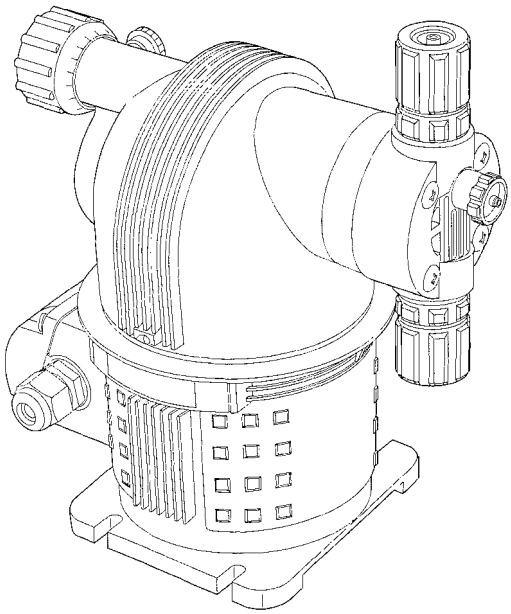
TACMINA
We make pumps

Diaphragm-type Motor-Driven Metering Pump

CSII Series

OPERATION Manual

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



Applicable Models

CSII-10
CSII-30
CSII-60
CSII-100
CSII-300
CSII-600
CSII-1000

- Thank you for purchasing this TACMINA product. Please read this manual carefully in order to ensure that you use this pump safely and correctly.
- Be sure to keep this manual in a place where it will be easily available for reference.
- If the CSII series pump you bought conforms to special specifications not described in this OPERATION Manual, handle the pump according to details of separate meetings and drawings.

For the Safe Use of This Product

This 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 or 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.
- Do not exceed the following operating ranges. Doing so might cause the pump to malfunction.

Ambient Temperature	0 to 40°C		
Operating Chemical Temperature	0 to 40°C (no freezing allowed.)		
Operating Chemical Viscosity	Standard joint specification	CSII-10·30·60·100 model	100 mPa·S or less
		CSII-300·600·1000 model	50 mPa·S or less
	High-viscosity joint specification (*)	CSII-30·60·100·300·600 model	2000 mPa·S or less
		CSII-1000 model	1000 mPa·S or less
Installation Site	Outdoors (IEC529-IPX3/rain-proof type)		

* Install the chemical tank at a place higher than the pump.
Also, note that the viscosity that can be transferred or discharge volume change according to the piping conditions and the nature of the chemical.

Transportation, Installation and Piping

⚠ Warning

- Install this pump in a location where it will not come into contact with children or other people besides the operator.

⚠ Caution

- If you drop or damage this pump, contact your supplying agent. Continued use in this state might cause accidents or malfunction.
- Do not install this pump at humid or dusty locations. Doing so might cause electric shock or malfunction.
- If the discharge piping is provided with a cut-off valve, and when there is the danger that the piping will choke, install a relief valve on the piping immediately after the discharge side of this pump.
- 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.
- The discharge volume cannot be adjusted by operating the valves on the discharge piping.
- This pump generates pulsation. Install an air chamber or other pulsation attenuator.
- The durability of the hose varies greatly according to the chemicals used, temperature, pressure and degree of exposure to ultraviolet light. Inspect the hose, and replace with a new one if it has deteriorated.

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?
(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

Model	VTCE/VTCF						
	10	30	60	100	300	600	1000
Anti siphonal check valve	1 pce						
Foot valve	1 pce						
Braided hose	3 m (4 x 9 mm dia.)		3 m (6 x 11 mm dia.)			3 m (12 x 18 mm dia.)	
Air release hose	1 m (4 x 6 mm dia.)					–	
Pump fixing bolt	4 (M5 x 30, w/ spring washer, flat washer, flange nut)						
Operation manual	1 copy						

Model	CL			
	10	30	60	100
Anti siphonal check valve	1 pce			
Foot valve	1 pce			
Braided hose	3 m (4 x 9 mm dia.)		3 m (6 x 11 mm dia.)	
Air release hose	1 m (4 x 6 mm dia.)			
Pump fixing bolt	4 (M5 x 30, w/ spring washer, flat washer, flange nut)			
Operation manual	1 copy			

Model	VTCE (boiler specification)			
	10	30	60	100
Straight check valve for boiler	1 pce			
Foot valve	1 pce			
Nylon tube	2 m (4 x 6 mm dia.)		2 m (6 x 8 mm dia.)	
Braided hose	1 m (4 x 9 mm dia.)		1 m (6 x 11 mm dia.)	
Air release hose	1 m (4 x 6 mm dia.)			
Pump fixing bolt	4 (M5 x 30, w/ spring washer, flat washer, flange nut)			
Operation manual	1 copy			

Model	FTCT						
	10	30	60	100	300	600	1000
Straight check valve for boiler	1 pce						
Foot valve	1 pce						
PTFE hose	3 m (6 x 8 mm dia.)					3 m (12 x 15 mm dia.)	
Hose pump	1 pce					–	
Pump fixing bolt	4 (M5 x 30, w/ spring washer, flat washer, flange nut)						
Operation manual	1 copy						

Model	6TCT					STCT	
	10	30	60	100	300	600	1000
Straight check valve for boiler	1 pce						
Foot valve	1 pce						
PTFE hose	3 m (6 x 8 mm dia.)					3 m (12 x 15 mm dia.)	
Hose pump	1 pce					–	
Pump fixing bolt	4 (M5 x 30, w/ spring washer, flat washer, flange nut)						
Operation manual	1 copy						

Model	VT6E (high-viscosity specification)						
	10	30	60	100	300	600	1000
Braided hose	3 m (12 x 18 mm dia.)					3 m (19 x 26 mm dia.)	
Air release hose	1 m (4 x 6 mm dia.)					–	
Pump fixing bolt	4 (M5 x 30, w/ spring washer, flat washer, flange nut)						
Operation manual	1 copy						

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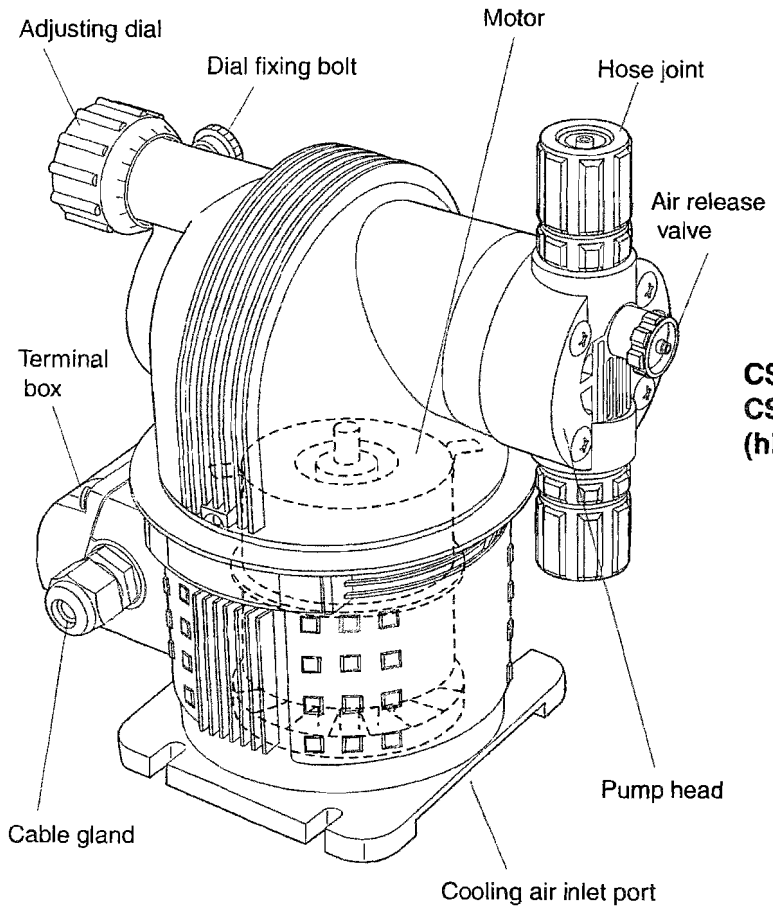
Product Description

The CSII Series Diaphragm-type Motor-Driven Metering Pump can accurately transfer fixed volumes of liquids at fixed intervals.
The CSII's pump head has two check valves that allow liquid to pass in only one direction, which helps ensure a fixed discharge volume per single pump operation.
The CSII Series is simply designed and is easy to maintain. It can be disassembled and inspected by the user, which reduces maintenance costs.

Names of Parts

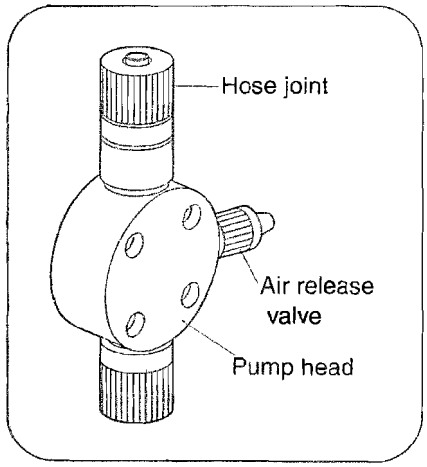
All models of the CSII Series share the same body with the exception of the pump head that differs according to model type and pump size.

CSII-10/30/60/100/300-VTCE/VTCF
CSII-10/30/60/100-CL
CSII-10/30/60/100-VTCE (boiler specification)*
* A tube fitting joint is used on the discharge side.

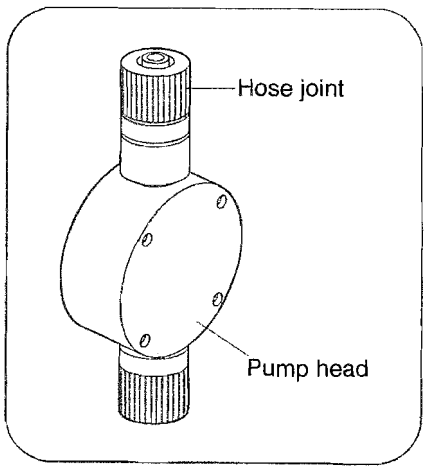


Pump head variations

CSII-10/30/60/100/300-FTCT/6TCT



CSII-600/1000-VTCE/VTCF/FTCT/STCT
CSII-30/60/100/300/600/1000-VT6E
(high-viscosity specification)



Operation

⚠ Warning

- When handling chemicals, be sure to use protective coverings (rubber gloves, face mask, protective goggles, chemical-resistant work clothes, etc.) matched to the chemicals you are using.
- If you forget to open the discharge-side valve or if foreign matter clogs the discharge piping, the pressure in the piping and pump head may increase beyond the range indicated in the pump specifications. This may result in the chemicals leaking or spurting, or in damage to the pump or the piping. Check the valves and other parts before you start pump operation.

Check the following points.

Before operation

Check Location	Details of Check	Remarks
Chemical solution tank	Check for insufficient chemicals. Replenish if insufficient.	Pay special attention to processes or chemicals that are incompatible when air mixes into the chemical.
Piping	Check piping for disconnection or damage. Repair if disconnected or damage.	
Valve (suction/discharge sides)	Make sure that the valve is open. Open if closed.	This condition results in excessive pressure rise, spraying out of chemicals or damage to piping, which is dangerous.
Power supply	Make sure that the pump is connected to the specified power supply.	Connection of a non-specified motor may cause motor seizure.
Electrical wiring	Check electrical wiring for mistakes.	Mistakes in the electrical wiring may cause short circuits or current leakage.

During operation

Check Location	Details of Check	Remarks
Pump head	Check for chemical leakage from the hole at the bottom of the spacer ring on the rear of the pump head.	A probable cause of chemical leakage is a damaged diaphragm. Inspect the diaphragm.
Joint	Check for chemical leakage.	Tighten the joints if chemicals are leaking from the joints. If this does not stop chemical leakage, inspect the O-rings at each section.
Discharge side pressure	Check the needle of the pressure gage on the pump discharge side.	If erroneous numerical values are indicated, probable causes are clogged piping or blocked valves. Inspect the piping.

- When using the pump for the first time
- When resuming operation after the pump is shut down for an extended period
- When gas lock is occurring on the pump
- When the chemical solution tank is empty, for example, due to tank replacement

→ **Releasing Air (page 8)**

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

→ **Adjusting the Discharge Volume (page 9)**

- When shutting down operation for an extended period
- When resuming operation after the pump is shut down for an extended period

→ **Shutting Down Operation for an Extended Period (page 9)**

Releasing Air

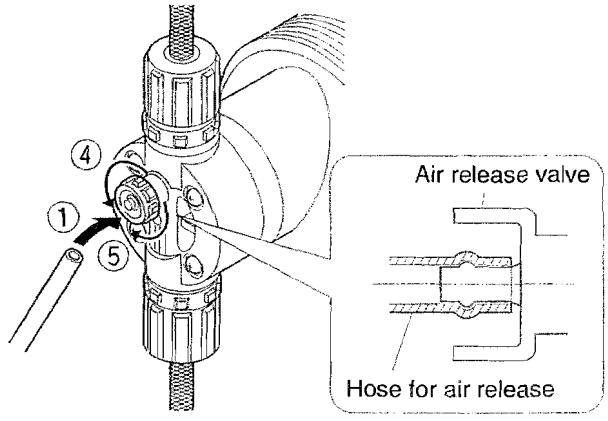
⚠ Warning

- During air release, chemicals spout forcefully from the tip of the air release valve (or piping, etc.). Either release air using water or other safe liquid, or return the tip of the air release piping to the tank or other receptacle.

CSII-10/30/60/100/300-VTCE/VTCF
CSII-10/30/60/100-CL
CSII-10/30/60/100-VTCE (boiler specification)

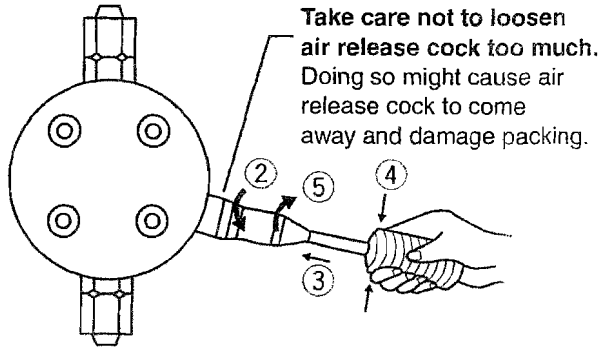
① Insert the air release hose (provided) onto the tip of the air release valve.
② Set the stroke length to maximum.
- For details on how to the set the stroke length, see "Adjusting the Discharge Volume."
- The maximum stroke length differs according to the pump model.

③ Turn the pump ON.
④ Turn the air release valve 1 to 1.5 turns CCW while operating the pump.
Air remaining in the suction-side hose and pump head is discharged, and the pump head is filled with liquid.
⑤ Tighten the air release valve if liquid comes out of the air release valve.



CSII-10/30/60/100/300-FTCT/6TCT

① Turn the pump OFF, and fully release the pressure on the discharge piping.
② Turn the air release cock CCW.
③ Insert the hose pump (provided).
④ Squeeze the hose pump a few times.
Air remaining in the suction-side hose and pump head is discharged, and the pump head is filled with liquid.
⑤ Tighten the air release cock if liquid comes out of the hose pump.



