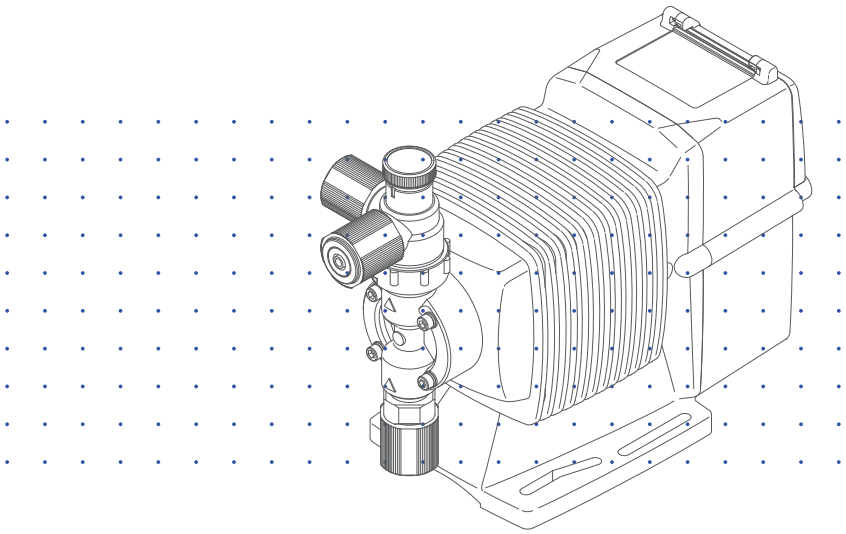
IWAKI PUMPS

Iwaki
Electromagnetic Metering Pump

EWN-W (For water quality control)



Instruction manual

Thank you for choosing our product.

Please read through this instruction manual before use.

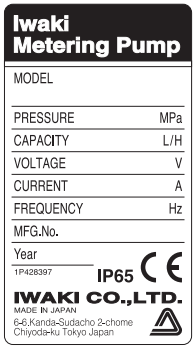
This instruction manual describes important precautions and instructions for the product. Always keep it on hand for quick reference.

Order confirmation

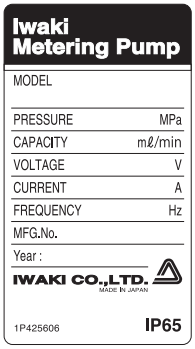
Open the package and check that the product conforms to your order. If any problem or inconsistency is found, immediately contact your distributor.

a. Check if the delivery is correct.

Check the nameplate to see if the information such as model codes, discharge capacity and discharge pressure are as ordered.



Spec label for the European market



Spec label for any area other than the European market

*The CE marking on our product(s) is for us to market the product(s) into the European market, however, the CE marking does not ensure any safety or conformity of the product(s) outside the European market.
When the pump is incorporated into the equipment marketed in the European market, such equipment must meet all the requirements of applicable directives. In such a case, any person who places the equipment on the market must carry a CE mark on the equipment as a manufacturer.

b. Check if the delivery is damaged or deformed.

Check for transit damage and loose bolts.

Contents

Safety instructions

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

■ Symbols

In this instruction manual, the degree of risk caused by incorrect use is noted with the following symbols. Please pay attention to the information associated with the symbols.

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

A symbol accompanies each precaution, suggesting the use of "Caution", "Prohibited actions" or specific "Requirements".

Caution marks		Prohibited mark		Requirement mark		
						
Caution	Electrical shock	Prohibited	Do not rework or alter	Requirement	Wear protection	Grounding

⚠ Export Restrictions

Technical information contained in this instruction manual might be treated as controlled technology in your countries, due to agreements in international regime for export control.

Please be reminded that export license/permission could be required when this manual is provided, due to export control regulations of your country.

⚠ WARNING

Turn off power before service

Risk of electrical shock. Be sure to turn off power to stop the pump and related devices before service is performed.


Electrical shock

Stop operation

If you notice any abnormal or dangerous conditions, suspend operation immediately and inspect/solve problems.


Requirement

Do not use the pump in any condition other than its intended purpose

The use of the pump in any conditions other than those clearly specified may result in failure or injury. Use this product in specified conditions only.


Prohibited

Do not modify the pump

Alterations to the pump carries a high degree of risk. It is not the manufacturer's responsibility for any failure or injury resulting from alterations to the pump.


Do not remodel

Wear protective clothing

Always wear protective clothing such as an eye protection, chemical resistant gloves, a mask and a face shield during disassembly, assembly or maintenance work. The specific solution will dictate the degree of protection. Refer to MSDS precautions from the solution supplier.


Wear protectors

Do not damage the power cable

Do not pull, knot, or crush the power cable. Damage to the power cable could lead to a fire or electrical shock if cut or broken.


Prohibited

Do not operate the pump in a flammable atmosphere

Do not place explosive or flammable material near the pump.


Prohibited

⚠ CAUTION

Qualified personnel only

The pump should be handled or operated by qualified personnel with a full understanding of the pump. Any person not familiar with the product should not take part in the operation or maintenance of the pump.


Requirement

Use specified power only

Do not apply power other than that specified on the nameplate. Otherwise, failure or fire may result. Ensure the pump is properly grounded.


Prohibited

Do not run pump dry

Do not run pump dry for more than 30 minutes (even when the pump runs for degassing). Otherwise, the pump head fixing screws may loosen and liquid may leak. Optimise your system. If the pump runs dry for a long period (for more than 30 minutes), the pump head and the valve cases may deform by friction heat and consequently leakage results.


Caution

Keep electric parts and wiring dry

Risk of fire or electric shock. Install the pump where it can be kept dry.


Prohibited

Ventilation

Fumes or vapours can be hazardous with certain solutions. Ensure proper ventilation at the operation site.


Caution

Do not install or store the pump:

- In a flammable atmosphere.
- In a dusty/humid environment.
- Where ambient temperature can exceed 0-40ºC.
- In direct sunlight or wind & rain.


Prohibited

Spill precautions

Ensure protection and containment of solution in the event of plumbing or pump damage (secondary containment).


Requirement

Do not use the pump in a wet location

The pump is not waterproof. Use of the pump in wet or extremely humid locations could lead to electric shock or short circuit.


Prohibited

Grounding

Risk of electrical shock! Always properly ground the pump. Conform to local electric codes.


Grounding

Install a GFCI (earth leakage breaker)

An electrical failure of the pump may adversely affect other devices on the same line. Purchase and install a GFCI (earth leakage breaker) separately.


Electrical shock

Preventative maintenance

Follow instructions in this manual for replacement of wear parts. Do not disassemble the pump beyond the extent of the instructions.


Requirement

Do not use a damaged pump

Use of a damaged pump could lead to an electric shock or death.


Prohibited

Disposal of a used pump

Dispose of any used or damaged pump in accordance with local rules and regulations. If necessary, consult a licensed industrial waste disposal company.


Requirement

Check pump head bolts

Liquid may leak if any of the pump head bolts become loose. Tighten the bolts evenly to the following torque in diagonal order before initial operation and at regular intervals.


Caution

Tightening torque

EWN-B09/-B11/-B16/-B21/-C16/-C21	: 2.16 N•m
EWN-B31/-C31/-C36	: 2.55 N•m

Install a relief valve

Install a relief valve on a discharge line near the pump so as to automatically release the discharge pressure when it exceeds the maximum level.

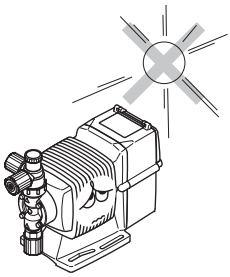

Requirement

Precautions for use

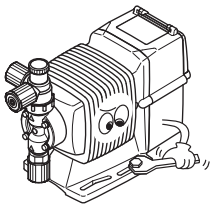
- Electrical work should be performed by a qualified electrician. Otherwise, personal injury or property damage could result.

Caution

- Do not install the pump:
  –In a flammable atmosphere.
  –In a dusty/humid place.
  –In direct sunlight or wind & rain.
  –Where ambient temperature can exceed 0-40ºC.
  Protect the pump with a cover when installing it out of doors.



- Select a level location, free from vibration, that won't hold liquid. Anchor the pump with four M5 bolts so it doesn't vibrate. If the pump is not installed level, output may be affected.



- When two or more pumps are installed together, vibration may be significant, resulting in poor performance or failure. Select a solid foundation (concrete) and fasten anchor bolts securely to prevent vibration during operation.

Caution

- Allow sufficient space around the pump for easy access and maintenance.

Caution

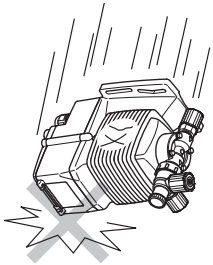
- Install the pump as close to the supply tank as possible.

Caution

- When handling liquids that generate gas bubbles (sodium hypochlorite or hydrazine solution), install the pump in a cool and dark place. Flooded suction installation is strongly recommended.

Caution

- Use care handling the pump. Do not drop. An impact may affect pump performance. Do not use a pump that has been damaged to avoid the risk of electrical damage or shock.



- The pump has a rating of IP65, but is not waterproof. Do not operate the pump while wet with solution or water. Failure or injury may result. Immediately dry off the pump if it gets wet.

- Do not close discharge line during operation. Solution may leak or piping may break. Install a relief valve to ensure safety and prevent damaged plumbing.

- Do not remove the control unit. Note that an applicable control unit differs with each drive unit. Do not attach a control unit to a different drive unit. Otherwise, an electrical circuit or the drive unit may fail.

- Solution in the discharge line may be under pressure. Release the pressure from the discharge line before disconnecting plumbing or disassembly of the pump to avoid solution spray.

- Wear protective clothing when handling or working with pumps. Consult solution MSDS for appropriate precautions. Do not come into contact with residual solution.

- Do not clean the pump or nameplate with a solvent such as benzine or thinner. This may discolour the pump or erase printing. Use a dry or damp cloth or a neutral detergent.

