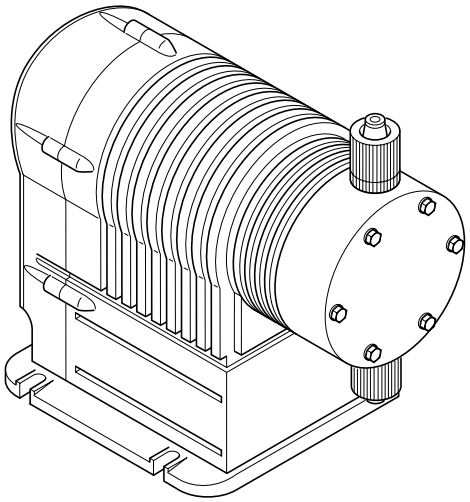
TACMINA

Solenoid-Driven Metering Pump

PZiG Series

USER'S MANUAL

Before beginning operation, read this User's Manual carefully! Ignoring the descriptions in this User's Manual and mishandling the unit may result in death or injury, or cause physical damage.



Applicable Models

PZiG-300
PZiG-500
PZiG-700
PZiG-1000
PZiG-1300

- Be sure to keep this User's Manual in a place where it will be easily available for reference.
- If the PZiG series pump you bought conforms to special specifications not described in this User's Manual, handle the pump according to details of separate meetings and drawings.

- TACMINA accepts no liability whatsoever for any damage caused by malfunction of this unit and other damage caused by use of this unit.

CE

For the Safe Use of This Product

This User's Manual is intended to help the operator to handle the product safely and correctly. In support of this aim, important safety-related instructions are classified as explained below.
Be sure to follow them at all times.

⚠ WARNING

- **If the product is operated incorrectly in contravention of this instruction, it is possible that an accident resulting in death of serious injury will occur.**

⚠ CAUTION

- **This indicates that improper operation can result in an injury or physical damage to the product.**

IMPORTANT

- **This indicates information that should always be followed to maximize the product's performance and service life.**

NOTE

- **This indicates supplementary explanations.**

Conditions of Use

⚠ WARNING

- **This pump cannot be used in explosion-proof areas, and in explosive/ignitable atmospheres.**

⚠ CAUTION

- **This pump can be used for injection of chemicals only. Do not use this pump for other applications. Doing so might cause accidents or malfunction.**
- **This pump cannot be used for transferring fluids that contain slurry.**
- **The discharge volume cannot be adjusted by operating valves on the discharge piping.**
- **This pump generates pulsation. Install a pulsation attenuator such as a damper.**
- **Do not use this pump outside the operating ranges indicated below. Doing so might cause malfunction.**

Ambient temperature	0 to 40°C*1	
Operating liquid temperature	0 to 40°C (freezing not allowed)	
Humidity	35 to 85% (freezing not allowed)	
Viscosity	Standard valve type	50 mPa • s or less
	High-viscosity valve type*2	1000 mPa • s or less
Max. discharge pressure	PZiG-300	1.0 MPa (0.5 MPa on the FTCT type with PTFE tube)
	PZiG-500	0.7 MPa (0.5 MPa on the FTCT type with PTFE tube)
	PZiG-700	0.4 MPa
	PZiG-1000	0.3 MPa
	PZiG-1300	0.2 MPa
Installation location	1000 m above sea level or less	

*1 The ambient temperature range is -10°C to 50°C during transportation and storage. Also, do not subject this pump to strong shock during transportation and storage.

*2 Install the chemical tank at a location higher than the pump using pressure boosting piping.
Also, note that the viscosity that can be transferred and the discharge volume change according to piping conditions and the nature of chemicals.

Transportation, Installation & Piping

⚠ WARNING

- **This pump is not made to explosion-proof specifications. Do not install this pump in explosion-proof areas or in explosive/inflammable atmospheres.**
- **Install this pump in a location where it will not come into contact with other people besides the operator.**
- **Reliably ground the ground terminal. Failure to do so might cause electric shock.**

⚠ CAUTION

- **Connect the piping to the pump correctly.**
- **If this pump is dropped or becomes damaged, contact us or your supplying agent. Continued use of this pump might cause an accident or damage.**
  TACMINA Europe Representative Office
  Hochstr.35,56235 Ransbach-Baumbach,Germany
  Tel.+49(0)2623-928-345 Fax.+49(0)2623-928-507 E-mail:trade@tacmina.com
- **Do not install this pump at humid or dusty location. Doing so might cause electric shock or malfunction.**
- **Be sure to connect and wire the ground lead (green) to prevent electric shock.**

- When a tightening valve is located on the discharge piping, and when there is a risk of blockage, be sure to install a relief valve on the piping immediately on the discharge side of this pump. When a valve has been tightened or foreign matter clogs the discharge piping of the pump, the pressure in the pump may increase beyond the range indicated in the pump specifications. This may result in chemicals spurting out, damage to the piping or malfunction of the pump, which are dangerous.
- To prevent chemical leakage from the relief valve return piping, return the tip of the piping to a tank or other receptacle.
- This pump is made to outdoor specifications. It is, however, made of plastic so try to avoid installing it at locations that will shorten its life (e.g. where it is exposed to direct sunlight or wind and rain).
- When using water-diluted solutions in cold areas, chemicals may freeze in the pump head or piping, damaging the pump and peripheral parts. Be sure to install heating apparatus or heat insulation.
- Water used in the pre-shipment test may remain on pump liquid-end parts. When using chemicals that generate gas or harden due to reaction with water, be sure to drain any water and allow liquid-end parts to dry before use.
- Generally, the pressure-resistant performance of hoses is impaired when they become hot. When using commercially available hoses, be sure to use hoses that can resist the operating temperature and pressure as well as being resistant to chemicals. Otherwise, the hoses may become damaged or chemicals may spray from the piping.
- The durability of hoses varies considerably depending on the chemical used, temperature, pressure, and UV rays. Inspect the piping, and replace it if it has deteriorated.
- Do not apply excessive force on the cover as it is made of plastic. Doing so might damage the cover.

Electrical Wiring

⚠ WARNING

- Do not operate this pump with wet hands. Doing so might result in electric shock.
- Do not turn the power ON during electrical wiring. Attach a "Work In Progress" label to the power switch.
- Reliably ground the ground terminal. Failure to do so might cause electric shock. Be sure to install a current leakage breaker.
- Do not disassemble the body or circuits.

⚠ CAUTION

- Electrical wiring must be performed by personnel such as an electrician having specialist knowledge.
- Check the power voltage before wiring. Do not wire a power supply outside of the rated voltage range.
- Be sure to ground the earth lead (green-yellow) when wiring to prevent electric shock.

Operation and Maintenance

⚠ WARNING

- Only the operator or administrator is allowed to operate this pump.
- Do not operate this pump with wet hands. Doing so might result in electric shock.
- If anything unusual occurs such as smoke or a burning smell during operation, immediately stop operation and contact your supplying agent. Failure to do so might result in fire, electric shock or damage to the product.
- Do not disassemble the body or circuits.
- During air release, chemicals spray forcefully from the tip of the piping. Either release air using water or other safe liquid, or return the tip of the air release piping to the tank. During this operation, either hold the air release hose by hand or secure it in position.
- When a valve has been tightened or foreign matter clogs the discharge piping of the pump, the pressure in the pump may increase beyond the range indicated in the pump specifications. This may result in chemicals spurting out, damage to the piping or malfunction of the pump, which are dangerous. Check the valves before the operation.

⚠ CAUTION

- Before disassembling liquid end parts for maintenance or repair, be sure to turn the power OFF and make sure that no voltage is being applied to the pump.
- Do not turn the power ON during electrical wiring. Attach a "Work In Progress" label to the power switch.
- When handling liquid-end sections, be sure to wear protective coverings (rubber gloves, mask, protective goggles, chemical-resistant overalls, etc.) appropriate for the chemicals be using used.
- Before maintaining or repairing the pump, be sure to release the discharge-side pressure, drain the chemicals from liquid-end sections, and wash the pump with water.
- Pump vibration sometimes causes hoses to become loose and disconnected. Before starting operation, make sure that tubes are secured in position and tightened.
- During operation, the surface of the pump sometimes reaches or exceeds 60°C. When touching the pump during operation, be sure to wear protective coverings that can resist high temperatures.
- Idling the pump for a long time may cause the pump to malfunction. Do not idle the pump for more than one hour.

Other

⚠ CAUTION

- **Do not remodel this pump.**
- **Adopt preventative measures such as a chemical drain ditch in case chemicals flood out of the pump. Also, install so that the chemical level does not rise up to the surface where the pump is installed.**
- **When disposing of used pumps, ask an authorized disposal expert to dispose of the pump in accordance with local laws and regulations.**

Checking the Product

When unpacking, please confirm the following items:

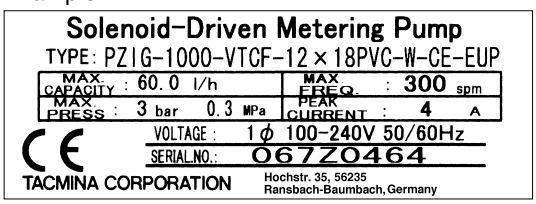
(1) Is the enclosed product the same model you ordered?

(2) Do the details on the pump nameplate match your order?

The pump nameplate contains the following information:

- Product name
- Type
- Maximum capacity
- Maximum pressure
- Stroke frequency
- Power supply
- Peak current
- Serial number

Example:



(3) Are all the accessories present and correct?

Please refer to the accessory list below.

(4) Can you detect any damage due to vibration or shock during transportation?

(5) Are there any loose or disconnected screws?

All TACMINA products are carefully checked prior to shipment. If, however, you find a defect, please contact your supplying agent.

■Accessory List

Connection	12 x 18PVC
Anti siphonal check valve	1 pc
Strainer	1 pc
Braided house	3 m (dia.12 x dia.18)
Pump fixing bolt	4 sets (M8 x 45, w/washers, nuts)
User's Manual	1 copy

Connection	FNPT1/2, FNPT3/4, MNPT3/4, VP20
Pump fixing bolt	4 sets (M8 x 45, w/washers, nuts)
User's Manual	1 copy

Connection	12 x 15PTFE
Anti siphonal check valve	1 pc
Strainer	1 pc
PTFE hose	3 m (dia.12 x dia.15)
Pump fixing bolt	4 sets (M8 x 45, w/washers, nuts)
User's Manual	1 copy

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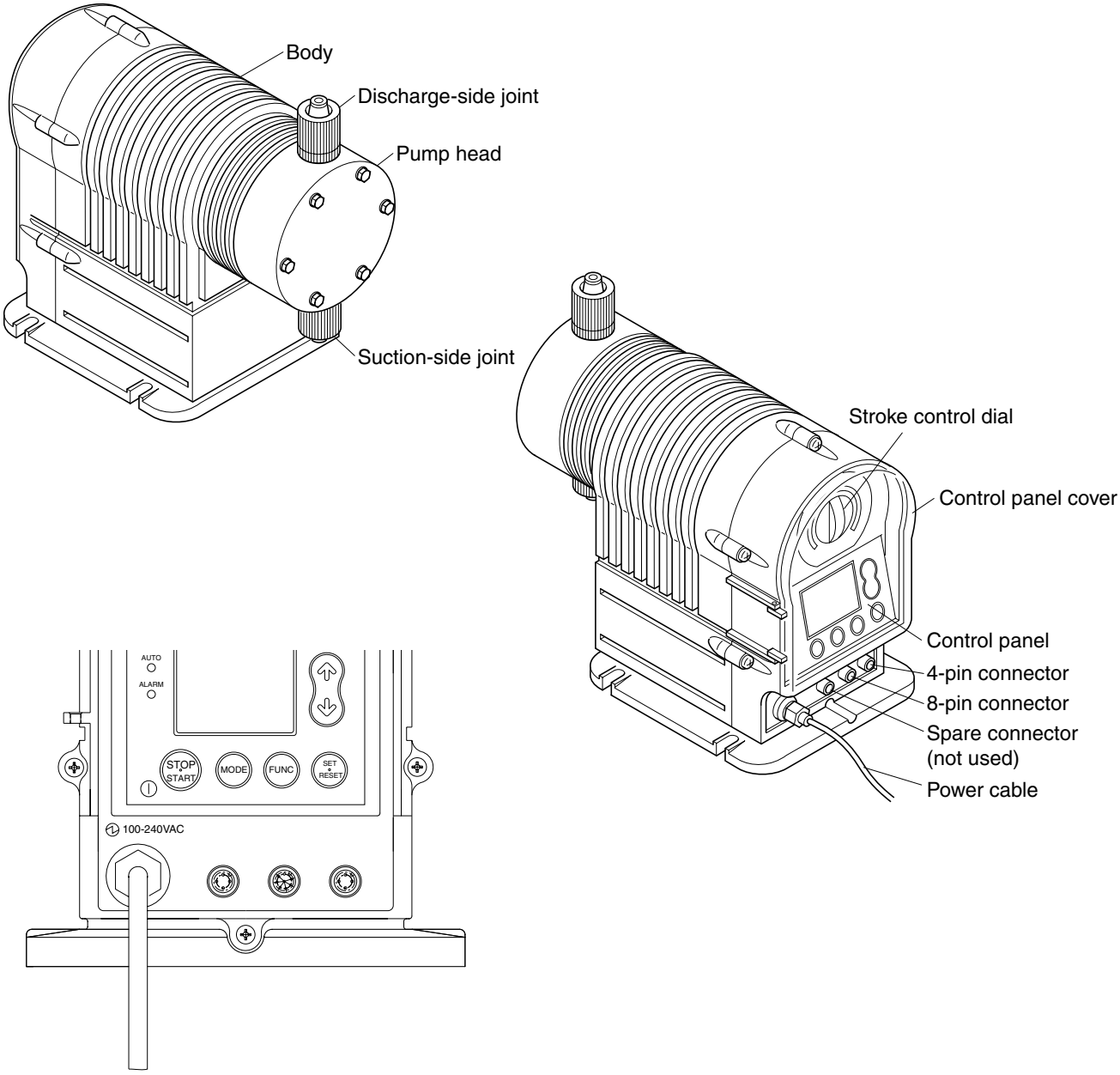
Explanation of Product

The metering pump PZiG Series accurately feeds a fixed amount of liquid for a fixed period of time. Liquid is fed by action of the check valve inside the pump head and volumetric changes in the pump head that occur by reciprocating motion of the diaphragm driven by the force of the electromagnet (solenoid). This structure ensures that the discharge volume per single operation of the pump is fixed. The pump can be used on a power supply within the voltage range 90 to 264 V. A CPU is located inside the pump, which means that various control action can be achieved by externally input signals and pre-input programs. Control action states can also be output to external devices.

Names of Parts



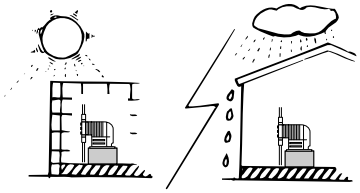
Installation

⚠ WARNING

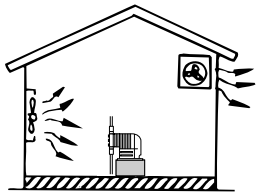
- **This pump is not designed to explosion-proof specifications. It cannot be used in explosion-proof areas, and in explosive/ignitable atmospheres.**
- **Install the pump in locations out of reach of personnel other than an administrator.**
- **If you have forgotten to open a valve or foreign objects are blocking the piping on the discharge-side of the pump, an excessive pressure rise that will exceed the pump's specification ranges may occur, liquid may spray out or piping may be damaged, which is dangerous.**

Installation Site

- Avoid installing the pump in the direct sunlight. Also, prevent it from being exposed to wind and rain. Though this pump is designed for outdoor use (IP65), temperature sometimes builds up on metal parts due to direct sunlight, plastic parts sometimes become impaired due to UV rays, and scratches and rusting sometimes occurs due to sand, dirt and rainfall. To extend the service life of the pump when it is installed outdoors, we recommend installing an awning or shade cover.

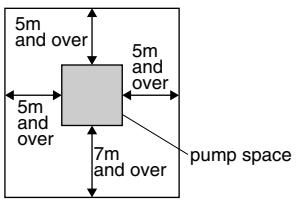


- Install the pump in a location that is well-ventilated during summer, and where chemicals will not freeze in winter.

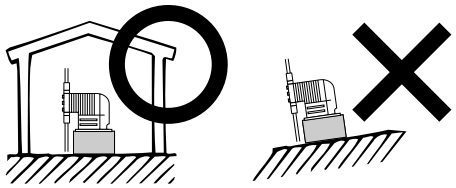


- Leave enough space to allow easy access for maintenance and inspection work.

- Maintenance space.

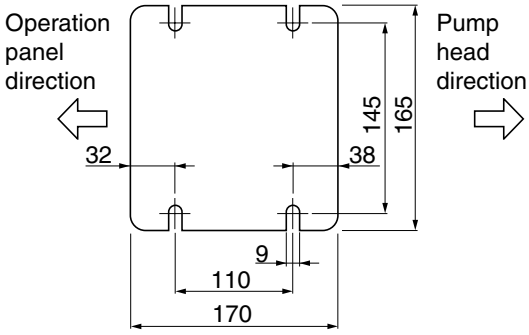


- Install the pump on a flat horizontal surface and fix it securely to prevent it from vibrating during operation. If the pump is installed on an inclined surface, the pump may not be able to discharge properly or at all.



Position of Installation Bolts

Use the four pump fixing bolts (supplied) to secure the pump in position.



Piping

This section mainly describes hose connection type piping.
Contact TACMINA separately for details of other types of piping.

Requests during Piping

●Pulsation

- The hoses on this pump vibrate as this pump generates pulsation. Secure this pump in such a way that hoses do not vibrate.
- We recommend installing a damper to reduce pulsation. Contact TACMINA separately.

●Length of Piping

- If the hose is too long, pressure loss might increase, causing the pump's permissible pressure to be exceeded and overfeed to occur or the pulsation to occur on the piping.
- A total of three meters of hose is provided on the discharge and suction side. In particular, when extending the discharge-side piping beyond two meters, pressure loss might exceed the pump's maximum discharge pressure. So, a damper must be installed or thicker piping must be provided. Notify your supplying agent of (1) viscosity of the liquid, (2) length (positional relationship) of the piping, (3) specific gravity of the liquid, and other information. On the 1300 type, when extending the discharge-side piping beyond two meters, be sure to install a damper. Select a damper and the optimum piping size.

●Maintenance

- When removing hoses during maintenance, for example, and the same hose is to be used again, cut the tip of the hose by about 10 mm before inserting it.
- Before performing maintenance, open the discharge-side piping to release pressure to the air.