CSII-600/1000-VTCE/VTCF/FTCT/STCT
CSII-30/60/100/300/600/1000-VT6E (high-viscosity specification)

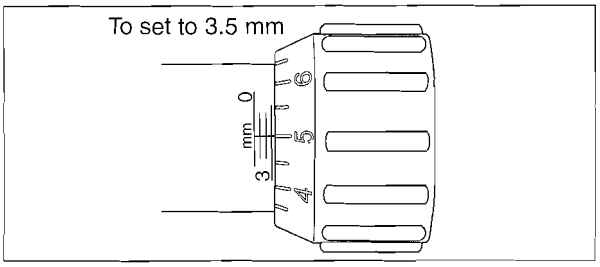
① Fully release the pressure on the discharge piping.
② Set the stroke length to maximum.
- For details on how to the set the stroke length, see "Adjusting the Discharge Volume."
- The maximum stroke length differs according to the pump model.

③ Turn the pump ON.
④ Turn the pump OFF when liquid enters the pump head.
⑤ Restore the discharge piping.

Adjusting the Discharge Volume

To adjust the injection amount, turn the adjusting dial. The scale on this dial is divided into two scales, a primary dial scale and secondary dial scale.
The primary dial scale indicates the stroke length in millimeters (mm).
The secondary dial scale is divided into ten equal sections, with one turn of the dial corresponding to 1 mm.

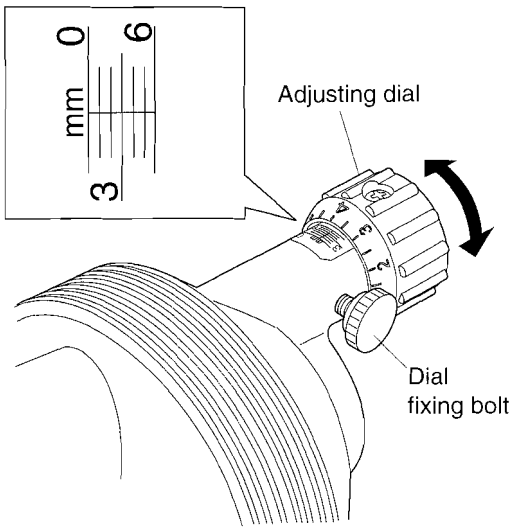
① **Loosen the dial set bolt.**
② **Set the desired stroke length by the primary dial scale, and make stroke length adjustments of less than 1 mm by the secondary dial scale.**
③ **Fix the adjusting dial in place by the dial set bolt to prevent the adjusting dial from moving during pump operation.**



* Turning the adjusting dial CCW increases the discharge volume, while turning it CW decreases the discharge volume.
* Turning the adjusting dial beyond the effective adjustment range does not increase the discharge volume.

Important

For details on the relationship between scale and injection amount, see the performance curves on pages 31 and 32.
The values indicated in these performance curves were obtained using clean water under fixed conditions on TACMINA testing facilities.
To obtain more accurate discharge volumes, measure the discharge volume at the end of actual piping.



Do not turn the adjusting dial beyond 0 on the dial scale or the maximum effective value indicated on the scale.

Note

0 to 6 are indicated as the adjustment range on the dial scale. The maximum effective value, however, differs according to pump model.

(Unit: mm)

Model	CSII-10	CSII-30	CSII-60	CSII-100
Max. effective scale	2		3	

(Unit: mm)

Model	CSII-300	CSII-600	CSII-1000
Max. effective scale	6		

Shutting Down Operation for an Extended Period

Follow the respective procedure below to shut down operation for an extended period or to resume operation after an extended period.

To shut down operation

① Clean inside the pump head.
Suck in and discharge clean water or washing water into the pump for about 30 minutes.
② Turn the pump OFF and disconnect the power leads.
③ Cover the pump with its protective cover.
Take measures to prevent dust from accumulating on the pump and protect it from corrosive environments.

To resume operation

① Check the inside of the tank for accumulation of sediment, clouding of liquid or other abnormalities.
If you find that liquid quality has deteriorated, clean the inside of the tank, and completely replace with fresh liquid.
② Check the check ball and valve seat inside the pump head to make sure they are free of adhering dirt or foreign matter.

Maintenance

⚠ Warning

- When performing maintenance on liquid-end parts, be sure to use protective coverings (rubber gloves, face mask, protective goggles, chemical-resistant work clothes, etc.) matched to the chemicals you are using.
- Do not turn the power ON during maintenance and inspection. Attach a "Work In Progress" label to the power switch.
- Before disassembling connecting parts, relieve the pressure from the discharge piping, drain chemicals at connecting parts, and clean.

Periodic inspection

• 4000 hours of operation or once every year • Abnormal discharge (reduced discharge volume) • Fluid leakage from pump head periphery	→ **Replacing the Diaphragm (page 11)**
• 4000 hours of operation or once every year • Abnormal discharge (reduced discharge volume)	→ **Replacing the Valve Seat and Check Ball (pages 12, 13)**
• 4000 hours of operation or once every year • Abnormal noise from drive unit • Abnormal heat generated on drive unit	→ **Lubrication Inspection on Drive Unit (page 14)**

When an abnormality is observed

• Actual discharge volume deviates considerably from set discharge volume. • Adjusting dial is turned to 0 or less or 6 or more.	→ **Zero Adjustment of Flow Adjusting Section (page 17)**
• Motor failure	→ **Mounting (Removing) the Motor (page 17)**
• Other abnormalities	→ **Troubleshooting (page 19)**

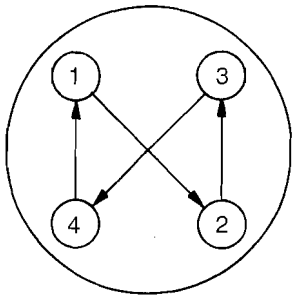
Note

Perform periodic 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 in the figure on the right a little at a time using even force. For example, tightening will be uneven if the bolts are tightened in the order 1, 3, 2, and 4. This might cause chemicals to leak from the pump head.



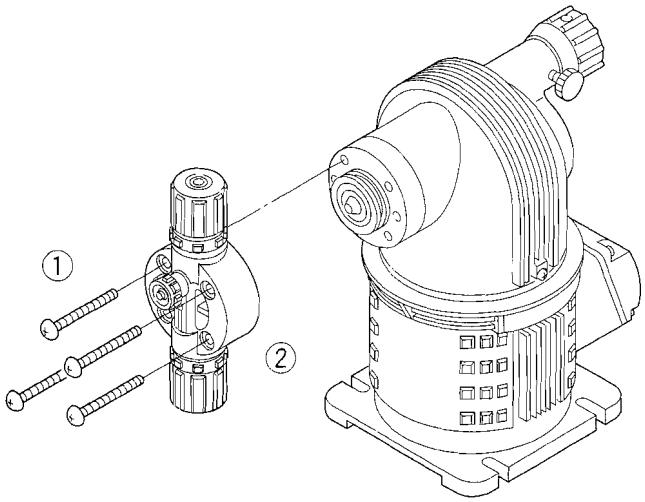
Removing the pump head

① Remove the four head bolts.

② Remove the pump head.

Important

Before attaching the diaphragm, remove any transferring liquid or rust attached to the tip of the pump shaft and surrounding area with a clean cloth,and apply a coating of grease.



Replacing the diaphragm

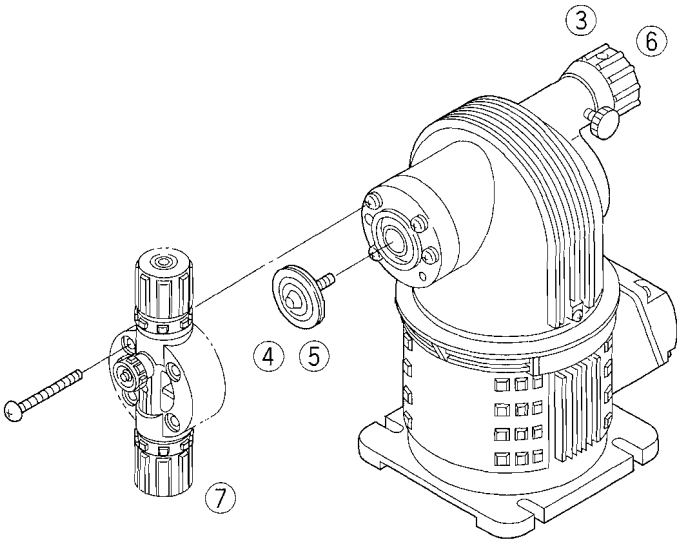
③ Set the adjusting dial to "0".

④ Remove the diaphragm.
Holding the outer periphery of the diaphragm, turn the diaphragm CCW to remove.

⑤ Attach the new diaphragm.
Firmly turn CW the diaphragm until it cannot be turned any more.
If the diaphragm is loose, it may contact the pump head, and cause an accident or malfunction.

⑥ Turn the adjusting dial CCW until the diaphragm contacts the spacer ring at the rear.

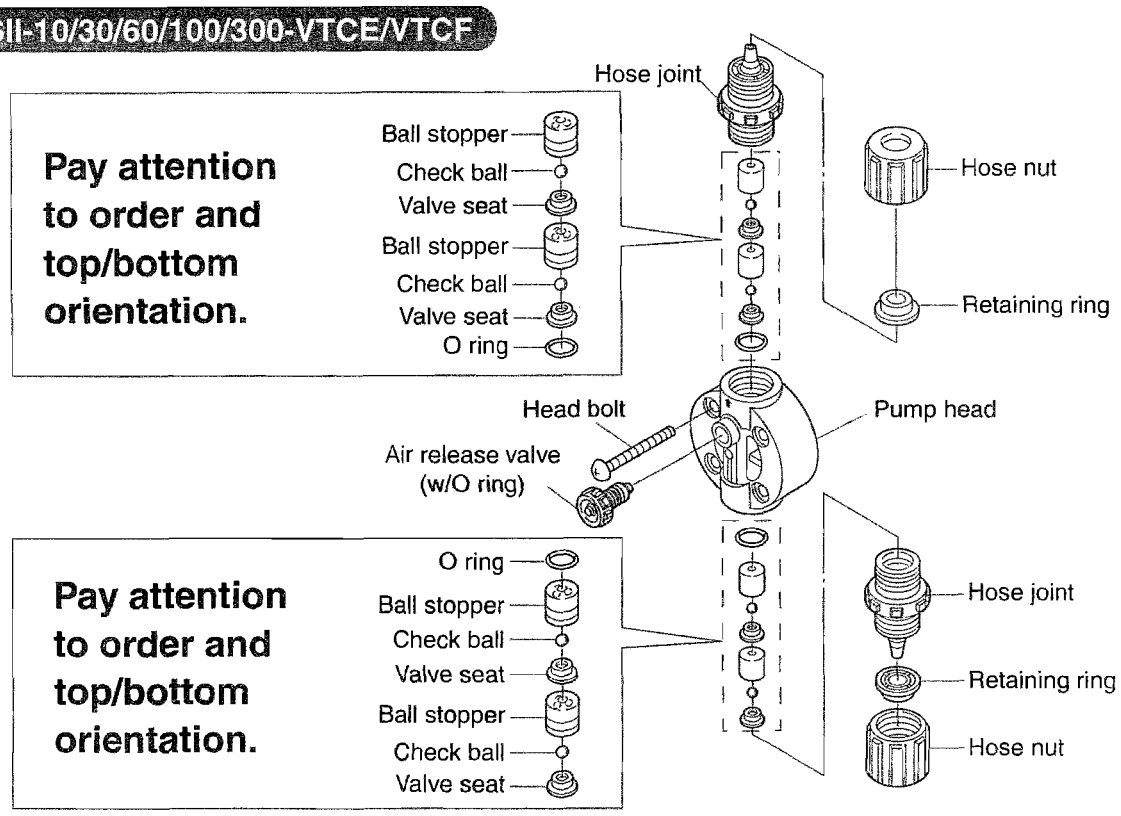
⑦ Attach the pump head.



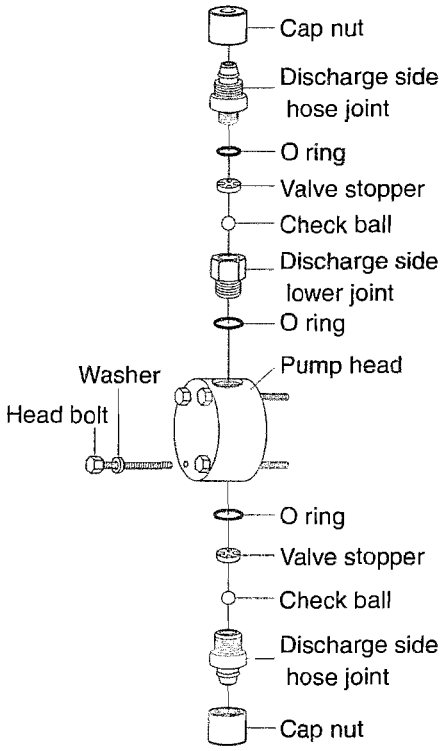
Replacing the Valve Seat and Check Ball ①

- Attach O rings, ball stoppers, and check balls making sure that they face the right way.
- When removing and re-attaching the upper and lower joint sets, take care not to mistake the upper and lower joints.
- Check the O rings and check balls for scratches, or the valve seats for scratches or adhesion of dirt.
- A parts kit containing diaphragms for the CSII 10 to 300(excluding FTCT and 6TCT) and consumables for the valve seat section is available.
- An upper casing parts set, lower casting parts set, and pump head set each with replacement parts and consumables are available.