Pump characteristics, features and part names are described in this section.

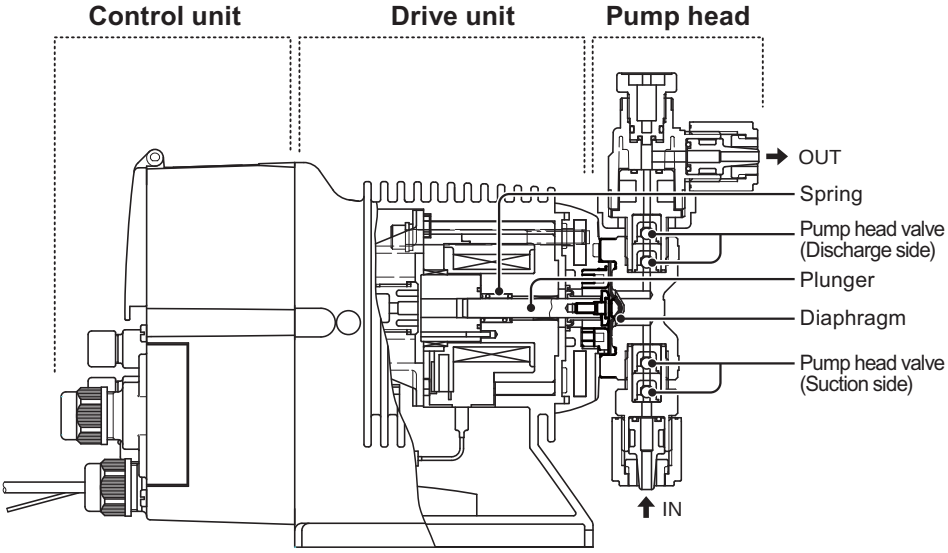
Introduction

Pump structure & Operating principle

The EWN-W is a diaphragm type electromagnetic metering pump which automatically monitors and controls water quality by means of electrodes and sensors.

Principle of operation

The pulse signal controls the electromagnetic force and spring force in order to make reciprocating motion. 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.



Features

- **Automatic control**

  The EWN-W automatically monitors and controls water quality by means of electrodes and sensors.

  WPO type: Controls a flow rate in proportion to the pH or ORP value measured by electrodes.

  WEC type: Controls a flow rate in proportion to the conductivity measured by sensors.

  WCT type: Controls a blowdown valve along with the conductivity measured by sensors.

- **Multivoltage operation**

  The EWN-W is a multivoltage type (100-240VAC) and can be selected without concern for local power voltage.

- **Waterproof and dustproof structure (IP65)**

  The drive unit, control unit and pump head are hermetically sealed in order to ensure a certain level of water-/dust-proof that is equal to IP65.

  *This pump is not completely water resistant. Protect the pump with a cover when installing it out of doors.

Operational functions

- **AUTO operation (see page 75)**

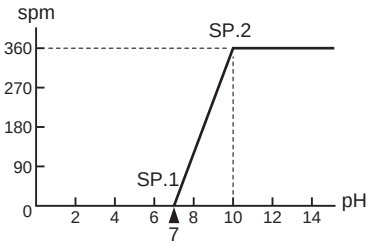
  The external sensor signal (pH/ORP or conductivity) controls the pump operation. The AUTO operation acts as the proportional control, PID control and blowdown control.

Proportional control (WPO/WEC)

In this mode the pump controls stroke rate in proportion to the measured pH/ORP value or conductivity. Program stroke rates at two different points before operation.

<Example of program parameters>

SP.1	pH: 7.00
	spm: 0
SP.2	pH: 10.00
	spm: 360



PID control (WPO/WEC)

Programming integral and derivative values compensates deviation in the proportional control. See the following formula.

spm=Kp×Deviation + Ki×Accumulated deviation + Kd (Previous deviation- deviation)

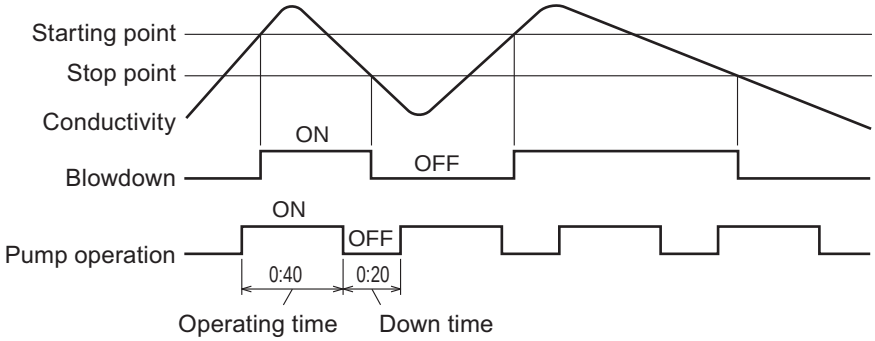
Kp: Proportional gain (calculated by SP.1 and SP.2)
Ki: Integral gain (Kp/Ti Ti=Integral term)
Kd: Derivative gain (Kp×Td Td=Derivative term)
Deviation: Process value (PV) - Setpoint (SP)
Accumulated deviation: Summed instantaneous deviation

Blowdown control (WCT)

The pump controls a blowdown valve along with the measured conductivity.
In this control there are two operation.
*The multibox (relay type) is required to supply power in this control.

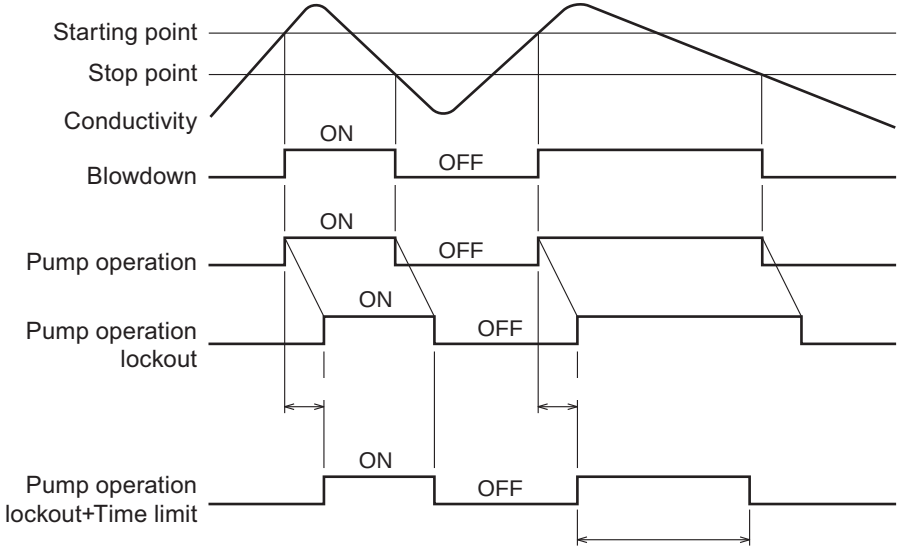
• Interval operation

The pump runs separately from the blowdown operation.



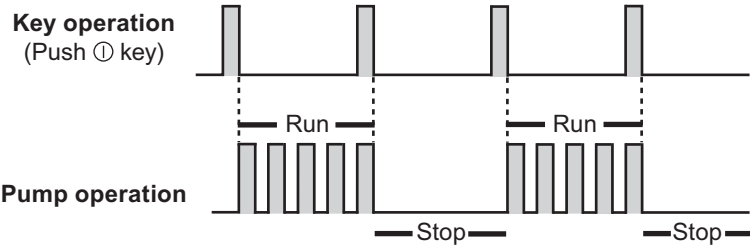
• Synchronized blowdown operation

The pump runs in sync with the blowdown operation. Lockout and a time limit can also be programmed.



● MAN operation (see page 76)

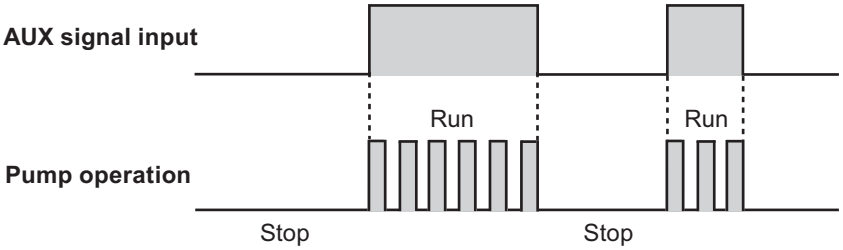
The start/stop of the pump by key operation



*Operation can also be stopped or resumed by plugging in or off.

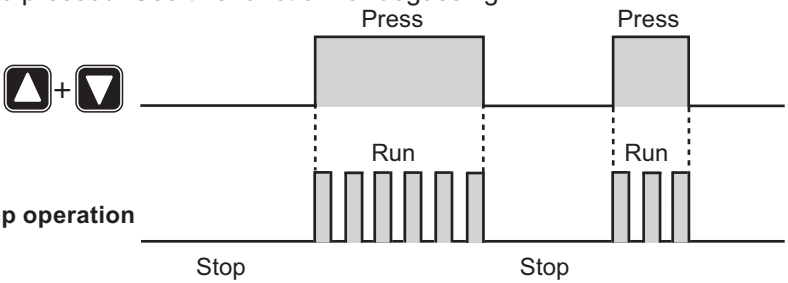
● **AUX function**

The pump runs at the maximum stroke rate while receiving the external signal via the AUX terminal. Use this function for degassing.



● **Priming function (See page 76)**

The pump runs at the maximum stroke rate while both the UP and DOWN keys are pressed. Use this function for degassing.



