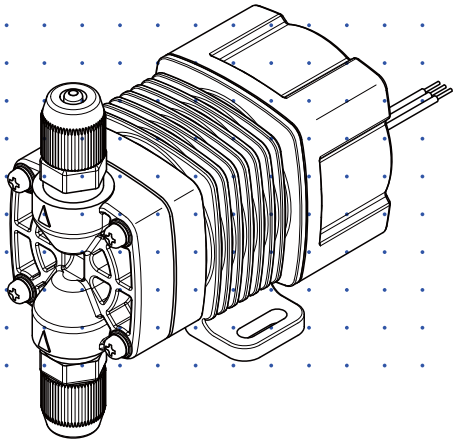
LANGO Hi-Resolution Dosing Pump LT-12V



Instruction manual

Thank you for choosing our product.

Please read through this instruction manual before use.

This instruction manual describes important precautions and instructions for the product. Always keep it on hand for quick reference.

Order confirmation

After unpacking, check the following points. Contact us or your nearest dealer if the delivery is imperfect.

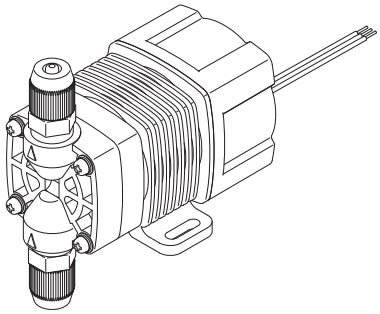
a. Check if the delivery is as per order.

Check the nameplate to see if the discharge capacity, discharge pressure and voltage are as per order.

b. Check for transit damage.

c. Check for loose screws.

Delivery should include...



LT with a special power cable



Instruction manual

Safety instructions

Read through this section before use. This section describes important information for you to prevent personal injury or property damage.

■ Pictorial indication

In this instruction manual, the estimated risk of degree caused by incorrect use is ranked with the following pictorial indications. First, fully understand information on the pictorial indications.

⚠ **WARNING**	Indicates mishandling could lead to a fatal or serious injury accident.
⚠ **CAUTION**	Indicates mishandling could lead to personal or property damage.

Pictorial indication accompanies each precaution, suggesting "Caution", "Prohibition" and "Requirement".

Caution marks	Prohibition mark	Requirement mark
 Caution, Electrical shock	 Prohibition, Do not remodel	 Requirement, Wear protectors, Earthing

⚠ For exportation

Technology related to the use of goods in this instruction manual falls in the category of technology contained in the Foreign Exchange Order Attachment, which includes complementary export control of technology. Please be reminded that export license, which is issued by the Ministry of Economy, Trade, and Industry could be required, when this is exported or provided to someone even in Japan.

Outline

The information such as characteristics, features and part names are described in this section.

