication on the LCD should be as shown at the middle stage of Fig.12-3.)

- 3) Press the TOUCH KEY set, reset, then the indication on the LCD becomes as shown on the lower stage of Fig. 12-3, and the number flashers.

This indicates that the flashing part is a location to be set.

- 4) Press the TOUCH KEY \triangle / ∇ to adjust the number, then set 0, 1 and 2. Please refer to Table 12-1 Parameter setting.
- 5) When the TOUCH KEY mode is pressed, the screen returns to the first screen, and when the TOUCH KEY stop, start is pressed, pump operation is started.

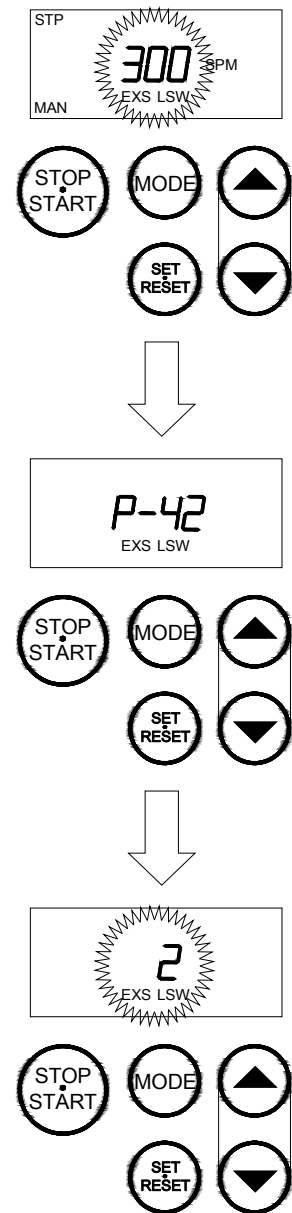


Fig.12-3 Parameter setting

Table 12-1 Parameter setting

Parameter No.	Set Value	Input	LCD display
P- 4 4	0 (Default value)	Timer mode OFF	-
	1	Timer mode ON	-
P- 4 2 Or P- 4 3	0	Set the unit to “second”	OPT
	1 (Default value)	Set the unit to “minute”	min
	2	Set the unit to “x 10 minutes”	Simultaneous display of OPT and min

12. Operation, setting

Timer setting (Option Function)

- 1) Press the TOUCH KEY stop, start.

Pump operation stops.

Press the TOUCH KEY mode.

Mode indication on the lower left changes from MUL to INT. The indication on the LCD is as shown at the upper left of Fig.12-4. LCD indication 1 is the default set value.

- 2) Press the TOUCH KEY stop, start. A part 1 to be set flashes and is highlighted. Press the TOUCH KEY \triangle ∇ to set to the predetermined ON time. 2 minutes are set at the upper right in Fig.12-4.

The indication ON at the upper left of Fig.12-4 shows a screen to set ON time.

- 3) Press the TOUCH KEY stop, start. The set 2 min is confirmed, and consequently OFF time is set. The indication on the LCD is as shown at the lower right of Fig.12-4. Set 1 min for OFF time and press the TOUCH key set, reset. Now, the flashing part disappears, and setting of 2 min for ON time and 1 min for OFF time is completed.

The unit for the set time displayed here is the unit set for the parameter No. "P-42" or "P-43". Check the unit to avoid faulty setting.

- 4) Press the TOUCH KEY stop, start. Pump operation is started.

The indication on the LCD is as shown at the lower left of Fig.12-4.

When the indication switching is set for the simple timer operation, the set time and number of strokes are indicated, and then the display is changed to the timer indication. (Please refer to the indication switching during simple timer operation on the next page.)

- 5) The pump is operated by the number of strokes set in the MAN mode as the number of strokes for pump ON time. When changing this, perform setting according to section 12.4.

Switching the indication during simple timer operation

During simple timer operation, the number of strokes can be displayed for checking the operating conditions. Use the parameter setting No. "P-40" or "P-41".

- 1) Press the TOUCH KEY stop, start. Pump operation stops. The indication on the LCD is as shown at the upper stage of Fig.12-5.

(The parameters can be set in any operation mode.)