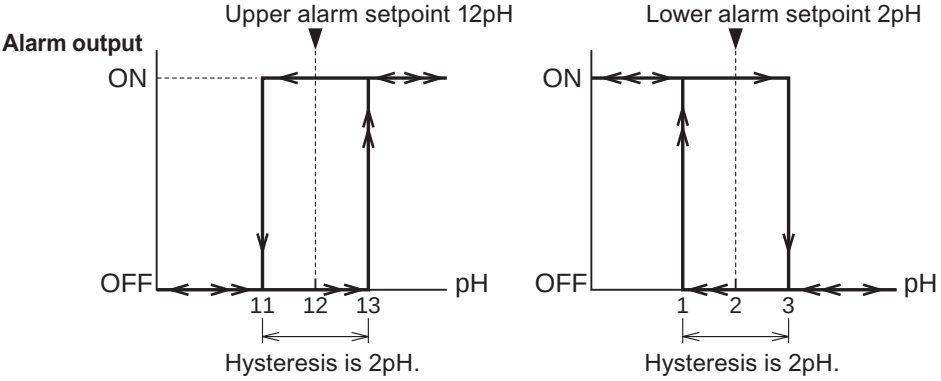
● **OUTPUT function (See page 69)**

Signals can be sent via the output terminal in sync with programming.

OUT1 (Mechanical relay)

The upper alarm and lower alarm function via OUT1.

<Example>



Interlock, STOP, Pre-STOP, AUX and Sensor failure alarms can be programmed to the OUT1.

OUT2 (PhotoMOS relay)

The synchronization signal in sync with stroke rates can be outputted as well as the above alarms.

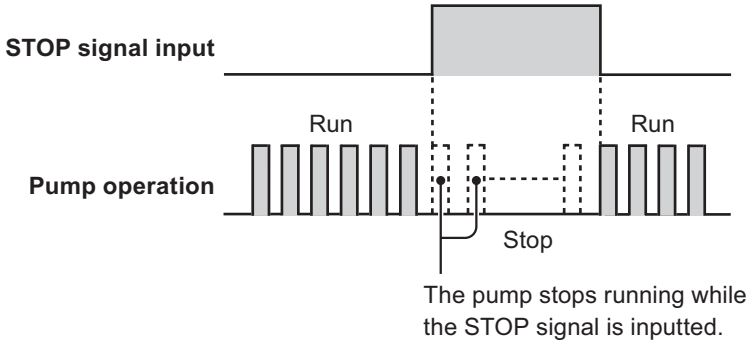
● STOP function (See page 68)

The start/stop of the pump can be controlled by the external signal from a level sensor or other devices.

When "NOR. OP" is selected:

The pump stops while receiving the external signal via the STOP terminal (closed contact).

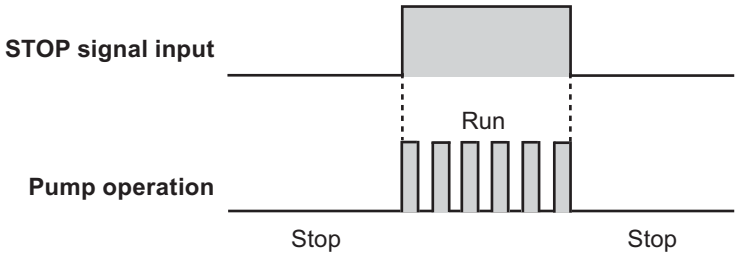
*The pump resumes operation when the STOP signal is released.



When "NOR. CL" is selected:

The pump runs while receiving the external signal via the STOP terminal (closed contact).

*The pump stops operation when the stop signal is released.



● Pre-STOP function

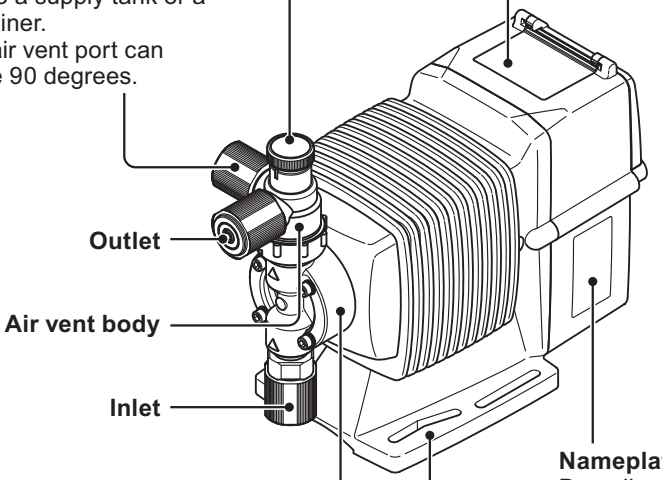
When "NOR. OP" is selected:

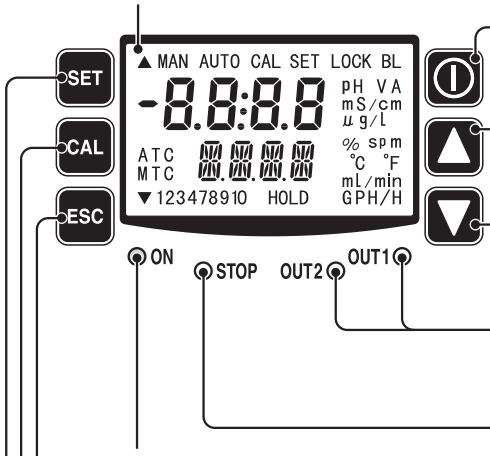
The STOP LED lights orange while the pump is receiving the external signal via the Pre-STOP terminal (closed contact).

When "NOR. CL" is selected:

The STOP LED stops lightening while the pump is receiving the external signal via the Pre-STOP terminal (closed contact).

Pump


Adjusting screw
Used for opening the air vent port.
Control unit
Used for the start/stop of the pump and stroke rate adjustment/setting.
Air vent port
Always connect a tube.
Be sure to return the tube end to a supply tank or a container.
The air vent port can rotate 90 degrees.
Outlet
Air vent body
Inlet
Pump head
Nameplate
Describes the pump specifications.
Base
Always fix with bolts.



Display
An operational status, a selected mode and a programmed value are shown here.

START/STOP key
Used for starting/stopping the pump operation or moving between modes.

UP key
Used for increasing numeric values or selecting a programming mode.

DOWN key
Used for decreasing numeric values or selecting a programming mode.

OUT LED
Lights red as the pump outputs the signal.

STOP LED
Lights red as the pump stops running by the STOP signal.
Lights orange as the pump keeps running while receiving the Pre-STOP signal.

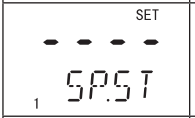
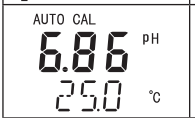
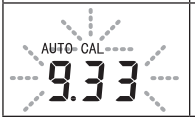
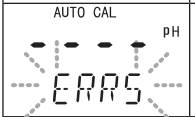
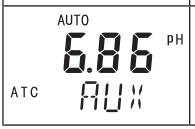
ON LED
Lights orange as turning on power. The LED lights green and flashes at each stroke.

ESC key
Used for cancelling programming and moving back to a previous menu.

CAL key
Used for moving to the calibration mode.

SET key
Used for entering programming. Pressing this key for one second, the pump enters the user mode.

■ Basic displays & Pump states

	STOP LED lights red	ON LED lights orange	ON LED blinks green	OUT LED lights red
	—	Manual wait state. Display shows pH value.	—	OUT1 & 2 function as programmed.
	—	—	Operation in manual mode. Display shows pH and stroke rate in %. 360spm is at 100%.	OUT1 & 2 function as programmed.
	—	Wait state in Auto mode. Display shows pH value and temperature.	Operation in Auto mode. Display shows pH value and temperature.	OUT1 & 2 function as programmed.
	Operation stop by the STOP signal	—	—	—
	—	Programming in the User mode	—	—
	—	Programming at SP.1	—	—
	Programming in the calibration mode	—	—	—
	—	Auto calibration is in process	—	—
	Error occurred.	—	—	—
	—	—	PRIME mode. Operation at the maximum stroke rate	—
	—	—	AUX mode. Operation at the maximum stroke rate	—

Identification codes

The model codes of the pump/drive units and the control unit represent the following information.

Pump/Drive units

EWN - B 11 VC __ E WPO __ - __
a b c d e f g h i

a. Series name

EWN: Multivoltage electromagnetic metering pump

b. Drive unit (Average power consumption)

B: 20W
C: 24W

c. Diaphragm effective diameter

09: 8mm 11: 10mm 16: 15mm
21: 20mm 31: 30mm 36: 35mm

d. Wet end materials

Code	Pump head	Valve	O ring	Valve seat	Gasket	Diaphragm
VC	PVC	Alumina ceramic	FKM	FKM	PTFE	PTFE + EPDM
VH		HC276	EPDM	EPDM		
PC	GFRPP	Alumina ceramic	FKM	FKM		
PH		HC276	EPDM	EPDM		

Material code

PVC : Transparent polyvinyl chloride
GFRPP : Glassfiber-reinforced polypropylene
EPDM : Ethylene-propylene rubber
FKM : Fluorine-contained rubber
PTFE : Polytetrafluoroethylene
HC276 : HASTELLOY C276

e. Tube connection bore

No.	Hose size (ID×OD)	Wet end materials	Pump model
No code*	ø4×ø6	VC/VH/VC-C/VH-C	EWN-09/-11/-16 & -21
	ø9×ø12	VC/VH	EWN-31 & -36
	ø6×ø12	VC-C/VH-C	EWN-09/-11/-16 & -21
	IN/AIR: ø4×ø6 OUT: Rc 1/4	PC/PH-H	EWN-11 & -16
1	ø4×ø9	VC/VH/VC-C/VH-C	EWN-09/-11/-16 & -21
3	ø6×ø8	VC/VH/VC-C/VH-C	EWN-09/-11/-16 & -21
4	ø8×ø13	VC/VH	EWN-31 & -36
6	ø10×ø12	VC/VH	EWN-31 & -36
7	ø1/4"×ø3/8"	VC/VH/VC-C/VH-C	EWN-09/-11/-16 & -21
8	ø3/8"×ø1/2"	VC/VH	EWN-31 & -36
23	ø6×ø12	VC	EWN-11/-16/-21/-31 & -36
24	ø5×ø8	VC/VC-C	EWN-09/-11/-16 & -21

* No code: ø4×ø6 and ø6×ø12 are equipped to the EWN-09, -11, -16 & -21 (the VC or VH-C types).

f. Power cable

E: European type

g. Control unit function

WPO: pH/ORP

WEC: Conductivity

WCT: Cooling tower

h. Special version

C: High compression type

H: High pressure type

i. Special configuration

Sensors

The EWN-W always needs sensors during operation.