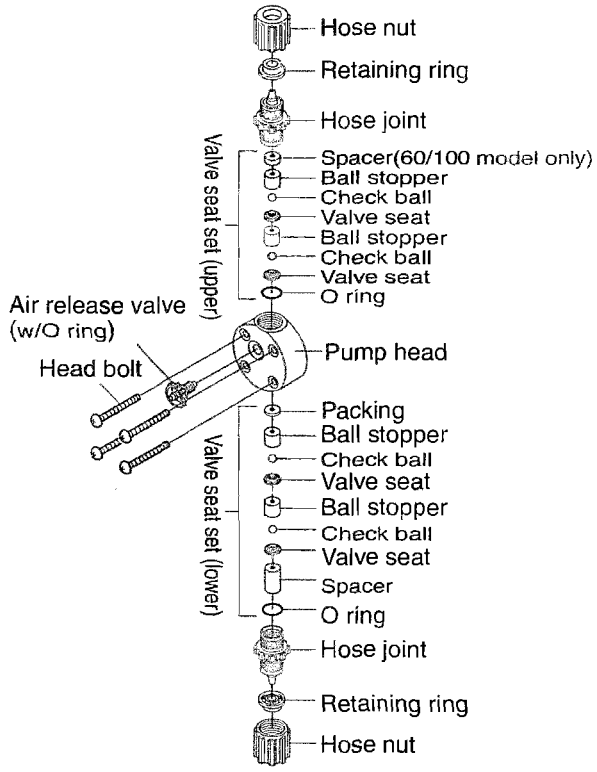
CSII-10/30/60/100/300-VTCE/VTCF



CSII-600/1000-VTCE/VTCF/FTCT/STCT



CSII-10/30/60/100-CL

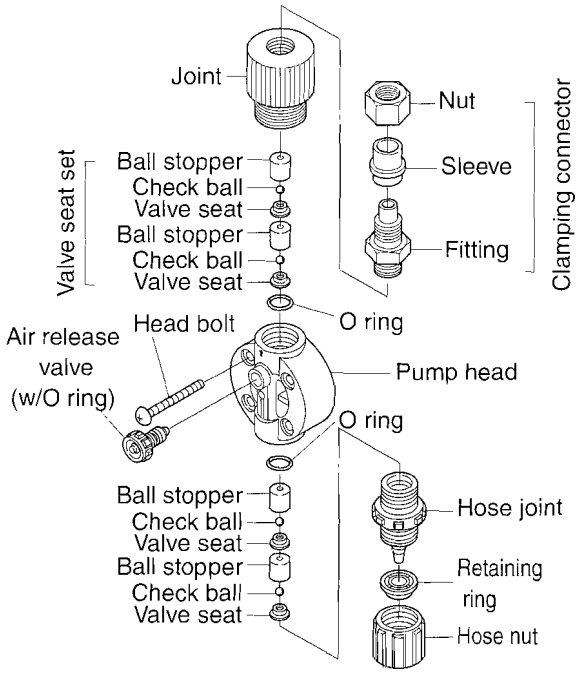


Maintenance

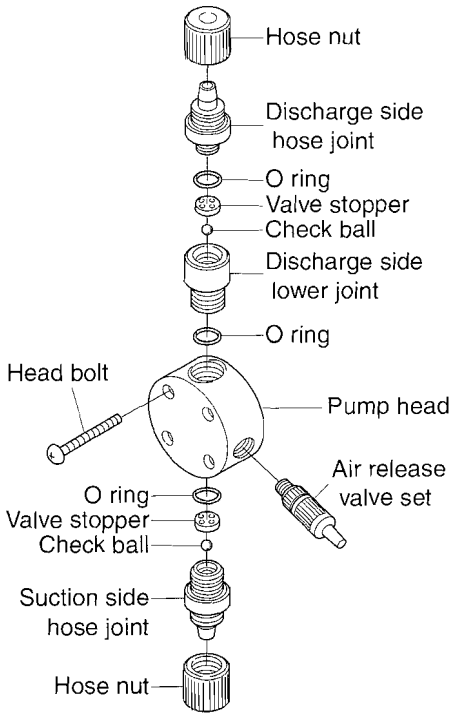
Replacing the Valve Seat and Check Ball ②

- Attach O rings, ball stoppers, and check balls making sure that they face the right way.
- When removing and re-attaching the upper and lower joint sets, take care not to mistake the upper and lower joints.
- Check the O rings and check balls for scratches, or the valve seats for scratches or adhesion of dirt.

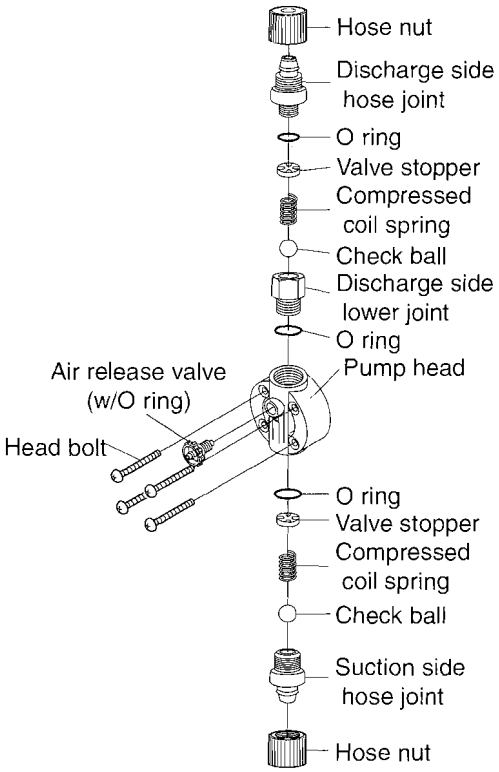
CSII-10/30/60/100-VTCE (boiler specifications)



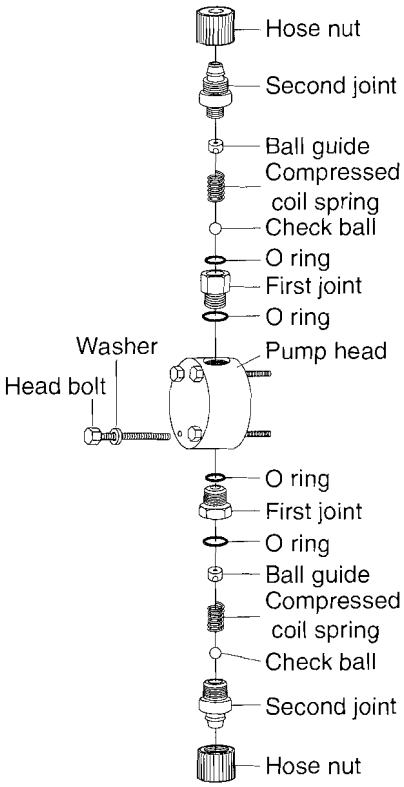
CSII-10/30/60/100/300-FTCT/6TCT



CSII-30/60/100/300-VT6E (high-viscosity specification)



CSII-600/1000-VT6E (high-viscosity specification)



Maintenance

Lubrication ① (4000 hours or once every year)

⚠ Caution

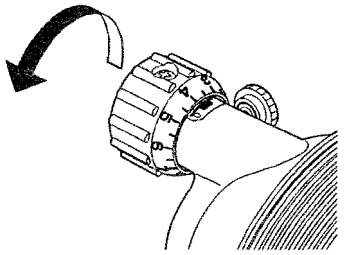
- If you perform the following immediately after stopping pump operation, be sure to use protective coverings to prevent burns as components inside the pump are hot.

* The following description uses illustrations showing a terminal block attached.

Steps ① to ⑨ are sufficient for regular lubrication work.

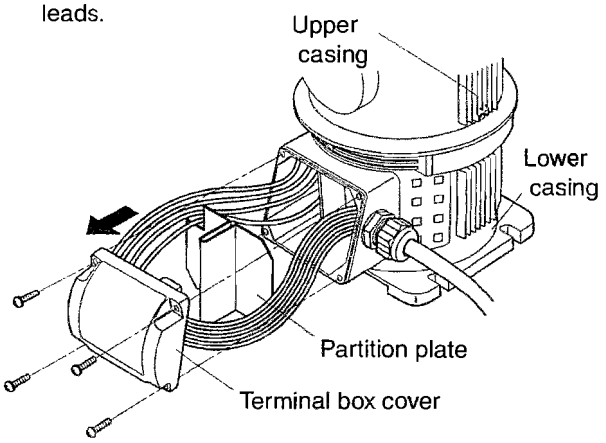
However, we recommend the procedure on page 16 after performing step ⑥ after 8000 hours of pump operation or every two years to sustain performance or ensure a long service life.

① Set the adjusting dial to "0".

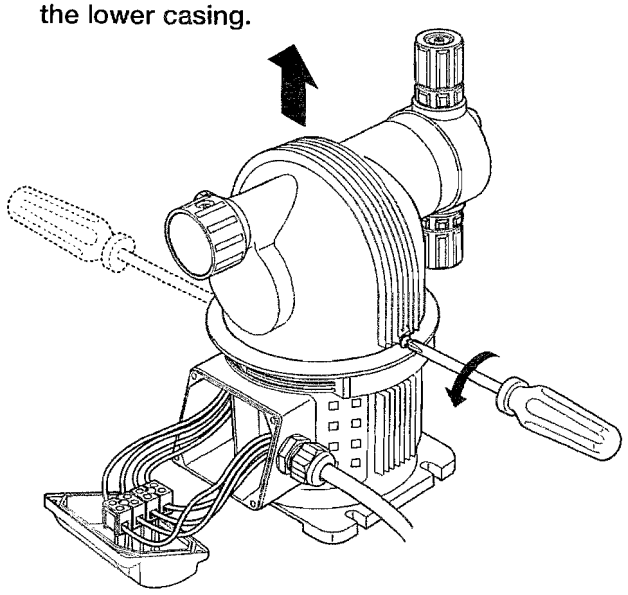


② Remove the four screws to remove the terminal box cover.

When removing the terminal box cover and partition plate, and disassembling the upper and lower casings, provide additional slack for the power leads so that the cases are not pulled together by the power leads.

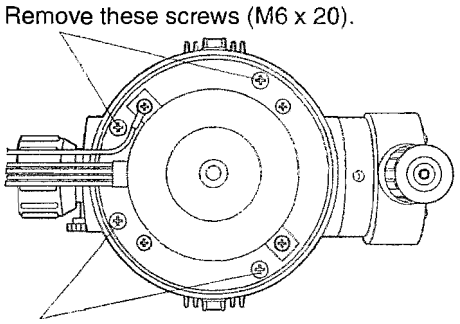


③ Loosen the two screws (three turns CCW) to remove, and remove the upper casing from the lower casing.

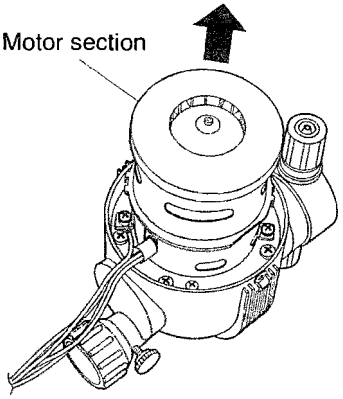


④ Turn the upper casing upside down, remove the four larger (M6 x 20) screws, and remove the drive unit.

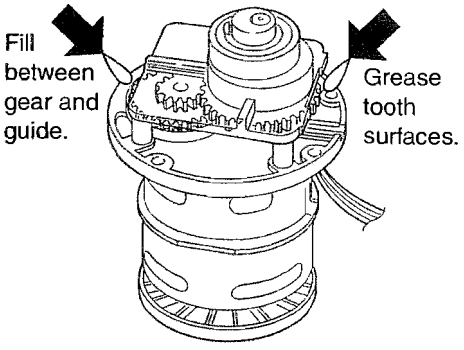
* Do not remove other screws.



⑤ Hold the motor and draw it out straight up.



⑥ Grease the two gears.

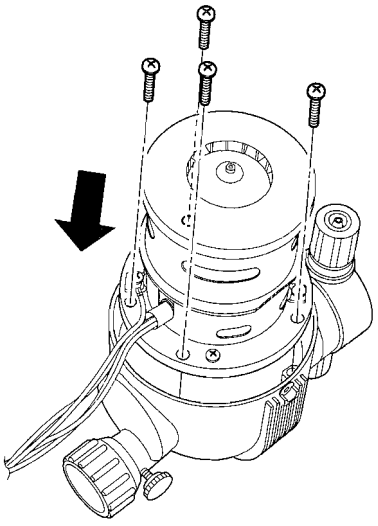


* Use MOLY-HD grease No.2 (Sumiko).

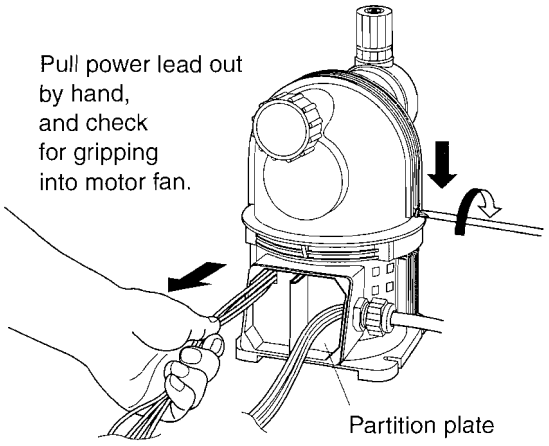
Lubrication ① (4000 hours or once every year)

⑦ **Attach the drive unit, and fix in place by the four screws.**

Insert the motor straight down following the procedure in POINT below.



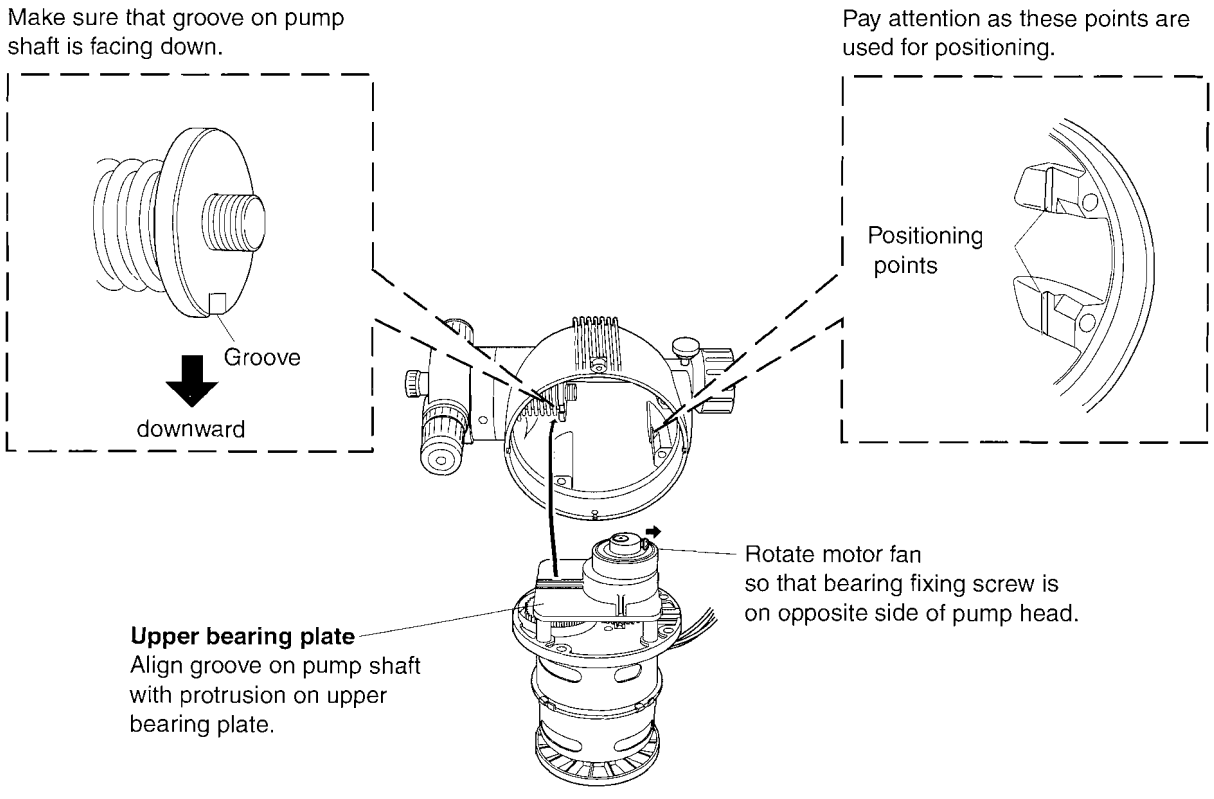
⑧ **Fix the upper casing in place by the two screws, and insert the partition plate.**



⑨ **Attach the terminal box cover, and fix in place by the four screws.**

* **Take care to prevent the power lead from entering the motor fan.**
* **Make sure that the power lead is not being gripped in.**
* **Make sure that the O ring is fitted into the terminal box cover.**

POINT



Lubrication ② (8000 hours or once every two years)