●Bending Hoses

- Provide sufficient margin (in the case of 12 × 18 mm dia. PVC braided hose, a radius of 100 mm or more) to prevent the hose from folding.
  Prevent hoses from being folded, rubbed, cut, or trodden on. Failure to do so might damage the hose.
- Minimize bending of hoses that might lead to piping becoming bent or resistance occurring in the flow in joints, for example.

Piping

The following examples show layouts for a hose connection type pump.

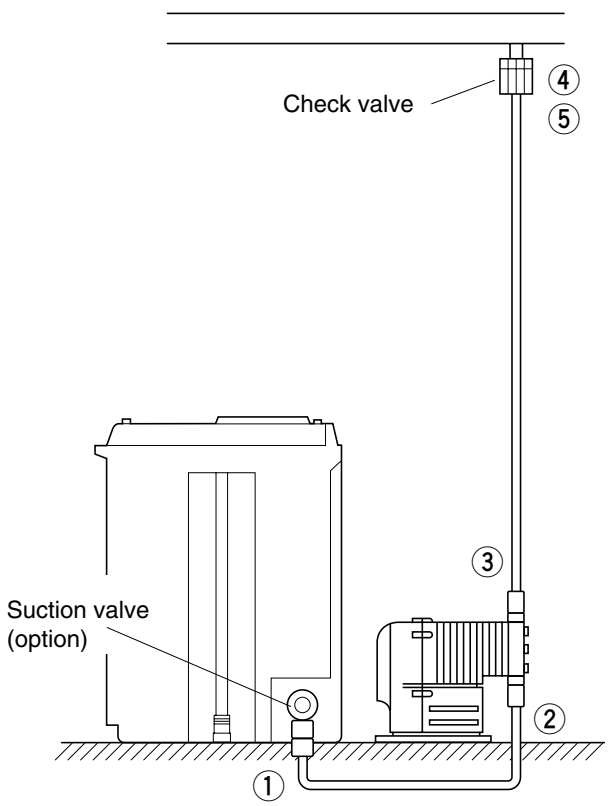
Flooded Installation

●Floor installation procedure

The following explains an example where a TACMINA tank is used.

①Remove the hose nut on the tank side, pass the suction-side hose through the nut, connect the hose to the suction valve on the tank, and tighten the hose nut.
②Connect the hose to the suction-side hose joint on the pump by the same procedure as in (1) above.
③In the same way, connect the discharge-side hose to the discharge-side hose joint on the pump.
④Install the anti siphonal check valve at the injection point.
⑤Connect the discharge-side hose to the anti siphonal check valve.

- We recommend installing a relief valve for automatically releasing abnormal pressure to air in the discharge-side piping.
- Install a pressure gage on the discharge-side piping to measure the pressure on the pump's discharge side.
- Install the pump as close as possible to the chemical tank.
  If the suction-side piping is too long, cavitation sometimes occurs and metering performance can no longer be ensured.



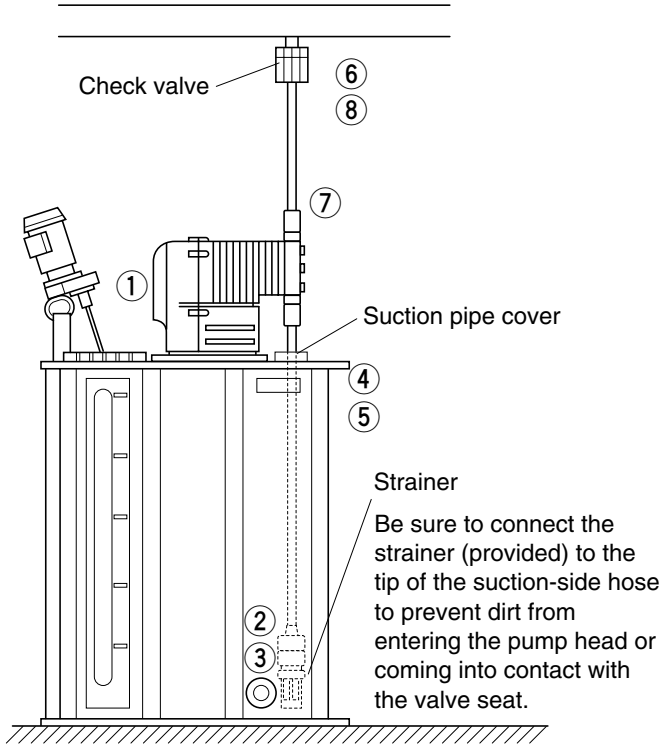
Suction-lift Installation

●Tank-top installation procedure

The following explains an example where a TACMINA tank is used.

- Installing the pump on a chemical tank containing chemicals that are likely to generate bubbles is not recommended.
- The suction height of this pump is -1.5 m. The suction capabilities of this pump may be impaired if the valve seat in the pump head is dry.

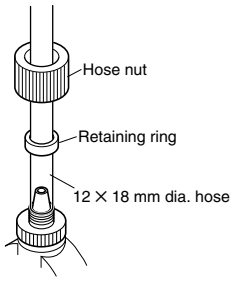
①Secure the pump at the specified position on the top of the tank using the fixing bolts (provided).
②Remove the hose nut from the strainer, pass the hose through the nut and install the strainer.
③Cut the hose so that the strainer is 30 mm above the tank bottom.
④Pass the hose through the suction pipe cover and pump's suction-side hose nut, and connect the hose to the suction-side joint on the pump.
⑤Set the suction pipe cover in position.
⑥Install the anti siphonal check valve at the injection point.
⑦Pass the discharge-side hose through the hose nut, and connect to the discharge-side hose joint on the pump.
⑧Connect the discharge-side hose to the anti siphonal check valve.



Piping

Hose Connections

- Insert hoses sufficiently and firmly tighten hose nuts to prevent hoses from becoming disconnected. Do not tighten them with a tool using excessive force. Doing so might damage the hose.
- When liquid temperature or ambient environmental temperature is higher than room temperature, hoses may become disconnected. Re-tighten nuts as required after pump operation is started.
- When tightening the hose nut, hold the hose firmly to prevent it from twisting. The return force of the hose sometimes causes the tightening section to become loose.



Anti Siphonal Check Valve

An anti siphonal check valve is provided with this pump. Use this anti siphonal check valve as long as it does obstruct operation (except for high-viscosity chemicals). Be sure to install the anti siphonal check valve in the following instances.

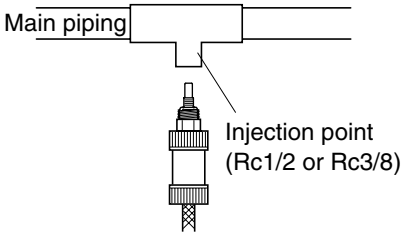
- When the injection point is open to air and chemicals are injected at a position lower then the level of chemicals in the chemical tank (to prevent siphoning)
- When injecting chemicals to the suction-side piping of a centrifugal pump, for example
- When a lot of chemicals exceeding the rated discharge volume are transferred (to prevent overfeeding)
- Overfeeding may occur if piping is too long even on the ascending piping.

●Installing the anti siphonal check valve (VTCE/VTCF)

* In the case of FTCT, though the shape differs the procedure is almost the same.

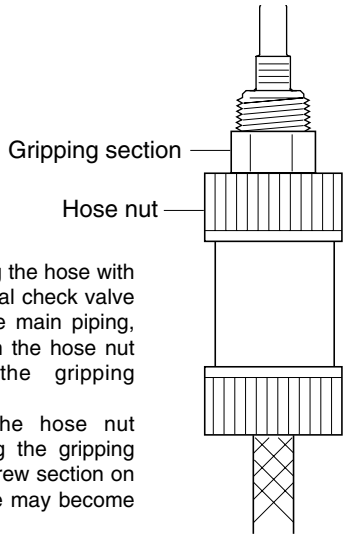
①**Provide an Rc3/8, 1/2 female screw at the injection point.**

The R1/2 or R3/8 male screw on the anti siphonal check valve is already cut.



②**Wrap sealing tape around the male screw of the anti siphonal check valve and screw the screw into the injection point.**

If it is difficult to screw in the screw, grip the gripping section of the nozzle with pliers or a similar tool, and re-tighten lightly.

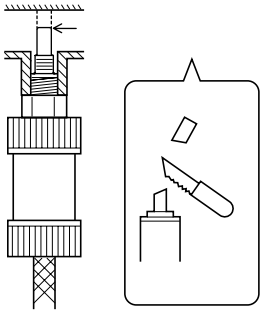


When installing the hose with the anti siphonal check valve attached to the main piping, be sure to turn the hose nut by holding the gripping section.
If you turn the hose nut without holding the gripping section, the screw section on the nozzle side may become damaged.

POINT

When injecting chemicals into slender piping, cut the tip of the injection nozzle as required before use.

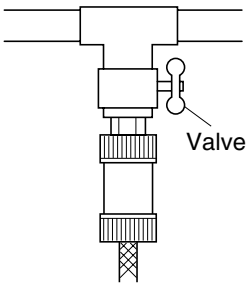
Cut the tip so that it is positioned at the center of the piping into which chemicals are to be injected.



When the injection nozzle is too long compared with the piping aperture, cut the dotted section in the figure before use.

We recommend installing the anti siphonal check valve via a valve, for example, for maintenance.

Provide an Rc1/2 or Rc3/8 female screw and screw in.
Use a valve made of a material that is resistant to the chemicals to be used.



Electrical Wiring

⚠ WARNING

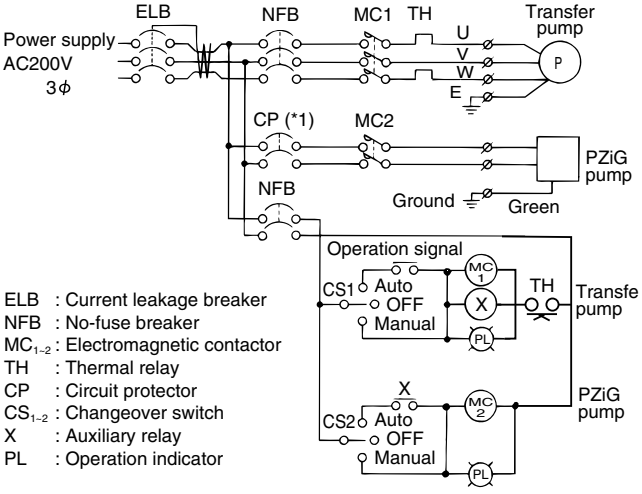
- **Do not operate this pump with wet hands. Doing so might result in electric shock.**
- **Do not turn the power ON during electrical wiring. Attach a "Work In Progress" label to the power switch.**
- **Reliably ground the earth terminal. Failure to do so might result in electric shock. Be sure to install a current leakage breaker.**
- **Do not disassemble the body or circuits.**

⚠ CAUTION

- **Electrical wiring must be performed by personnel such as an electrician having specialist knowledge.**
- **Check the power voltage before wiring. Do not wire a power supply outside of the rated voltage range.**
- **Be sure to ground the earth lead (green) when wiring to prevent electric shock.**

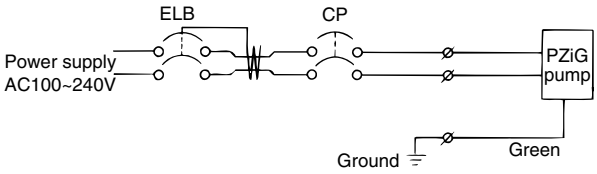
Wiring Example

●When operating the pump interlocked with a transfer pump



ELB : Current leakage breaker
NFB : No-fuse breaker
MC_{1-2} : Electromagnetic contactor
TH : Thermal relay
CP : Circuit protector
CS_{1-2} : Changeover switch
X : Auxiliary relay
PL : Operation indicator

●Standalone operation

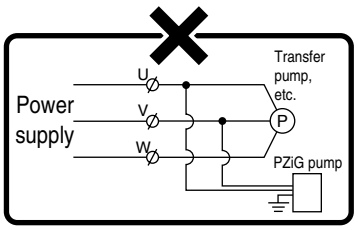


NOTE

- A circuit protector (CP) is ideal as an overcurrent protection device on this pump from the aspects of operating time and shutoff current characteristics. (5 A medium-speed type)
- The circuit protector indicated as a recommended protective device can also be used as a power supply switch, which simplifies wiring.
- A thermal relay for a motor is unsuitable for protection of this pump from the aspect of characteristics.

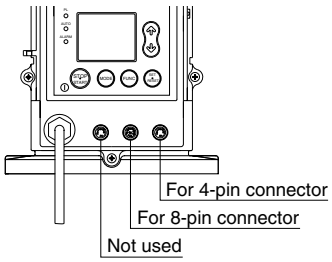
IMPORTANT

- Be sure to use a commercial power supply (power supplied from an electric power company) as the power supply.
- Power supplies that cannot be used:
  1.Power supply equipped with an AC power regulator
  2.Power supply on the output side of the inverter
- Do not take power in from the same terminal as an induction motor (e.g. transfer pump).
  A high voltage may be generated, for example, when the power is turned OFF and damages the pump.



Electrical Wiring

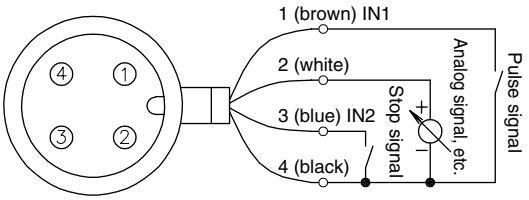
Signal Lead Connections



A 4-pin/8-pin separation-type connector is used for the signal connections on this pump. The signal lead used is a multi-core round tough-rubber sheath cable. Though the size of the signal lead differs according to the number of signals to be used, select a signal lead that meets the following criteria:

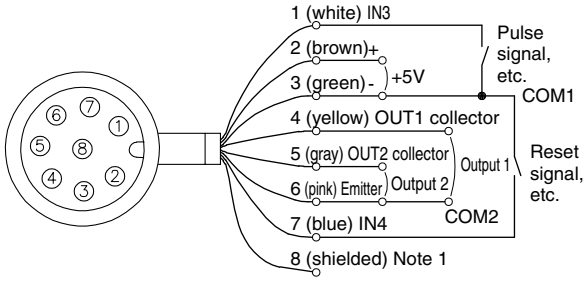
- Cross-sectional area of 0.5 mm² or more
- O.D. 5 to 10 mm dia.

(Example) 4-pin connector, OMRON XS2F-D421-D80A



1 (brown) : Pulse input (IN1)
2 (white) : Analog input (4 to 20 mA)
3 (blue) : Pulse input (IN2)
4 (black) : Common (COM1)

(Example) 8-pin connector, OMRON XF2F-D821-GHO-C (2 m)

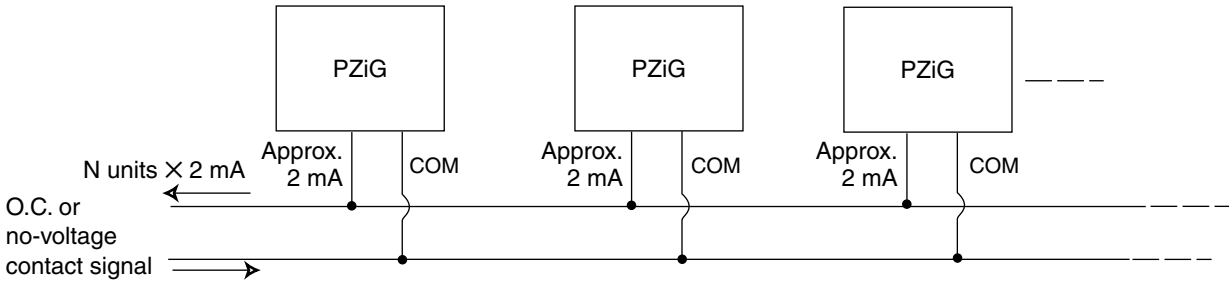


1 (white) : Digital input (IN3, high speed)
2 (brown) : +5 V power (sensor power supply)
3 (green) : Input common (COM1)
4 (yellow) : Output 1 (OUT1, open collector)
5 (gray) : Output 2 (OUT2, open collector)
6 (pink) : Output common (COM2)
7 (blue) : Digital input (IN4, low speed)
8 (shielded): Shielded

NOTE1: Keep "8" shield open without connecting to the ground.
NOTE2: Above pin layout shows the connector side. Accordingly the pump side should be viewed reversed.

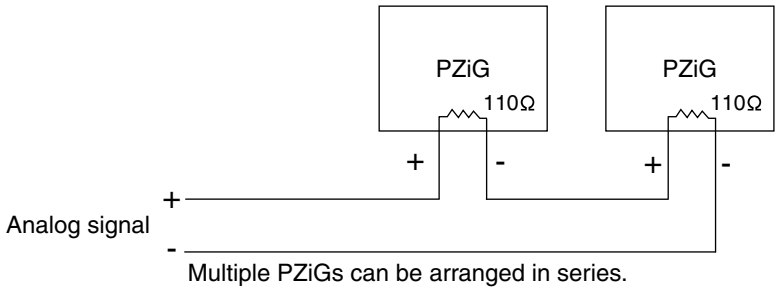
Distribution of Signal Leads

●Pulse signal



Multiple PZiGs can be connected in parallel.

●Analog signal

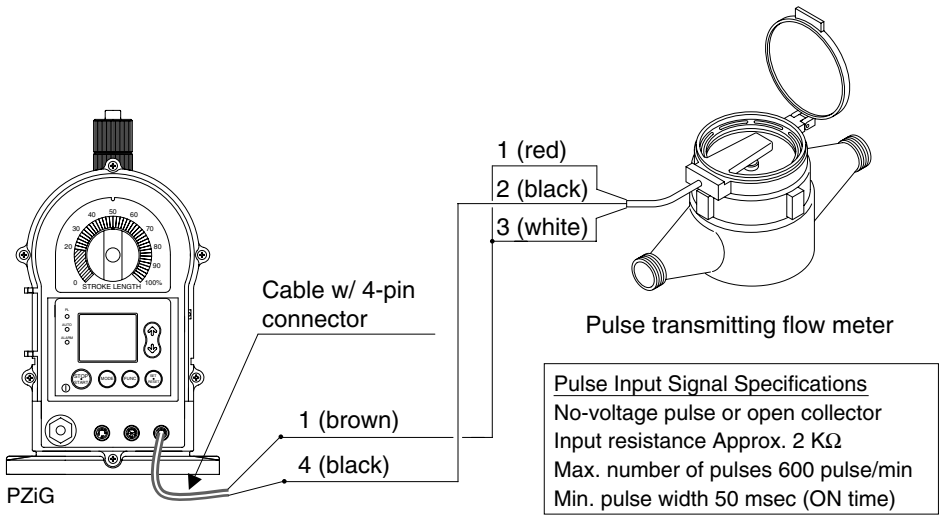


Multiple PZiGs can be arranged in series.