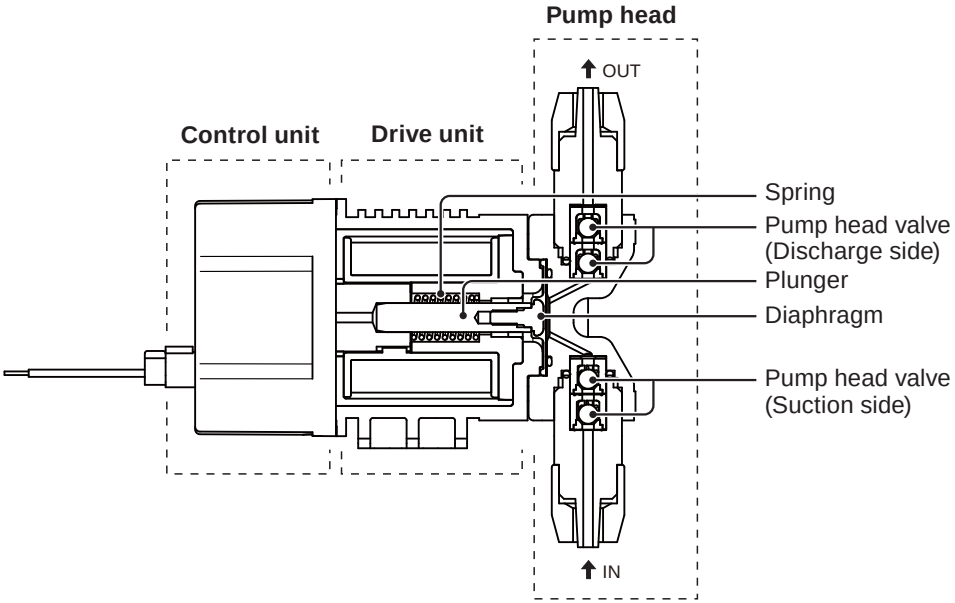
Introduction

Pump structure & Operating principle

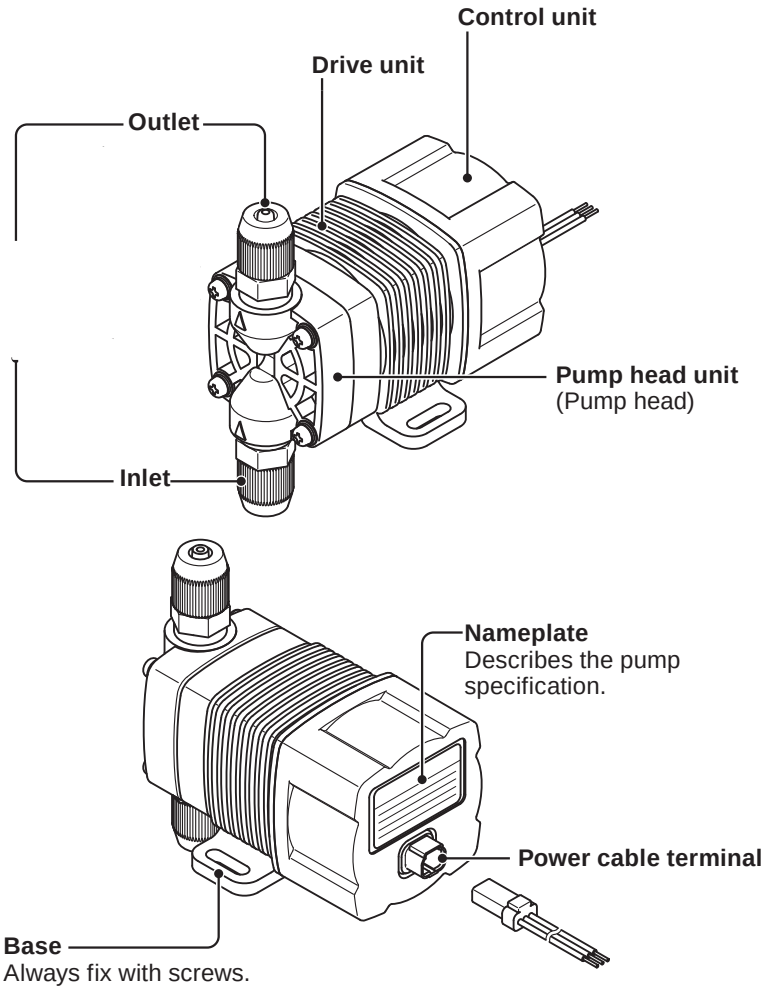
The LT series is a diaphragm metering pump which consists of a pump head, drive unit and control unit. A diaphragm is directly driven by electromagnetic force.

Principle of operation

The pulse signal controls the electromagnetic force in order to make reciprocating motion that is assisted by spring force. The reciprocating motion is transferred to a diaphragm through a plunger and then volumetric change occurs in the pump head. This action transfers liquid along with pump head valve action.



Part names


Control unit
Drive unit
Outlet
Pump head unit
(Pump head)
Inlet
Nameplate
Describes the pump specification.
Power cable terminal
Base
Always fix with screws.

Identification codes

The model code represents the following information.