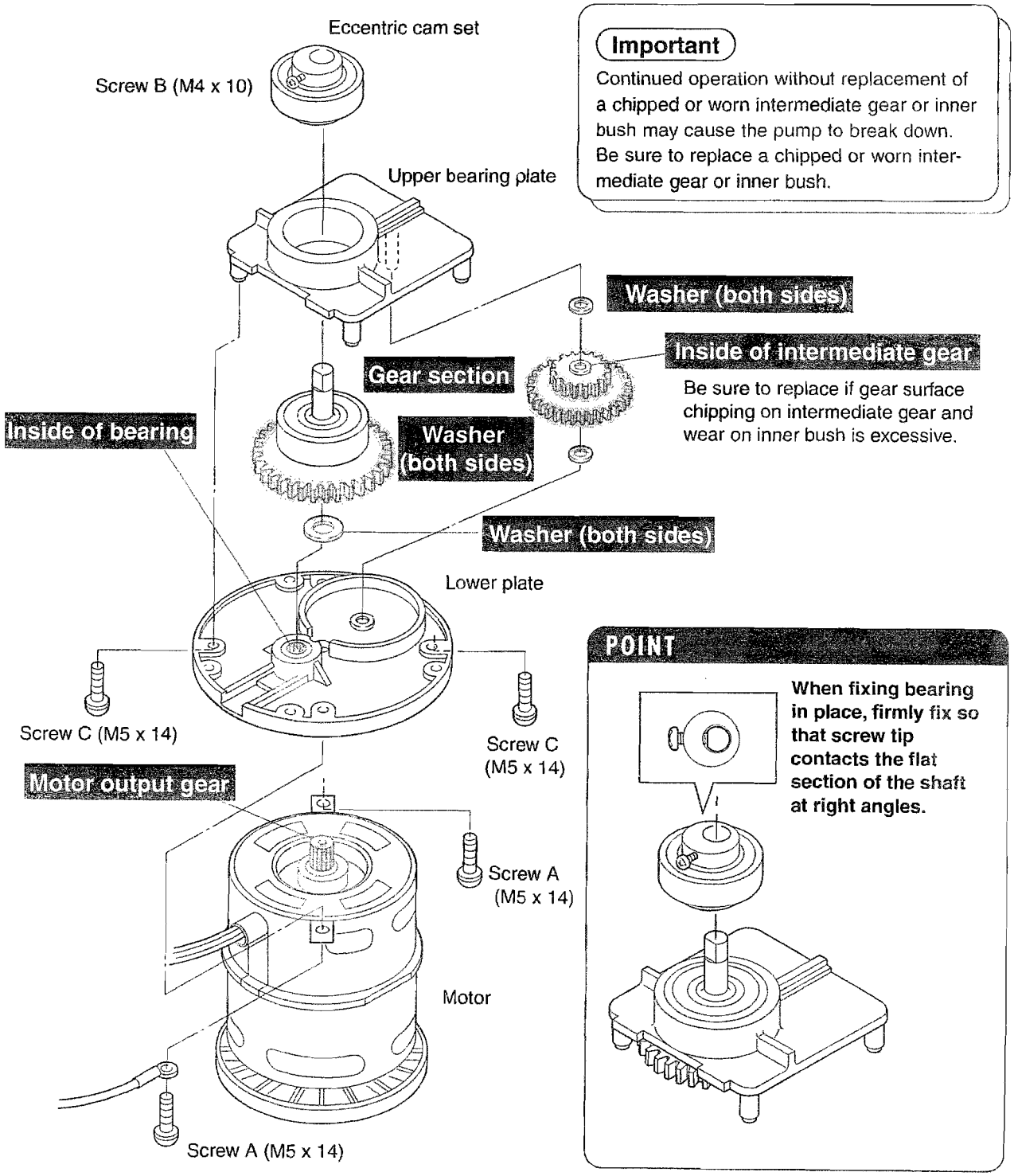
Perform the following procedure after step (6) on page 14.

① Remove two screws A to remove the motor.

② Loosen screw B to draw out the eccentric cam set.

③ Remove two screws C.

④ Grease the white lettered sections ●●●●● in the figure.



Important

Continued operation without replacement of a chipped or worn intermediate gear or inner bush may cause the pump to break down. Be sure to replace a chipped or worn intermediate gear or inner bush.

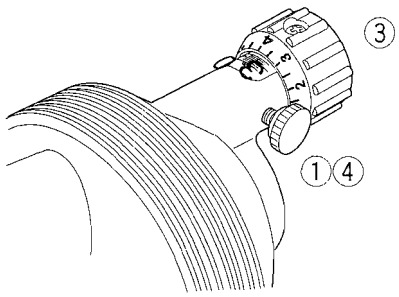
Be sure to replace if gear surface chipping on intermediate gear and wear on inner bush is excessive.

POINT

When fixing bearing in place, firmly fix so that screw tip contacts the flat section of the shaft at right angles.

Zero Adjustment of Flow Adjusting Section

① Loosen the dial set bolt.



② Turn the pump ON, and start pump operation.
At this time, remove the piping from the joint to prevent liquid from being fed.

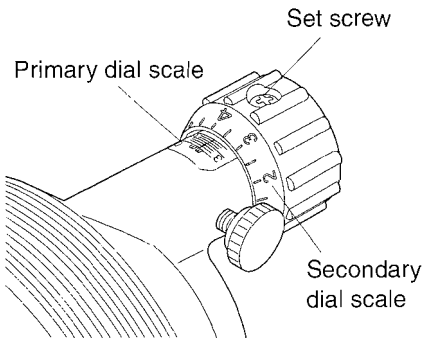
③ Continually turn the adjusting dial CW while operating the pump.

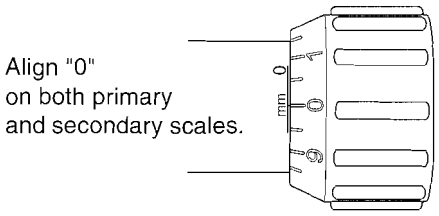
POINT

During this operation, you will feel the pump shaft tap against the flow adjusting shaft. As you continue to further turn the adjusting dial, you will find a position where this contact feeling disappears. This is the zero point.

④ Temporarily tighten the dial set bolt.
Tighten the dial set bolt to prevent the shaft on the adjusting section from turning.

⑤ Set the adjusting dial to "0".
Loosen the set screw on the adjusting dial, slide and turn the dial so that the main dial scale is aligned with "0 mm" and the secondary dial scale is aligned with "0", and then fully tighten the adjusting dial with the set screw.

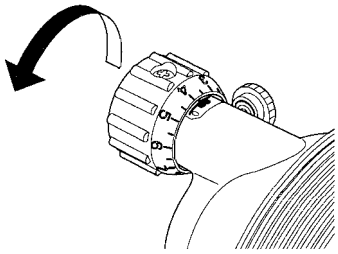




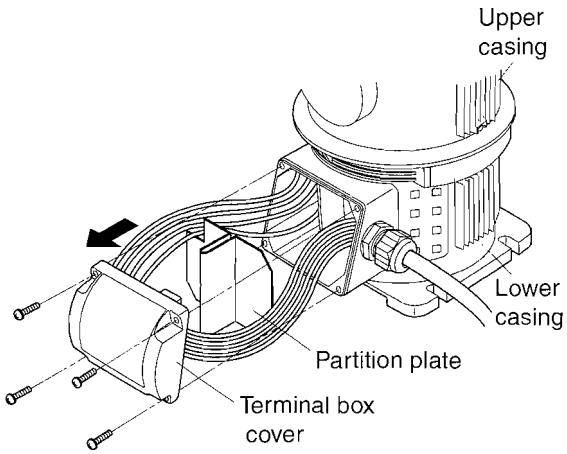
Mounting (Removing) the Motor

* The following description uses illustrations showing a terminal block attached.

① Set the adjusting dial to "0".

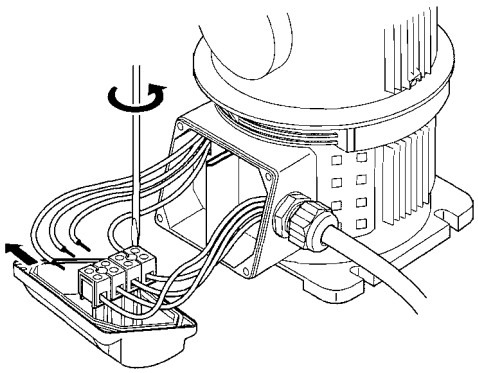


② Remove the four screws to remove the terminal box cover.
When removing the terminal box cover and partition plate, and disassembling the upper and lower casings, provide additional slack for the power leads so that the cases are not pulled together by the power leads.



③ Disconnect the power leads on the motor side from the terminal block.

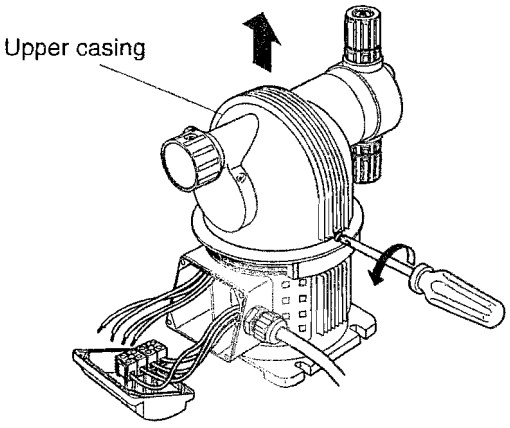
3-phase: 4 leads
Single-phase: 3 leads



Maintenance

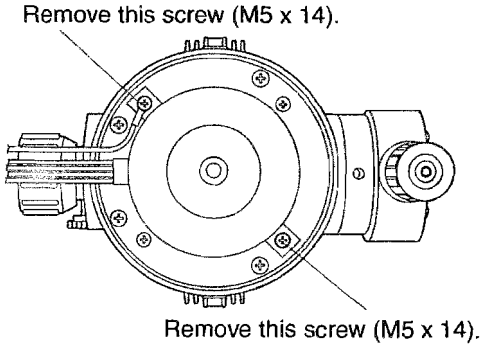
Mounting (Removing) the Motor

④ Loosen the two screws (three turns CCW) to remove, and remove the upper casing from the lower casing.

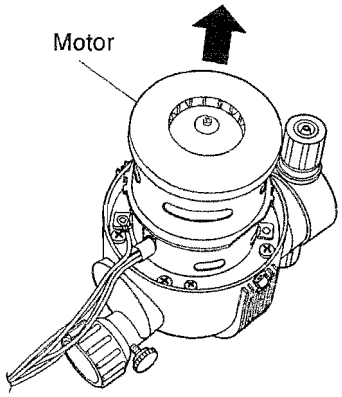


⑤ Turn the upper casing upside down, remove the two screws (M15 x 14) fixing the motor in place, and remove the motor.

* Do not remove other screws.

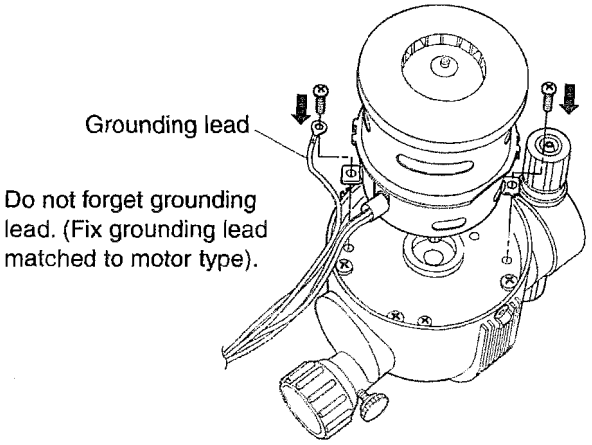


⑥ Remove the motor.

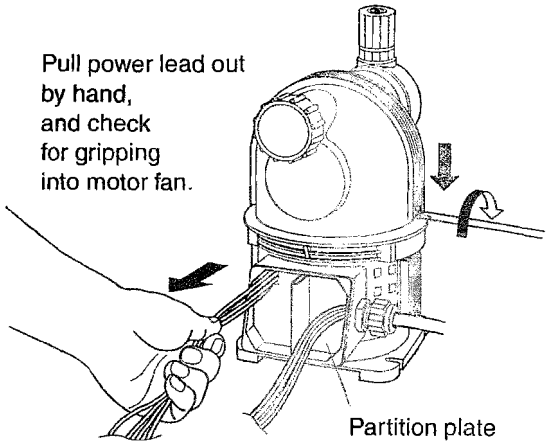


⑦ Attach the motor.

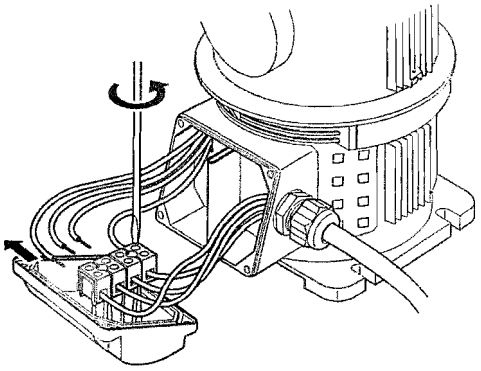
At this time, grease the motor output gear.



⑧ Fix the upper casing in place by the two screws, and insert the partition plate.



⑨ Wire the power leads to the terminal block.



⑩ Attach the terminal box cover, and fix in place by the four screws.

* Take care to prevent the power leads from entering the motor fan.
* Make sure that the power leads is not being gripped in.
* Make sure that the O ring is fitted into the terminal box cover.

Troubleshooting

■ Liquid is not discharged.

Description		Cause	Remedy
Pump does not operate.	Motor is not operating.	(1) Defective power supply or voltage	(1) Check the power supply and voltage. Connect to the correct power supply.
		(2) Defective motor wiring	(2) Inspect the wiring, and correct the wiring if necessary.
		(3) Power leads disconnection	(3) Repair or replace the power leads.
		(4) Switch is OFF.	(4) Turn switch ON.
		(5) Breaker is tripped or fuse is blown.	(5) Replace the motor.
		(6) Motor is immersed in water.	(6) Replace the motor.
		(7) Motor damage	(7) Replace the motor.
		(8) Defective magnet switch	(8) Replace the magnet switch.
	Motor is operating.	(1) Reduction gear mechanism is damaged.	(1) Repair or replace the motor.
		(2) Eccentric cam mechanism is damaged.	(2) Replace the motor.
Pump operates but chemical is not fed.	Air is entering the pump.	(1) Gas is caused by nature of chemical.	(1) Remove the cause of gas generation.
		(2) Leakage from joints and seals	(2) Check and tighten O-rings and other parts if necessary.
		(3) Chemical solution tank is empty.	(3) Replenish chemicals and release air.
	Chemical is not being sucked in.	(1) Strainer is clogged.	(1) Clean the strainer and tank.
		(2) Dirt is biting into seats.	(2) Disassemble and clean.
		(3) Valve seat is scratched.	(3) Replace the valve seat.
	Chemical is leaking.	(1) Diaphragm is damaged.	(1) Replace the diaphragm.