Observe the following points for sensor.

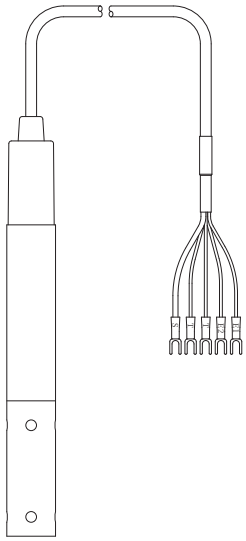
- Do not cause mechanical damage to the sensor. Failure may result.
- Do not touch a measuring surface with bare hands. Sensitivity may reduce when the surface is contaminated by sebum.
- The sensor is a ware part. Replace it with new one periodically.

- **Conductivity sensor**

  Use the designated conductivity sensor.

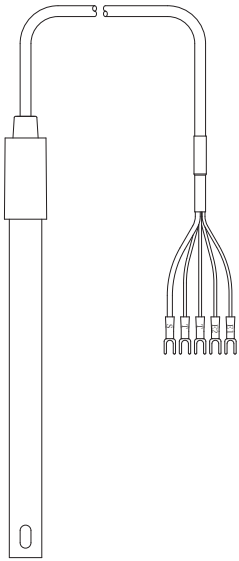
  Immersion mounted sensor: ESC-150P1-06YV

  This type of sensor is placed in a tank. There are two vertical probes at the sensor end.



InLine mounted sensor: CS150TC-Y

This type of sensor is placed in a pipeline through a flow cell. There are two probes in a slot at the sensor end.



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.

- Risk of electrical shock. Be sure to turn off power to stop the pump and related devices before service is performed.
- If you notice any abnormal or dangerous conditions, suspend operation immediately and inspect/solve problems.
- Do not place explosive or flammable material near the pump.
- Do not use a damaged pump. Use of a damaged pump could lead to an electric shock or death.

Pump mounting

Select an installation location and mount the pump.

Necessary tools

- Four M5 bolts (pump mounting)
- Adjustable wrench or spanner

1 **Select a suitable place.**

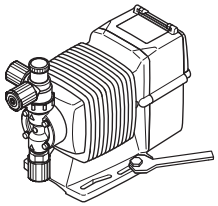
Always select a flat floor free of vibration. See page 10 for detail.
Flooded suction is recommended when handling a gaseous liquid such as sodium hypochlorite.

2 **Anchor the pump by the M5 bolts.**

Be sure to fix the pump at four points.

NOTE

Select a level location. If the pump is not installed level, output may be affected.



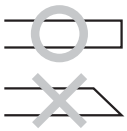
Plumbing

Connect tubes to the pump and install a check valve.

Before operation

• Cut the tube ends flat.

Tube end (side view)

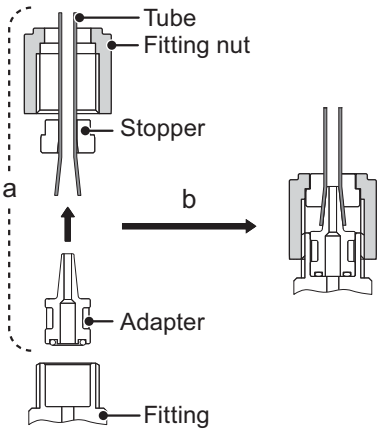


Necessary tools

• An adjustable wrench or a spanner

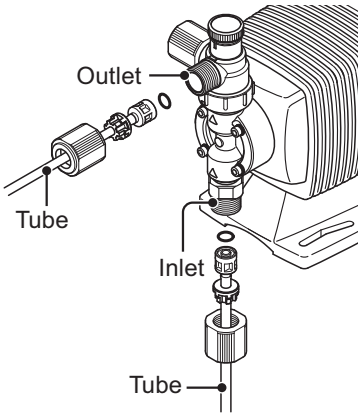
Tube connection

a. Pass a tube into the fitting nut and stopper and then slide it down to the adapter as far as it will go.
b. Put the tube end (adapter) in the fitting. Then hand tighten the fitting nut.
c. Retighten the fitting nut by turning it further 180 degrees with an adjustable wrench or spanner (crush tube mount).



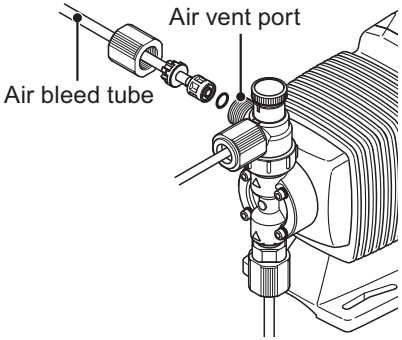
*Do not use excessive force to the plastic fitting nut.
*In your try to remove the connection, the adapter may be stuck in the crushed tube and the stopper. Try not to damage the taper of the adapter that is crushing the tube against the stopper. If it has been damaged, contact us for the new adapter/stopper.
*Do not reuse the same tube end for the crush sealing. Cut it off for ensuring the new seal is established.

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



2 **Connect an air bleed tube into the air vent port.**

Route back the other tube end to a supply tank or a container.



3 **Determine an air vent port direction.**

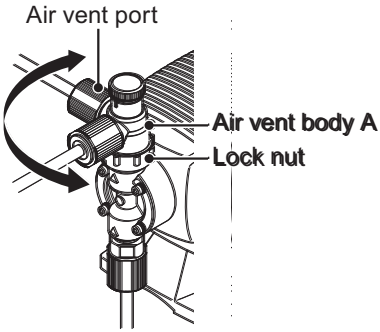
The air vent port can rotate 90 degrees.

a. Turn the lock nut anticlockwise.

b. Adjust the direction of the air vent port.

c. Hand-tighten the lock nut, holding the air vent body A.

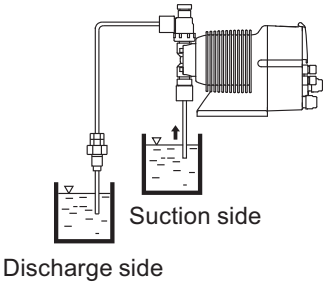
d. Turn the lock nut 90 degrees clockwise further with an adjustable wrench or spanner.



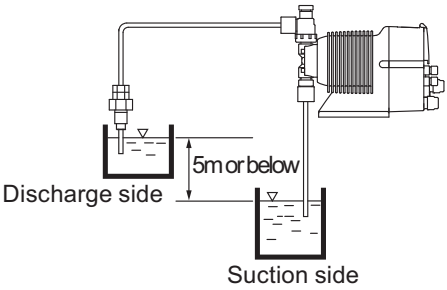
Check valve mounting

Install an optional check valve to the EWN for the prevention of a back flow, siphon and overfeeding. In the following cases be sure to install the check valve.

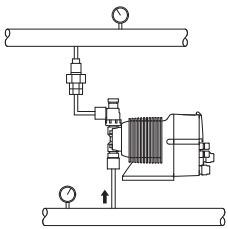
• A suction side liquid level is higher than a discharge side or an injection point at atmospheric pressure.



• A discharge side liquid level is higher than a suction side but the distance is 5m or below.



• A suction line pressure is higher than a discharge line pressure.

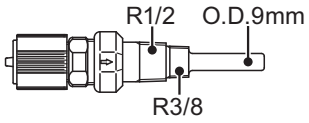


• A discharge pressure (including pipe resistance and discharge head) is below 0.13MPa. (0.049MPa for B31 and C36).

1 Mount a check valve at the discharge tube end.

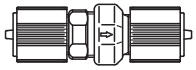
*The CAN check valve has R1/2 and R3/8 thread connections as well as an O.D. 9 mm tube connection. Cut off an unused part and adjust the connection length as necessary.

CAN check valve



*The CBN check valve (both ends tube connections) is optionally available. Contact us or your nearest distributor.

CBN check valve

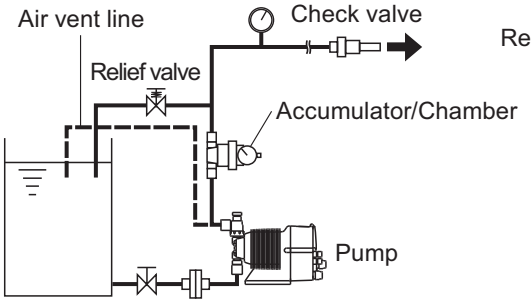


NOTE

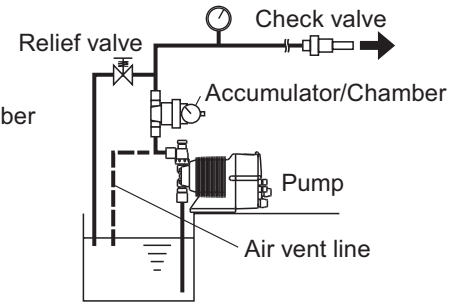
- Periodically clean or replace a check valve with new one for the prevention of crystal clogging, especially when using sodium hypochlorite.
- In the nature of the pump, the lower discharge pressure, the higher discharge capacity (and vice versa). If you want to observe the max discharge capacity at any low level of system (/discharge) pressure, use the check/back pressure valve to give the additional pressure of 0.17MPa±0.04 to the discharge line or reduce the pump speed/stroke length.

Tubing layout

Flooded suction application



Suction lift application



NOTE

- Flooded suction installation is strongly recommended when handling liquids that generate gas bubbles (sodium hypochlorite or hydrazine solution).
- Install a relief valve on a discharge line near the pump so as to release the discharge pressure when it exceeds the maximum level.