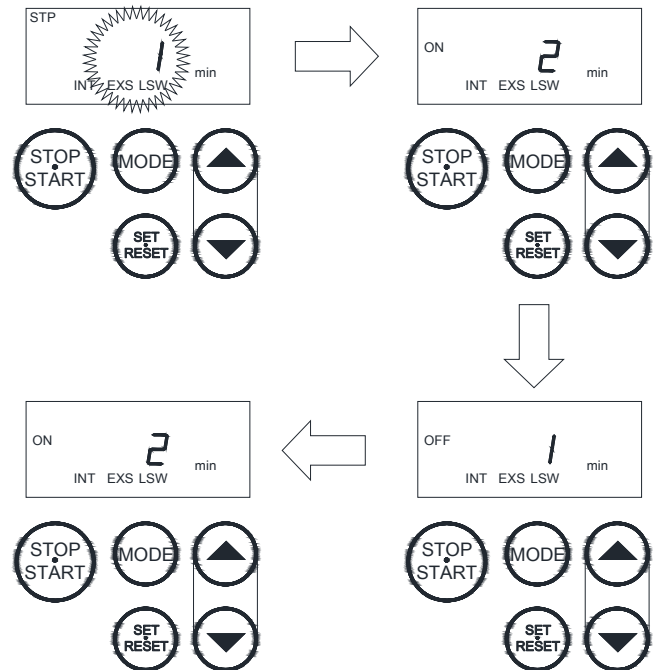


Fig. 12-4 Simple timer function mode setting

12. Operation, setting

- 2) Press the TOUCH KEY set, reset and the TOUCH key \triangle simultaneously, then “P-XX” is displayed on the LCD. Press the TOUCH KEY $\triangle \nabla$ to adjust the display setting for the number of strokes to the parameter No. “P-40”, or adjust the flashing time setting for the ON/OFF time to the parameter No. “P-41”. (The indication on the LCD should be as shown at the middle stage of Fig.12-5.)
- 3) Press the TOUCH KEY set, reset, then the indication on the LCD becomes as shown on the lower stage of Fig.12-5, and the number flashers.
- 4) Press the TOUCH KEY $\triangle \nabla$, and set the time. The setting range is 0 to 10 seconds. Press the TOUCH KEY set, reset to confirm it.
- 5) When the TOUCH KEY mode is pressed, the screen returns to the first screen, and when the TOUCH KEY stop, start is pressed, pump operation is started.
- 6) Indications

Number of strokes indication, ON/OFF time indication

The indication is switched; the number of strokes(flashing) → ON time(flashing) → ON time → ...in a one minute period during the pump operation.

The indication is switched; the number of strokes(flashing) → OFF time(flashing) → OFF time → ...in a one minute period when the pump operation is stopped.

Number of strokes indication

To check the number of strokes used for the current operation, press the TOUCH KEY mode.

The indication on the LCD turns off when the key is released.

ON/OFF time indication

To check the ON time or OFF time set for the current operation, press the TOUCH KEY set, reset. The indication on the LCD turns off when the key is released.

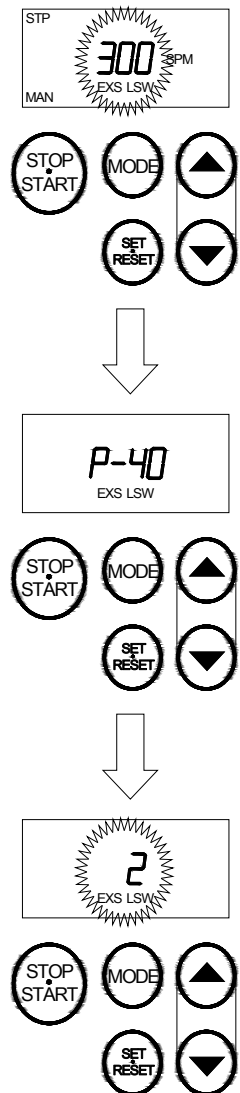


Fig. 12-5
Parameter setting
Switching the indication during
simple timer operation

12. Operation, setting

12.6 Switching the indication

In manual operation mode, three types of indications, that is, number of strokes, % and simple flow rate (use this as a guide because actual flow rate is not measured.) are indicated.

The setting method is as follows.

- 1) The indication is switched as number of strokes → % → simple flow rate → number of strokes by pressing the TOUCH KEY \triangle ∇ simultaneously.