Electrical Wiring

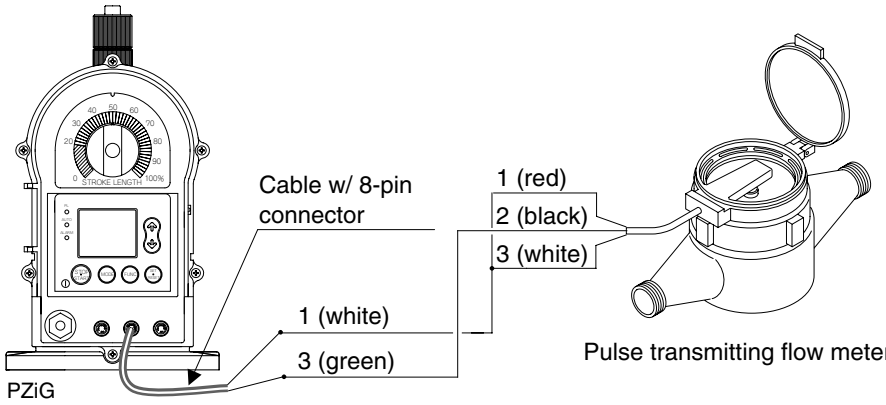
Connection to a TACMINA Pulse Transmitting Flow Meter

- Cable w/ 4-pin connector
  Bring leads 1 (red) and 3 (white) of the 3-core cable provided with the flow meter together, and connect them to lead 1 (brown) of the cable w/ 4-pin connector on the PZiG.
  Connect lead 2 (black) to lead 4 (black) of the same cable w/ 4-pin connector.



Pulse Input Signal Specifications
No-voltage pulse or open collector
Input resistance Approx. 2 KΩ
Max. number of pulses 600 pulse/min
Min. pulse width 50 msec (ON time)

- Cable w/ 8-pole connector
  Bring leads 1 (red) and 3 (white) of the 3-core cable provided with the flow meter together, and connect them to lead 1 (white) of the cable w/ 8-pin connector on the PZiG.
  Connect lead 2 (black) to lead 3 (green) of the same cable w/ 8-pin connector.



To receive pulse inputs by an 8-pin connector, the pump parameters must be changed.
(in the case of default parameter settings)

[How to change parameter settings]

1. Stop pump operation in the manual mode.
2. Hold down the ⇧ key with the (SET/RESET) key held down.
3. Display [P-02] by the ⇧⇩ keys.
4. Press the (SET/RESET) key and set the parameter number to [0] by the ⇧⇩ keys.
5. Press the (SET/RESET) key to apply the setting, and set to the [P-04] display by the ⇧⇩ keys.
6. Press the (SET/RESET) key and change the number to [1] by the ⇧⇩ keys.
7. Press the (SET/RESET) key to apply the setting, and press the (FUNC) key to return to the previous screen.

* The pump can be connected to multiple flow meters in parallel.

Operation

⚠ WARNING

- **When handling liquid-end sections, be sure to wear protective coverings (rubber gloves, mask, protective goggles, chemical-resistant overalls, etc.) appropriate for the chemicals be using used.**
- **If you forget to open the discharge-side valve or if foreign matter clogs the discharge-side piping, the pressure in the pump and pump head may increase beyond the range indicated in the pump specifications. This may result in the chemical leaking or spurting out, or in damage to the pump or piping. Check valves before starting pump operation.**

Check the following:

Before Operation

Check Point	Details to Check	Remarks
Chemical tank	Make sure that there are sufficient chemicals in the chemical tank. Replenish the chemical tank if necessary.	Pay particular attention when handling chemicals or performing processes that are adversely affected by contact with air.
Piping	Check the piping for any disconnections, liquid leaks caused by damage to piping. Reconnect or repair damage if necessary.	
Valves (suction side and discharge side)	Make sure that valves on the suction side and discharge side are open. Open any closed valves.	Closed valves may cause pressure to build up, chemicals to spurt out or damage piping.
Power supply	Make sure that the pump is connected correctly to the specified power supply.	The electronic circuit or solenoid may seize.
Electrical wiring - signal	Check for wrong connections.	Wrong connections may cause short circuits or electrical leakage.

During Operation

Check Point	Details to Check	Remarks
Pump head	Check for chemical leaks from the hole at the bottom of the auxiliary ring on the rear of the pump head.	If a chemical leaks, the diaphragm may be damaged. So, inspect the diaphragm.
Joints - hoses	Check for liquid leakage or looseness.	If there are chemical leaks, re-tighten joints. If this does not correct the chemical leaks, inspect each of the O-rings.
Discharge-side pressure	Check the needle of the pressure gage on the pump discharge side.	If an abnormal numerical value is indicated, the piping may be clogged or valves may be blocked. Inspect the piping also.

- **When using the pump for the first time**
- **When restarting the pump after prolonged downtime**
- **When gas lock is occurring on the pump**
- **When the chemical tank is empty, for example, when the chemical tank is replaced**

→ **Release air (page 14)**

- **When using the pump for the first time**
- **When changing the discharge volume**

→ **Adjust the discharge volume (page 14)**

- **When stopping operation for a long time**
- **When restarting the pump after prolonged downtime**

→ **When stopping operation for a long time (page 25)**

Air Release

⚠ WARNING

- **During air release, chemicals spray forcefully from the tip of the piping. Either release air using water or other safe liquid, or return the tip of the air release piping to the tank.**

IMPORTANT

- Release air before pump operation when using the pump for the first time or when replacing the chemical container.

Release Air by the Following Procedure

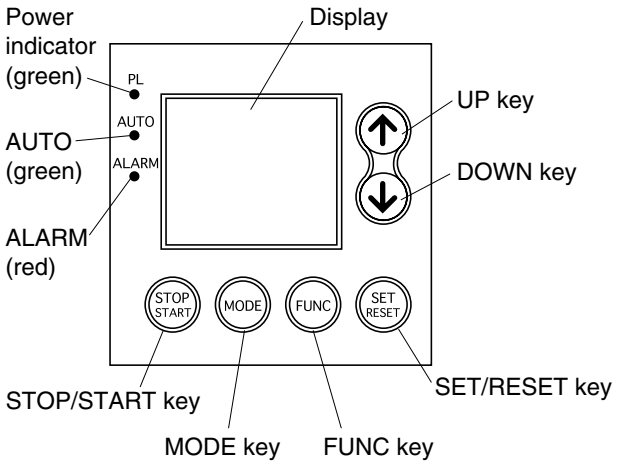
(1) Release the pressure on the discharge-side piping to air.
(2) Set the scale on the stroke length adjusting dial on the operation panel to 100%.
(3) Turn the pump ON, set the number of strokes to 300 spm (100% or maximum discharge volume) and press the start button.

Setting the Discharge Volume

Outline

On the PZG, the discharge volume can be set by performing the following setup on the operation panel. Before you set the discharge volume, calibration must be performed, and the maximum discharge volume per minute must be set in advance. For details on the calibration method, see "Calibration" (page 16).

Operation Panel



- **Manual mode** Sets the strokes (spm, %) or discharge volume (mL/min).
- **Analog mode** The stroke spm is varied by an external signal (analog signal) to control the discharge volume.
- **Pulse mode** The stroke spm is varied by an external signal (pulse signal) to control the discharge volume.
- **Counter mode** Pump operation is performed for the number of preset strokes after the start signal is received to control the discharge volume.
- **Interval mode** Pump operation is turned ON/OFF using an internal timer function to control the discharge volume.

How to Apply/Cancel Selections by the UP/DOWN Keys

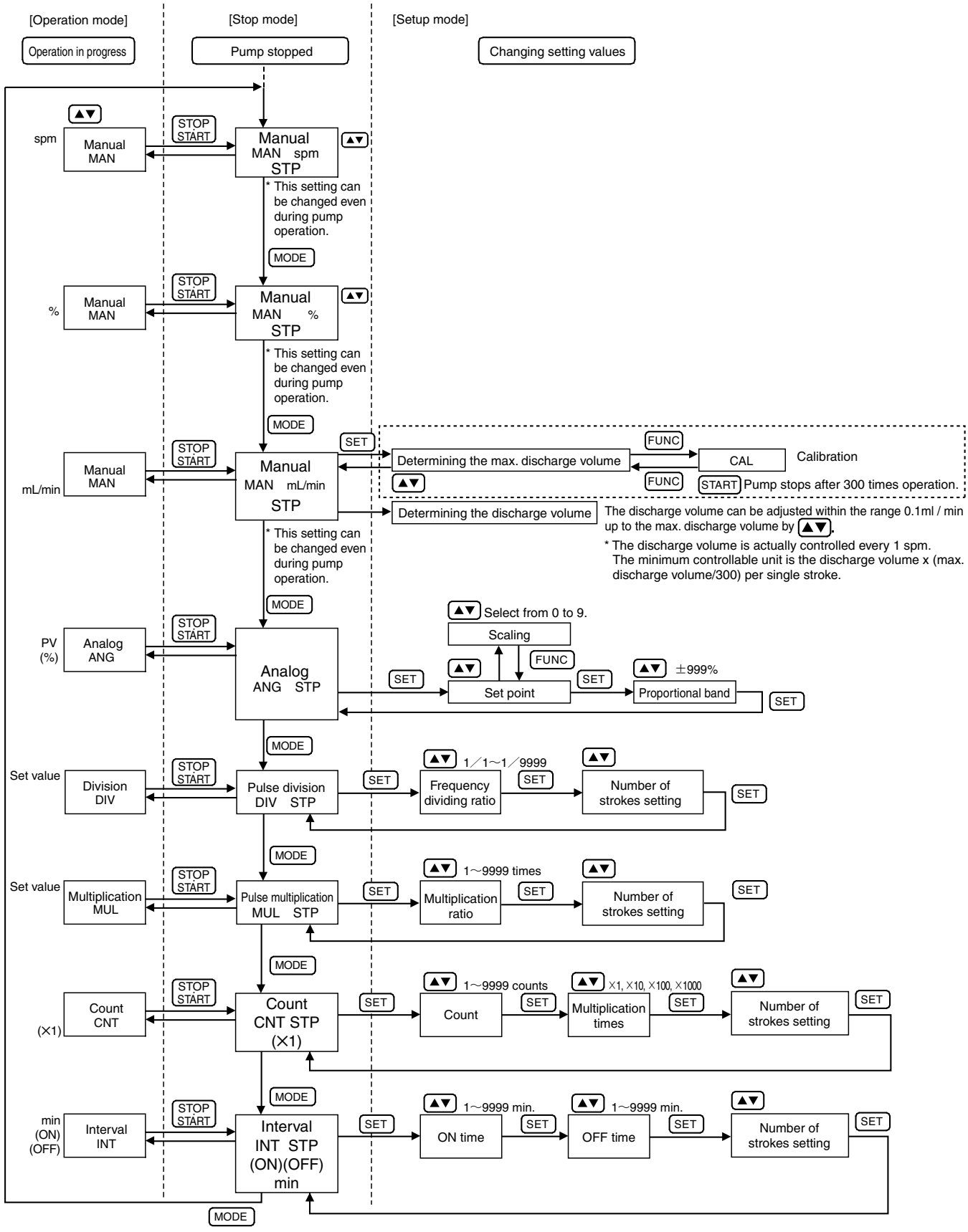
Table shows how to apply or cancel the contents that were input using the UP/DOWN keys.

Mode	To Apply	To Cancel
Calibration Analog Pulse (division/multiplication) Count Interval	Press the SET key.	Do nothing for 5 seconds.
Manual mode	Do nothing for 2 seconds.	To cancel, return the settings to their original settings.
Scaling (analog mode)	Press the FUNC key.	Return the settings to their original settings.

Setting the Discharge Volume

Operation Flow

Before changing the mode, stop pump operation and then press the MODE key.



* Can be changed by the ▲▼ keys also while pump operation is stopped or during pump operation. (Determine when the numeric value changed from blinking to light on.)

Setting the Discharge Volume

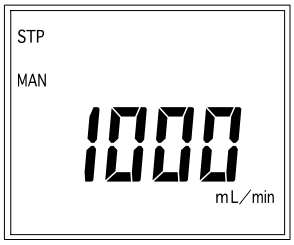
Calibration

The calibration procedure is as follows. The figures below are for a PZiG-1000.

(1) Install the pump and pump to match the actual piping conditions, and set to the trial operation mode

(2) Pour the solution to be actually used into a measuring utensil (e.g. graduated cylinder) capable of measuring the maximum discharge volume per minute of pump operation.

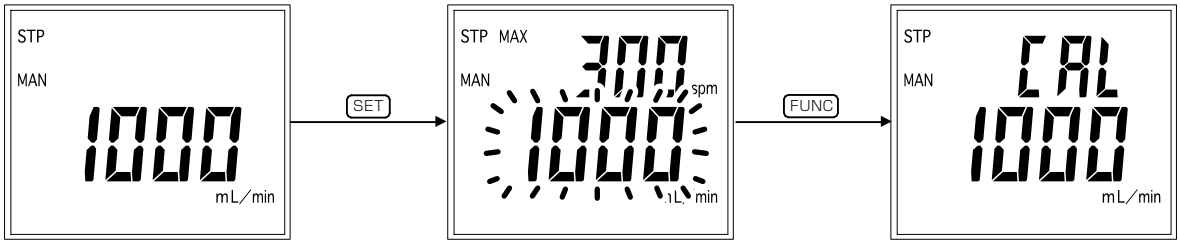
(3) Insert the suction-side end of the pump piping into the graduated cylinder, and release air.
* It is more convenient to use the measuring piping if this is provided on the tank.



(4) Turn the stroke length adjusting dial to set the actual stroke length to be used. Do not change the stroke length after the maximum discharge volume has been set.

(5) Press the MODE key several times until the display changes to mL/min.
If the pump is operating, press the STOP key to stop pump operation before performing this operation.

(6) Press the SET key to display the discharge volume setup screen. Press the FUNC key to enter the calibration mode.

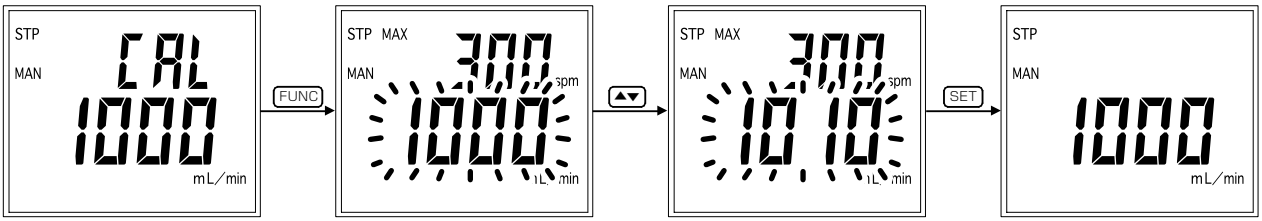


(7) Note down the level of the solution in the graduated cylinder.

(8) Press the START key.
The pump operates for one minute (300 times) and comes to a stop.

(9) Check the level of the solution in the graduated cylinder, and measure the amount of decrease of the solution.

(10) Press the FUNC to return to the discharge volume setup screen.



(11) Press the UP/DOWN key to set to the value calculated in step (9). (when the measurement value is 1010 mL)

(12) Press the SET to return to the discharge volume setup screen.

Remarks

When the screen returns to the discharge volume setup screen, the discharge volume setting value will not change. However, the stroke spm of the pump has changed.

(13) Set the discharge volume as necessary using the UP/DOWN key.

(14) Turn the pump OFF, and restore the piping.

■Calibration

The specification capability of this pump is the maximum discharge volume at 300 strokes (on the PZiG-1000, 1000 mL/min). However, the discharge volume does not always match the actual discharge volume depending on the operating conditions, product differences, and stroke length setting.

For this reason, the actual discharge volume per 300 strokes is measured, and the maximum discharge volume is stored to the pump's memory. This eliminates any error between the preset discharge volume on screen and the actual discharge volume.

Setting the Discharge Volume

Manual Mode

●Basic operation

In the manual mode, the discharge volume can be set by the following methods:

- By changing the stroke spm (1 to 300 spm)
- By changing the ratio (1 to 100%)
- By changing the discharge volume (0.1 to maximum discharge volume mL/min)

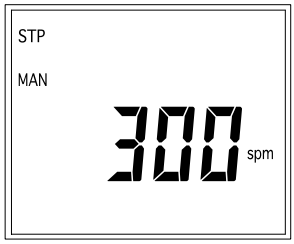
●Purpose of use

The manual mode is used for the following purposes:

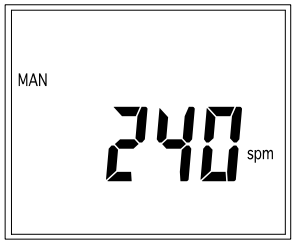
- Regular operation
- Test operation during pump installation, for example
- Provisional operation during an abnormality (e.g. signals are not output) in automatic operation

●Operation panel display

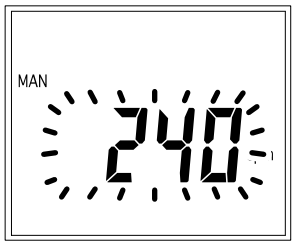
During pump stoppage



During pump operation



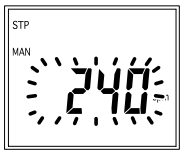
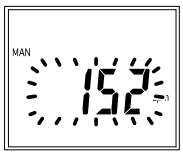
During setup



●External stop signal

Basically, there is no need to supply signals from the outside in the manual mode. However, operation can be paused by a stop input (continuous signal) from the outside.

Setting Manual Mode (changing the number of strokes)

Display	Operation	Explanation
	START / STOP	In the manual mode, the number of strokes can be changed during pump operation or when pump operation has stopped.
	MODE	In other modes, stop pump operation by the STOP key, and press the MODE key several times to set the manual mode.
		Default is 300 spm.
	⇑⇓	Press the UP/DOWN key to set the number of strokes within the range 0 to 300 spm. (in single step increments)
		The number of strokes (spm) blinks.
		If you do not touch any of the keys for two seconds after setting the number of strokes, the numerical value you entered is determined, and the number of strokes stops blinking and lights.
		This completes changing of the setting value.
	START / STOP	If the pump has stopped, press the START key to start operation.
		The pump enters the run mode, and STP goes out.
		* If the screen on the left is displayed during pump operation, the number of strokes can be changed. Press the UP/DOWN key to change the number of strokes.
	⇑⇓	
		If you do not touch any of the keys for two seconds after changing the number of strokes, the change is reflected.