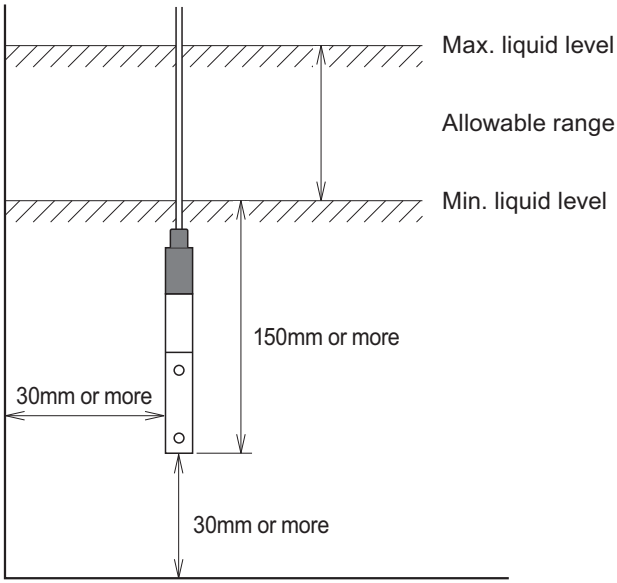
pH/ORP electrode

Observe the instruction manual of the pH/ORP electrode. Always select "MTC" in AUTO/MAN TC selection. *See page 66 for detail.*

Conductivity sensor

● **Immersion mounted sensor**

Place the sensor into a tank. Insure that the sensor is surrounded by at least 30mm of liquid on all sides, including top and bottom. Otherwise, an accurate measurement can not be obtained.



Wiring

Wiring for a power voltage and an external signal.

! Observe the following points during wiring work.

- Electrical work should be performed by a qualified electrician. Always observe applicable codes or regulations.
- Observe the rated voltage range, or the electrical circuit in the control unit may fail.
- Risk of electrical shock. Be sure to turn off power to stop the pump and related devices before service is performed.
- Replacement of the power cable should be conducted by a manufacturer, his agency or a skilled person. Otherwise, an accident may result.

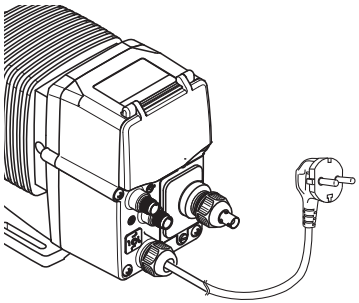
Necessary tools

- Adjustable wrench or spanner
- Phillips screw driver
- Precision screw driver

Power voltage/Earthing

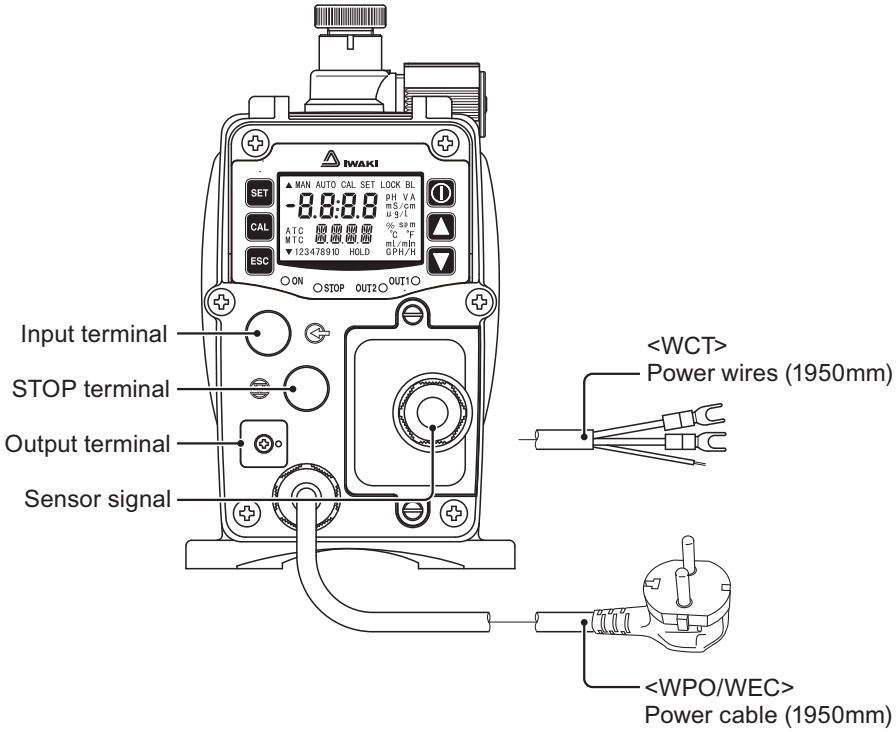
Check that the main power is turned off.

1 **For the WPO and WEC types, insert the plug all the way seated in a socket.**
For the WCT, connect power wires and earth wire to correct terminals.
This product has two power wires and one earth wire, and is classified as class I.
*Make sure the earth plug is connected as well.



End terminals

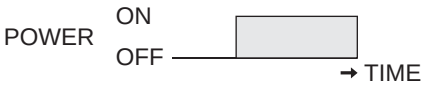
See the following diagram for detail.



NOTE

- Do not share a power source with a high power device which may generate surge voltage. Otherwise an electronic circuit may fail. The noise caused by an inverter also affects the circuit.
- Energize the pump with a power voltage via a mechanical relay or switch. Do not fluctuate the voltage, or CPU may malfunction. See page 34 for the precautions for ON-OFF control by a mechanical relay.

Apply power at a sitting

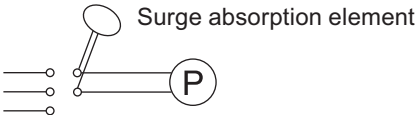


Do not apply gradually

Surge voltage

The electronic circuit in the control unit may fail due to surge voltage. Do not place the pump close to a high power device of 200V or more which may generate large surge voltage. Otherwise, take any of the following measures.

- Install a surge absorption element (ex. a varister with capacity of 2000A or more) via power cable.

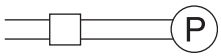


Recommended varisters

Panasonic	ERZV14D431
KOA	NVD14UCD430

See manufacturer's catalogues for detail.

- Install a noise cut transformer via power cable.



Noise cut transformer

Precautions for ON-OFF control by a mechanical relay

The pump is equipped with a CPU. To ensure the CPU to work properly, always start/stop the pump by the STOP signal for ON-OFF control. Try not to turn on and off the main power. Otherwise, observe the following points:

- Ensure the minimum OFF time of 10 minutes.
- The contact capacity of a mechanical relay should be 5A or more. Or a contact point may break.
- If the contact capacity of a mechanical relay is 5A, the maximum allowable number of times the power is turned ON/OFF is limited to 150,000. Use the contact capacity of 10A or more when the actual number of times is over 150,000 or when sharing a power source with a large capacity equipment which may cause a surge voltage and damage a contact point.
- Use a solid state relay (SSR) as necessary (such as the OMRON G3F). See manufacturer's catalogues for detail.

Signal wire connection

Use the DIN 4- or 5-pin female connector cable. We recommend the use of Binder connector cables (German manufacturer). Contact us for detail.

Binder round connector cables

5-pin : 713 series 99-0436-10-05	*Input signal*
4-pin : 715 series 99-0430-15-04	*Stop signal*

Hirschmann square connector cables

4-pin : GDS307	*Output signal*

Points to be checked

- Check that the main power is turned off.

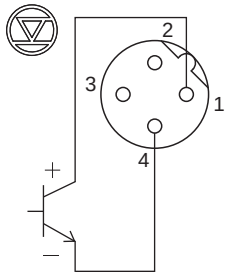
NOTE

- Do not lay on these signal cables in parallel with a power cable or combine them in a concentric cable (ex. 5 wires cable). Otherwise the electromagnetic induction noise is generated and malfunction or failure may result.
- The following products are the recommended SSRs (Solid State Relays) for signal input. Any other SSRs may cause malfunction. See manufacturer's information for details on these SSRs.
  –OMRON G3FD-102S or G3FD-102SN
  –OMRON G3TA-IDZR02S or G3TA-IDZR02SM
- When using a mechanical relay for signal input, its minimum application load should be 1mA or below.
- Use either a no-voltage contact or an open collector for the STOP and Input signals.

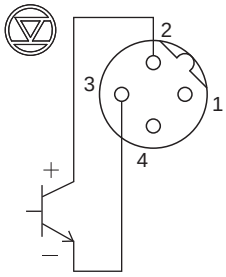
■ STOP signal

Connect signal wires to the STOP terminal via a DIN 4-pin connector.

- *When using an open collector:*
  Pay attention to polarity. Pre-STOP and STOP are plus(+), and COM is minus(-).
- *When using a contact:*
  The contact must be designed for an electronic circuit. The minimum application load should be 1mA or less.



Wiring for
STOP function



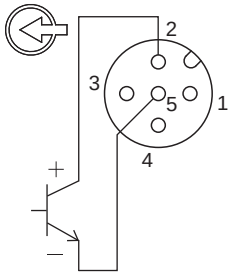
Wiring for
Pre-STOP function

1 : STOP
2 : Pre-STOP
3 : COM
4 : COM

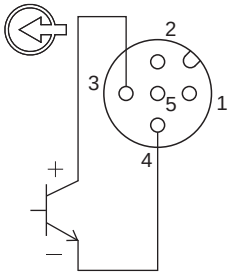
■ Input signal

Connect signal wires to the Interlock and AUX terminals via a DIN 5-pin connector.

- *When using an open collector:*
  Pay attention to polarity. Interlock & AUX are plus(+), and COM is minus(-).
- *When using a contact:*
  The contact should be designed for an electronic circuit. The minimum application load should be 1mA or less.