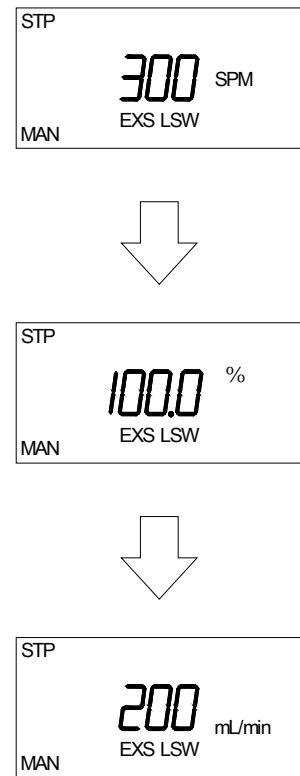


Fig. 12-6 Switching the indication

12.7 Calibration

Adjusting the simple flow rate to the actual flow rate in the field enables more precise field control. Before displaying the simple flow rate, check the number of strokes for operation and actual flow rate.

Use the parameter setting No. “P-10” for the simple slow rate indication.

- 1) Press the TOUCH KEY stop,start.

Pump operation stops.

(The indication on the LCD is as shown at the upper left of Fig.12-7.)

- 2) Press the TOUCH KEY set, reset and the TOUCH key \triangle simultaneously, then “P-XX” is displayed on the LCD. Press the TOUCH KEY \triangle ∇ to adjust to the parameter No. “P-10”.

(The indication on the LCD is as shown at the upper right of Fig.12-7.)

- 3) Press the TOUCH KEY set, reset,

then the indication on the LCD becomes as shown on the lower right of Fig.12-7, and the flow rate indication flashes.

Press the TOUCH KEY \triangle ∇ to adjust to the actual value, then press the TOUCH KEY set, reset to confirm the simple flow rate indication setting. The screen changes to the number of strokes setting.

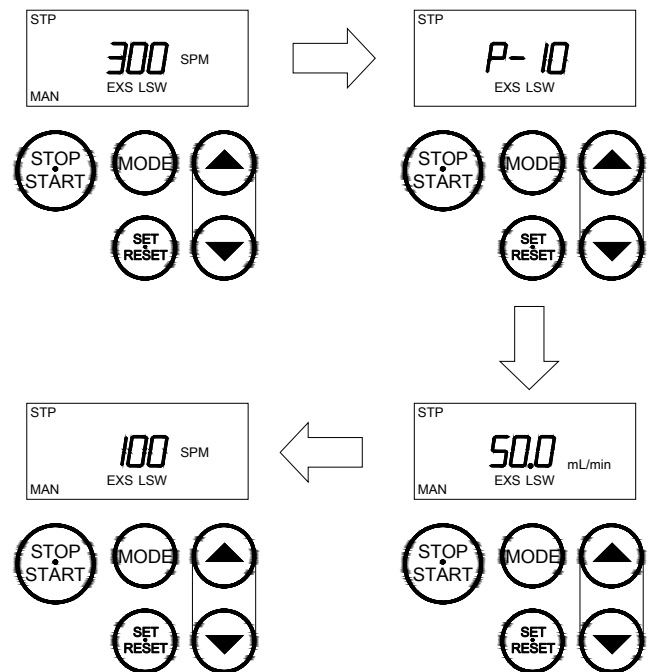


Fig. 12-7 Switching the parameter
Setting indication

12. Operating, setting

(The indication on the LCD is as shown at the lower left of Fig.12-7.)

Press the TOUCH KEY \triangle ∇ to set the number of strokes, then press the TOUCH KEY set, reset to confirm it.

- 4) When the TOUCH KEY mode is pressed, the screen returns to the first screen, and when the TOUCH KEY stop, start is pressed, pump operation is started.

12.8 Key lock function

Key lock function is effective in order to prevent a pump operation accident caused by tampering or malfunction.

Key lock is performed by the following procedure.

- 1) Press the TOUCH KEY stop, start to stop the pump.
Key lock is applied by pressing 3 keys of TOUCH KEY \triangle ∇ , TOUCH KEY mode simultaneously.
- 2) To cancel the key lock, similarly press three keys of TOUCH KEY \triangle ∇ , TOUCH KEY mode simultaneously.
- 3) During operation in the key lock status, "LOC" is indicated as shown in Fig.12-8 when the touch key is pressed.

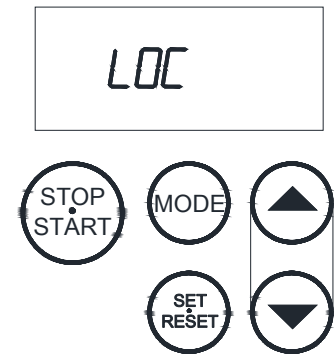


Fig. 12-8 Key lock function

12.9 Air vent

Standard type

When ending the preparation before operation, turn on the power switch to carry out air vent.