Setting the Discharge Volume

Setting Manual Mode (changing the ratio)

Display	Operation	Explanation
	START / STOP	In the manual mode, the ratio can be changed during pump operation or when pump operation has stopped.
STP MAN 100 %	MODE	In other modes, stop pump operation by the STOP key, and press the MODE key several times to set the manual mode.
		Default is 100%.
		Press the UP/DOWN key to set the ratio within the range 1 to 100 %. (in 1% step increments)
STP MAN 60 %		The number of % blinks.
		If you do not touch any of the keys for two seconds after setting, the numerical value you entered is determined, and the number stops blinking and lights.
STP MAN 60 %		This completes changing of the setting value.
	START / STOP	If the pump has stopped, press the START key to start operation.
MAN 60 %		The pump enters the run mode, and STP goes out.
		* If the screen on the left is displayed during pump operation, the number of % can be changed. Press the UP/DOWN key to change the ratio.
MAN 85 %		If you do not touch any of the keys for two seconds after changing the ratio, the change is reflected.

Setting Manual Mode (changing the discharge volume)

Display	Operation	Explanation
	START / STOP	In the manual mode, the discharge volume can be changed during pump operation or when pump operation has stopped.
STP MAN 1000 mL/min	MODE	In other modes, stop pump operation by the STOP key, and press the MODE key several times to set the manual mode.
		Default varies depending on the model.
		Press the UP/DOWN key to set the discharge volume within the range 0.1 to the maximum discharge volume mL/min*1. (in 0.1mL/min. step increments)
STP MAN 666.7 mL/min		The number of mL/min. blinks.
		If you do not touch any of the keys for two seconds after setting, the numerical value you entered is determined, and the number stops blinking and lights.
STP MAN 666.7 mL/min		This completes changing of the setting value.
	START / STOP	If the pump has stopped, press the START key to start operation.
MAN 666.7 mL/min		The pump enters the run mode, and STP goes out.
		* If the screen on the left is displayed during pump operation, the number of mL/min. can be changed. Press the UP/DOWN key to change the discharge volume.
MAN 196.7 mL/min		If you do not touch any of the keys for two seconds after changing the number, the change is reflected.

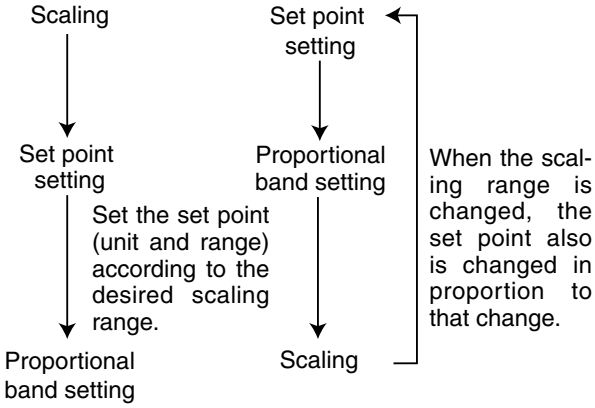
*1 The discharge volume is actually controlled every 1 spm.
The minimum controllable unit is the discharge volume x (max. discharge volume/300) per single stroke.

Setting the Discharge Volume

Analog Mode

In the analog mode, analog signals from an external device are received, and automatic operation is performed within the range 0 to 300 spm according to the setting values (set point (SP), and proportional band (PB)).
First, perform scaling according to the application of this pump, and then set the set point. Set the ramp of the stroke with respect to analog output as a proportional band (increment value: 1 to 999%, and decrement value: -1 to -999%), and linearly vary the number of strokes according to the analog input signal from the external device.

●Relationship between scaling and set point/proportional band



●Scaling

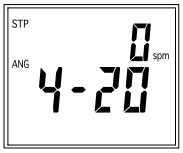
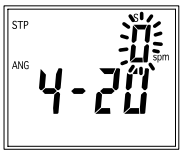
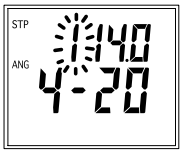
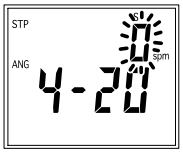
Normally, perform scaling before setting the set point. Set points matched to the target application can be set by performing scaling. Scaling details can also be changed after the set point is set. However, in this case, the target value is automatically changed according to the newly changed scaling details.
The following summarizes the scaling ranges that can be selected.

●List of scaling selections

No.	Scaling Range	Indication on Operation Panel	Settable Unit	Application
0	0 to 100	0 100 %	1 step (Step 1)	Standard
1	0.0 to 14.0	1 14.0	0.1 step (Step 0.1)	pH
2	0.00 to 1.00	2 1.00	0.01 step (Step 0.01)	Residual chlorine
3	0.00 to 2.00	3 2.00	0.01 step (Step 0.01)	Residual chlorine
4	0.00 to 5.00	4 5.00	0.01 step (Step 0.01)	Residual chlorine
5	0.0 to 10.0	5 10.0	0.1 step (Step 0.1)	Residual chlorine
6	0.0 to 20.0	6 20.0	0.1 step (Step 0.1)	Residual chlorine
7	0.0 to 50.0	7 50.0	0.1 step (Step 0.1)	Residual chlorine
8	0 to 100	8 100	1 step (Step 1)	Residual chlorine
9	0 to 200	9 200	1 step (Step 1)	Residual chlorine

* On the operation panel, the selected scaling No. and the maximum value of the scaling range are displayed.

Setting Scaling in the Analog Mode

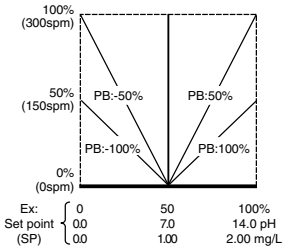
Display	Operation	Explanation
	START / STOP	If the pump is operating, press the STOP key to stop pump operation.
	MODE	If the screen on the left is not displayed, press the MODE key until it is displayed.
	SET RESET	Press the SET key with pump operation stopped to enter the set point setting screen.
		
	FUNC	Press the FUNC key to enter the scaling change screen. The screen on the left shows that scaling No.1: 0.0 to 14.0 is currently selected. For details on scaling selection details, refer to the "List of scaling selections."
		
	⇧ ⇩	Press the UP/DOWN key to select scaling.
	FUNC	Press the FUNC key to apply the selected details. When a scaling No. has been changed to a different No., the scale of the set point is automatically changed. Next, set the set point. Proceed to "Set the set point by the UP/DOWN key" on the 11th line of "Setting Set Point/Proportional Band in the Analog Mode" on the following page.
		

Setting the Discharge Volume

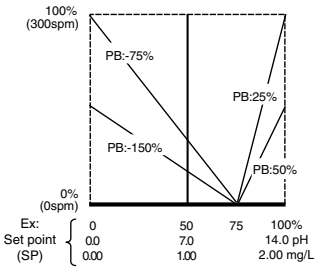
Set Point/Proportional Band in the Analog Mode

●Set point (SP)

For the set point (SP), set a target value on the X-axis (horizontal axis).



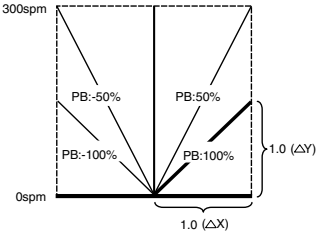
Example: When the SP is 75% (scaling No.0)



●Proportional band (PB)

With the proportional band (PB), set the inverse number of the line's ramp.

Example: When the PB is 100%



Proportional band (PB) = (△ X / △ Y) × 100
= (1/1) × 100 = 100%

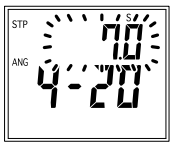
●Purpose of use

These settings are used for proportional injection, for example.

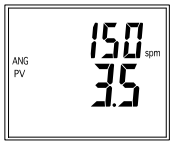
●Operation panel display (when scaled by pH)

When the pump is stopped

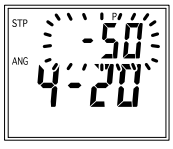
During setting of SP



During pump operation



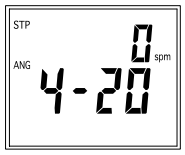
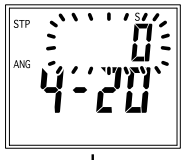
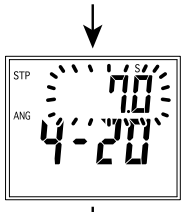
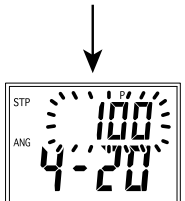
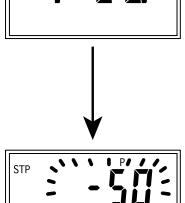
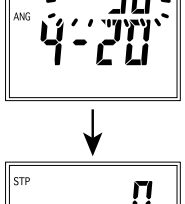
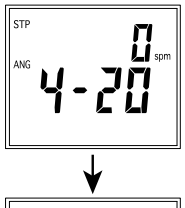
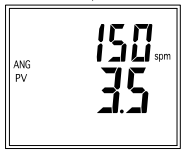
During setting of PB



●Operation control signal

4 to 20 mA DC

Setting the Set Point/Proportional Band in the Analog Mode

Display	Operation	Explanation
	START / STOP	If the pump is operating, press the STOP key to stop pump operation.
	MODE	If the screen on the left is not displayed, press the MODE key until it is displayed.
	SET RESET	Press the SET key to enter the set point setting screen. "S" is displayed so that you can tell that the screen is the set point setting screen.
	⇧⇩	Press the UP/DOWN key to set the set point. The setting range is the same as the selected scaling range. The following instance is for scaling No.1 0.0 to 14.0 (for pH). To operate the pump at 100% capacity at pH 0 and stop operation at pH 7.0 in alkali injection, set 7.0 as the SP and -50% as the PB. The screen on the left shows that the set point is set to 7.0.
	SET RESET	The setting value is displayed but not yet applied. To apply the value, press the SET key. After the value is applied, the screen enters the proportional band (PB) setting screen. The default is 100%. "P" is displayed so that you can tell that the screen is the proportional band setting screen.
	⇧⇩	Press the UP/DOWN key to set the proportional band. The setting range is -999 to 999% (excluding 0).
	SET RESET	The setting value is displayed but not yet applied. To apply the value, press the SET key. The state returns to the stopped state in the analog mode.
	START / STOP	Press the START key to start pump operation.
		The upper row displays the number of strokes.

Operation

Setting the Discharge Volume

Pulse Frequency-division Mode

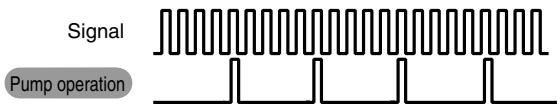
●Basic operation

①Pulse signals from the outside are received, and automatic operation is performed according the frequency-division ratio setting.

②The frequency-division ratio can be set within the range 1/1 to 1/9999.

Frequency-division (settable within range 1/1 to 1/9999)

(Example) 1/5 division



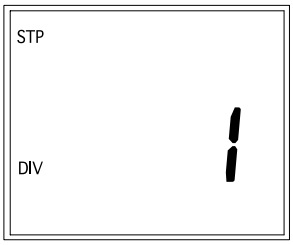
●Purpose of use

- This mode is used for flow rate proportional injection, etc. (The pump operates according to the number of input pulses from the outside)
- This mode is used when there is a large number of pulses for a flow meter, and the injection amount is too great.

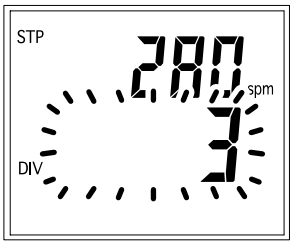
* Perform fine adjustment of the discharge volume by also using the stroke length adjusting dial.

●Operation panel display

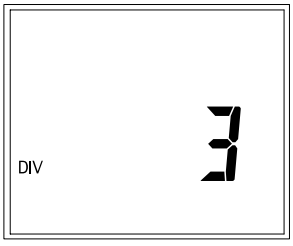
During pump stoppage



During setup



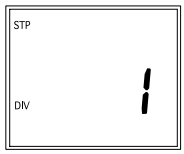
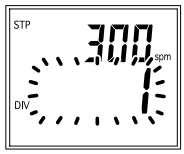
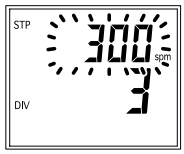
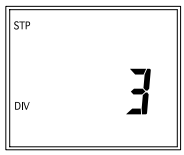
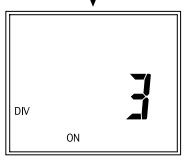
During pump operation



●Operation control signals

No-voltage contact or open collector signal input

Setting Pulse Frequency-division Mode

Display	Operation	Explanation
	START / STOP	If the pump is operating, press the STOP key to stop pump operation. If the screen on the left is not displayed, press the MODE key until it is displayed.
	MODE	The pulse division mode default is as follows: dividing ratio 1, and stroke speed interval of 300 spm (maximum stroke speed). (When the display indicates 1, the set dividing ratio is 1/1.) DIV is displayed on screen.
	SET RESET	Press the SET key to enter the dividing ratio setting screen.
		The current value starts blinking.
	⇧⇩	Change the dividing ratio setting by the UP/DOWN key within the range 1 to 9999. In this frequency-division ratio setup, the numerator is fixed at 1. So, set the denominator.
	SET RESET	Press the SET key to determine the setting value. When the setting value is determined, the operating number of strokes setup screen is entered. (The number of strokes on the upper row starts blinking.) Normally, this item does not need to be changed. The injection amount can, however, be limited when there are too many pulse signals.
		
	⇧⇩	Change the operating number of strokes setting by the UP/DOWN key within the range 1 to 300 spm.
	SET RESET	Determine the setting value by the SET key. When the setting value is determined, the display stops blinking and lights.
		The screen on the left shows that one single operation of the pump is performed for every three pulses. (The maximum stroke speed is 300 spm.)
	START / STOP	Press the START key to enter the pump operation mode.
		STP goes out, and the pump enters the pump operation mode. The pump starts to operate according to external pulse signals. (ON lights when a pulse signal is input.)

Setting the Discharge Volume

Pulse Multiplication Mode

●Basic operation

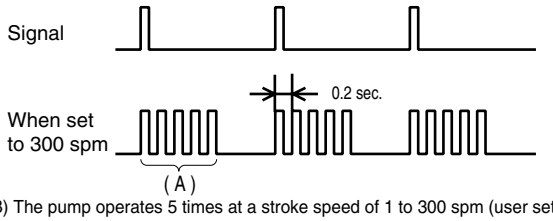
①Pulse signals from the outside are received, and automatic operation is performed by the number of strokes corresponding to the preset multiplication.

②The multiplication can be set within the range 1 to 9999. at this time, the pump operates at the number of operation strokes (spm) set in the manual mode.

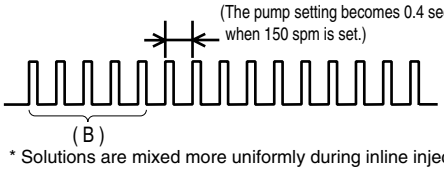
Multiplication (Can be set within the range 1 to 9999)

As the default setting, external signals are canceled when an external pulse input signal is input again during pump operation. You can set to put the external pulse input signal on hold and store it in memory in parameters (P-15, 16).

(A) The pump operates 5 times at a stroke speed of 300 spm (default).



(B) The pump operates 5 times at a stroke speed of 1 to 300 spm (user setting).



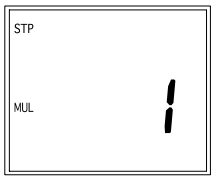
* Solutions are mixed more uniformly during inline injection.

●Purpose of use

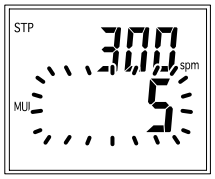
- This mode is used for flow rate proportional injection, etc. (The pump operates proportionally to the number of input pulses from the outside)
- Use when there are few pulses from a flow meter or other instrument, and the injection amount is too small.
- Fine-adjustment of discharge volume is performed by the stroke length adjusting dial.

●Operation panel display

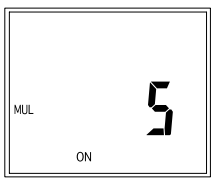
During pump stoppage



During setup



During pump operation



●Operation control signal

No-voltage contact or open collector signal input

Setting the Pulse Multiplication Mode

Display	Operation	Explanation
	START / STOP	If the pump is operating, press the STOP key to stop pump operation. If the screen on the left is not displayed, press the MODE key until it is displayed.
STP MUL 1	MODE	The default of the pulse multiplication mode is 1, and the default number of strokes is 300 spm (maximum number of strokes).
	SET RESET	Press the SET key to enter the multiplication setting screen.
STP 300 spm MUL 5		The current multiplication starts blinking.
	↑↓	Change the multiplication setting by the UP/DOWN key within the range 1 to 9999.
STP 300 spm MUL 5	SET RESET	Press the SET key to determine the set multiplication. When the setting value is determined, the operating number of strokes setup screen is entered. (The number of strokes on the upper row starts blinking.)
STP 150 spm MUL 5	↑↓	Change the operating number of strokes setting by the UP/DOWN key within the range 1 to 300 spm.
STP MUL 5	SET RESET	Determine the setting value by the SET key. When the setting value is determined, the display stops blinking and lights. The screen on the left indicates that the pump operates fives times for every single pulse at 150 spm (0.4 second) intervals.
	START / STOP	Press the START key to enter the pump operation mode.
MUL 5 ON		STP goes out, and the pump enters the pump operation mode. The pump starts to operate according to external pulse signals. (ON lights when a pulse signal is input.)

Setting the Discharge Volume

Count Mode

●Basic operation

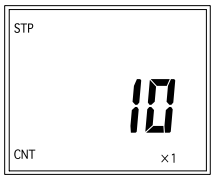
①The start signal is received and the pump operates for the number of preset times. (batch processing)
②The setting value can be set by a combination of 1 to 9999 times and ×1, ×10, ×100, ×1000 multiplication. (1 to 9999, 10 to 99990, 100 to 999900, 1000 to 9999000)
③The start signal can be selected from an external input and START/STOP key.
④The end signal can be output when operation when operation for the preset count ends.

●Purpose of use

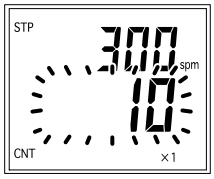
This mode is used in site where fixed amounts are repeatedly injected. (Operation can be easily instructed or confirmed from the outside by the start and end signals, for example, during batch injection to a container on a conveyor belt.)