Wiring for
Interlock function



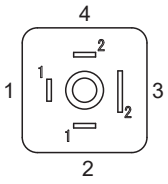
Wiring for
AUX function

1 : Free
2 : Interlock
3 : AUX
4 : COM
5 : COM

■ Output signal

Connect signal wires to the OUT terminal via a DIN 4-pin connector.

- *OUT1<Mechanical relay>: Upper limit alarm, Lower limit alarm or Batch alarm*
  *Upper limit alarm is selected at factory default setting.
  *For the WCT type, OUT1 is an open collector and is specifically used for blowdown control.
- *OUT2<PhotoMOS relay>: Upper limit alarm, Lower limit alarm, Batch alarm or Synchronous output.*
  *Batch alarm is selected at factory default setting.



1 : OUT1
2 : OUT1
3 : OUT2 (to the "PE" terminal of the output signal cable)
4 : OUT2

Sensor cable connection

Points to be checked

• Check that the main power is turned off.

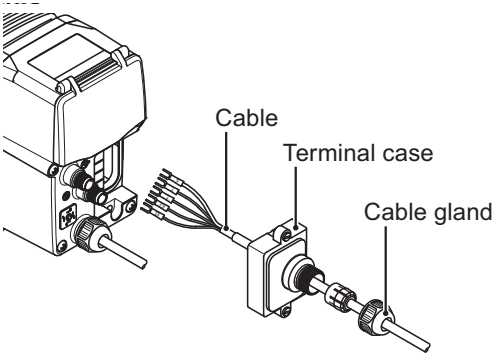
NOTE

• Do not wet wire terminals or the terminal block. Keep them free from contamination such as oil. Contamination impairs insulation and affects readings. Clean with alcohol and wait until they dry off when they are contaminated.

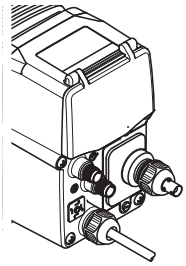
• Keep the sensor cable away from a motor and its power cable which generate noise.

• Optimise the sensor cable wiring, taking account of calibration, inspection and replacement works.

For the WCT, remove the terminal case and pass the sensor cable into the cable path as below.



For the WPO, connect the sensor cable via the BNC connector. Always select "MTC (Manual Temperature Compensation)" in User mode after the connection.

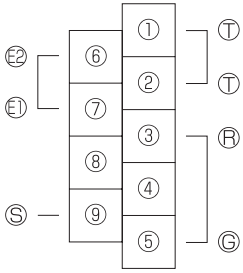


NOTE

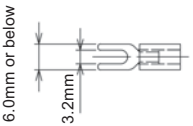
Tighten the terminal case and cable gland enough to keep sealing performance.

■ Terminal block

Connect sensor cable terminals to the terminal block.



*Use spade terminal with the following size.

Optimum terminal size	

WEC/WCT type

See the table below when wiring.

Terminal #	Functions
1-2	T, T: Temperature compensation
3-5	Disused
6-7	E1, E2: Conductivity sensor
8	Disused
9	S: Shield

NOTE

- The pH/ORP electrode cable is a high-voltage insulated cable so extra care is required.
- Always use a specified junction cable when extending or relaying the sensor cable. The use of conduit pipe to the optional junction cable is recommended for the prevention of the static electricity caused by induction or vibration.
- Be careful not to damage the sensor cable. The sensor signal is a faint electrical signal.
- Do not extend or modify sensor cable.

Multibox (Relay type)

The WCT type needs a Multibox (relay type) when making blowdown control.

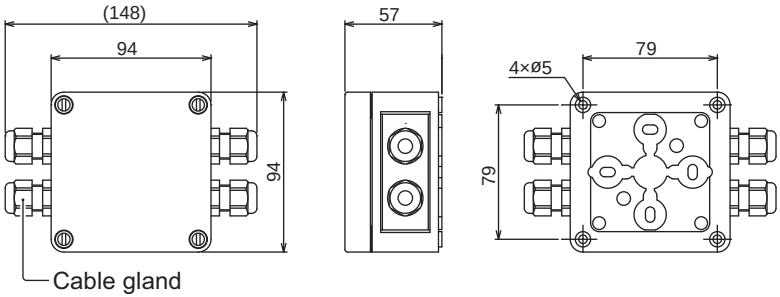
■ Outline

The multibox is designed to supply power voltage to both the pump and a blow-down valve.

Specifications

Model code		TK-PC99-6RY
Input	Power voltage	100-240VAC 50/60Hz
	Control	Blowdown control
Output	Voltage contact	Max. 250VAC, 3A (Resistance load) The same voltage as power voltage
	Pump power supply	The same voltage as power voltage

Outer dimensions



■ Installation

Fix the Multibox.

Necessary tools

- Four M4 Phillips screws (Multibox mounting)

1 Select an installation location.

See page 10 and select the best installation location.

NOTE

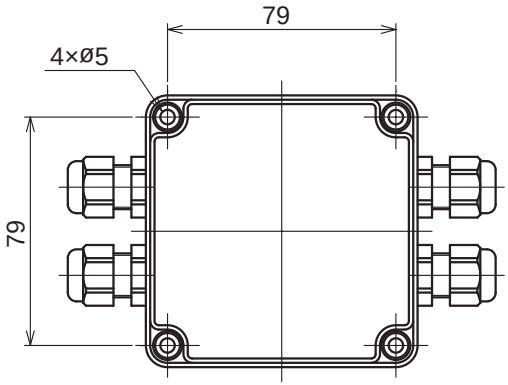
Maintain a space for wiring work.

2 Open the cover.

Unscrew and open the cover.

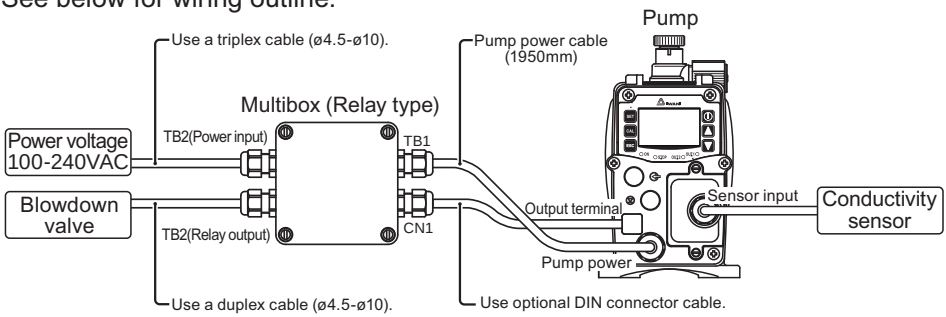
3 Fix with Four M4 screws.

Unscrewing the cover, there are four through-holes on corners. Fix the multibox through the holes by M4 screws and then mount the cover in the last place.



■ Wiring

See below for wiring outline.

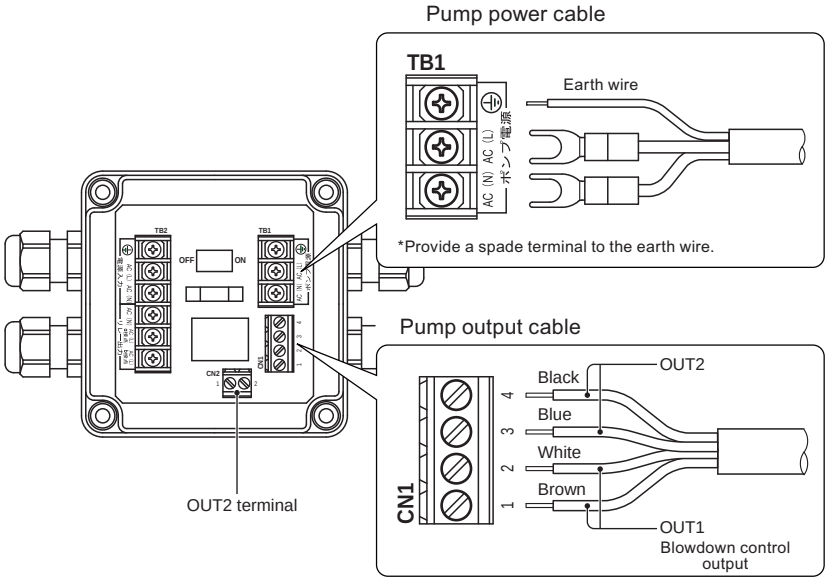


Cable connection

Connect cables to the Multibox. Follow the instruction below.

Points to be checked

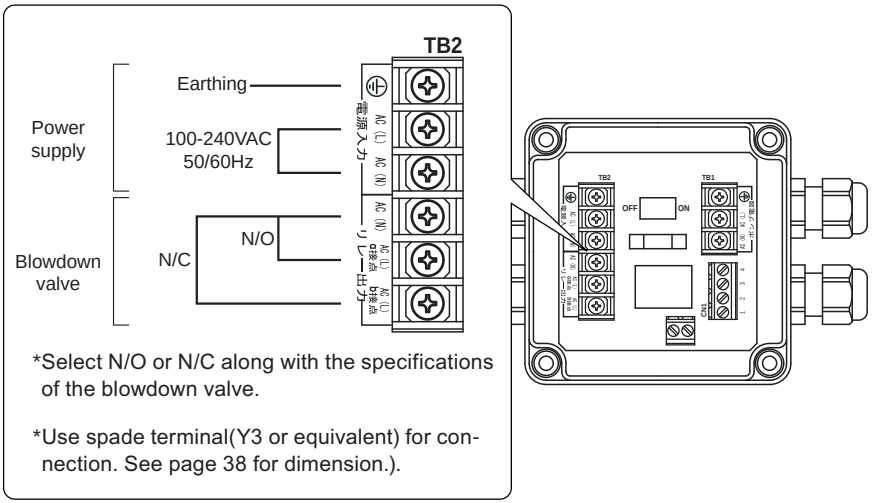
- Check that the main power is turned off.



- *When using OUT2:*

  Punch out the cover on the CN2 and connect a output cable. Use cable glands to tighten the cable.