Air vent is an operation to vent air from the inside of the diaphragm head and inside of the suction hose. When operating the pump for the first time and when replacing the chemical tank, make sure to vent air before operating the pump.

Air is vented by turning the air vent valve located on the front of the diaphragm head by 1/2 to 1 turn counterclockwise and operating the pump for approximately 10 minutes.

When air is completely vented, turn the air vent valve clockwise to tighten.

Since the pump in which S2 is used as the material of the diaphragm head does not have the air vent valve, air vent operation is unnecessary.

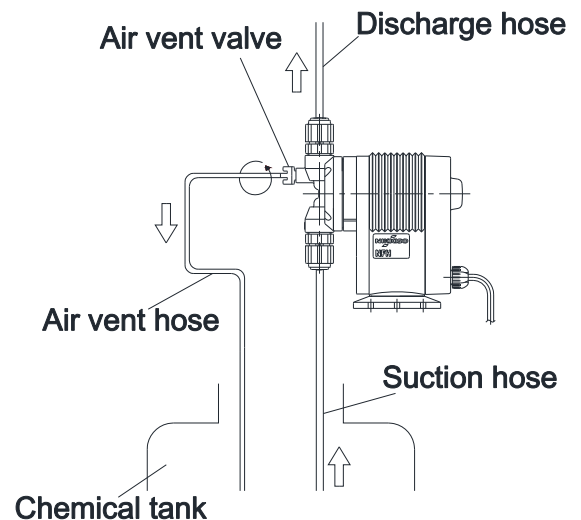


Fig. 12-9 Air vent operation



CAUTION

Make sure to attach a hose to the air vent valve and return the end of the hose to the chemical tank. It is dangerous for liquid together with air to fly out when the air vent valve is opened without attaching the hose.