■ Small discharge volume

Description	Cause	Remedy
Pump is running normally but discharge volume is small.	(1) The diaphragm is damaged.	(1) Replace the diaphragm.
	(2) Foreign matter is biting into valve seat and check ball.	(2) Inspect and clean.
	(3) Air is being sucked in from suction side piping.	(3) Inspect and tighten the piping if necessary.
	(4) Dial is at tightened position.	(4) Set the dial again.
	(5) Defective valve seat and seals	(5) Replace valve seats, check ball, O rings and other parts.

■ Excessive discharge volume

Description	Cause	Remedy
Pump is running normally but discharge volume is large.	(1) Overfeeding is occurring.	(1) Review the piping, and install a back pressure valve.
	(2) Piping is connected to suction side of main pump.	(2) Check or install an anti siphonal check valve.
Chemical discharge does not stop.	(1) Siphoning is occurring.	(1) Review the piping, and install a breather pipe or a back pressure valve.
	(2) Air still remains in piping and is causing damper effect.	(2) Release air from the piping.

■ Liquid leakage

Description	Cause	Remedy
Chemical is leaking.	(1) The discharge side piping is blocked, which is causing pressure to build up.	(1) Disassemble and clean.
	(2) The diaphragm is damaged.	(2) Replace the diaphragm.
	(3) The screws are insufficiently tightened.	(3) Tighten. The bolts on the pump head are unevenly tightened.

■ Heat generated, abnormal sound

Description	Cause	Remedy
Abnormal noise or heat is being generated at the drive section.	(1) Overload	(1) Inspect the discharge pressure and parts for clogging.
	(2) Insufficient lubrication	(2) Apply grease.
	(3) Outside air temperature or transferring air liquid temperature is too high.	(3) Improve the installation conditions.
	(4) Reduction gear mechanism is damaged.	(4) Repair or replace.
	(5) Spring is damaged.	(5) Replace.
	(6) Abnormal pressure is being applied on the discharge side.	(6) Inspect the piping.

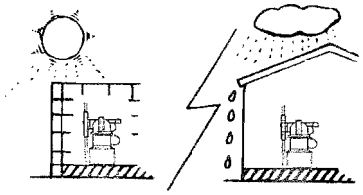
Installation

⚠ Warning

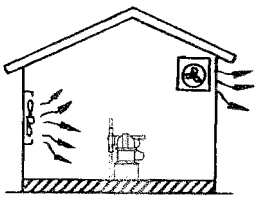
- This pump is not designed to explosion-proof specifications. It cannot be used in explosion-proof areas, and in explosive/ignitable atmospheres.
- Install the pump in locations out of the reach of children and personnel other than an operator.

Installation site

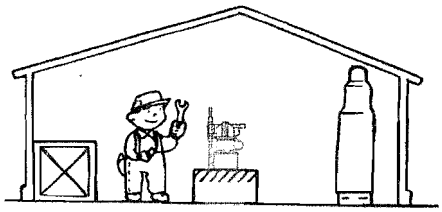
- Avoid installing the pump in the direct sunlight. Also, prevent it from being exposed to wind and rain. Though this pump is designed for outdoor use, metal parts sometimes heat up due to direct sunlight, plastic parts sometimes deteriorate due to UV rays, and scratches or rust sometimes appears due to grit and dirt, or rainfall. To prolong the service life of the pump when it is used outdoors, we recommend attaching a shade or cover.



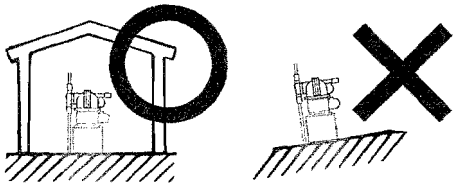
- Install the pump in a location that is well-ventilated during summer, and where chemicals will not freeze in winter.



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

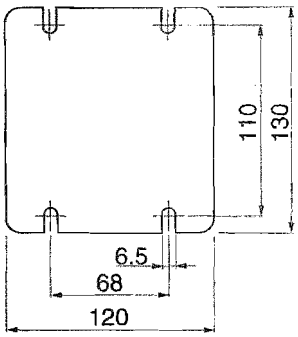


- Install the pump on a flat horizontal surface and fix it securely to prevent it from vibrating during the operation. If the pump is installed on an inclined surface, the pump may not be able to discharge properly or at all.



Position of mounting bolts

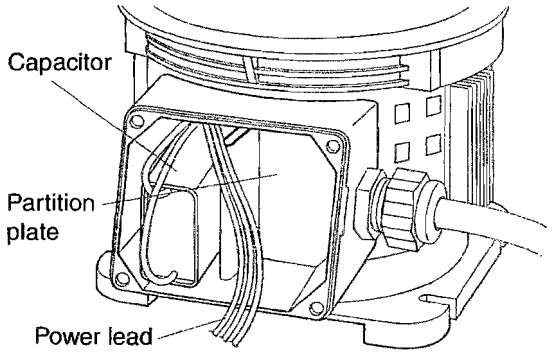
Use the four pump set bolts (provided) for fixing the pump in position at the positions shown in the figure below.



POINT

Fitting the capacitor inside the pump during use of a single-phase motor

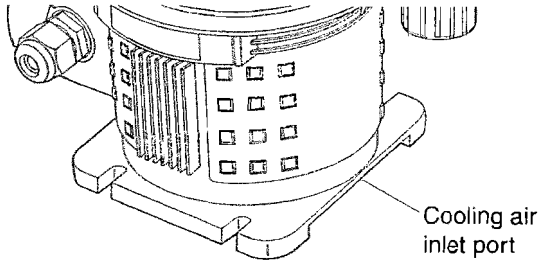
When lubricating the pump, changing the pump head orientation, or other work, open the terminal box cover, and remove the capacitor from inside the case. When fitting the capacitor inside the pump, fit it at the position in the figure shown below.



POINT

About the cooling air inlet port

Do not block the cooling air inlet port on the bottom of the pump. Also, prevent this port from being immersed in water during rainfall, etc.

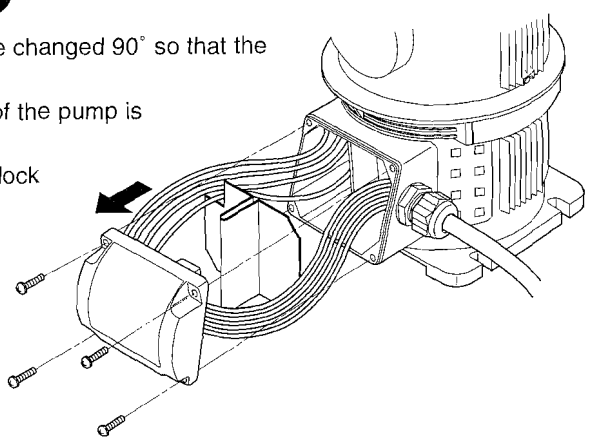


Installation

Changing the orientation of the pump head

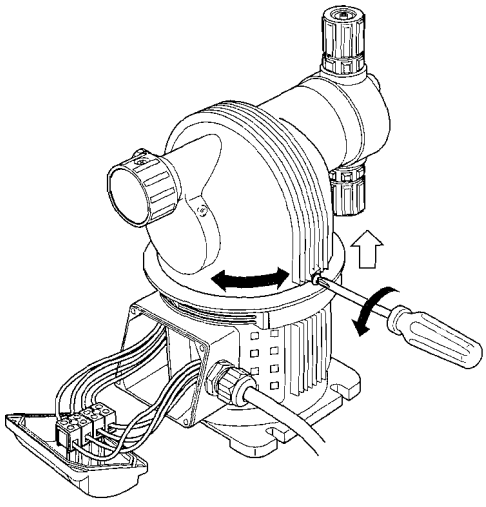
The mounting of the upper and lower casings of this pump can be changed 90° so that the pump head faces three different directions.
Change the mounting orientation when, for example, installation of the pump is subject to piping restrictions.

* The following description uses illustrations showing a terminal block attached.

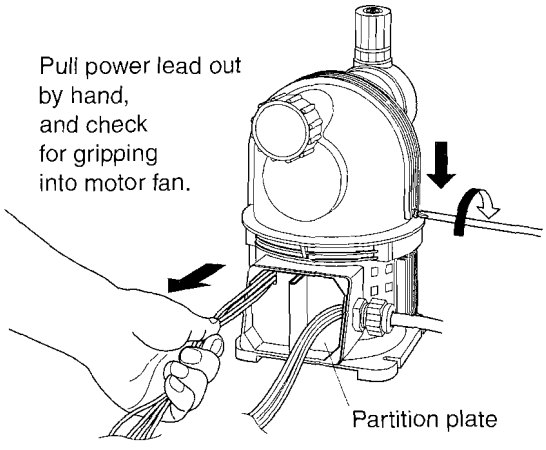


① **Remove the four screws to remove the terminal box cover.**
When removing the terminal box cover and partition plate, and disassembling the upper and lower casings, provide additional slack for the power leads so that the cases are not pulled together by the power leads.

② **Loosen the two screws, and position the pump head in the desired orientation (90° only in left and right).**
Lift up the upper casing by about 5 mm from the lower casing, and turn the upper casing.



③ **Fix the upper casing in place by the two screws, and insert the partition plate.**

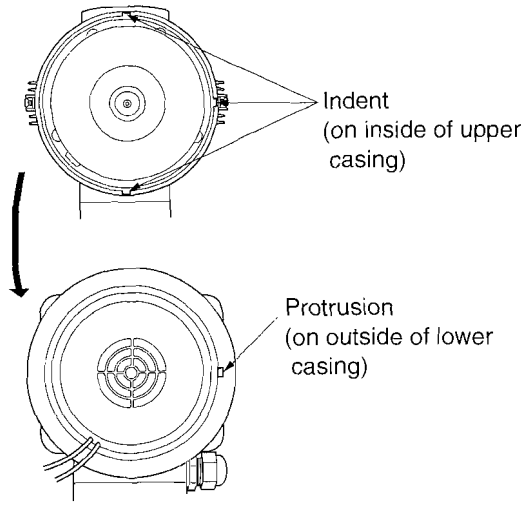


④ **Attach the terminal box cover, and fix in place by the four screws.**

* **Take care to prevent the power leads from entering the motor fan.**
* **Make sure that the power lead is not being gripped in.**
* **Make sure that the O ring is fitted into the terminal box cover.**

POINT

An indent and a protrusion for positioning are located on the upper casing (inside) and lower casing (outside), respectively. After you have changed the pump head's orientation by turning the upper casing, make sure that you hear the protrusion click in place into the indent.



Piping

This section describes mainly piping for the VTCE and VTCF types, and gives additional descriptions for the CL type and boiler specification models.
For details on piping on the FTCT, 6TCT, STCT, and VT6E, contact your supplying agent.

Requests during piping

• About pulsation

- The hose vibrates as this pump generates pulsation. Support the hose so that it does not vibrate.
- We recommend installing an air chamber to reduce pulsation. Consult your supplying agent separately for details.

• Hose length

- If the hose is too long, pressure loss might increase, causing the pump's permissible pressure to be exceeded and overfeed to occur.
- A total of three meters of hose is provided for the discharge and suction sides.
  When extending the piping beyond this distance, pressure loss sometimes exceeds the pump's maximum discharge pressure. So, thicker piping must be provided. When extending the piping, notify your supplying agent of the viscosity of the chemicals (1), piping length (positional relationship) (2), specific gravity of the chemicals (3), and other information. Your supplying agent will select the ideal piping sizes for you.

• Maintenance

- When removing hoses and laying the same hoses during maintenance, for example, cut about 10 mm from the end of the hoses before inserting them onto the pump.
- We recommend a multi-valve and maintenance valve (boiler specification only) that allow pressure in the discharge piping to be relieved by one-touch operation during maintenance.

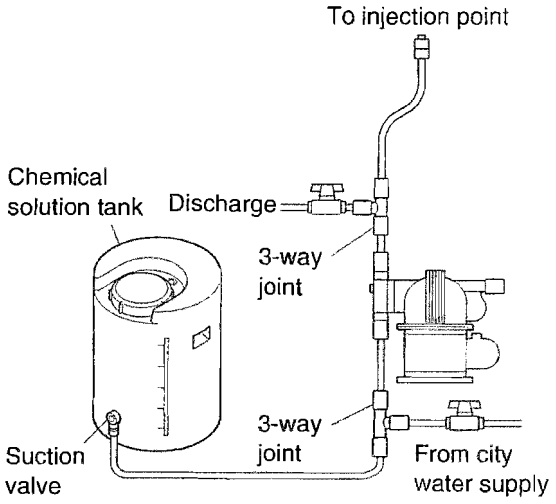
• Bending hoses

- When bending the hose, allow sufficient bending margin (40 mm radius for dia. 4 x 9 mm, and dia. 6 x 11 mm hose, or 100 mm radius or more for dia. 12 x 18 mm hose in the case of a PVC braided hose) to prevent it from folding. Prevent the hose from being folded, worn, cut, or stepped on. Failure to do so might break the hose.
- Avoid using piping with bends or joints that might cause resistance in chemical flow.

Installation

★CL type piping request

- Use push-in piping (installing below the tank position). This makes it harder for gas lock and other trouble to occur.
- Make the piping (hose) as short as possible. This reduces the amount of gas that is generated and accumulates in the piping, and makes it harder for gas lock to occur.
- Do not lay piping above pathways. Also, prevent chemicals from splashing personnel if hoses are damaged.
- We recommend providing a washing water line in the piping.



Piping

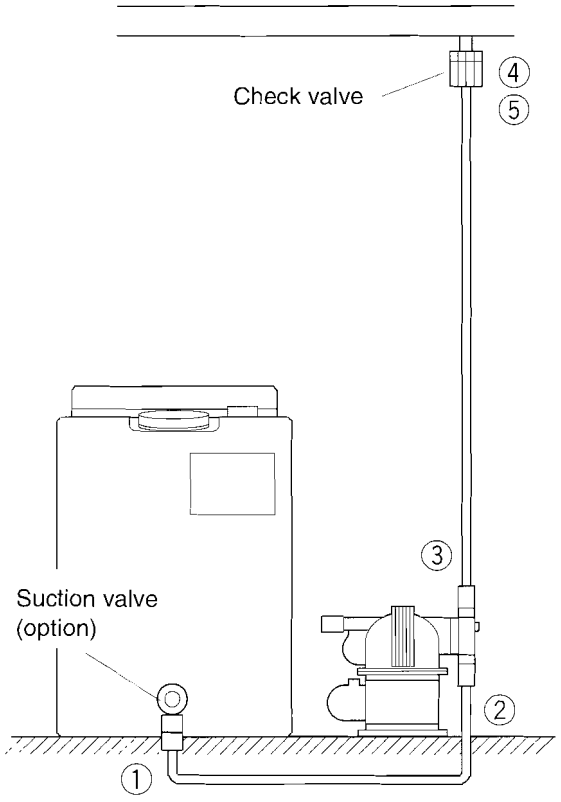
The following describes sample piping layouts.

Installed on the floor

• Procedure for installing on the floor

The following describes an example when a TACMINA tank is used.

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



- We recommend installing a relief valve that automatically releases abnormal pressure from the discharge side piping.
- Install a pressure gage on the discharge side piping to measure the pressure on the discharge side of the pump.
- Install the pump as close as possible to the chemical tank. If the suction side piping is too long, cavitation may occur and metering performance may no longer be ensured.