●Operation panel display

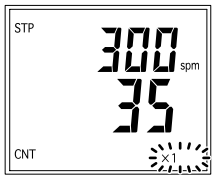
During pump stoppage



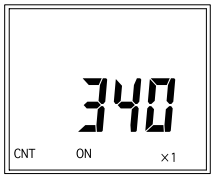
During setup



During setup
(multiplication)



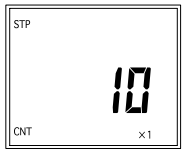
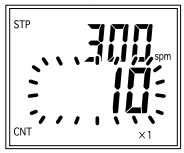
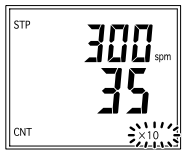
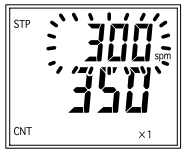
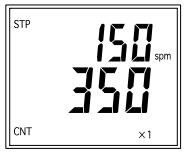
During pump operation



●Operation control signal

[Start signal]
No-voltage contact or open collector signal input
START/STOP key

Setting Count Mode

Display	Operation	Explanation
	START / STOP	If the pump is operating, press the STOP key to stop pump operation. If the screen on the left is not displayed, press the MODE key until it is displayed.
	MODE	The default count is 10x1, and the default number of strokes is 300 spm (maximum number of strokes).
	SET RESET	Press the SET key to enter the count setting screen.
		The current count starts blinking.
	UP/DOWN	Change the count setting by the UP/DOWN key within the range 1 to 9999.
	SET RESET	Press the SET key to determine the set count. When the setting value is determined, the count multiple setup screen is entered. X... is displayed blinking.
	UP/DOWN	Change the count multiple by the UP/DOWN key to one of X1, X10, X1000 or X1000 scales.
	SET RESET	Press the SET key to determine the set count multiple. When the "count x multiple" is 10000 or more, the value is displayed as a 4-digit count OOOO x 10. For example, in the case of a total 30000 count (count: 300, multiple: x 100), this is displayed as 3000X10 on screen. When the setting value is applied, the screen enters the operating number of strokes (stroke speed) setting screen.
		
	UP/DOWN	Change the operating number of strokes setting by the UP/DOWN key within the range 1 to 300 spm.
	SET RESET	Determine the setting value by the SET key. When the setting value is determined, the display stops blinking and lights.
		The screen on the left indicates that the pump operates 350 times at a speed of 150 spm (0.4 second intervals) when the start signal is received, and then stops operating.
	START / STOP	Press the START key to enter the pump operation mode. The pump operates by an external start signal or by pressing the START key. (Start of pump operation by an external start signal or by the START key can be selected in parameter P-31.)

Setting the Discharge Volume

Interval Mode

●Basic operation

①Intermittent operation by the preset ON and OFF times is repeated.

* The ON/FF state during a start can be changed by parameters.

②The setting values of each of the ON and OFF times is set from to 1 to 9999 minutes (in 1-minute increments).

③Operation can be paused by input of an external stop signal.

When the parameter (P-30) is 0 or 1

	State of the pump operation when it is stopped by the external signal (hold)
Stop input (continuous signal)	ON / OFF
Interval	ON / OFF — T1, T2, T1, T2, T1, T2, T1

Operation Time Chart

1) T1=ON time setting (1 to 9999 min)
T2=OFF time setting (1 to 9999 min)
2) When the stop signal turns ON, counting of both T1 and T2 is discontinued.
* When an external stop is determined, timers in the interval mode also are paused.

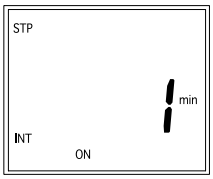
●Purpose of use

This mode can be used in sites where control is performed by alternate ON/OFF operation.

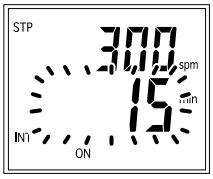
- Can be used for skipped operation at sites, for example, small amounts of chemicals are injected for air conditioning sterilization.
- Small amounts can be injected by combining intermittent operation and stop input.

●Operation panel display

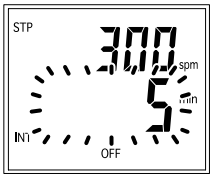
During pump stoppage



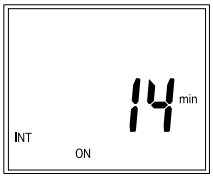
During ON time setup



During OFF time setup



During pump operation



●Operation control signal

Stop input: Operation is paused by input of an external stop signal.

Setting the Interval Mode

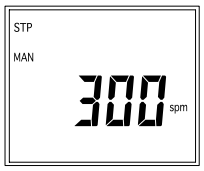
Display	Operation	Explanation
	START / STOP	If the pump is operating, press the STOP key to stop pump operation. If the screen on the left is not displayed, press the MODE key until it is displayed.
STP 1 min INT ON	MODE	INT is displayed at the bottom left of the screen, and ON or OFF is displayed at the bottom of the screen. ON is displayed when operation at start is set to ON. (This can be changed in parameter P-30.) The default ON time is 1 minute, the default OFF time is 1 minute, and the default number of strokes is 300 spm (maximum number of strokes).
	SET RESET	Press the SET key with the pump stopped to enter the interval ON time setup screen.
STP 300 spm 15 min IN1 ON		The current ON time value is displayed. The default ON time is 1 min (minute).
	⇧⇩	Change the ON time setting by the UP/DOWN key within the range 1 to 9999 minutes.
	SET RESET	Press the SET key to determine the set ON time. When the setting value is determined, the OFF time setup screen is entered. (The current OFF time is displayed blinking.)
STP 300 spm 5 min IN1 OFF		The default OFF time is 1 min (minute).
	⇧⇩	Change the OFF time setting by the UP/DOWN key within the range 1 to 9999 minutes.
	SET RESET	Press the SET key to determine the set OFF time. When the setting value is determined, the operating number of strokes setup screen is entered. (The operating number of strokes on the upper row is displayed blinking.)
STP 180 spm 5 INT		
	⇧⇩	Change the operating number of strokes setting by the UP/DOWN key within the range 1 to 300 spm.
	SET RESET	Determine the setting value by the SET key. When the setting value is determined, the display stops blinking and lights.
STP 15 min INT ON		ON is displayed at the bottom, and the ON time setting value is displayed.
	START / STOP	Press the START key to start pump operation. (setting when starting by ON)
STP 14 min INT ON		Counting starts and the display is decremented from the setting value. 15, 14, 13, ... 5, 4 ... ON time / OFF time

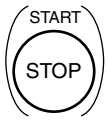
Operation

Key Lock

Keys can be locked to protect setting values.
The STOP/START key can be operated even when the key lock is active.

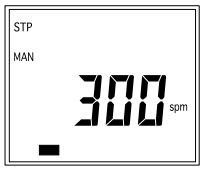
(1) Set the mode that you want to lock, and press the STOP key to stop the mode.

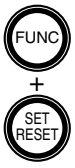




STP is displayed to indicate that the mode is stopped.

(2) Hold down the SET key for at least two seconds with the FUNC key held down.

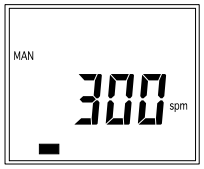


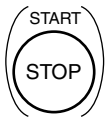


2 seconds or longer

This enables the key lock, and operations other than the STOP/START key are disabled. When the key lock is enabled, ▬ is displayed on the lower row.

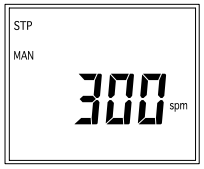
(3) Press the START key to start operation.

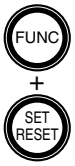




This starts operation.

(4) To cancel the key lock, stop pump operation, and hold down the SET key for at least two seconds with the FUNC key held down again.





2 seconds or longer

This cancels the key lock, and enables all operations.
When the key lock is canceled, ▬ goes out.

NOTE

- During the key lock, all operations are disabled except use of the STOP/START key and cancellation of the key lock.

When Stopping Operation for a Long Time

Perform the following operation when stopping operation for a long time (e.g. due to an off season) and restarting pump operation after a prolonged downtime.

When Stopping Operation

①Wash inside the pump head.
Suck in and discharge clean water or diluted detergent for about 30 minutes.

②Completely turn OFF the pump's power supply.

③Attach the pump's protective cover.
Adopt other measures to prevent dirt or dust from accumulating on the pump, and protect the pump from corrosive environments.
- ambient temperature -10~50°C
- ambient humidity 35~85% (freezing not allowed)

When Resuming Operation

①Check the inside of the tank for sediment, clouding of chemicals and other abnormalities.
If the chemicals inside the tank have deteriorated, drain the chemicals, wash the inside of the tank with water, and completely replace with fresh chemicals.

②Check the check ball and valve seats inside the joints for adhesion of dirt.

Maintenance

⚠ WARNING

- **When handling liquid-end sections, be sure to wear protective coverings (rubber gloves, mask, protective goggles, chemical-resistant overalls, etc.) appropriate for the chemicals be using used.**
- **Do not turn the power ON during maintenance. Attach a "Work In Progress" label to the power switch.**
- **Before disassembling liquid-end sections, be sure to release the discharge-side pressure, drain the chemicals from liquid-end sections, and wash them.**

Periodic Inspection

- **4000 hours of operation or once every year**
- **Abnormal discharge (reduced discharge volume)**
- **Chemical leakage around the pump head**

→ **Replacing the diaphragm (page 27)**

- **4000 hours of operation or once every year**
- **Abnormal discharge (reduced discharge volume)**

→ **Replacing the valve seat and check ball (page 28)**

When an Abnormality Occurs

- **Abnormalities during operation**

→ **Troubleshooting (page 33)**

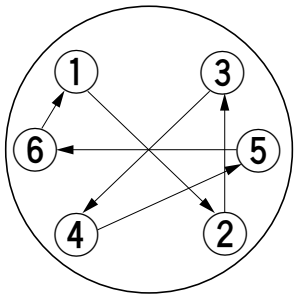
NOTE

- Perform maintenance and inspection every 4000 hours of operation or once every year, whichever comes first.

Replacing the Diaphragm

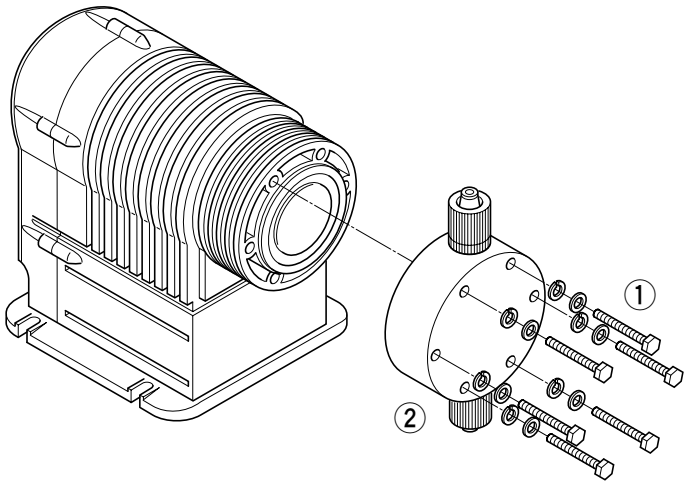
IMPORTANT

When fixing the pump head using the head bolts, tighten the bolts in the order shown below a little at a time using even force. For example, tightening will be uneven if the bolts are tightened in the order 1, 3, 5 and 2. This might cause chemicals to leak from the pump head.



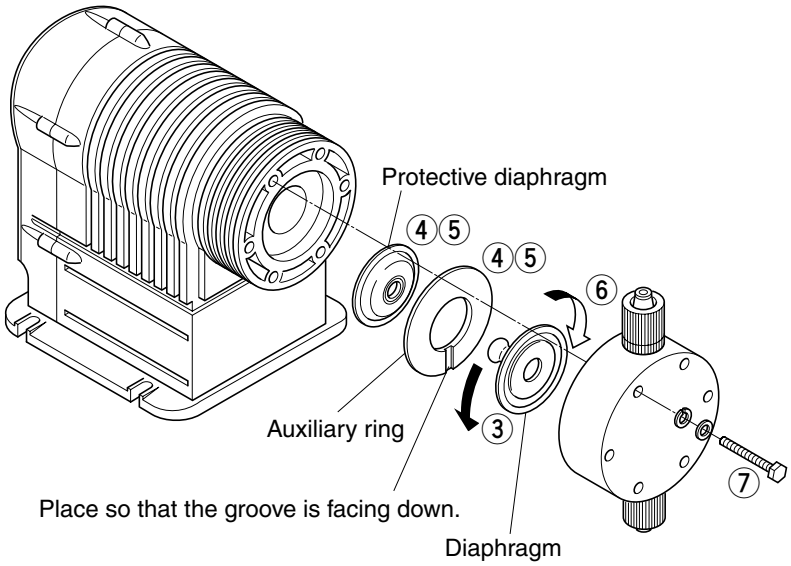
Removing the Pump Head

①Remove the six head bolts.
②Remove the pump head.



Replacing the Diaphragm/Protective Diaphragm

③**Remove the diaphragm.**
Remove the diaphragm by holding its outer periphery and turning counter-clockwise.
④**Remove the auxiliary ring to remove the protective diaphragm.**
⑤**Replace with a new protective diaphragm, and set the auxiliary ring in position.**
⑥**Install the new diaphragm. Firmly turn the diaphragm clockwise as far as possible.**
If the diaphragm is loose, it may contact the pump head and cause a malfunction or become damaged.
⑦**Install the pump head.**



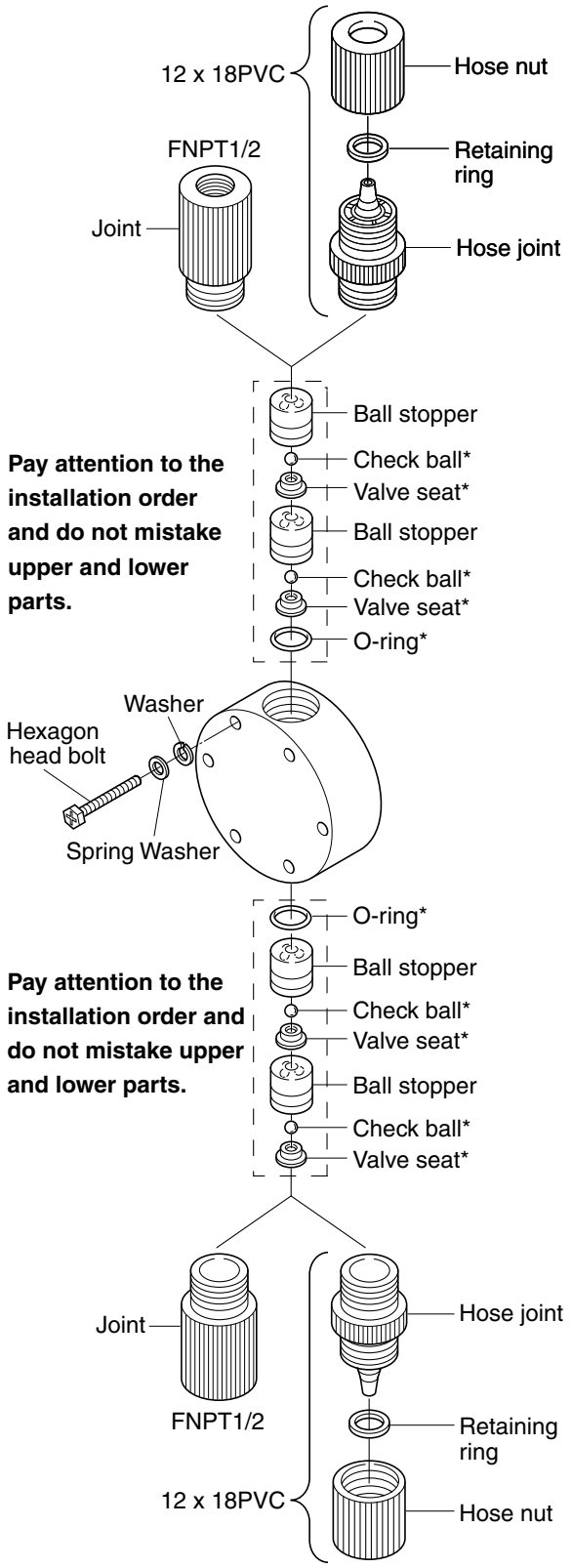
Maintenance

Replacing the Valve Seat and Check Ball

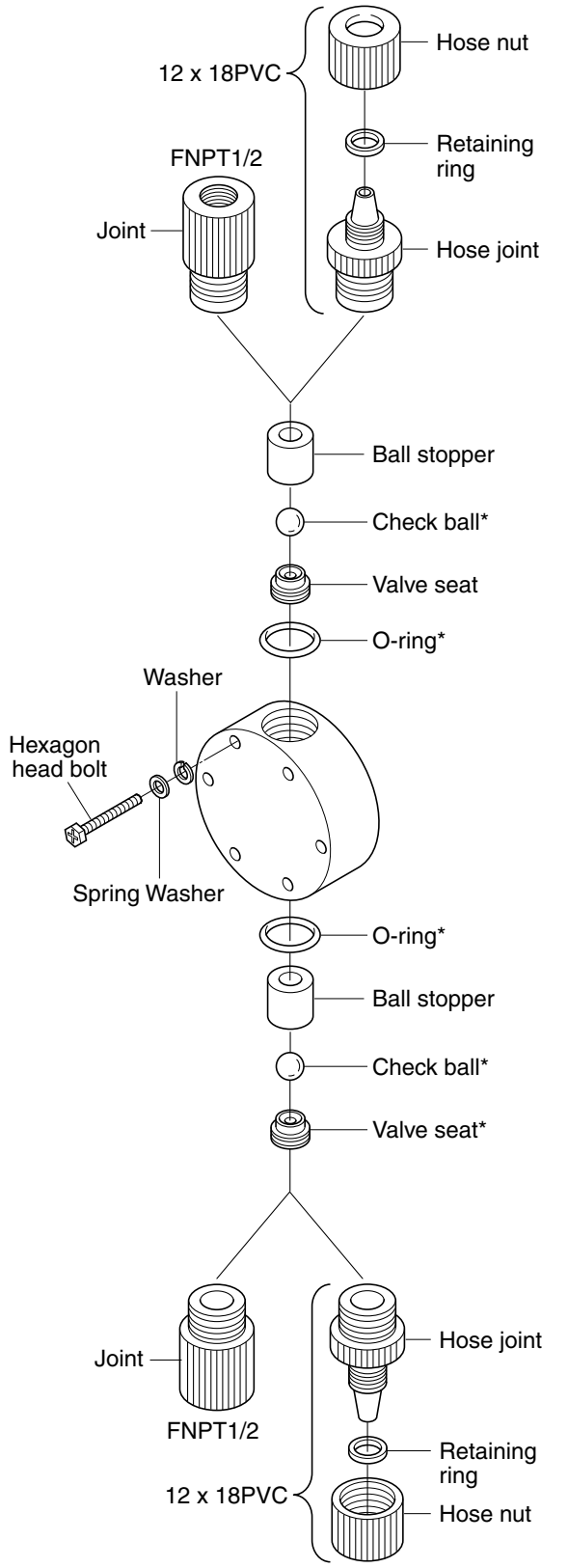
- Attach O-rings, ball stoppers and check balls making sure that they face the correct direction.
- When removing and re-fitting in the upper/lower joints, make sure that you do not mistake the upper and lower joints.
- Also, make sure that the O-rings and check balls are not scratched, and dust or dirt is not sticking to the valve seat.