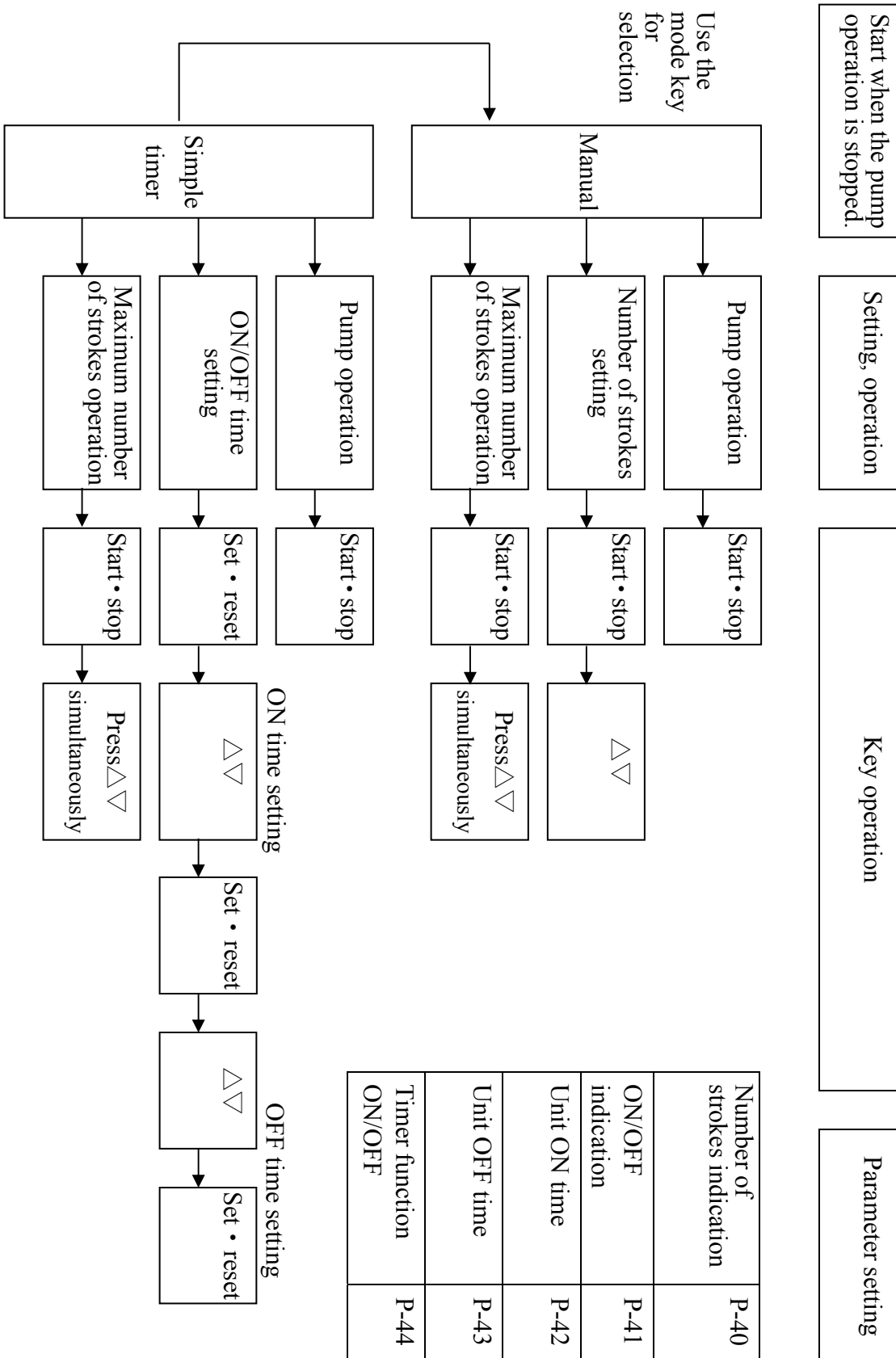
12. Operating, setting



CAUTION

It is necessary to pay attention to tightening the air vent valve because it is made of resin. Make sure to tighten it by hand without using any tool.

12.10 Simplified chart for setting



13. Maintenance, inspection

13.1 Daily inspection

Pay attention to the following items during operation. If any abnormality is found, immediately stop operation to remedy with reference to “Causes of failure and remedies” on page 23.

Table 13-1 Daily inspection item

Check item	Content, remedy	How to check
Does the pump normally Deliver liquid?	<ul style="list-style-type: none"> · Is liquid delivered? · Are the suction pressure and discharge pressure normal? · Is the check valve clogged by deterioration, sticking of the check valve or crystallization of the handled liquid? 	<ul style="list-style-type: none"> · Visually check or check with flow meter. · Check with nameplate. · Visually check
Is there any abnormal noise of vibration?	<ul style="list-style-type: none"> · Is there no abnormal sound in the pump frame? 	<ul style="list-style-type: none"> · Listen for the sound.
Is there any liquid leakage or suction from joint sections or piping?	<ul style="list-style-type: none"> · In addition, tighten the liquid leaking sections. · If air is mixed in the liquid in the discharging hose, air is sucked. 	<ul style="list-style-type: none"> · Visually check · Visually check

13.2 When stopping operation for a long term

- 1) Operate the pump with clean water for approximately 30 minutes and clean the inside of the diaphragm head.
- 2) Turn off the power of the pump after finishing cleaning.
- 3) Put a protective cover on the pump in order to protect the pump from a corrosive environment and adherence of dust.
- 4) When starting operation again, visually check the check valve and the valve seat to confirm that there is no adherence of contaminants such as dust.

13.3 Other maintenance

Clean the chemical tank every three months as a guide to keep it clean

Determine the cleaning interval depending on the contaminating conditions.



WARNING

When handling chemicals, wear rubber gloves, a protective mask and protective glasses for safety.

13. Maintenance, inspection



CAUTION

- Make sure to turn “OFF” the power source to perform maintenance.
- Depressurize the discharge hose to the atmospheric condition for disassembly and inspection of the pump.
- Never assemble the electronic circuit section.

14. Cause of failure and its remedy

Phenomena associated with failures of the pump and their remedies are summarized in the following table. In general, failures often occur as a result of some cause influencing each other, and a cause cannot be easily identified, however, use the following table as a rough guide.