Connection for power supply and a blowdown valve

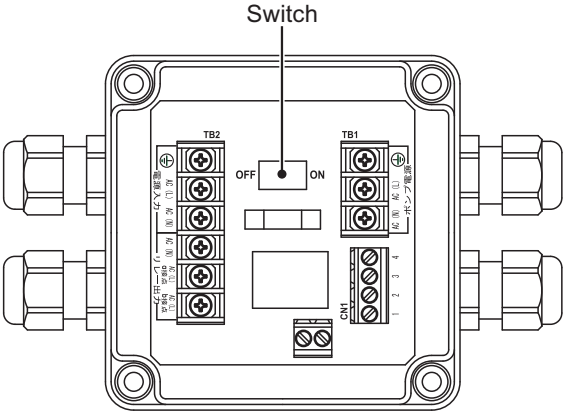


NOTE

Tighten cable glands securely to maintain sealing performance.

Switch ON

Switch on the Multibox and close the cover after wiring work. The system is now ready for blowdown control.



NOTE

Close the cover tight to maintain sealing performance.

Operation

This section describes pump operation and setting.
Run the pump after plumbing and wiring is completed.

Before operation

Check a flow rate, 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 a supply tank is enough.
- Tubing is securely connected and is free from leakage and clogging.
- Discharge/suction valves are opened.
- A power voltage is in the allowable range.
- Electrical wiring is correct and is free from the risk of short circuit and electrical leakage.

Retightening of pump head fixing bolts

Important

The pump head fixing bolts may loosen when plastic parts creep due to temperature change in storage or in transit, and this can lead to leakage. Be sure to retighten the bolts evenly to the specified tightening torque below in diagonal order before starting operation.

Tightening torque

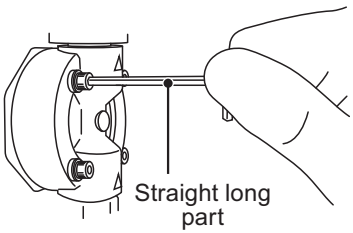
Model code	Torque	Bolts
EWN-B09/-B11/-B16/-B21	2.16 N•m	M4 Hex. socket head bolt
EWN-B31	2.55 N•m	M4 Hex. socket head bolt
EWN-C16/-C21	2.16 N•m	M4 Hex. socket head bolt
EWN-C31	2.55 N•m	M4 Hex. socket head bolt
EWN-C36	2.55 N•m	M5 Hex. socket head bolt

*Tighten fixing bolts once every three months.

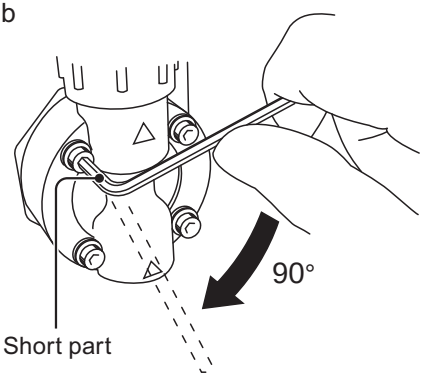
■ **Use of hexagon wrench instead of a torque wrench**

Fasten the fixing bolts as tight as can be by the hand with the straight long part of a hexagon wrench (a) and further turn the bolts clockwise 90 degrees with the short part (b).

a



b



Degassing

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

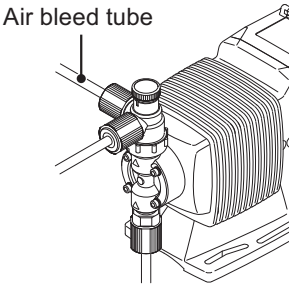
- When the pump starts to run for the first time
- When a flow rate is too low
- After liquid is replaced in a supply tank
- After a long period of stoppage
- After maintenance and inspection

NOTE

- Both gas and chemical come out together through an air bleed tube. Place the end of the tube in a supply tank or a container.
- Some chemicals may cause skin trouble or damage component parts. When your hand or component parts get wet with chemical liquid, wipe off immediately.

Points to be checked

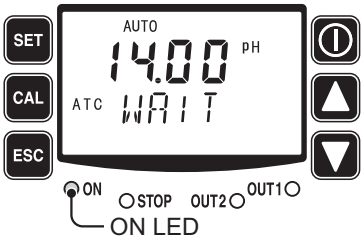
• An air bleed tube is connected to the pump.



1 Turn on power.

The ON LED lights and a display related to the current mode appears on the screen.

*The pump waits in the AUTO mode when the power is turned ON with a default setting or calls up the last selected mode with other settings.



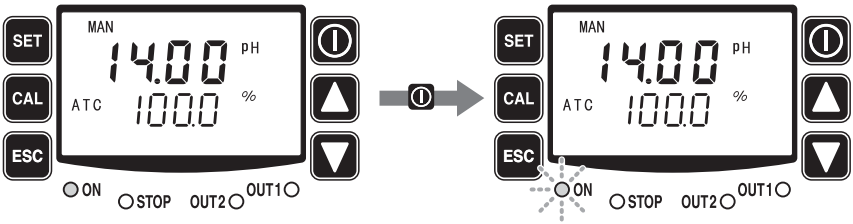
NOTE

The screen shows "ERR7" when input signal wires are not connected. Complete connection and then turn on power.

2 Run the pump at the maximum stroke rate.

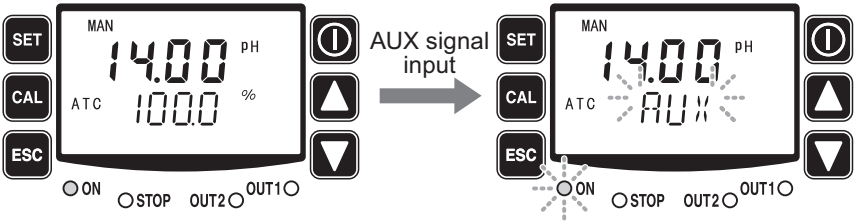
Select a convenient way from the following.

• Set a stroke rate to 100% and run the pump manually.

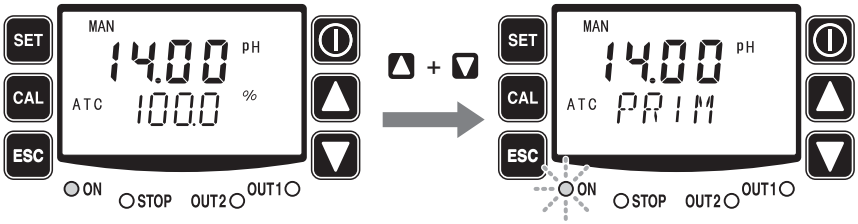


*Select MAN operation in the user mode. See page 61 for detail. The pump runs or stops as the start/stop key is pressed.

• Enter the external signal via the AUX terminals.

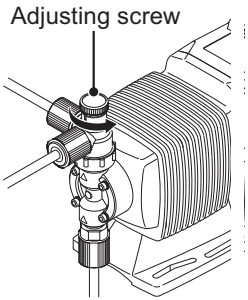


• Press and hold both the UP and DOWN keys.



3 **Rotate the adjusting screw two revolutions anticlockwise to open the air vent port.**

*Do not rotate it three revolutions. Otherwise, liquid may come out from the adjusting screw.



4 **Keep the pump running for more than ten minutes for degassing.**

5 **Stop the pump by:**

- pushing the start/stop key once or
- stopping the AUX signal or
- releasing the UP and DOWN keys.

6 **Rotate the adjusting screw clockwise to close the air vent port.**

7 **Check liquid is discharged.**

*Degassing is required again if the pump does not discharge liquid.

8 **Check connections for leakage.**

Degassing has now been completed.

*Do not forget to select auto operation in the user mode after making degassing in MAN operation.

Before a long period of stoppage (One month or more)

Clean wet ends and the inside of tubing.

• Run the pump with clean water for about 30 minutes to rinse chemicals off.

Before unplugging the pump

• Always stop the pump by key operation and wait for three seconds before unplugging the pump. Otherwise, the last key operation may not be put in memory. In this case the pump unintentionally starts to run as powered on, discharging liquid.

When the pump does not transfer liquid at resuming operation.

• Clean the valve sets and remove foreign matters.

• If gas is in the pump head, expel gas and readjust a flow rate. See the "Degassing" section on page 44.

Operation programming

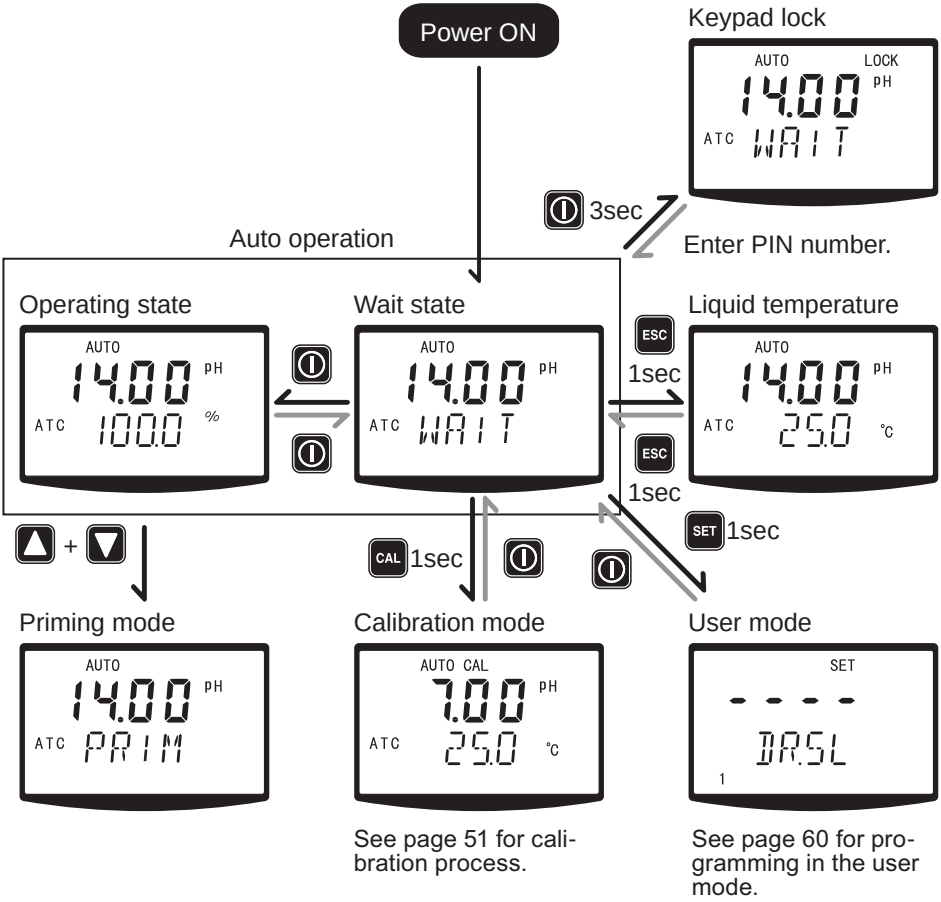
Operation at each mode is individually set and controlled by keypad operation. Select a proper mode to make optimal operation.