LT - 5 4 V - 1 P 1 - □□
a b c d e f g H

a. Series name
LT: High resolution pulse pump

b. Drive unit (Average power consumption)
5: 5.6W

c. Discharge capacity
4: 38ml/min

d. Pump head
V: Vertically oriented

e. Power voltage
1: 12VDC

f. Control method
P: Pulse control

g. Connection bore

No.	Tube connection bore
1	ø4×ø6mm

H. Special version

Wet end materials

Pump head	Valve	O ring	Valve seat	Valve spring	Gasket	Diaphragm
PVDF	Alumina ceramic	FKM	FKM	PEEK (H type only)	PTFE	PTFE+ EPDM (non wet end)

*Valve springs are equipped to the H type only.

Material code

PVDF: Polyvinylidene difluoride
PTFE : Polytetrafluoroethylene
FKM: Fluorine-contained rubber
PEEK: Polyetheretherketone

Installation

This section describes the installation of the pump, tubing and wiring. Read through this section before work.

Observe the following points when installing the pump.

- Be sure to turn off power to stop the pump and related devices before work.
- Upon sensing abnormal condition or a dangerous sign, stop the work immediately. Remove problems before resuming work.
- Do not place dangerous or flammable goods near the pump for your safety.
- Risk of an electrical leak or shock. Do not use a damaged pump.

Pump mounting

Select an installation location and mount the pump.

Necessary tools

- Two M4 screws (pump fixing)
- Two plate washers (pump fixing)
- Phillips screwdriver

*Use chemical resistant tools as necessary.

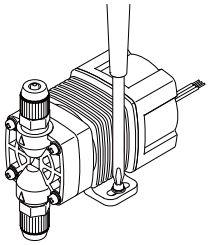
1 **Select a suitable place.**

Always fix the pump on a flat floor where is free of vibration and liquid can't stay. See page 9 for detail.

Position the pump lower than the supply tank to assure flooded suction.

2 **Fix the pump by M4 screws.**

Be sure to fix the pump at two points.



NOTE

Install the pump horizontally. If the pump is installed at a tilt, the flow may reduces.

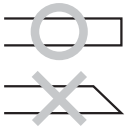
Pipework

Connect tubes to the pump and install a check valve.

Before operation

- Select proper chemical resistant tubes.
- The tubes should resist liquid temperature and pressure.
- Cut the tube ends flat.

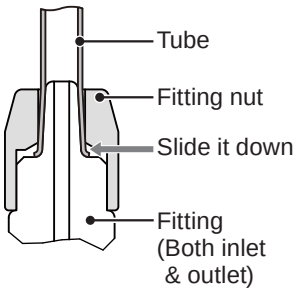
Tube end (Side view)



Tube connection

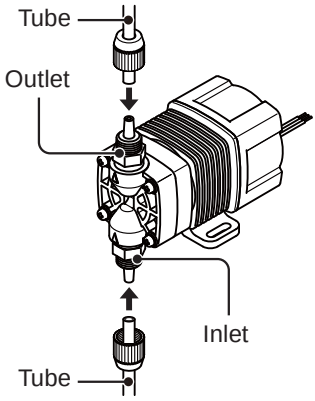
Pass a tube into the fitting nut and slide down the tube onto the fitting. Then hand tighten the fitting nut until it bottoms out.

*The fitting nut is made by plastics and may be broken if it is tightened too much.



1 **Connect tubes into the inlet and outlet.**

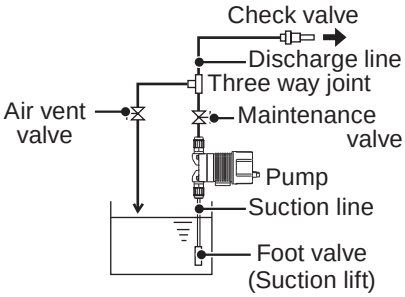
*Be careful not to bend a tube completely.