Table 14-1 Cause of failure and its remedy

Content of failure	Cause	Remedy
The pump does not start.	<ul style="list-style-type: none"> • Improper wiring connection. • Failure of circuit. • Voltage drop. 	<ul style="list-style-type: none"> • Correct the wiring. • Replace the pump. • Investigate the cause and increase the voltage up to the rated voltage.
The pump is operating, but does not suck liquid.	<ul style="list-style-type: none"> • Air is sucked from the suction piping. • The check valve set is assembled in the improper direction. • The ball valve and valve seat are stuck. • The pump is air-locked. • The pump stroke length is excessively long. • The suction or discharge check valve is clogged. • The valve seat is deformed. • The chemical tank is empty. 	<ul style="list-style-type: none"> • Correct the piping. • Correct the assembly direction. • Disassemble and inspect. • Carry out air vent. • Re-set the stroke length after operating with the stroke length 100%. • Disassemble, inspect or clean the check valve set. If it is not corrected, replace it. • Replace the check valve set. • Refill chemical liquid.
Does not discharge.	<ul style="list-style-type: none"> • The suction or discharge check valve is clogged. • The pump is air-locked. • The stroke length is excessively short. • The diaphragm is broken or deteriorated. • The siphon check valve is closed. 	<ul style="list-style-type: none"> • Disassemble, inspect or clean the check valve set. • Carry out air vent. • Increase the stroke length. • Replace the diaphragm. • Clean the siphon check valve.
There is some liquid leakage.	<ul style="list-style-type: none"> • The diaphragm is broken or deteriorated. • The diaphragm head is improperly tightened. • The hose joint or union nut is improperly tightened. 	<ul style="list-style-type: none"> • Replace the diaphragm. • Additionally tighten it. • Additionally tighten it.