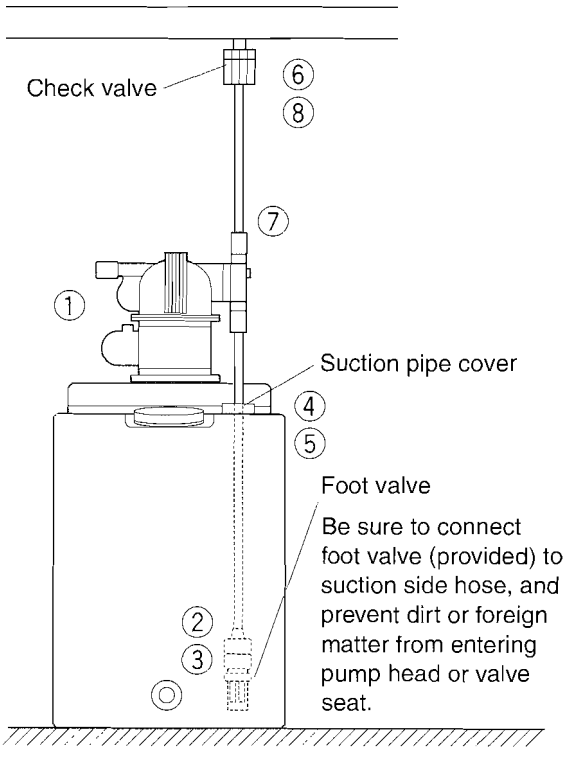
Installed on the tank

• Procedure for installing on a tank

The following describes an example when a TACMINA tank is used.

- We do not recommend installing the pump above the tank when using chemicals that are likely to generate bubbles.
- The suction height on this pump is -1.5 m. Suction performance may drop if the pump head's valve seat dries up.

① Fasten the pump at the specified position on the top surface of the tank with the mounting bolts (provided).
② Remove the hose nut on the foot valve, pass the hose through, and attach the foot valve.
③ Cut the hose so that the foot valve is 30 mm above the bottom surface of the tank.
④ Pass the hose through the suction pipe cover and pump suction side hose nut, and connect to the suction side joint on the pump.
⑤ Fix the suction pipe cover in place.
⑥ Attach the anti siphonal check valve at the injection point.
⑦ Pass the discharge side hose through the hose nut, and connect to the discharge side hose joint on the pump.
⑧ Connect the discharge side hose to the anti siphonal check valve.

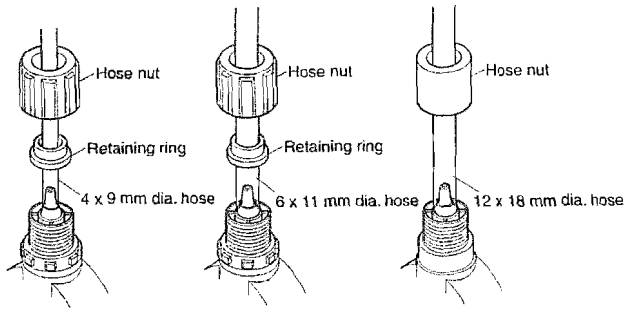


Installation

Piping

Hose connections

- To prevent the hose from becoming disconnected, fully insert it up to its specified position and firmly tighten the nut. Some models have a retaining ring and others do not. Do not excessively tighten the nut using a tool. Doing so might break the hose.
- The tightening force on the hose sometimes weakens if the pump is used at a location where the chemical temperature and ambient operating temperature are higher than room temperature. Tighten the nut as required at start of pump operation.



Anti siphonal check valve

This pump is provided with an anti siphonal check valve. Use this valve in the following instances:

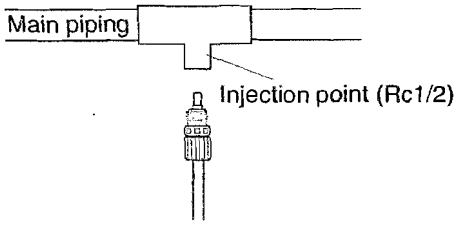
- When chemicals are injected with the injection point open to air and at a point lower than the fluid level in the chemical tank. (prevention of siphoning)
- When chemicals are injected into suction piping on other centrifugal pumps
- When an excessively large amount of chemicals beyond the rated discharge volume flow
- Overfeed may occur if the piping on even the ascending piping is too long.

• Installing the anti siphonal check valve (VTCE/VTCF, CL)

*** The shape of the check valve differs on the FTCT, 6TCT and STCT. The procedure, though, is almost the same.**

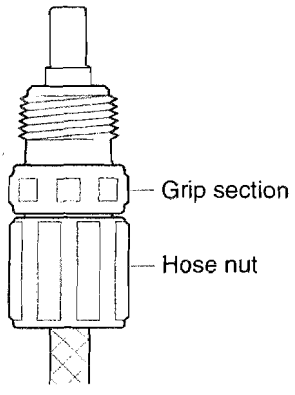
① Provide an Rc1/2 female screw section at the injection point.

The anti siphonal check valve is already threaded for an R1/2 male screw.



② Screw the seal tape onto the male screw section on the anti siphonal check valve.

If the screw is difficult to screw in, hold the nozzle grip with pliers or other tool, and gently tighten.

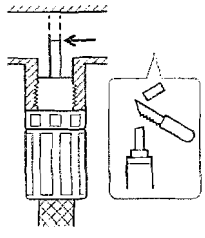


When hose is attached with anti siphonal check valve attached to main piping, be sure to turn hose nut while holding grip section.
If hose nut is turned without holding grip section, screw section of nozzle may be damaged.

POINT

When injecting chemicals into small diameter piping

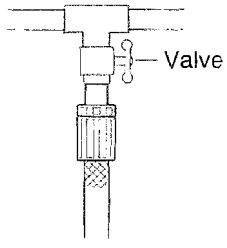
Cut the tip of the injection nozzle to an appropriate length before use. Cut the nozzle to an appropriate length so that its tip is located in the center of the piping to carry the injected chemical.



If nozzle is too long compared with piping aperture, cut dotted line before use.

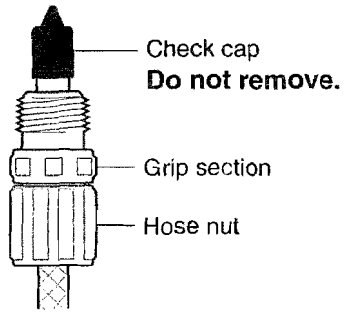
For maintenance

We recommend mounting a valve between the piping and the anti siphonal check valve for maintenance. Provide an Rc1/2 female screw section and screw in. Use a valve of material that resists the chemical in use.



Anti siphonal check valve for CL type

A black check cap is screwed onto the nozzle tip. Make sure that this part is not loose. Be sure to use the valve with the check cap attached.



Piping

Piping on boiler specification models

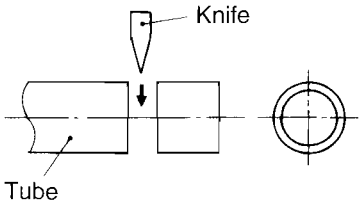
A 2 m nylon tube is provided for discharge.
Install the chemical pump as close as possible to the injection point, and cut off any surplus hose.
When attaching or removing the tube, be sure that the inside of the piping is in a non-pressurized state.

• How to attach the suction side piping

For details on how to attach the suction side piping, see the previous page.

• How to attach the discharge side piping

① Cutting the tube
Cut the tube vertically along the axial direction using a sharp knife.

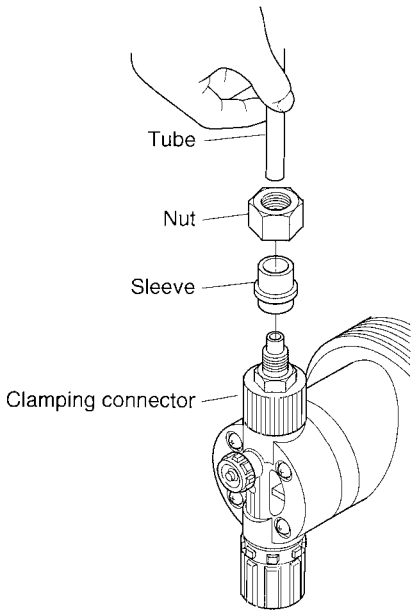


② Return the nut on the discharge side joint about one half turn CCW.

③ Make sure that the nut is loose, and firmly insert until the tip of the tube is closely contacting the inner side of the groove on the pump body.

④ Tighten the nut as far as possible by hand in this state.

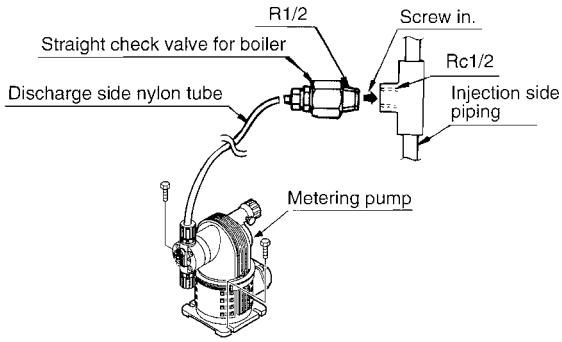
⑤ Next, tighten by a further few turns using a monkey wrench or spanner.



• How to attach a straight check valve for a boiler

The straight check valve for a boiler is connected by a nylon tube only.

① Provide an Rc1/2 female screw section at the injection point.
The anti siphonal check valve is already threaded for an R1/2 male screw.



② After fixing the straight check valve in place, connect the valve to the pump body by the same method as the discharge side piping.

Important

- Firmly make the connection between the nylon tube and check valve, and check valve and injection port.
- The check valve cannot be used as it may corrode depending on the chemical used. When using special chemicals, consult your supplying agent separately for details.

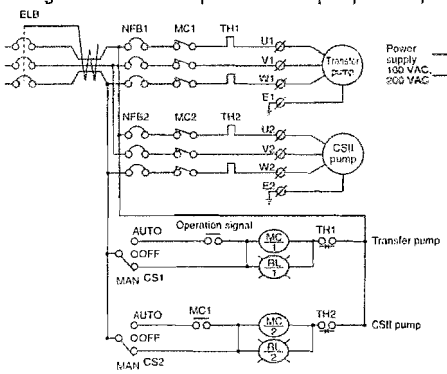
Electric Wiring

⚠ Warning

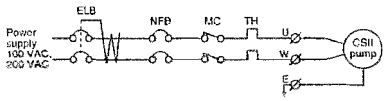
- Do not operate the pump with wet hands. Doing so might cause an electric shock.
- Do not turn the power ON during electrical wiring. Attach a "Work In Progress" label to the power switch.

Wiring example

Wiring interlocked with 3-phase transfer pump



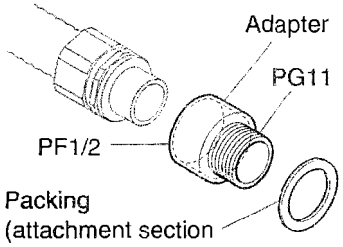
Example of wiring for 1-phase standalone operation



ELB : Leakage breaker
NFB : No-fuse circuit breaker
MC : Electromagnetic contactor
TH : Thermal relay
CS : Selector switch
RL : Red lamp

POINT

The size of the terminal box screw on the pump is PG11. The following adapter (B4163:optinal) is available when performing piping on the electrical lead duct.



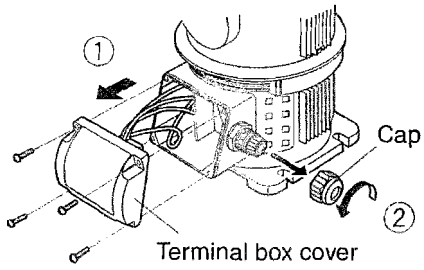
* Be sure to install the electromagnetic contactor and thermal relay on the pump.
* For details on selection of the thermal relay, see the table on the following page.

Wiring procedure

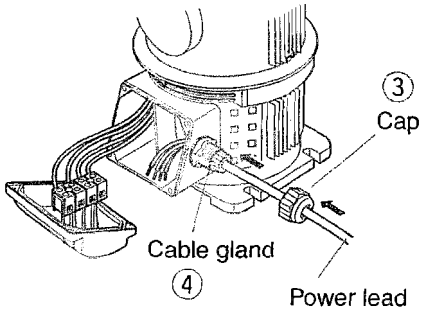
The direction of motor rotation on this pump cannot be selected so U, V and W (U and V in the case of a single-phase power supply) may be connected to any terminal.
However, do not mistake the position of the ground lead (green/yellow spiral lead).

* The lead wire for the motor is 300mm long to facilitate maintenance. Do not cut this lead wire.
* The following describes an example for a pump w/ 3-phase terminal block.

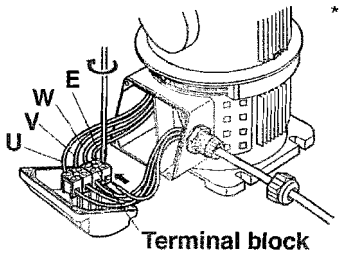
① Remove the terminal box.
② Remove the cap from the cable gland.



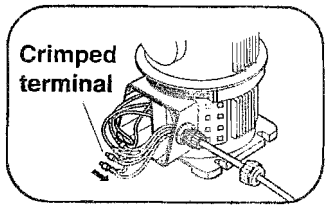
③ Pass the power leads through the cap.
④ Pass the power leads through the cable gland.



⑤ Connect the power leads to the terminal block.
Loosen the screw with a screwdriver (3 mm), insert the power lead, and fasten the screw.



* Wire using crimped terminals when there is no terminal block.



⑥ Attach the terminal box cover, and fix in place by the four screws.

* Take care to prevent the power leads from entering the motor fan.
* Make sure that the power lead is not being gripped in.
* Make sure that the O ring is fitted into the terminal box cover.

Voltage		U	V	W	Ground
Single-phase	100/100-110V	Red	Blue	–	Green/yellow
	120/115-120V	Red	Brown	–	Green/yellow
	200-220V	Red	Black	–	Green/yellow
	230-240V	Red	Orange	–	Green/yellow
3-phase	200/200-220-230V	Red	White	Blue	Green/yellow
	346-380-400-415/380-400-440V	Brown	Black	Blue	Green/yellow

■ Model code

CSII - 30 - VTCE - HW 200V3 - Y - S - S

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Series name

CSII: CSII series

② Pump type

(discharge volume standard: at 50 Hz)

Model	Discharge volume
10	10mL/min
30	30mL/min
60	60mL/min
100	100mL/min
300	300mL/min
600	600mL/min
1000	1000mL/min

③ Liquid-end type/material

Type	Pump head	Diaphragm	Check ball	O-ring
VTCE	PVC	PTFE	Ceramic	EPDM
VTCF	PVC	PTFE	Ceramic	Fluoro-rubber
CL	Acrylic	PTFE	Ceramic	Fluoro-rubber
FTCT	PVDF	PTFE	Ceramic	PTFE
STCT	SUS304	PTFE	Ceramic	PTFE
6TCT	SUS316	PTFE	Ceramic	PTFE
VT6E	PVC	PTFE	SUS316	EPDM
X	Special			

④ Joint specification

Model	Discharge volume
HW	Hose type for standard viscosity
HV	Hose type for high-viscosity
BW	Boiler specification
X	Special

⑤ Power voltage

100V1	100/100·110 V, 50/60 Hz single-phase
120V1	120/115·120 V, 50/60 Hz single-phase
200V1	200·220 V, 50/60 Hz single-phase
230V1	230·240 V, 50 Hz single-phase
200V3	200/200·220·230 V, 50/60 Hz 3-phase
400V3	346·380·400·415/380· 400·440 V, 50/60 Hz 3-phase

⑥ Paint color

Y	Yellow (10YR7.5/14) standard color

⑦ Power supply connection

S	Standard (none)
C	w/ 2 m cable
T	w/ terminal block
X	Special

⑧ General specification

S	Standard
X	Special

Note 1) 10/30/60/100 only on CL type
Note 2) 10/30/60/100 only for BW specification
Note 3) VT6E only for HV specification
Note 4) 30 to 1000 only for HV specification
Note 5) 10/30/60/100/300 only for 6TCT
Note 6) 600/1000 only for STCT

■ List of CSII Thermal Relay Sizes

		Part No.	Frequency	Voltage	Thermal Relay Size
Motor	1-phase	CST47	50Hz	100V	TR (0.48A-0.72A)
			60Hz	100V·110V	
		CST48	50Hz	120V	
			60Hz	115V·120V	
		CST49	50Hz	200V·220V	TR (0.24A-0.36A)
			60Hz		
		CST50	50Hz	230V·240V	
	3-phase	CST51	50Hz	200V	TR (0.15A-0.24A)
			60Hz	200V·220V·230V	
		CST52	50Hz	346V·380V·400V·415V	TR (0.13A-0.20A)
			60Hz	380V·400V·440V	

* Be sure to set the thermal relay to the rated current value of the pump.