NOTE

Air vent valve mounting

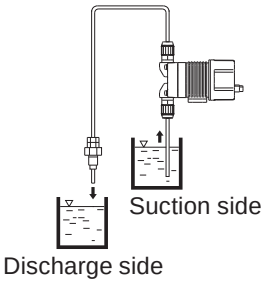
- Install valves on both suction and discharge lines for the convenience of maintenance.
- Install a three-way joint on the discharge line close to the pump to lay on an air vent line.
- Keep a distance between the suction tube end and the tank bottom.
- In the suction lift application, install a foot valve for the prevention of a back flow at pump stop. A filtering foot valve is also available to prevent deposits and foreign matters from entering.



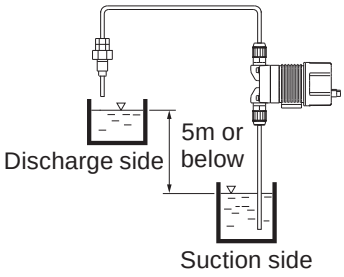
Check valve mounting

The use of a check valve prevents a back flow, siphon and overfeeding.
In the following cases install a check valve to assure back pressure and a constant flow rate.

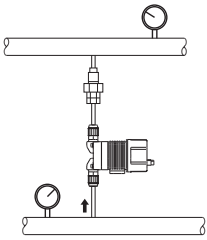
- An injection point is below the suction side liquid level at atmospheric pressure. In this state siphon happens.



- The discharge side liquid level is higher than the suction side one but the elevation difference between two liquid levels is five meters or below. In this state the differential pressure between two liquid levels is too low and overfeeding happens.



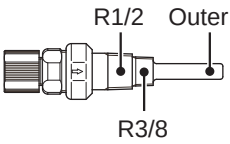
• Suction line pressure is higher than discharge line pressure. In this state siphon or overfeeding happens.



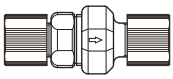
1 Mount the optional check valve at the discharge tube end.

*The CA check valve has R1/2 and R3/8 thread connections as well as tube connection. Cut off and adjust the connection length to fit the check valve into tubing.

CA check valve



CB check valve



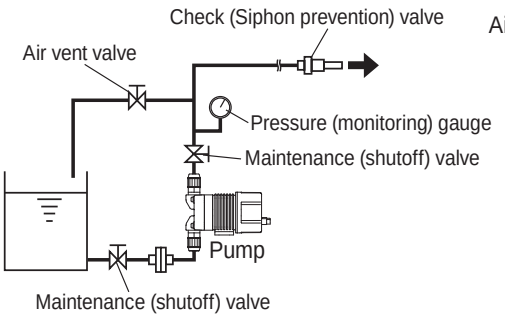
*Tubes can be connected to both ends of the CB check valve. Contact us or your nearest dealer for detail.

NOTE

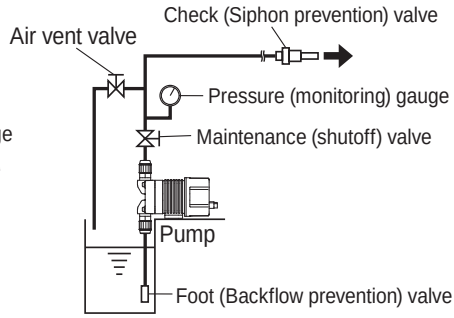
Periodically clean or replace the check valve with new one because it may be clogged when handling sodium hypochlorite or other crystallizing liquids.

Tubing layout

Flooded suction application



Suction lift application



*Flooded suction is recommended when handling a gaseous liquid such as sodium hypochlorite.

Wiring

Wiring for the power source, earthing and external signal.

Observe the following points during wiring work.

- Electrical work should be performed by a qualified operator. Always observe applicable codes or regulations.
- Observe the rated voltage. Otherwise the electrical circuit on the control unit may break.
- Do not perform wiring work while the power is on. Otherwise, an electrical shock and short circuit may result, and consequently the pump may fail. Be sure to turn off power before wiring work.
- Be careful for the power not to be turned on during work.
- Observe the correct polarity.
- Always use the attached triplex cable.
- Do not extend cable length more than 10m.
- Do not lay on the cable out of doors.