15. Replacement of parts

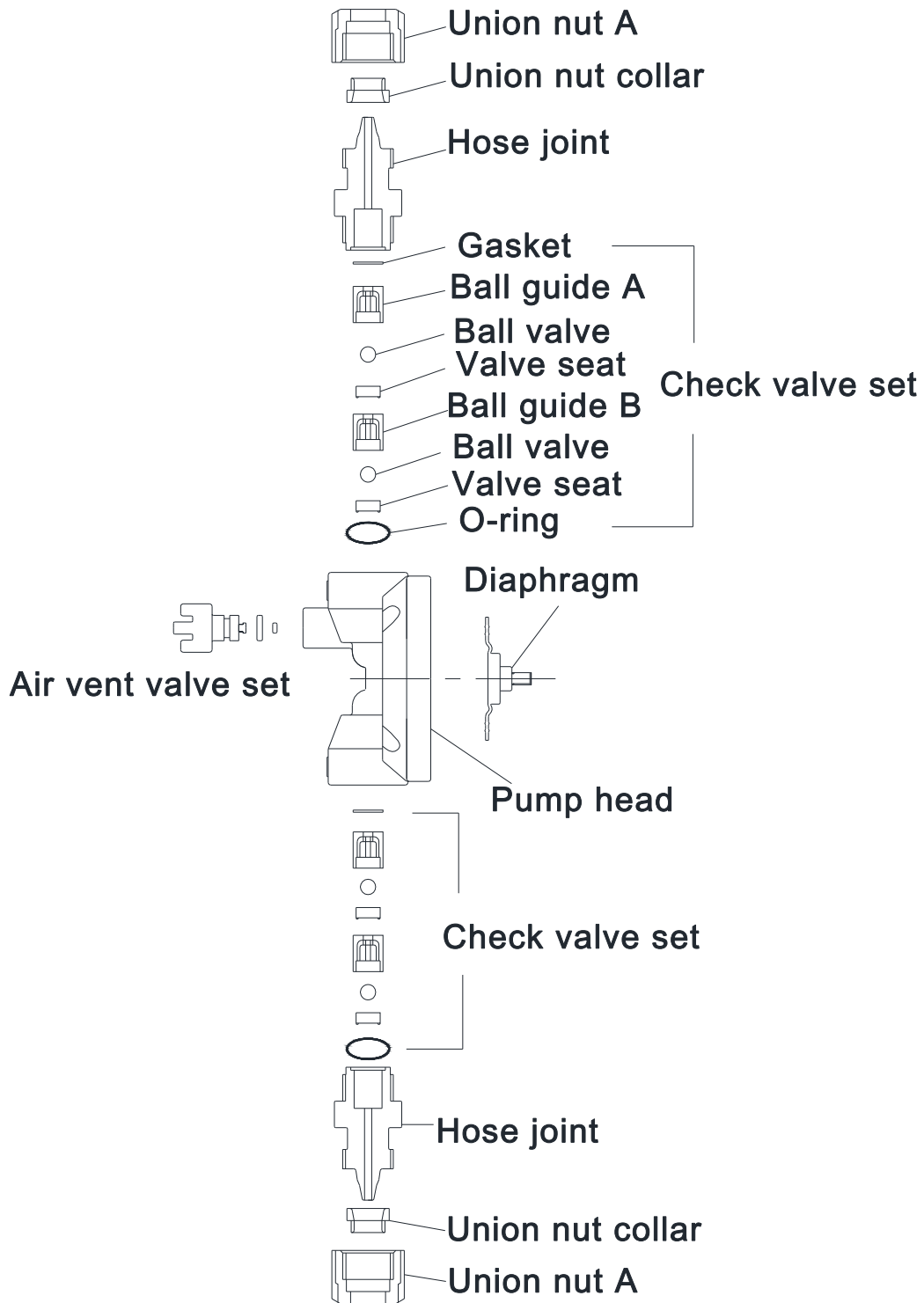


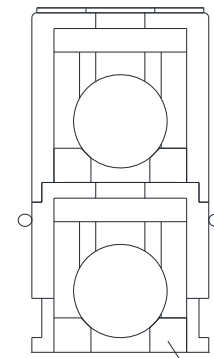
Fig. 15-1 Standard type

15. Replacement of parts

15.1 Replacement of check valve set

- 1) Make sure to turn off the power source before disassembling the pump. Begin disassembly after decreasing pressure in the pump down to atmospheric pressure. By operating the air vent valve, pressure in the pump decreases down to atmospheric pressure.
- 2) Replace the check valve set with reference to Fig.15-1 and Fig.15-2.
- 3) Pay attention to the assembling direction of the check valve set. If the valve seat is always directed, downward for assembly, the check valve set is normally positioned.

Fig. 15-2 Check valve set



Install the valve seat downward

15.2 Replacement of diaphragm

- 1) Remove the diaphragm head.
- 2) The diaphragm is screwed into the plunger of the solenoid. Hold the periphery of the diaphragm and turn it left (counterclockwise), then it can be removed.
- 3) To install the diaphragm, set the stroke length to 0%. Grab the periphery of the diaphragm and turn it right (clockwise) to a position where it stops. It is unnecessary to excessively tighten. Then, set the stroke length to 100%.
- 4) Install the diaphragm head. Evenly tighten the hexagon socket head cap screws fixing the diaphragm diagonally so as to prevent uneven tightening.
- 5) Recommended replacement interval of the diaphragm is one year.



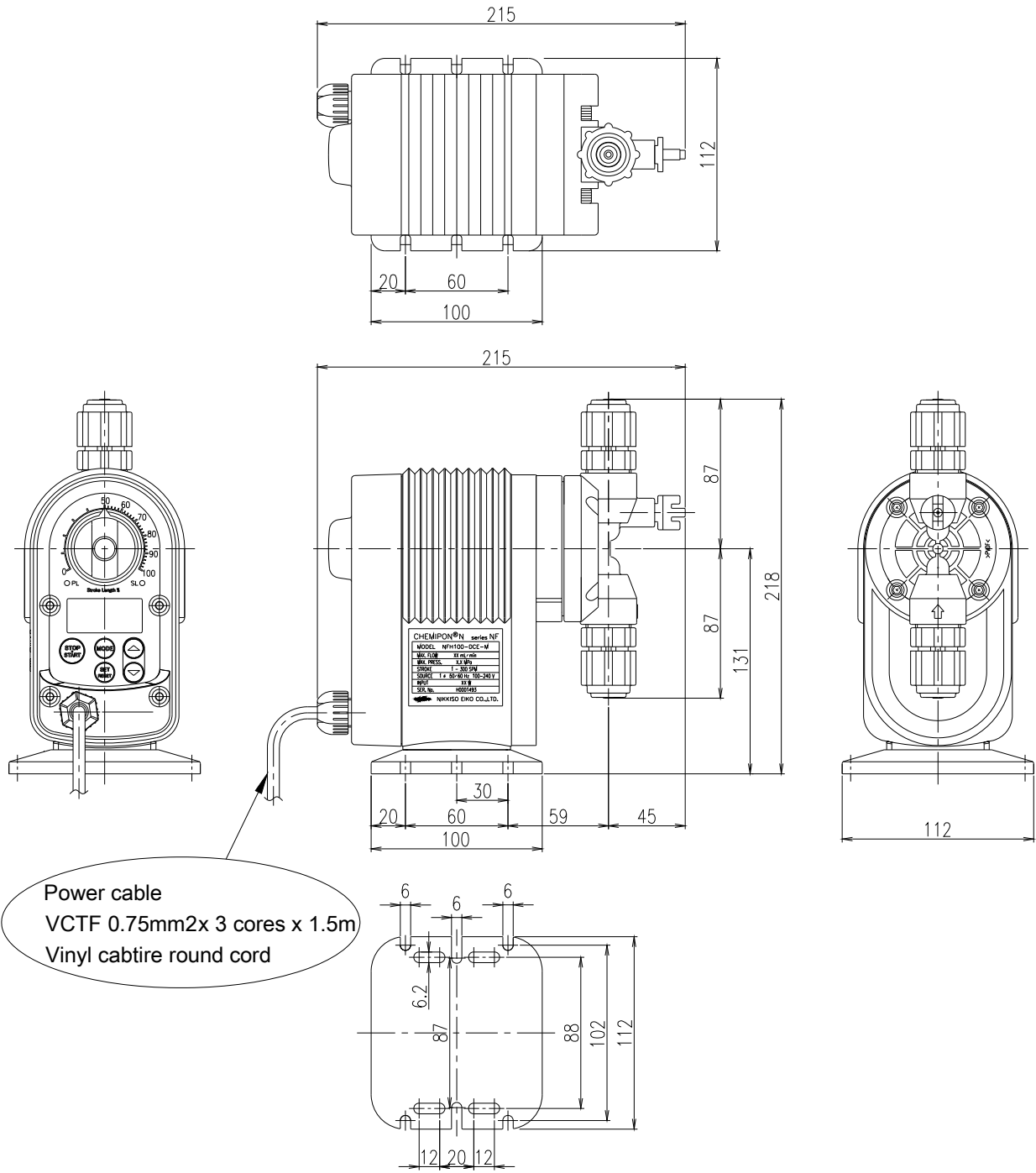
WARNING When handling chemicals, wear rubber gloves, a protective mask and protective glasses for safety.