PZiG-300/500-VTCE/VTCF

A component kit comprising consumable parts (diaphragm and valve seats) is available.

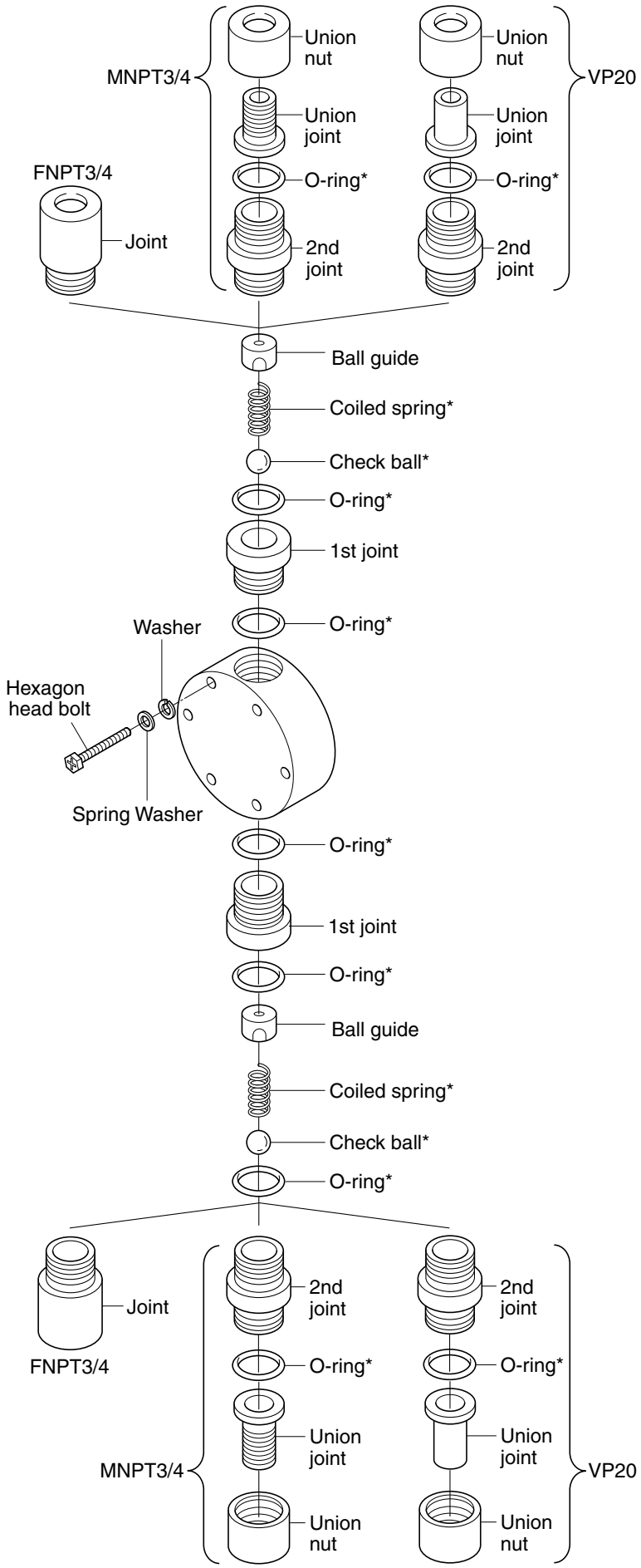


PZiG-700/1000/1300-VTCE/VTCF



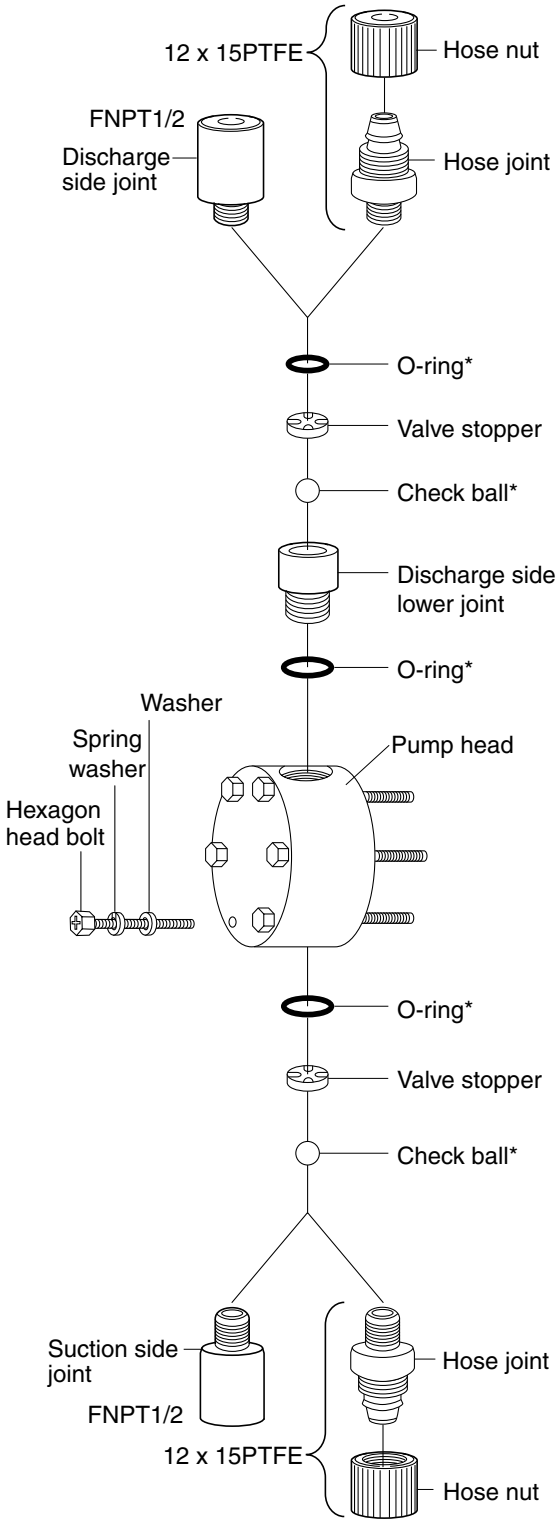
*Consumable

PZiG-300/500/700/1000/1300-VTCF (High viscosity specification)

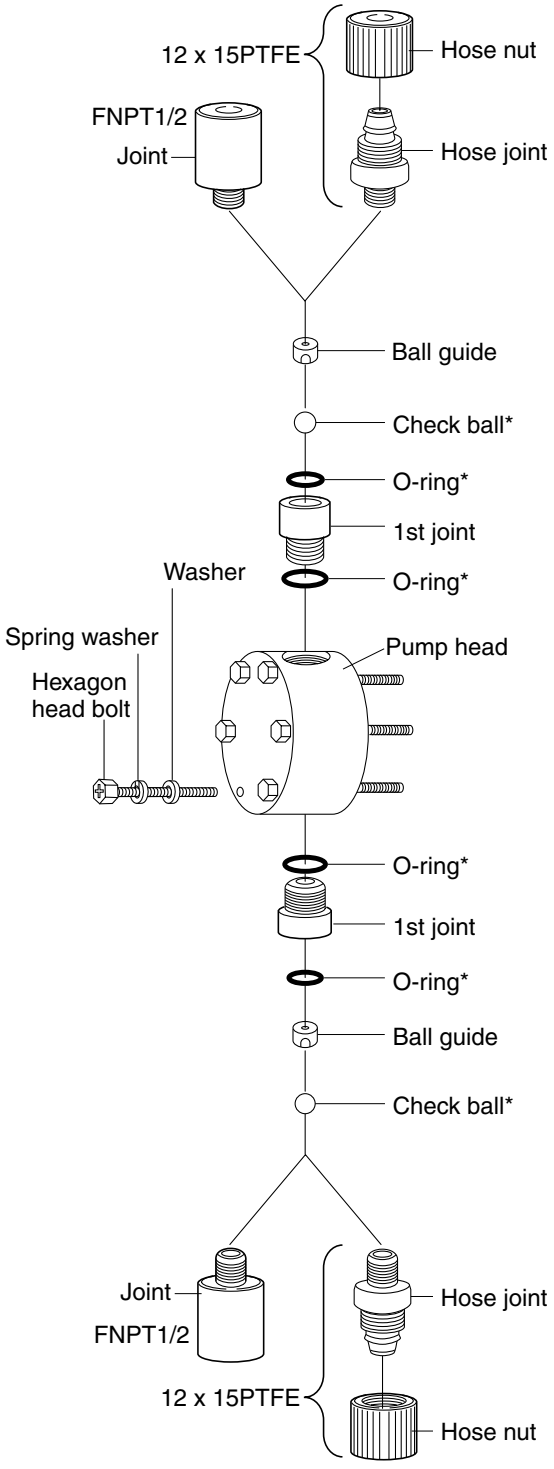


*Consumable

PZiG-300/500/700-FTCT



PZiG-1000/1300-FTCT



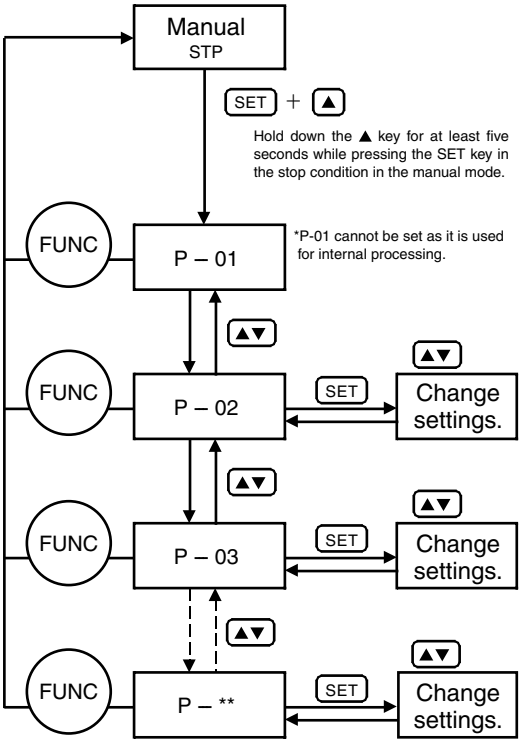
Maintenance

*Consumable

Setting Parameters

For defaults, see page 32.

Parameter Setup Flow



* The parameter setting screen is entered from the manual mode (pump stopped state).
* Changes made to parameter settings are applied when the SET key is pressed in the setting change screen.

Setting Parameters

Display	Operation	Explanation
STP MAN 100 spm		Make sure that STP, MAN and spm are displayed.
	SET RESET	First, enter the parameter setting screen by holding down the SET and UP keys for at least 5 seconds.
P-01	⇧⇩	This is the parameter number selection screen.
	⇧⇩	Change to the desired parameter number by the UP/DOWN keys. (See Parameter List on page 32.)
P-10		
	SET RESET	When the desired parameter number is displayed, press the SET key to enter the parameter setting change
P-10 0		The current value is displayed.
	⇧⇩	Set the parameter referring to the Parameter List on page 32.
P-10 1		
	SET RESET	Press the SET key to apply the selected value.
P-10		The original parameter No. is displayed.
	FUNC	
STP MAN 100 spm		

Note: You can continue to change other parameter settings until you press the FUNC key.

Setting Parameters

Parameter List

No.	Item	Details	Parameter	Default	Explanation
P-01	Internal processing			0	Used for internal processing. Cannot be set by the user.
P-02	Digital input	Input 1	See Table 1.	1	Can be selected from Table 1. Only the selected function is enabled.
P-03		Input 2	See Table 1.	2	
P-04		Input 3	See Table 1.	3	
P-05		Input 4	See Table 1.	4	
P-07	Digital output	Output 1	See Table 2.	1	Can be selected from Table 2. Only the selected function is enabled. (Port and functions are assigned simultaneously.)
P-08		Output 2	See Table 2.	2	
P-10	Analog input	Input signal type	0:4-20	0	Used for internal processing
P-15	DIV/MUL	Surplus pulse signal count	0: none 1 to 9999 buffer size	10	Changes the number of pulses that are held.
P-16		Surplus pulse at external stop	0: Save 1: Reset	0	Sets whether to save or clear surplus pulses at an external stop.
P-20	Display	Discharge volume setting max. value	0:1～9999mL	***	Discharge volume max. value (differs according to model)
P-22	Unit	Flow rate basic unit	0:mL/min 1:GPH	0	Select the display basic unit.
P-23	Mode screen display	ANG	0: Disabled 1: Enabled	1	Hides the mode when "Disabled" is selected.
P-24		DIV	0: Disabled 1: Enabled	1	
P-25		MUL	0: Disabled 1: Enabled	1	
P-26		CNT	0: Disabled 1: Enabled	1	
P-27		INT	0: Disabled 1: Enabled	1	
P-30	INT	Operation at start	0: ON (hold) 1: OFF (hold) 2: ON (clear) 3: OFF (clear)	0	Initial operation when pump operation is started. Selects whether to return timer states to their defaults or hold them at an external stop.
P-31	CNT	Start trigger	0: Start key 1: External input	1	Selects the start reset method.
P-32	Alarm operation	Level	0: Continue operation 1: Pause 2: Stop pump operation	1	Select operation when an alarm is generated. Pause: Pauses pump operation when an alarm is output, and automatically restores pump operation when the function is canceled. Stop pump operation: Pump operation is not resumed until the start key is next pressed.
P-33		Pulse overflow		0	
P-34		Analog error		1	
P-38	Alarm	Delay time	0 to 999 sec.	0	Provides a delay time until display/output when an error is generated.
P-44	Backlight	Lighting of backlight	0: OFF 1: ON	1	Sets whether or not to light the backlight.
P-45	Power restore	Forced stop at power restore	0: Reset and stop 1: Continue operation	1	Sets the operation state when the power is turned ON again.
P-46	Reset	Restore defaults at shipment from factory	0: Disabled 1: Enabled	0	When "1" is selected and the SET key is pressed, all settings are initialized and returned to their defaults.
P-47	Diagnostics	Diagnosis of LCD display malfunction	All LCDs lit		

● Table 1: Input signal assignments

No.	Details	Application
0	Unused	Assignment inhibited
1	Pulse input signal (high speed)	Used in the division/multiplication mode.
2	Stop input	When stop input is input, pump operation stops and the LCD display blinks. The START key cannot be used while pump operation is stopped.
3	Start input	Used in the counter mode.
4	Start reset	Resets the current value to the setting value.
5	Alarm reset	Resets the alarm flag.
7	Level input	Displays and outputs an alarm when the level is input.
10	MAX operation	Operates the pump at 300 spm in all modes when this input is input.

* For details on signal specifications, see "I/O Signal Specifications" (page 36).

● Table 2: Output signal assignments

No.	Details	Application
0	Unused	Assignment inhibited
1	All alarms	This is output when any alarm is output.
2	Operation sync pulse	This pulse signal is synchronized with solenoid drive.
3	Operation signal	This is output during operation. (including standby in progress)*1
4	Run signal	This is output during pump operation. (excluding standby in progress)*1
5	End signal	This is output when the preset count is reached in the count mode.
7	Level	Select this to individually output alarm outputs.
8	Pulse overflow	
9	Analog error	

*1 Standby in progress: This is a state where the pump waits for pulses in the division/multiplication mode.
During 4 mA input in the analog input mode
Pump waiting for the start signal in the count/batch mode

Troubleshooting

⚠ WARNING

- **Do not operate this pump with wet hands. Doing so might result in electric shock.**
- **Make sure to turn OFF the power before disassembling the liquid end and check that the power is not applied to the pump. Do not start the disassembly only by stopping the pump with a key. Attach a "Work In Progress" label to the power switch so that the power cannot be turned ON during repair works.**
- **When handling liquid-end sections, be sure to wear protective coverings (rubber gloves, mask, protective goggles, chemical-resistant overalls, etc.) appropriate for the chemicals be using used.**
- **Before maintaining or repairing the pump, be sure to release the discharge-side pressure, drain the chemicals from liquid-end sections, and wash the pump.**

IMPORTANT

- We recommend using the flow indicator as a means of detecting defective discharge.

During Pump Operation

Details of Trouble		Cause	Remedy
Pump operates though chemicals are not transferred.	Air enters the pump.	(1) Gas is being generated due to the nature of the chemicals. (2) Chemical leaks for joints, seals, etc. (3) Empty chemical tank	(1) Dilute the chemicals. (2) Re-tighten. (3) Replenish chemicals and release air.
	Liquid does not rise up.	(1) Clogged strainer (2) Gas lock is occurring on the pump. (3) The pump's stroke length is too short. (4) Wrong valve fitting direction	(1) Wash the strainer and tank. (2) Release air. (3) Set the stroke length to 100%, release air, and set the stroke length. (4) Disassemble and re-assemble.
	Pressure does not increase.	(1) Lower power voltage or not a commercial power supply	(1) Connect to the correct power supply.
	Liquid is not discharged.	(1) Liquid viscosity too high (2) Large pressure loss (piping resistance)	(1) Lower the liquid's viscosity. (2) Install a damper or use larger piping on the discharge side.
Liquid leakage		(1) Pressure buildup caused by dirt clogging (2) Damage caused by fatigue on hose, diaphragm or other parts (3) Hose nut insufficiently tightened	(1) Disassemble and clean. (2) Replace with new parts. (3) Re-tighten.
Pump does not operate.	Pilot lamp does not blink.	(1) Insufficient power supply and voltage (2) Defective pump wiring (3) Broken power cable (4) Switch of mains power supply OFF (5) Breaker tripped (6) Built-in protective fuse blown	(1) Check the power supply and voltage, and connect to the correct power supply. (2) Inspect the wiring and correct as required. (3) Correct or replace. (4) Turn the switch ON. (5) Check the cause, and restore the breaker. (6) Ask the manufacturer for repair.
	Solenoid does not work.	(1) Current leakage breaker is actuated. (2) Defective magnet switch	(1) Ask the manufacturer for repair. (2) Replace the magnet switch.
The discharge volume greatly differs from the setting value when specifying the discharge volume in the manual mode.		(1) The maximum discharge volume setting is wrong. (2) The piping conditions differ from the actually measured values that are used for setting the maximum discharge volume. (3) The stroke length when the maximum value was set differs.	(1) Set a correct maximum value. (2) Measure again under actual conditions, and set the maximum discharge volume. (3) Set to the required stroke length, measure the discharge volume and set the maximum discharge volume.
Keys cannot be operated.		(1) The key lock is active.	(1) Cancel the key lock.