Power & External signal cables

Before work

- Check that the main power is turned off.
- Wait for one minute to start wiring work. The internal pump is still electrically charged right after power is turned off.

Applicable power cable

Use the attached triplex cable.

Triplex cable: UL3265 AWG22

Pink: +12VDC

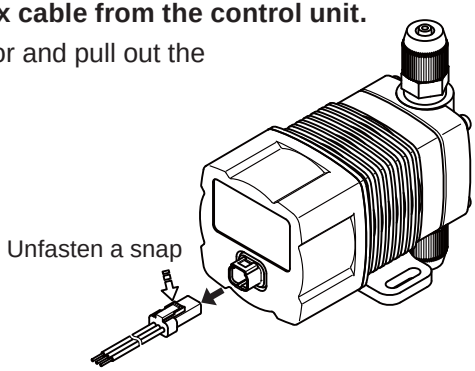
Black: GND

White: EXT

*The attached triplex cable is designed for the HRP. Do not use another cable.

1 Remove the attached triplex cable from the control unit.

Unfasten a snap-fit connector and pull out the cable.



2 Connect power and external signal wires.

Observe the correct polarity.

Allocate pink and black wires for the power, and white and black wires for the external signal.

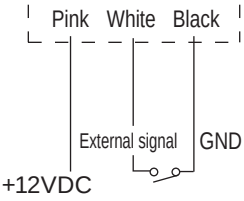
The black wire is common.

Wiring diagram

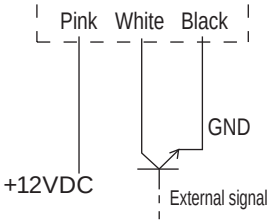
Pulse control type or Stop control type

The external signal should be either the no-voltage contact signal or open collector signal.

No-voltage contact signal



Open collector signal



*Pulse width should be 10 - 50ms. The number of pulses should be 720 per minute or below.

Operation

The pump becomes ready after pipework and wiring is completed.
This section describes pump operation and programming.

Before operation

Check the liquid level in the supply tank, tubing and wiring. And then perform degassing and flow rate adjustment before starting operation.

Points to be checked

Before operation, check if...

- Liquid level in the supply tank is enough.
- Tubing is securely connected and is free from leakage and clogging.
- Related discharge/suction valves are opened.
- Proper power voltage is applied to the pump.
- Electrical wiring is correct and is free from the risk of short circuit and electrical leakage.

Retightening of pump head unit fixing screws

Important

The pump head unit fixing screws may loosen when plastic parts creep due to temperature change in storage or in transit.
This can lead to leakage. Retighten the pump head unit fixing screws before starting operation.
Always tighten the screws diagonally, using a torque driver. See below for the tightening torque.

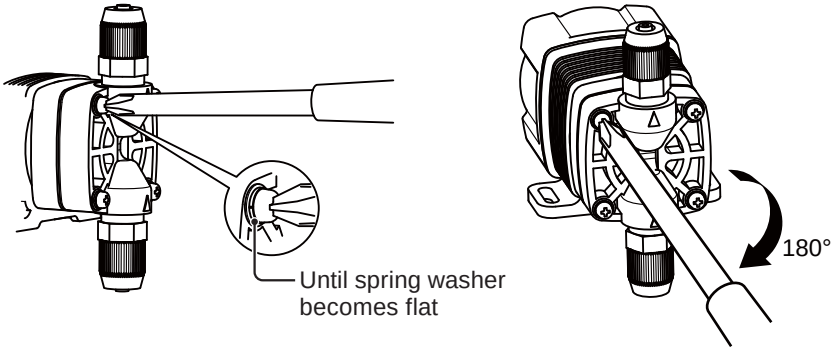
Tightening torque

Torque	Screw
0.7 N•m	M3 screw

*Tighten the fixing screws once every three months.

Use of a Phillips screwdriver instead of a torque driver

(a) Lightly tighten the pump head unit fixing screws until the sprig washer becomes flat. (b) Further turn the screws clockwise 180 degrees.



Degassing

The gas needs to be expelled from the pump and tubing by degassing. Normal operation can not be obtained with gas in the pump. Perform degassing in the following cases.