■ Performance specification tables

◦ VTCE/VTCF type

Model		10	30	60	100	300	600	1000
Max. discharge volume	50 Hz	10	30	60	100	300	600	1000
(mL/min)	60 Hz	12	36	72	120	360	720	1200
Max. discharge pressure (MPa)		1.0					0.5	0.3
Strokes per minute (spm)	50 Hz	56			104	102		
	60 Hz	67			125	122		
Stroke length (mm)		2		3		6		
Connection aperture	Braided hose	4 x 9 mm dia.		6 x 11 mm dia.			12 x 18 mm dia.	
Operating temperature range	Ambient temperature	0 to 40°C						
(°C)	Liquid temperature	0 to 40°C (no freezing allowed)						
Possible feed viscosity (mPa·S)		100 mPa·S or less				50 mPa·S or less		
Paint color	Upper casing	Acrylic urethane resin paint: Munsell (approximate) 10YR 7.5/14 (standard color)						
	Lower casing	Acrylic urethane resin paint: Munsell (approximate) N5						
	Spacer ring/adapter	–					Munsell (approximate) N5	
Weight (kg)		5.0					5.6	6.2

◦ CL type

Model		10	30	60	100
Max. discharge volume	50 Hz	10	30	60	100
(mL/min)	60 Hz	12	36	72	120
Max. discharge pressure (MPa)		1.0			
Strokes per minute (spm)	50 Hz	56			104
	60 Hz	67			125
Stroke length (mm)		2		3	
Connection aperture	Braided hose	4 x 9 mm dia.		6 x 11 mm dia.	
Operating temperature range	Ambient temperature	0 to 40°C			
(°C)	Liquid temperature	0 to 40°C (no freezing allowed)			
Possible feed viscosity (mPa·S)		100 mPa·S or less			
Pump color	Upper casing	Acrylic urethane resin paint: Munsell (approximate) 10YR 7.5/14 (standard color)			
	Lower casing	Acrylic urethane resin paint: Munsell (approximate) N5			
Weight (kg)		5.1			

◦ VTCE (boiler specification)

Model		10	30	60	100
Max. discharge volume	50 Hz	10	30	60	100
(mL/min)	60 Hz	12	36	72	120
Max. discharge pressure (MPa)		1.5			
Strokes per minute (spm)	50 Hz	56			104
	60 Hz	67			125
Stroke length (mm)		2		3	
Connection aperture	Discharge side (nylon tube)	4 x 6 mm dia.		6 x 8 mm dia.	
	Suction side (braided hose)	4 x 9 mm dia.		6 x 11 mm dia.	
Operating temperature range	Ambient temperature	0 to 40°C			
(°C)	Liquid temperature	0 to 40°C (no freezing allowed)			
Possible feed viscosity (mPa·S)		100 mPa·S or less			
Paint color	Upper casing	Acrylic urethane resin paint: Munsell (approximate) 10YR 7.5/14 (standard color)			
	Lower casing	Acrylic urethane resin paint: Munsell (approximate) N5			
Weight (kg)		5.0			

■ Performance specification tables

• FTCT type

Model		10	30	60	100	300	600	1000
Max. discharge volume	50 Hz	10	30	60	100	300	600	1000
(mL/min)	60 Hz	12	36	72	120	360	720	1200
Max. discharge pressure (MPa)		0.5						0.3
Strokes per minute (spm)	50 Hz	56			104		102	
	60 Hz	67			125		122	
Stroke length (mm)		2		3		6		
Connection aperture	PTFE hose	6 x 8 mm dia.					12 x 15 mm dia.	
Operating temperature range	Ambient temperature	0 to 40°C						
(°C)	Liquid temperature	0 to 40°C (no freezing allowed)						
Possible feed viscosity (mPa·S)		100 mPa·S or less				50 mPa·S or less		
Paint color	Upper casing	Acrylic urethane resin paint: Munsell (approximate) 10YR 7.5/14 (standard color)						
	Lower casing	Acrylic urethane resin paint: Munsell (approximate) N5						
	Spacer ring/adapter	–					Munsell (approximate) N5	
Weight (kg)		5.2					5.7	6.3

• 6TCT/STCT type

Model		6TCT					STCT	
		10	30	60	100	300	600	1000
Max. discharge volume	50 Hz	10	30	60	100	300	600	1000
(mL/min)	60 Hz	12	36	72	120	360	720	1200
Max. discharge pressure (MPa)		0.5					0.5	0.3
Strokes per minute (spm)	50 Hz	56			104		102	
	60 Hz	67			125		122	
Stroke length (mm)		2		3		6		
Connection aperture	Teflon hose	6 x 8 mm dia.					12 x 15 mm dia.	
Operating temperature range	Ambient temperature	0 to 40°C						
(°C)	Liquid temperature	0 to 40°C (no freezing allowed)						
Possible feed viscosity (mPa·S)		100 mPa·S or less				50 mPa·S or less		
Paint color	Upper casing	Acrylic urethane resin paint: Munsell (approximate) 10YR 7.5/14 (standard color)						
	Lower casing	Acrylic urethane resin paint: Munsell (approximate) N5						
	Spacer ring/adapter	–					Munsell (approximate) N5	
Weight (kg)		6.3					7.3	7.9

• VT6E type (high-viscosity specification)

Model		30	60	100	300	600	1000
Max. discharge volume	50 Hz	30	60	100	300	600	1000
(mL/min)	60 Hz	36	72	120	360	720	1200
Max. discharge pressure (MPa)		1.0				0.5	0.3
Strokes per minute (spm)	50 Hz	56		104		102	
	60 Hz	67		125		122	
Stroke length (mm)		2	3			6	
Connection aperture	Braided hose	12 x 18 mm dia.				19 x 26 mm dia.	
Operating temperature range	Ambient temperature	0 to 40°C					
(°C)	Liquid temperature	0 to 40°C (no freezing allowed)					
Possible feed viscosity (mPa·S)		2000 mPa·S or less					1000 mPa·S or less
Paint color	Upper casing	Acrylic urethane resin paint: Munsell (approximate) 10YR 7.5/14 (standard color)					
	Lower casing	Acrylic urethane resin paint: Munsell (approximate) N5					
	Spacer ring/adapter	–				Munsell (approximate) N5	
Weight (kg)		5.0				5.7	6.3

■ Power supply specifications

• Single-phase motor

	100/100·110V, 50/60Hz	
Output (W)	10	
Rated motor current value / startup current value	100V/50Hz	0.62/1.22
	100V/60Hz	0.60/1.12
	110V/60Hz	0.65/1.26
Number of poles (P)	4	

	120/115·120V, 50/60Hz	
Output (W)	10	
Rated motor current value / startup current value	120V/50Hz	0.52/1.00
	120V/60Hz	0.61/0.97
	115V/60Hz	0.59/0.92
Number of poles (P)	4	

	200·220V, 50/60Hz	
Output (W)	10	
Rated motor current value / startup current value	200V/50Hz	0.30/0.59
	200V/60Hz	0.30/0.56
	220V/50Hz	0.35/0.67
	220V/60Hz	0.32/0.64
Number of poles (P)	4	

	230·240V, 50Hz	
Output (W)	10	
Rated motor current value / startup current value	230V/50Hz	0.26/0.51
	240V/50Hz	0.28/0.54
Number of poles (P)	4	

• 3-phase motor

	200/200·220·230V, 50/60Hz	
Output (W)	10	
Rated motor current value / startup current value	200V/50Hz	0.23/0.56
	200V/60Hz	0.19/0.53
	220V/60Hz	0.21/0.58
	230V/60Hz	0.22/0.61
Number of poles (P)	4	

	346·380·400·415/380·400·440V 50/60Hz	
Output (W)	10	
Rated motor current value / startup current value	346V/50Hz	0.14/0.33
	380V/50Hz	0.15/0.36
	380V/60Hz	0.13/0.34
	400V/50Hz	0.16/0.38
	400V/60Hz	0.13/0.36
	415V/50Hz	0.17/0.40
	440V/60Hz	0.15/0.40
Number of poles (P)	4	

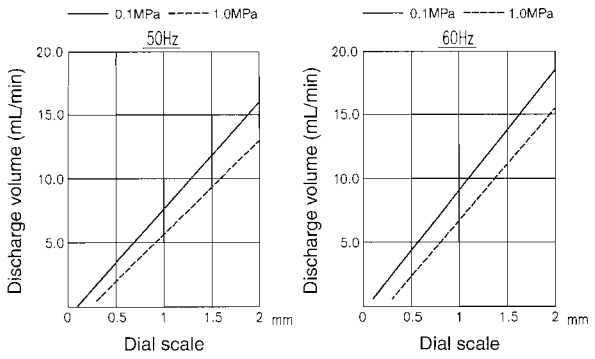
■ Performance curves

The following performance curves are examples of measurements obtained under the following conditions on test facilities at TACMINA.
These performance curves may differ slightly according to individual site conditions and product differences.
Measure the discharge volume based upon your actual conditions of use, and set the stroke length according to those performance curves.

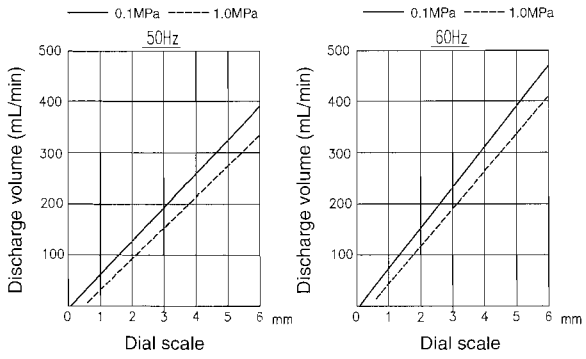
• Basic specifications (VTCE/VTCF/CL)