Troubleshooting

Troubles in the Signal Input Mode

Details of Trouble	Cause	Remedy
Signals are not input according to preset division or multiplication ratio. (during pulse signal input)	(1) Noise on signal line	(1) Move the signal line away from the power line. Or, use shielded cable for the signal line.
Signal does not reach 20 mA. (during analog signal input)	(2) Insufficient signal drive	(2) Check the maximum drive resistance of the signal source.
Keys other than START/STOP key do not function.	(3) The key lock is active.	(3) Cancel the key lock. To cancel the key lock, stop pump operation, and hold down the SET key for at least two seconds with the FUNC key held down.
E-00 is displayed.	See Alarm Codes.	See Alarm Codes.

Alarm Codes

The following codes appear on the display when an alarm occurs.

Alarm Code No.	Type	Cause of Alarm	Remarks
E-01	ROM write error	Pump error	Pump operation is stopped.
E-02	Abnormal level alarm	Level input" is set to the input port, and that port turned ON (short-circuited).	Select processing method in parameter P-32.
E-03*	Input pulse buffer overflow	The number of input pulses momentarily increased in the division/multiplication mode, and exceeded the preset buffer size.	Select processing method in parameter P-33.
E-04*	Abnormal analog input alarm (min to max)	The input signal went out of the specified value range during operation in the analog input mode.	Select processing method in parameter P-34.

* When the trouble is solved, the alarm is automatically canceled, and the display returns to the regular display.

● Mode in which alarms occur (only during pump operation)

Alarm Code No.	MAN	ANG	DIV·MUL	CNT·INT
E-01	●	●	●	●
E-02	●	●	●	●
E-03	–	–	●	–
E-04	–	●	–	–

● : Alarm occurs.

● How to cancel alarms

<E-01>

- Try turning the power OFF then back ON again. If this does not solve the problem, a probable cause is a circuit error.

<E-02 to 04>

- Press the RESET key.
- Input an alarm reset from the external device.
- Press the STOP key to stop pump operation.

■Model Codes

PZiG	-	1300	-	V	T	C	E	-	12x18PVC	-	W	-	S	-	JPL	-	X
①		②		③	④	⑤	⑥		⑦		⑧		⑨		⑩		⑪

①Series name
PZiG Series

②Pump model

Type	Discharge Volume
300	340mL/min
500	530mL/min
700	760mL/min
1000	1000mL/min
1300	1300mL/min

③Pump head materials

Type	Material
V	PVC
F	PVDF
X	Special

④Diaphragm materials

Type	Material
T	PTFE

⑤Check ball

Type	Material
C	Ceramic
X	Special

⑥O-ring

Type	Material
E	EPDM
F	Fluoro-rubber
T	PTFE
X	Special

⑦Connection

Type	
12 x 18 PVC	PVC braided hose 12 x 18mm dia.
12 x 15 PTFE	PTFE tube 12 x 15mm dia.
FNPT1/2	FNPT1/2"
FNPT3/4	FNPT3/4"
MNPT3/4	MNPT3/4"
VP20	VP20

⑧Joint Specification

Type	Specification
W	Standard joint
V	High-viscosity joint

⑨Applicable standard

Type	
S	Standard
CE	CE marking compatible

⑩Power plug

Type	
EUP	Euro plug*1
ULP	UL plug
AUP	Australia plug
UKP	U.K. plug*1
JPL	Japanese lead wire

*1 CE mark certified

⑪General specifications

Type	Specification
None	Standard
X	Special

■Performance Specifications

Specifications \ Model		300	500	700	1000	1300
Max. discharge volume	L/H	20.4	31.8	45.6	60.0	78.0
	mL/min	340	530	760	1000	1300
	G/H (US)	5.39	8.40	12.0	15.8	20.6
Discharge volume per stroke (mL/stroke)		1.1	1.8	2.5	3.3	4.3
Max. discharge pressure	MPa	1.0 ＊	0.7 ＊	0.4	0.3	0.2
	bar	10	7	4	3	2
	psi	145	101	58	43.5	29
Max. number of strokes (spm)		300				
Stroke length (mm)		1.5				
Stroke length adjustment range (%)		20 to 100% adjustable				
Connection size: For less than 50mPa•s (VTCE/VTCF)		PVC braided hose 12 x 18 mm dia. / FNPT 1/2				
Connection size: For less than 50mPa•s (FTCT)		PTFE tube 12 x 15 mm dia. / FNPT 1/2				
Connection size: For high-viscosity (VTCF)		FNPT3/4 / MNPT3/4 / VP20 union joint				
Operating temperature range	Ambient temperature	0 to 40˚C				
	Transferrable temperature	0 to 40˚C				
Transferrable viscosity (mPa·s)		50 or less (high viscosity: 1000 or less)				
Self-priming height (m)		-1.5				
Pump color	Pump case (front)	Munsell (approximately)10YR 7.5/14				
	Pump case (rear)	Munsell (approximately)5PB 6/2.5				
Weight (kg)		Approx. 11				

＊In the case of the FTCT using PTFE tube, this becomes 0.5 (MPa).

■Power Supply Specifications

Specifications \ Model		All models
Power supply voltage (Vac)	Rating	100 ~ 240
	Operating range	90 ~ 264
Frequency (Hz)		50/60
Number of phases (f)		1
Max. current (A)		4
Max. current consumption (VA)		750
Average current consumption (W)		100

• Use the maximum current when calculating the required power supply capacity.
• Be sure to use a commercial power supply (power supplied from an electric power company) as the power supply.
■Power supplies that cannot be used:
1. Power supply equipped with an AC power regulator
2. Power supply on the output side of the inverter

■I/O Signal Specifications

● 4-pin connector

Category	Name	Type	Connection Pin No.	Standard
Input	Digital signal input [pulse signal input]	No-voltage contact O.C	1-4 (IN1, high speed)	Max. response speed 125 Hz (duty 50%) Input resistance: approx. 2 kΩ
	Analog signal	DC 4 ~ 20mA	2-4	Damping 1 sec or less Input resistance: approx. 110 Ω
	Digital signal input 2 [stop signal input]	No-voltage contact O.C	3-4 (IN2, low speed)	Max. response speed 10 Hz (duty 50%) Input resistance: approx. 2 kΩ non-lock operation

Note1 The input control function can be changed in the program. The function between [] is initial at the factory shipment.
Note2 Pin No.4 is common (- side).

● 8-pin connector

Category	Name	Type	Connection	Standard
Input	Digital signal input [pulse signal input]	No-voltage contact O.C	1-3 (IN3, high speed)	Max. response speed 125 Hz (duty 50%) Input resistance: approx. 2 kΩ
	Digital signal [start reset]	No-voltage contact O.C	7-3 (IN4, low speed)	Max. response speed 10 Hz (duty 50%) Input resistance: approx. 2 kΩ
Output	Digital signal [all alarms]	O.C	4-6 (OUT1)	25 VDC/10 mA or less
	Digital signal [operation pulse]	O.C	7-3 (OUT2)	25 VDC/10 mA or less
Power supply	Sensor power supply	Stabilized power supply	2-3	+5 V/10 mA or less

Note1 The input control function can be changed in the program. The function between [] is initial at the factory shipment.
Note2 Connect pin No.3 to the input side and power supply common (- side), and to pin No.4 on the 4-pin side.
Note3 Pin No.6 is the output-side common (emitter side).

■Other Specifications

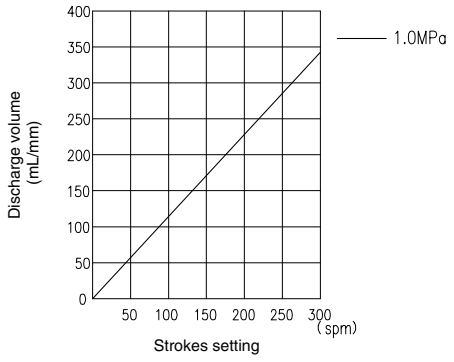
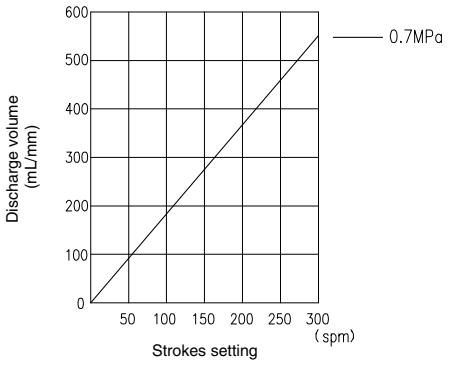
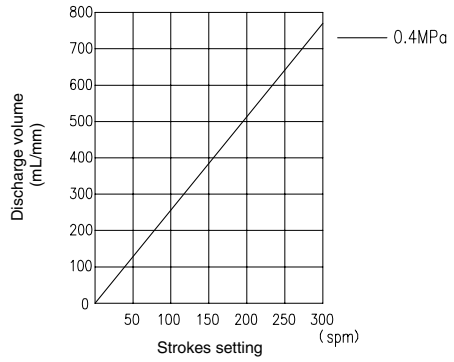
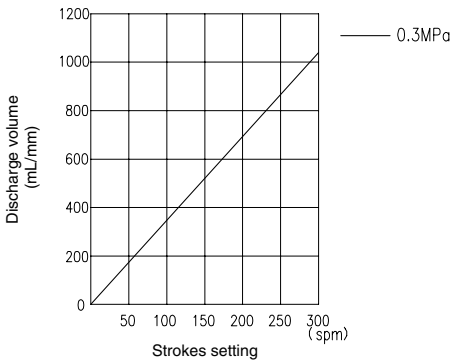
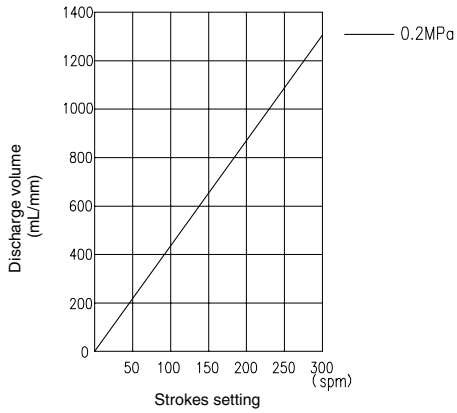
Specification	Data
Noise (dBA)	83 or less

■Performance Curves

The following performance curves are measurement examples obtained by measuring on test equipment at TACMINA. These performance curves may differ slightly depending on various on-site conditions and product differences.
Measure the discharge volume under actual operating conditions, and set the strokes according to the performance curve that is obtained.

● Basic specifications

Conditions: clean water, room temperature

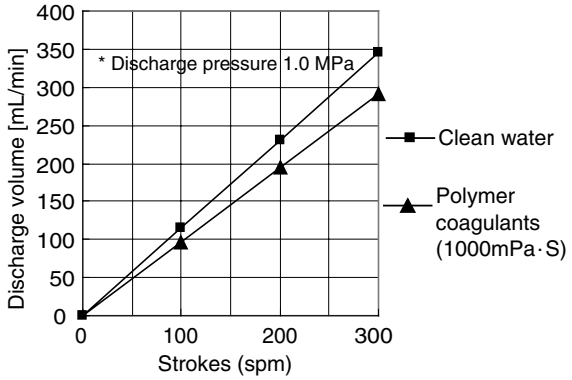
PZiG-300-VTCE-12x18-W-S	PZiG-500-VTCE-12x18-W-S
	
PZiG-700-VTCE-12x18-W-S	**PZiG-1000-VTCE-12x18-W-S**
	
PZiG-1300-VTCE-12x18-W-S	
	

■Discharge Performance of High-viscosity Liquids

When a fast stroke speed is set for transferring high-viscosity liquids, piping resistance on the suction side may cause the amount of sucked in liquid to be reduced.

PZiG-300-VTCF-VP20-V-S

Conditions: Room temperature

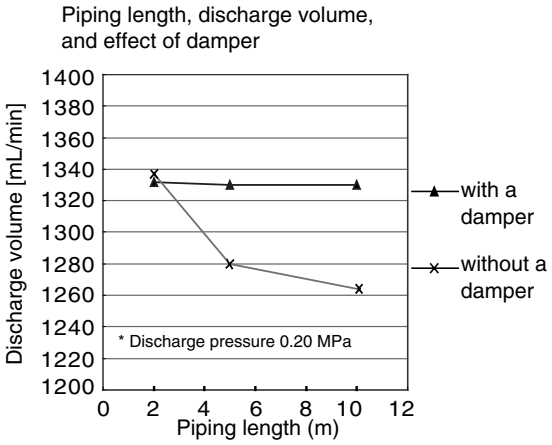


■Length of Discharge-side Piping and Discharge Volume

The graph below shows the relationship between piping length and discharge volume. Installing a damper lessens piping resistance and allows the length of the piping to be extended.

PZiG-1300-VTCE-12x18-W-S

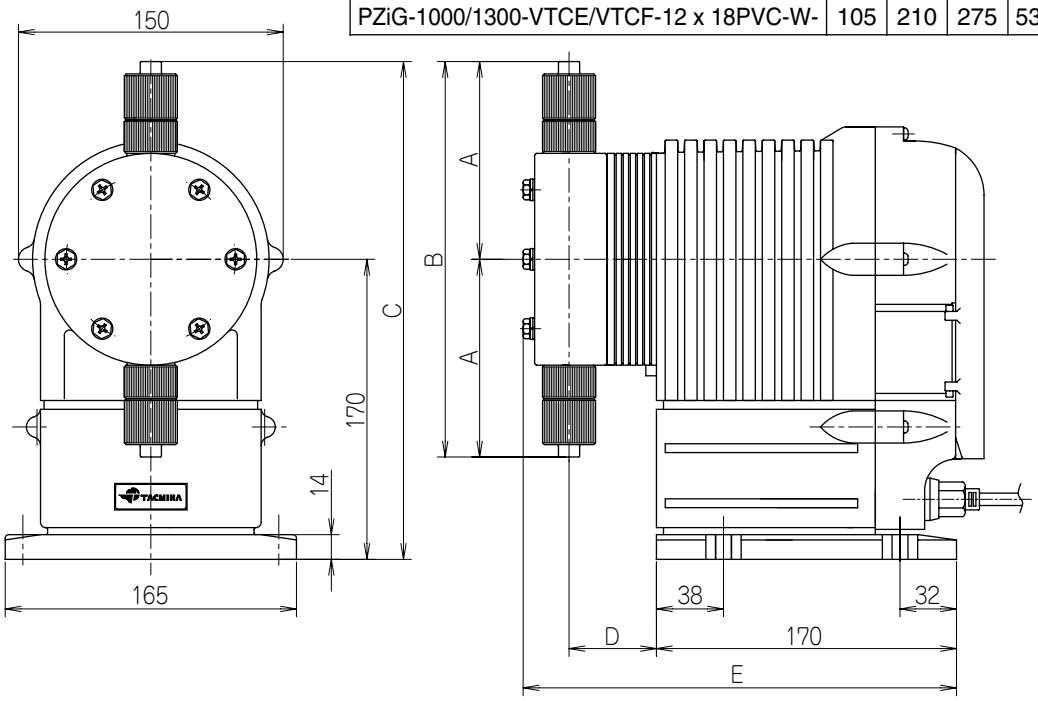
Conditions: Room temperature, clean water



■External Dimensions (mm)

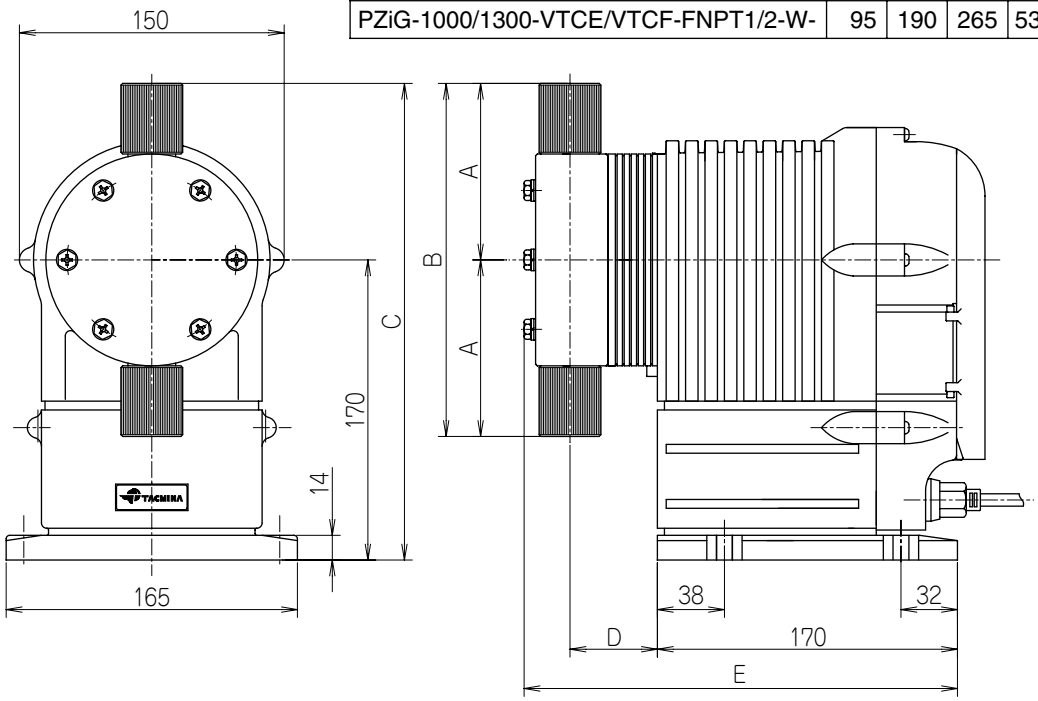
PZiG-300/500/700/1000/1300-VTCE/VTCF-12 x 18PVC-W-

	A	B	C	D	E
PZiG-300/500-VTCE/VTCF-12 x 18PVC-W-	112	224	282	49.5	246
PZiG-700-VTCE/VTCF-12 x 18PVC-W-	103	206	273	53.5	253
PZiG-1000/1300-VTCE/VTCF-12 x 18PVC-W-	105	210	275	53.5	253