- When the pump starts to run for the first time
- When the flow rate is too low
- After liquid is replaced in the supply tank
- After a long period of stoppage
- After maintenance and inspection

NOTE

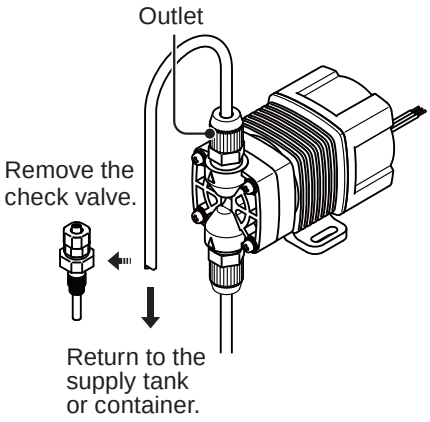
- Both gas and a chemical belch out together. Be careful not to be get wet with a chemical.
- Place the end of air bleed tube in the supply tank or another container when the air bleed tube is attached via a three way joint.
- Some chemicals may cause skin trouble or damage component parts. When your hand or component parts get wet with chemical liquid, wipe off immediately.

Install an air vent valve or AVC check valve on piping for degassing. Follow the procedure below to conduct degassing in case neither valve is available.

1 **Connect a discharge tube and place the tube end in the supply tank or another container.**

*Remove the check valve from the discharge tube if it is installed.

*When resuming the pump operation after liquid replacement in the supply tank or after a long period of stoppage, the internal pressure may remain in the pump or tubing. Removing the check valve at this state, liquid may gush out. Wrap a waste cloth around the check valve connection for the prevention of gushing.



2 **Turn on power.**

Run the pump by the external signal.

*Run the pump at 600spm or more. Otherwise it takes longer time for the pump to expel gas.

3 **Stop the pump.**

4 **Check that gas has been expelled from the pump head and liquid is pumped. Then reconnect the discharge tube to tubing system.**

5 **Check connections for leakage.**

Degassing has now been completed.

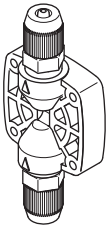
Wear part replacement

For a long operation wear parts need to be replaced periodically.
It is recommended that the following parts are always stocked for immediate replacement. Contact us or your nearest dealer for detail.

Precautions

- When dismantling the pump, pay attention to the residual liquid in the pump.
- Rinse wet ends thoroughly with water.
- Each time wet ends are dismantled, replace the diaphragm and pump head unit with new ones.

Wear part list

	Parts		# of parts	Estimated life
Pump	Pump head unit		1	8000 hours
	O ring		1	
	Diaphragm		1	

*Wear part duration varies with the pressure, temperature and characteristics of the liquid.
*The estimated life is calculated based on the continuous operation with ambient clean water.
*The whole pump needs to be replaced once the diaphragm is broken or damaged.
*Replace the pump head unit, O ring and diaphragm at the same time.

Before replacement

First release the pressure from the pump and discharge line. Otherwise, liquid may gush out.

1 **Stop the pump operation.**

2 **Release the internal pressure.**

Open the air vent valve if it is installed.

3 **Check that liquid comes out from the air vent port and the internal pressure has been expelled.**

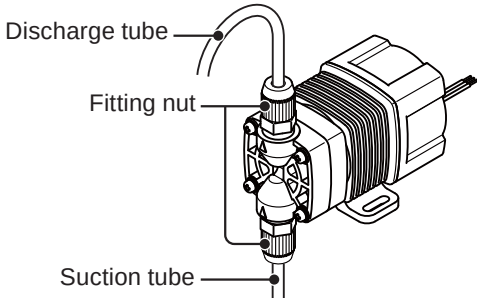
NOTE

The internal pressure may not be expelled completely as long as liquid does not comes out. In this case run the pump until the pressure is released.