Conditions: Clean water, room temperature

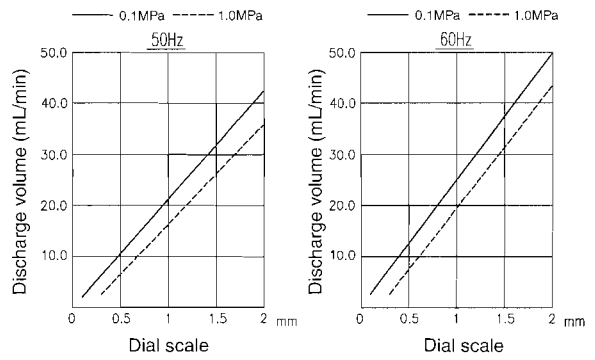
CSII-10



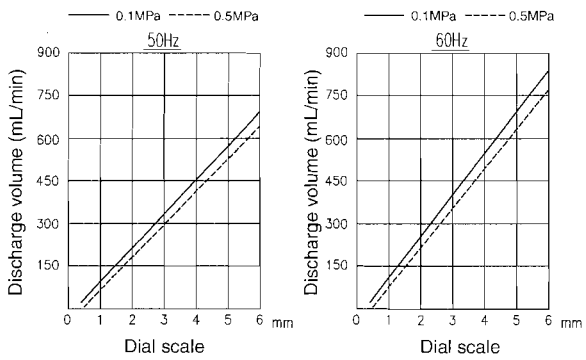
CSII-300



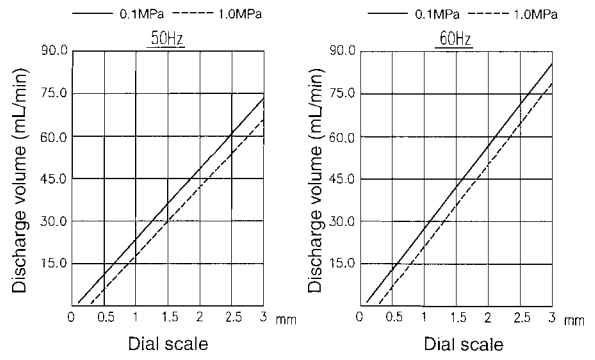
CSII-30



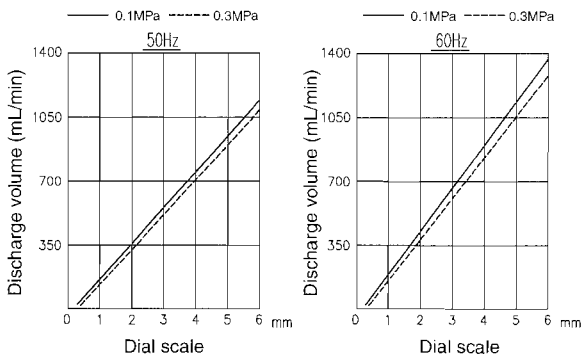
CSII-600



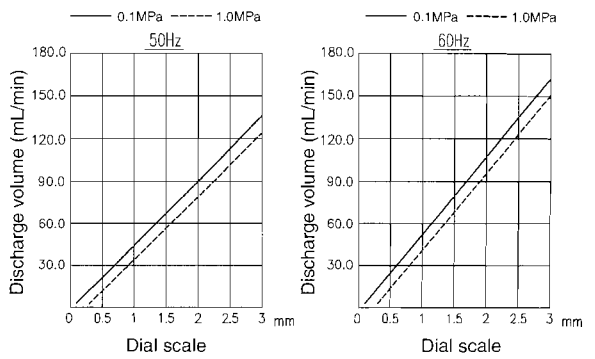
CSII-60



CSII-1000



CSII-100



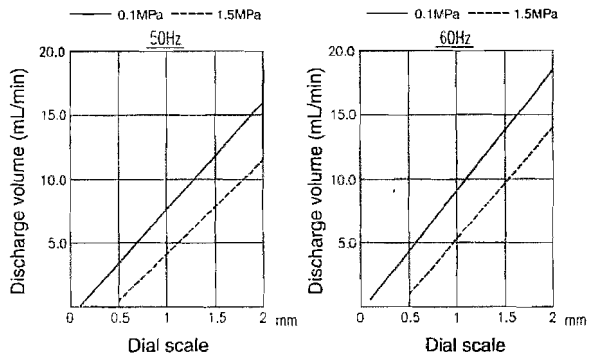
Specifications

■ Performance curves

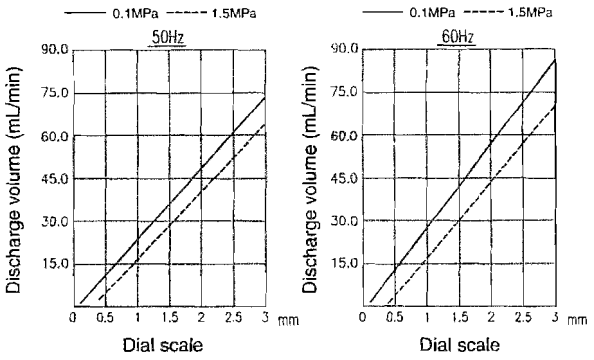
• Boiler specifications

Conditions: Clean water, room temperature

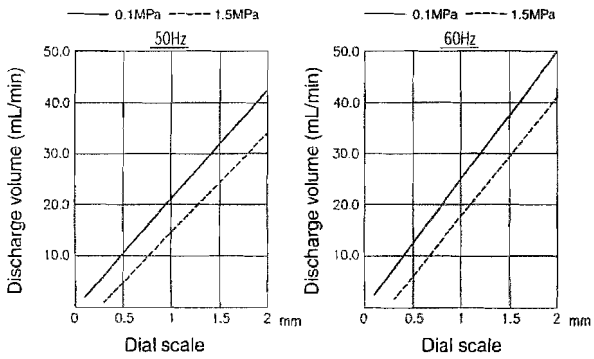
CSII-10



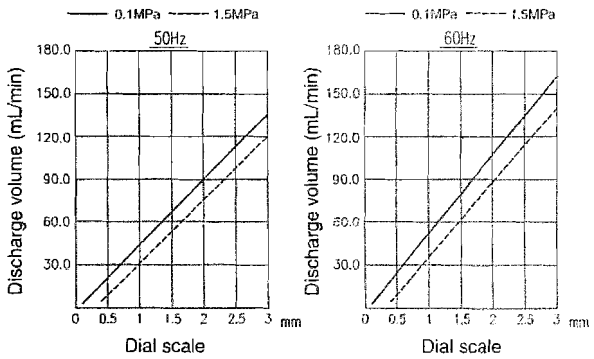
CSII-60



CSII-30



CSII-100

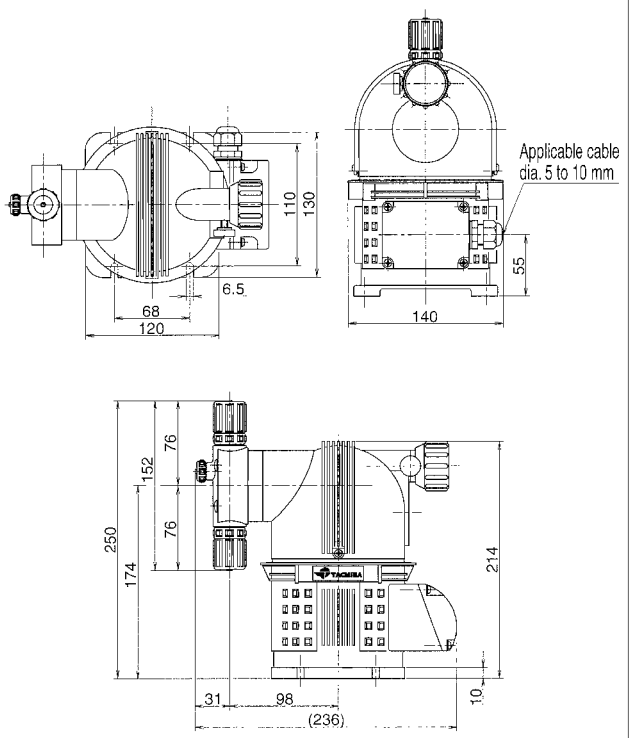


* The maximum discharge pressure of the FTCT 10 to 300 and 6TCT is 0.5MPa.

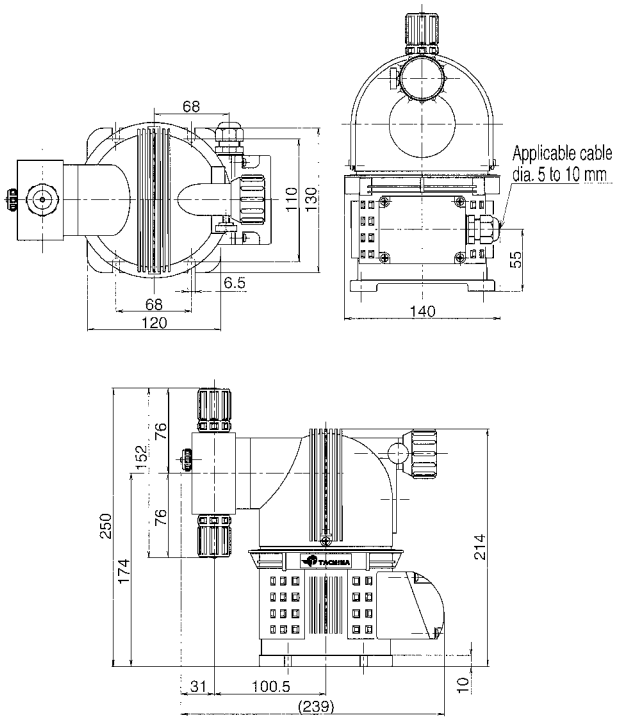
* The performance curves for the VT6E(high-viscosity specification),FTCT,6TCT,and STCT differ slightly.

■ External dimensions

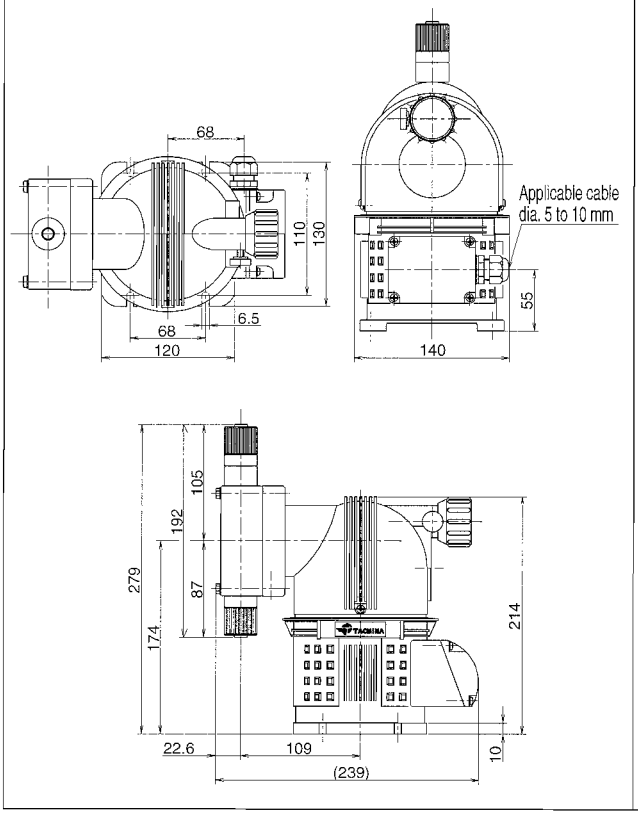
CSII-100 VTCE/VTCF



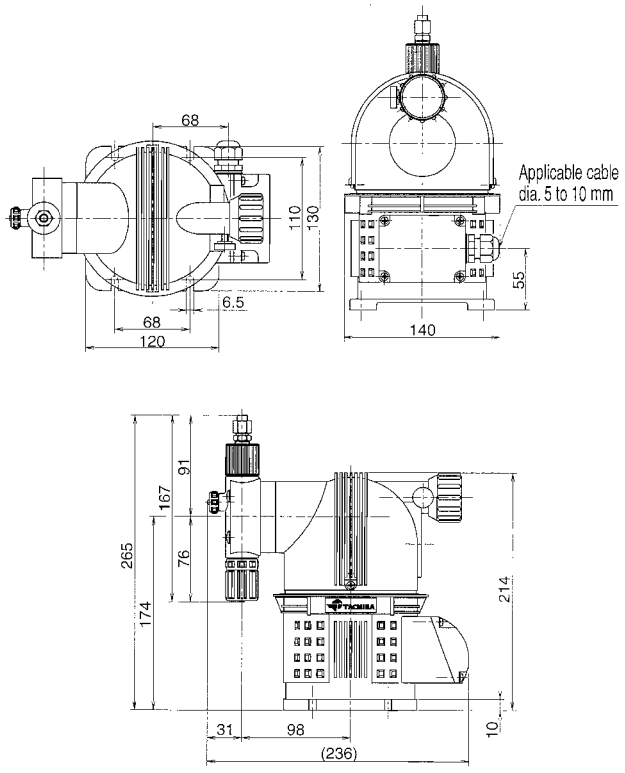
CSII-100 CL



CSII-1000 VTCE/VTCF



CSII-100 VTCE (boiler specification)



Specifications

Consumables and Spare Parts

■ Consumables

The recommended replacement intervals are for cases where the pump is operated under constant conditions (room temperature and clean water) on test facilities at TACMINA. These cycles change according to individual site conditions. Use these cycles as a rough guideline for replacing consumables. Neglecting to replace consumables may cause defective discharge (injection) or malfunction.
In particular, neglecting to replace the hose may result in chemicals spurting out.

⚠ Caution

The durability of the hose varies greatly according to the chemicals used, temperature, pressure and degree of exposure to ultraviolet light. Inspect the hose, and replace with a new one if it has deteriorated.

◦ CSII-10/30/60/100/300-VTCE/VTCF/CL/VTCE (boiler specification)

Part Name		Q'ty Per Unit	Recommended Replacement Cycle
Joint	Seat valve	4	4000 hours or 1 year
	Check ball	4	4000 hours or 1 year
	O ring	2	4000 hours or 1 year
Diaphragm		1	4000 hours or 1 year
Air release valve (w/ integrated O ring, duckbill valve and cap)		1	4000 hours or 1 year

* The recommended periodic inspection period is every 4000 hours of operation or once every year, whichever comes first.

◦ CSII-600/1000-VTCE/VTCF/FTCT/STCT

Part Name		Q'ty Per Unit	Recommended Replacement Cycle
Joint	Check ball	2	4000 hours or 1 year
	O ring	3	4000 hours or 1 year
Diaphragm		1	4000 hours or 1 year

◦ CSII-10/30/60/100/300-FTCT/6TCT

Part Name		Q'ty Per Unit	Recommended Replacement Cycle
Joint	Check ball	2	4000 hours or 1 year
	O ring	3	4000 hours or 1 year
Diaphragm		1	4000 hours or 1 year
Air release valve	O ring	2	4000 hours or 1 year

* The recommended periodic inspection period is every 4000 hours of operation or once every year, whichever comes first.

◦ CSII-30/60/100/300-VT6E (high-viscosity specification)

Part Name		Q'ty Per Unit	Recommended Replacement Cycle
Joint	Check ball	2	4000 hours or 1 year
	O ring	3	4000 hours or 1 year
	Compressed coil spring	2	2000 hours or every 6 months
Diaphragm		1	4000 hours or 1 year
Air release valve (w/ integrated O ring, duckbill valve and cap)		1	4000 hours or 1 year

* The recommended periodic inspection period is every 4000 or 2000 hours of operation or once every year or six months, whichever comes first.

◦ CSII-600/1000-VT6E (high-viscosity specification)

Part Name		Q'ty Per Unit	Recommended Replacement Cycle
Joint	Check ball	2	4000 hours or 1 year
	O ring	4	4000 hours or 1 year
	Compressed coil spring	2	2000 hours or every 6 months
Diaphragm		1	4000 hours or 1 year

* The recommended periodic inspection period is every 4000 or 2000 hours of operation or once every year or six months, whichever comes first.

List of Tools for Disassembly and Inspection

Type	Application
Phillips screwdriver No.2	General use
Phillips screwdriver No.3	Upper casing and lower plate
Spanner, distance between opposite sides 10 mm	600/1000 type pump head

After Service

If you have any questions concerning repair work within the product guarantee period, after-sales service, etc., please feel free to enquire at the store where you purchased the product or to contact your supplying agent.

Warranty

■Period and Range of Warranty

(1) The warranty is effective for a period of one full year from the date of delivery.
(2) If, during the warranty period, the product sustains damage or breakdown despite normal use and proper maintenance as a result of design or manufacturing defect, TACMINA will arrange for repair of the product at no charge to the customer.
However, the customer will be charged for the following expenses:
1. Replacement of consumables (parts that require regular replacement).
(3) The customer will be charged for repair of the product or replacement in the event of damage or breakdown in the following cases.
①Damage or breakdown occurring or reported after the guarantee period has expired.
②Damage or breakdown resulting from careless handling or abnormal operating or maintenance procedures.
③Damage or breakdown resulting from the use of parts not made or specified by TACMINA.
④Damage or breakdown resulting from repair or remodeling not specified by or using parts not made by TACMINA.
⑤Damage or breakdown resulting from fire, act of God, natural disaster or other unforeseeable circumstances.
⑥Damage or breakdown resulting from the use of materials or parts specified or supplied by the customer.
(4) In case there is doubt about the cause of the damage or breakdown, the customer and TACMINA will consult on the matter and abide by the result of the consultation.
(5) Chemical-proof and liquid handling performance of the product with regard to the liquids used by the customer are not covered by this warranty. The liquid-end part materials selected at the time of order are recommended materials and their chemical-proof performance and so on are not covered by warranty.
(6) Note that TACMINA does not accept any liability whatsoever regarding damages caused by malfunction of this product and damages caused by other use of this product.

Repair Service

If any abnormality is detected during operation, immediately stop operating the pump and inspect to determine whether it is a malfunction or not.
Before requesting repair, read the operation manual carefully and double-check the possible cause of problems. In the event that the failure needs outside repair work, please contact the store where you purchased the product.
(1) Within the warranty term
Present the warranty document to the store where you purchased the product. The store will arrange the repair according to the warranty contents.
(2) After expiration of the warranty term
Consult the store where you purchased the product. Depending on the type of repair required and whether the pump's functions can be maintained, the store will perform repair according to the customer's request for a charge.

⚠ Caution

To return the article for repair, be sure to observe the following points in order to maintain the operator' s safety and preserve the environment:
• TACMINA regrets that it cannot repair the pump on which the following liquids have been handled.

(1) Liquids containing radioactive components
(2) Liquids containing bacteria that pose a danger to human health
(3) Liquids containing chemical weapon components and other chemical substances, which pose a danger to human health
• Wash out the liquid-end part and outside of the pump thoroughly and return it together with the maintenance service datasheet or the safety data sheet (MSDS) for liquids used.
• If the maintenance service data sheet or safety data sheet (MSDS) does not accompany the product, repair work cannot be carried out.
• Even if the maintenance service data sheet or safety data sheet (MSDS) are provided, TACMINA reserves the right to refuse to repair the product if we determine it to be too dangerous.

■Minimum Keeping Period for Performance Spare Parts for Repair

It is TACMINA's policy to keep on hand a stock of spare parts that are vital to the performance and functionality of our products for a minimum of five years after we stop producing a particular model.