DANGER Chemicals may result in serious bodily accidents or damage to equipment. Pay strict attention when handling chemicals.

16. Dimensional outline drawing

Fig. 16-1 Pump dimensional outline drawing



(Note 1)

The above figure shows a pump in which material of the diaphragm head is P2.

17. Warranty and repair

Warranty

This provision, if attached to the quotation, constitutes a quotation together with the specifications, and you are deemed to have approved each item described below as a part of the contract unless a written separate agreement has been made when the contract has been concluded. Even if part of this provision will not be applied by agreement with you, other items except for the associated items shall still become effective.

Warranty provision	SHUN EIKO CO., LTD.
1. Warranty	
1) Our warranty period based on this provision shall be one year from the delivery date of the object product from us. 2) If our product to be delivered has any failure due to a cause which is clearly judged to be based on a defect of our manufacturing or material, we will assume responsibility for this failure.	
2. Limit of warranty	
If it is confirmed by both you and us that any defect or trouble has occurred due to any of the following items, we will be free from warranty responsibility based on this provision and the other responsibility of any nature and any kind.	
1) If the object product was used under conditions different from our handling instructions, or specifications or the other normal usage. 2) If installation, piping, operation, running, repair or rework of the object product was improperly or inaccurately carried out by any person other than us. 3) If the object product was used for purpose or by usage not specified in the specifications or the product instruction manual. 4) If any failure or damage was caused due to chemical or fluid frictional corrosion by liquid to be handled. 5) If any failure or damage was caused due to a fact that there exists a defect in material of a part which does not directly contact the handling liquid which cannot be found by a normal technical level in the manufacturing process of the object product. 6) If any failure or damage was caused due to use of parts which we do not manufacture or do not specify. 7) If the object product was broken by frost in another status which is not under conditions that the tank discharge port is opened and water is discharged and then the inside is dried. 8) If occurrence of vibration and pressure increase in the piping system of the object product executed by us is due to another factor in the related system.	
3. Content of warranty	
Our warranty for the object product shall be limited to repair of defective parts or offering of replacement products by us. Please note that we will provide or replace parts such as packing, gaskets, bearings and filtering sand which have consumable characteristics at a charge even in the warranty period. If our technician is dispatched to the specified place and the defective parts are repaired or replaced by the technician based on your request, expense to dispatch our technician shall be separately paid. We will assume no responsibility of any nature and any kind for damages such as passive damage or indirect damage, spillover damage other than contracted objects and damage caused by nuclear accidents in addition to the Article 2	

Repair

If you find any abnormality during use of this pump, immediately stop operation and inspect whether it is due to failure. Refer to the section of “Causes of failure and remedy”.

- 1) When requesting repair, contact the dealer from which you ordered, or our nearest headquarters, branch or sales office listed on the back cover.
- 2) When requesting repair, inform us of “Pump model No. and serial No. described on the nameplate,” “Operating period and operating status” and “Failure location and its situation.”
- 3) When returning the pump to us for repair, make sure to sufficiently clean the inside of the pump before returning it because it is dangerous that the handled liquid remaining in the pump flows out during transportation.