PZiG-300/500/700/1000/1300-VTCE/VTCF-FNPT1/2-W-

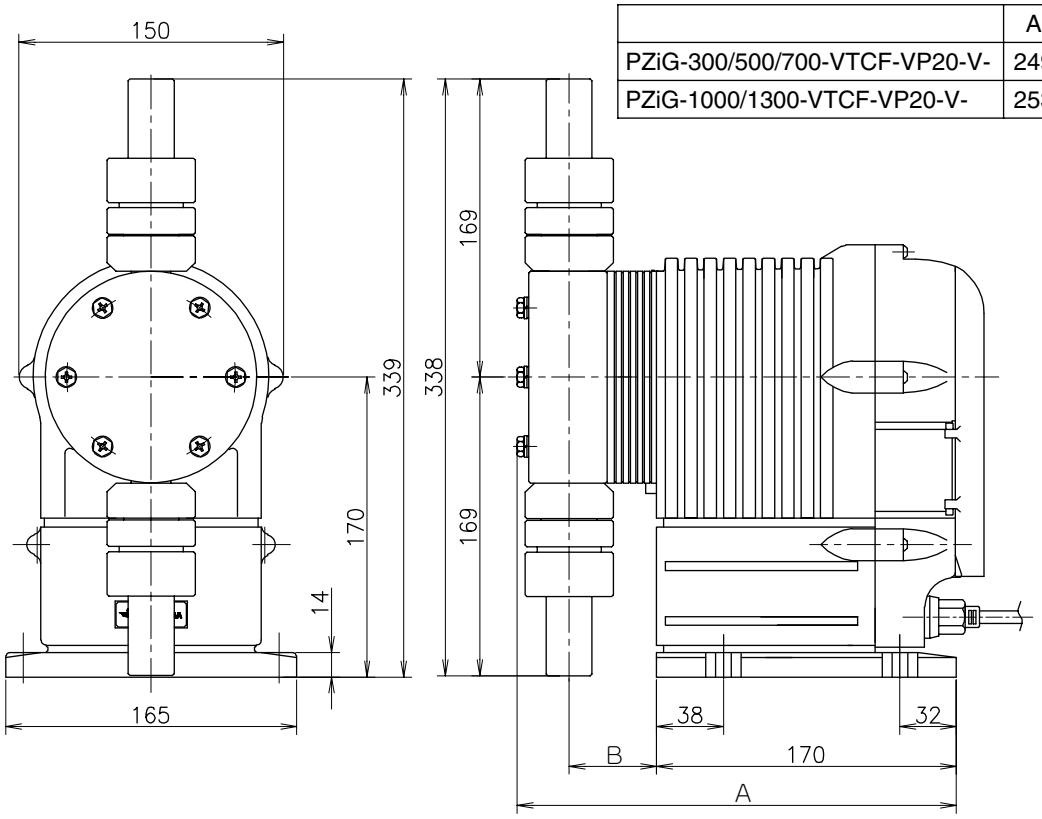
	A	B	C	D	E
PZiG-300/500-VTCE/VTCF-FNPT1/2-W-	100	200	270	49.5	246
PZiG-700-VTCE/VTCF-FNPT1/2-W-	90	180	260	49.5	246
PZiG-1000/1300-VTCE/VTCF-FNPT1/2-W-	95	190	265	53.5	253



■External Dimensions (mm)

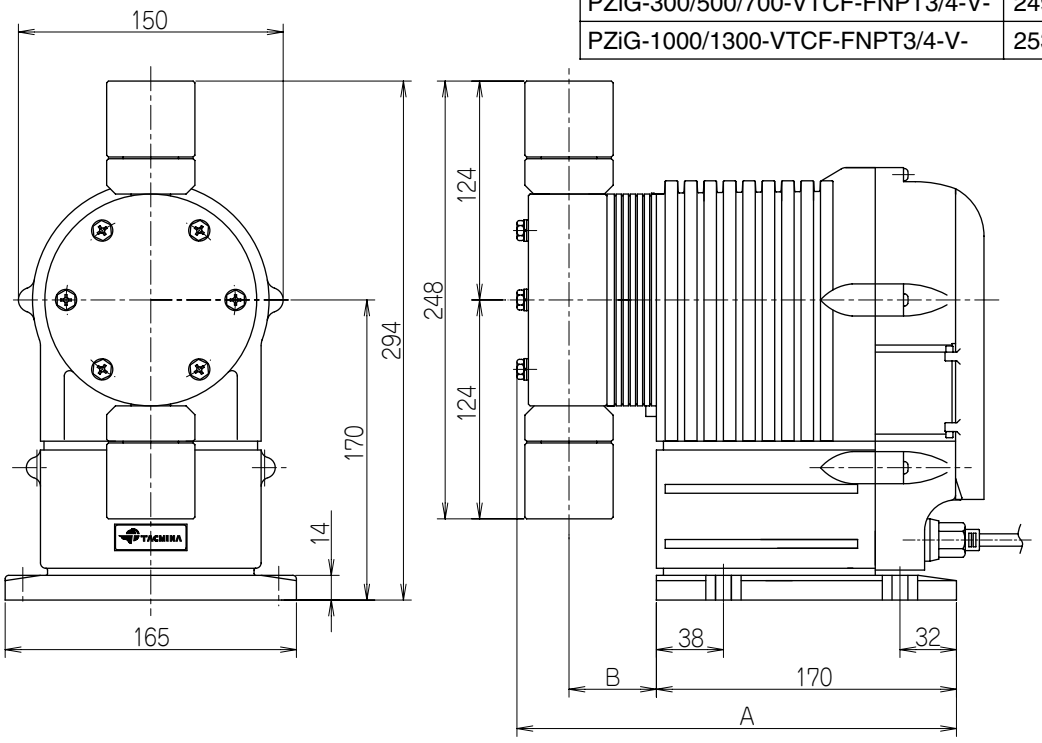
PZiG-300/500/700/1000/1300-VTCF-VP20-V-

	A	B
PZiG-300/500/700-VTCF-VP20-V-	249	49.5
PZiG-1000/1300-VTCF-VP20-V-	253	53.5



PZiG-300/500/700/1000/1300-VTCF-FNPT3/4-V-

	A	B
PZiG-300/500/700-VTCF-FNPT3/4-V-	249	49.5
PZiG-1000/1300-VTCF-FNPT3/4-V-	253	53.5

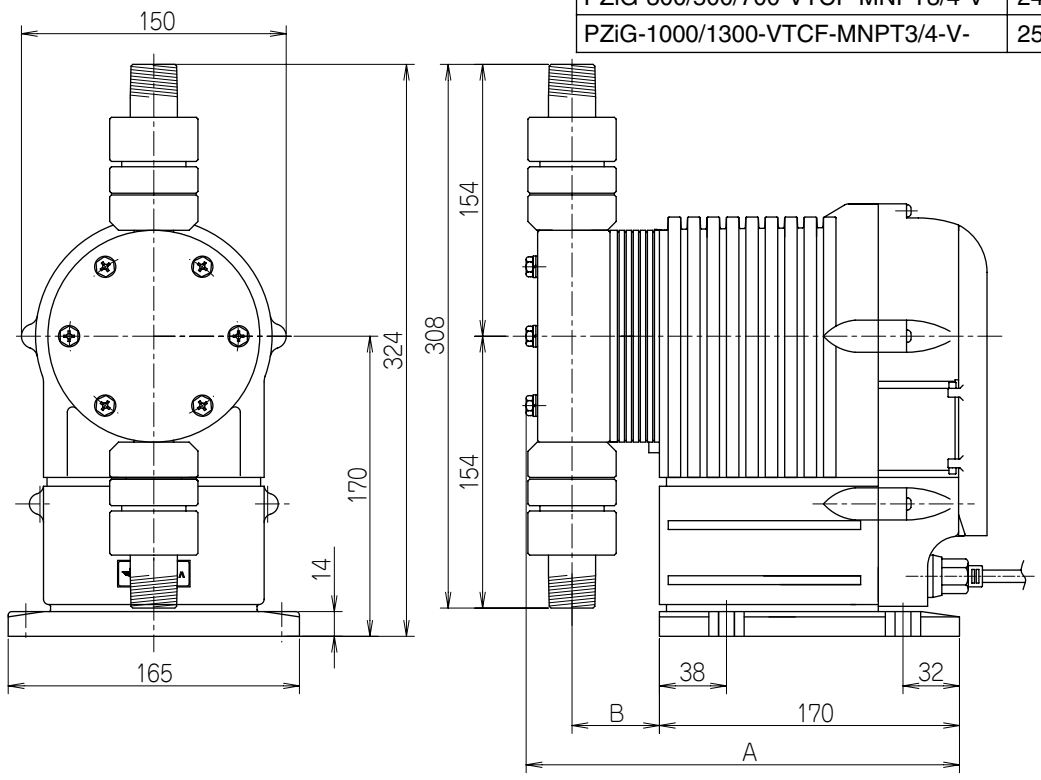


Specifications

■External Dimensions (mm)

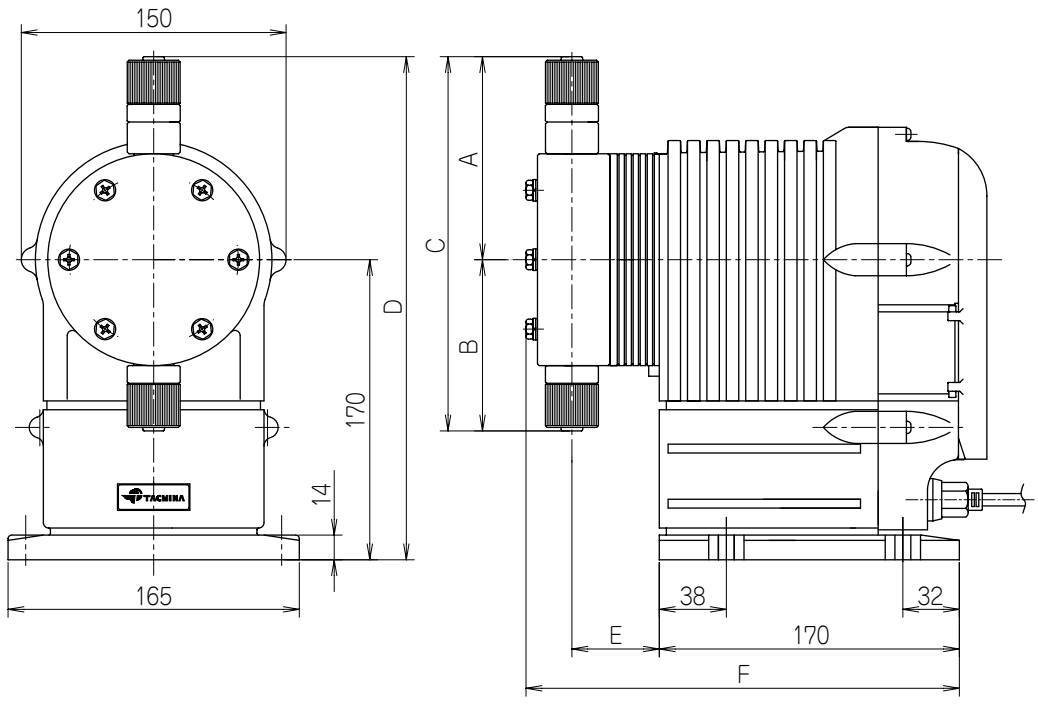
PZiG-300/500/700/1000/1300-VTCF-MNPT3/4-V-

	A	B
PZiG-300/500/700-VTCF-MNPT3/4-V-	246	49.5
PZiG-1000/1300-VTCF-MNPT3/4-V-	253	53.5



PZiG-300/500/700/1000/1300-FTCT-12 x 15PTFE-W-

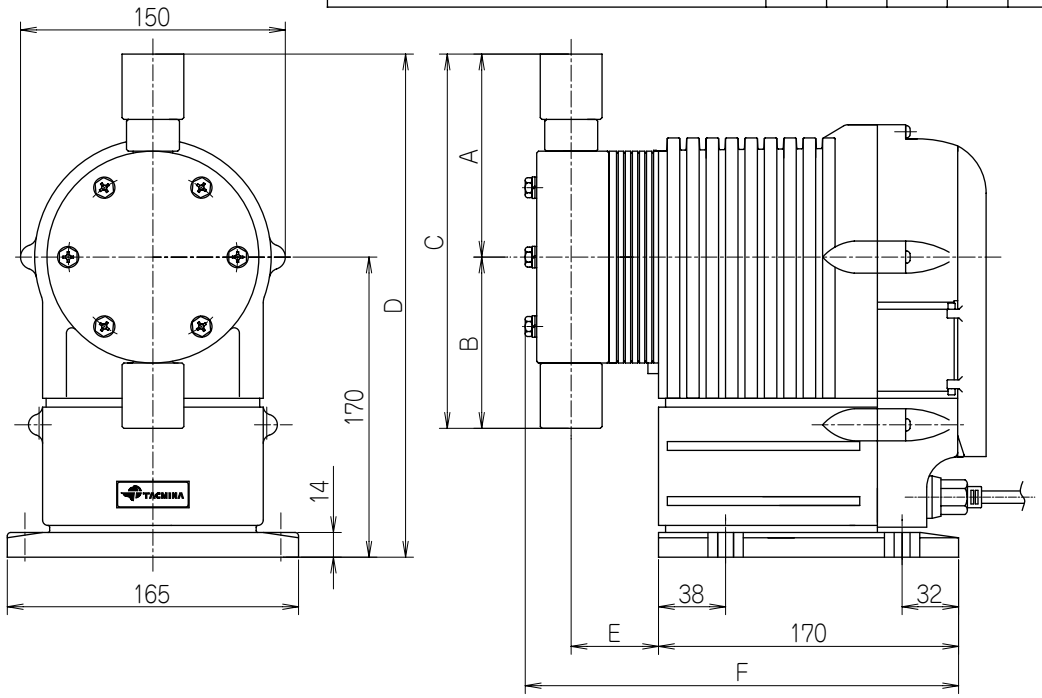
	A	B	C	D	E	F
PZiG-300/500/700-FTCT-12 x 15PTFE-W-	115	97	212	285	49.5	246
PZiG-1000/1300-FTCT-12 x 15PTFE-W-	128	128	256	298	53.5	253



■External Dimensions (mm)

PZiG-300/500/700/1000/1300-FTCT-FNPT-1/2-W-

	A	B	C	D	E	F
PZiG-300/500/700-FTCT-FNPT-1/2-W-	115	97	212	285	49.5	246
PZiG-1000/1300-FTCT-FNPT-1/2-W-	128	128	256	298	53.5	253



Consumables and Spare Parts

■Consumables

The recommended replacement cycles are for cases where the pump is operated under constant conditions (room temperature and clean water). These cycles change according to individual site conditions. Use these cycles as rough guidelines for replacing consumables. Neglecting to replace consumables may cause defective discharge (injection) or malfunction.

⚠ CAUTION

- **The durability of hoses varies considerably depending on the chemical used, temperature, pressure, and UV rays. Inspect the piping, and replace it if it has deteriorated.**

Part Name		Q'ty Per Unit	Recommended Replacement Cycle
Joints	Valve seat	See "Replacing the Valve Seat and Check Ball" on page 28.	4,000 hours after start of operation or 1 year
	Check ball		
	O-ring		
	Spring (high-viscosity specification only)		
Diaphragm		1	
Protective diaphragm		1	

* Use whichever arrives first, 4,000 hours after start of operation, or 1 year.

■Spare Parts

- Hose nut
- Retaining ring
- Hose joint

■Options

●Damper

This option reduces pulsation on the discharge-side piping, and lessens piping resistance, allowing the length of the piping to be extended.

●Signal cable

For 4-pin: 2 m, 5 m **For 8-pin:** 2 m, 5 m

●Relief valve

The valve automatically releases pressure when excessive pressure occurs in the pump's discharge-side piping due to clogging by foreign objects or a closed valve.

●Back pressure valve

This valve is used to prevent the "overfeeding"; the phenomenon that causes the flow of liquids at an excessive discharge volume depending on the piping condition.

Customer Services

If you are unsure about customer services (e.g. repair within the warranty period), please contact your supplying agent.

Warranty

■Warranty Period and Scope of Warranty

(1)The warranty period is one year from the date of purchase.

(2)During the warranty period, should the product malfunction or become damaged due to a design or production deficiency on the part of TACMINA regardless of regular use, TACMINA shall repair or replace the malfunctioning or damaged location free of charge.

(3)Repair of malfunctions and damage caused by the following and replacement of consumables shall be performed for a fee:

①Malfunction and damage outside of the warranty period
②Malfunction and damage arising from careless handling or incorrect use or storage
③Malfunction and damage when parts other than specified by TACMINA are used
④Malfunction and damage arising from repair or remodeling by persons other than TACMINA or vendors specified by TACMINA
⑤Malfunction and damage arising from changes to specifications and remodeling requested by persons other than TACMINA (e.g. the user)
⑥Malfunction and damage arising from fires, natural disasters, and force majeure
⑦Business trip expenses incurred when visiting remote sites and performing repair services

(4)Judgment of malfunction and damage shall be in accordance with the result of discussion between the customer and a TACMINA maintenance engineer.

(5)TACMINA accepts no liability whatsoever for damages arising from malfunctioning of the product or other use of this product.

Repair

■When requesting repair

Before requesting repair, thoroughly read this User's Manual and re-inspect the product. If a malfunction is observed, ask your supplying agent for repair.

(1)Within the warranty period
Ask your supplying agent for repair. The supplying agent will perform the repair in accordance with the details of the Warranty.
(2)Outside the warranty period
Contact and consult your supplying agent. If the functions of the product can be maintained by repair, TACMINA will repair the product in accordance with the customer's wishes for a fee.
(3)Precautions when returning items for repair
Be sure to observe the following to protect worker safety and conserve the environment:

- Wash the pump clean, and return the pump attached with maintenance data or a safety data sheet (MSDS).
- The product sometimes cannot be repaired if maintenance data or a safety data sheet (MSDS) is not attached.
- TACMINA may judge that repair is hazardous and return the pump even if the maintenance data or a safety data sheet (MSDS) is attached.

■ Minimum Retention Period for Performance Parts for Repair
Performance parts for repair are held at TACMINA for five years after discontinuation of production of the product.
"Performance parts" are parts that are required for maintaining the performance of the product.

TACMINA CORPORATION

Head Office:
2-4-8 Minami-Semba, Chuo-ku,
Osaka 542-0081 Japan
Tel. +81(0)6-6271-3974
Fax. +81(0)6-6271-4677
URL http://www.tacmina.com
E-mail trade@tacmina.com

Europe Representative Office:
Hochstr. 35
56235 Ransbach-Baumbach,
Germany
Tel. +49(0)2623-928-345
Fax. +49(0)2623-928-507
E-mail trade@tacmina.com

Southeast Asia Representative Office:
20/1 Soi Ramkhamheang 16, 2nd.
Branch Ramkhamheang Rd., Huamak,
Bangkapi, Bangkok 10240 Thailand
Tel. +66(0)2319-9315 or 9316
Fax. +66(0)2319-7390
E-mail tacmina_sea@pacific.net.sg

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