Pump head/Diaphragm replacement

Dismantlement

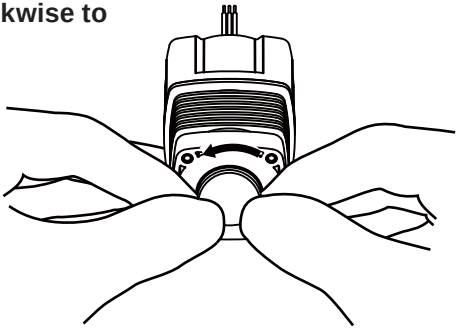
1 **Loosen the fitting nut and remove the discharge and suction tubes.**



2 **Detach the pump head unit.**

Use a Phillips screwdriver or torque driver to remove four M3 screws.

3 **Turn the diaphragm anticlockwise to detach it from the plunger.**



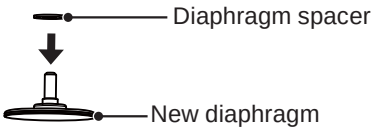
NOTE

Pay attention not to lose diaphragm spacers. Always apply a proper number of diaphragm spacers. 0 or a few diaphragm spacers are inserted between the retainer and plunger for the adjustment of diaphragm location. Note that the number of diaphragm spacers varies with pump model. Some pumps may use no spacer.

Assembly

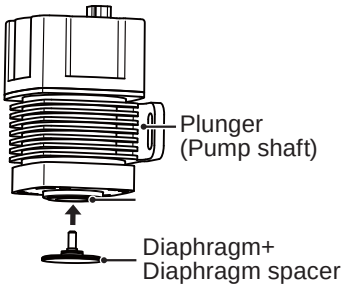
1 **Pass diaphragm spacers into the diaphragm shaft.**

Apply a proper number of diaphragm spacers.

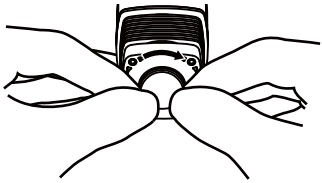


2 **Fit the new diaphragm into the plunger.**

Put the pump vertically downwards and screw the diaphragm into the plunger with the proper number of diaphragm spacers.

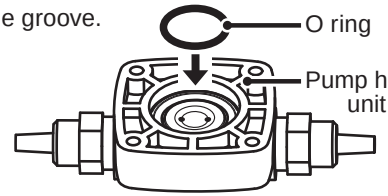


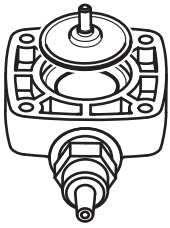
3 Turn the diaphragm clockwise to attach it to the plunger.



4 Place the O ring into the O ring groove on the pump head unit.

*Make sure the O ring does not stick out from the groove.





*When O ring can not fit in...
Place a used diaphragm on the O ring and push it down.

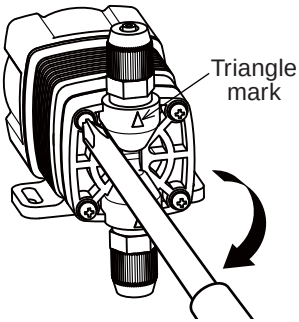
5 Attach the pump head unit.

Put a new pump head unit with a triangle mark upside. Tighten the four M3 screws to fasten the unit diagonally and evenly.

Tightening torque: 0.7N•m

*A Phillips screwdriver can be used for a torque driver.

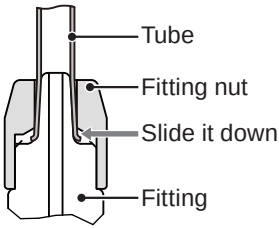
*Be careful not to strip the slot on screw heads.

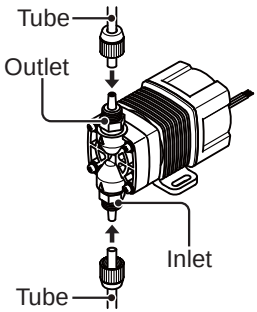


NOTE

Keep the pump head unit free from contaminations or foreign matters during work.

6 Attach the discharge and suction tubes and tighten the fitting nuts.

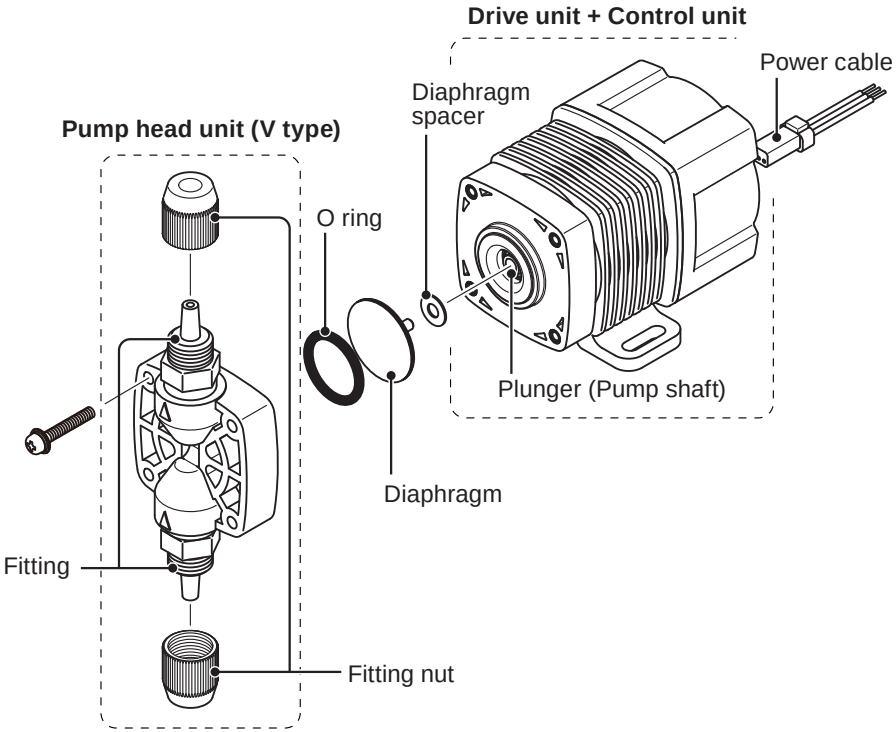




Exploded view

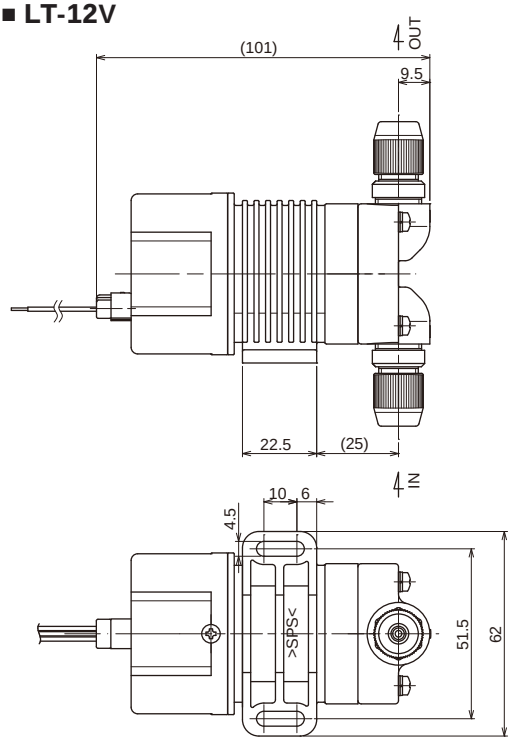
Pump head, Drive unit & Control unit

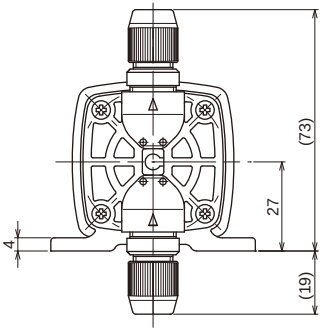
Observe instructions in this manual to dismantle the pump.



Outer dimensions

■ **LT-12V**





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