Default setting and setting range

		Parameters	Setting ranges		STEP*1	Default
Mode selection		-	AUTO or MAN		-	AUTO
Control	WPO WEC	1Pt	WPO	PH : 0.00 - 14.00	0.01	8.60
				ORP : -2000 - 2000	1	200
			WEC : 0 - 400		1	200
		1Pt stroke rate	1 - MAX (spm)		1	0
		2Pt	WPO	PH : 0.00 - 14.00	0.01	14.00
				ORP : -2000 - 2000	1	1200
			WEC : 0 - 400		1	0
		2Pt stroke rate	1 - MAX (spm)		1	MAX
		Integral	0 - 100.0 (s)		0.1	0.0
		Derivative	0 - 100.0 (s)		0.1	0.0
	WCT	Starting point	0 - 399		1	200
		Stop point	0 - 399		1	100
		Stroke rate range	1 - MAX (spm)		1	MAX
		Pump control	INT or B.SYC		-	INT
		ON time	00 : 01 - 23 : 59 (HH : MM)		00 : 01	01 : 00
		OFF time	00 : 01 - 23 : 59 (HH : MM)		00 : 01	02 : 00
		Lock out time	00 : 00 - 99 : 59 (MM : SS)		00 : 01	40 : 00
		Time limit	00 : 00 - 99 : 59 (MM : SS)		00 : 01	20 : 00
Measurement	WPO	PH/ORP selection	PH or ORP		-	PH
	WPO (PH)	PH buffer selection	NIST (4.7.9) / NIST (2.7.9) / TECH		-	NIST(4.7.9)
		Auto/Man selection	AUTO or MAN		-	AUTO
	WPO WEC WCT	Measured value adjustment	WPO	PH mode : -2.00 - 2.00	0.01	0.00
				ORP mode: -200 - 200	1	0
			WEC/WCT : -100 - 100		1	0
	WPO (PH) WEC	Auto/Man TC selection	AUTO or MAN		-	AUTO
		Temperature adjustment (When Auto TC is selected)	-10.0 - 10.0		0.1	0.0
	WPO WEC	Temperature setting (Man TC)	WPO: 0.0 - 99.0		0.1	25.0
			WEC: 0.0 - 50.0			

	Parameters	Setting ranges		STEP*1	Default
Functions	STOP/PreSTOP selection	NO.OP/ NO.CL		-	NO.OP
	Interlock selection	WPO/WEC : NO.OP/ NO.CL		-	NO.OP
		WCT : NO.OP/ NO.CL		-	NO.CL
	Out 1	WPO/WEC : UP/ DOWN/ AL/OFF		-	UP
		WCT : UP (No indication)		-	UP
	Out 2	UP/ DOWN/ ALM/ SYNC/ OFF		-	ALM
	UP	WPO	PH : 0.00 - 14.00	0.01	12.00
			ORP : -2000 - 2000	1	1000
		WEC/WCT : 0 - 400		1	300
	DOWN	WPO	PH : 0.00 - 14.00	0.01	2.00
			ORP : -2000 - 2000	1	400
		WEC/WCT : 0 - 400		1	50
	HYS	WPO	PH : 0.00 - 4.00	0.01	2.00
			ORP : 0 - 999	1	100
		WEC/WCT : 0 - 200		1	10
	DL.T	0 - 99		1	10
	I.LOC	ON or OFF		-	OFF
	STOP	ON or OFF		-	ON
	P.STP	ON or OFF		-	OFF
	AUX	ON or OFF		-	OFF
	SENS	ON or OFF		-	OFF
Display	Flow rate unit	spm or %		-	%
	Measurement unit	WPO (PH) : pH or mV WEC/WCT : mS/m or mS/cm		-	pH
				-	mS/m
Pin number	-	0000 - 9999		1	0000

*1 The flow rate increases/decreases by 1spm as pushing the UP/DOWN keys. Press and hold either key for quick change.



See page 51 for calibration process.

See page 60 for programming in the user mode.

Perform a calibration

Before calibration, program measurement conditions in the user mode. See page 64 for detail. And then enter the calibration mode and calibrate this product at each measuring object.

NOTE

Electrodes or sensors to be used and calibration process vary with a measuring object.

- *Calibration for pH measurement (WPO type):*
  Auto 1Pt or 2Pt calibration and Man 1Pt or 2Pt calibration are available.
- *Calibration for ORP measurement (WPO type):*
  A sensitivity check and a Man calibration is available.
- *Calibration for conductivity measurement (WEC/WCT types):*
  Cell constant programming and measured value calibration is available.

■ Use of a conductivity sensor

- *See the wiring section for connection. Always program the cell constant value tags along each sensor.*
- *Do not extend or shorten the sensor cable. A cell constant may change and an error may occur.*
- *Unscrew the top cover and rinse with tap water when cleaning. Use a neutral detergent with a soft cloth as necessary.*

■ Calibration for pH measurement (WPO type)

Always perform a calibration with a buffer solution to optimise the settings of a electrode and this product. The sensitivity of the electrode reduces with time. Calibrate it time to time.

NOTE

- Do not reuse a buffer solution.
- Keep a buffer solution temperature close to the process solution to obtain accuracy.

Auto 2Pt calibration	
Usable buffer solutions	JIS: pH2, 4, 7, and 9 US: pH4, 7, and 10
Combination of buffer solutions	JIS: pH4&7, pH7&9, pH4&9, pH2&7, pH2&9 US: pH4&7, pH7&10, pH4&10
Calibration order	Random
Auto buffer solution recognition	The control unit determines a pH value of buffer solution automatically. *Program JIS or US in advance. The control unit can not recognize JIS or US.
Auto potential check	The control unit determines if the electrode potential is stable or not.
Auto 1Pt calibration	
Usable buffer solutions	JIS: pH2, 4, 7, and 9 US: pH4, 7, and 10
Combination of buffer solutions	Just one buffer is required.
Auto buffer solution recognition	The control unit determines a pH value of buffer solution automatically. *Program JIS or US in advance. The control unit can not recognize JIS or US.
Auto potential check	The control unit determines if the electrode potential is stable or not.
Man 1Pt or 2Pt calibration	
Usable buffer solutions	Any pH buffer solution
Combination of buffer solution	One or two-different pH buffer solution
Calibration order	Random

NOTE

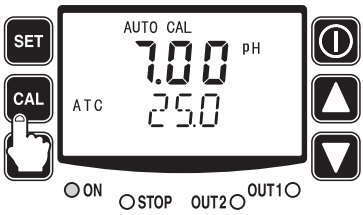
Man IPt or 2Pt calibration is used for calibration with a certain pH solution.
The electrode sensitivity is checked in calibration. Inadequate pH solution can not be used.

■ **Auto calibration**

1Pt or 2Pt calibration can be performed as immersing an electrode in buffer solution and pushing the CAL key.

1 **Press and hold the CAL key for one second to enter the Cal mode.**

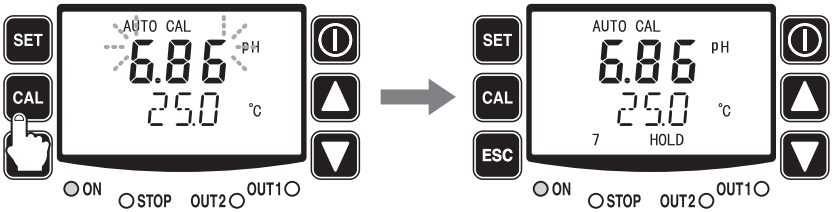
Immerse the electrode into a buffer solution. Keep a certain distance from a tank bottom and sidewalls.



2 **Push the CAL key once for 1Pt calibration.**

The measured pH flushes. If "HOLD" is shown on the screen as blinking stops, the 1Pt calibration has finished.

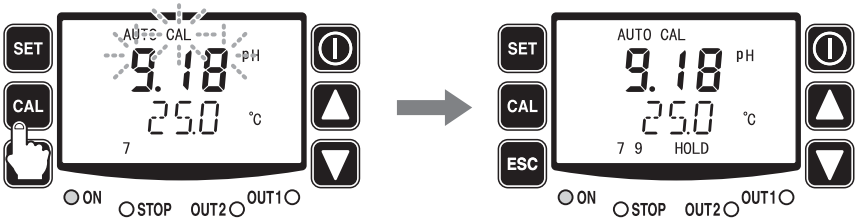
If the 2Pt calibration is not required, push the start/stop key once to return to the wait state.



3 **Push the CAL key once for 2Pt calibration.**

Immerse the electrode into the next buffer solution. The measured pH flashes. If "HOLD" is shown on the screen as blinking stops, the 2Pt calibration has finished.

Push the start/stop key once to return to the wait state.



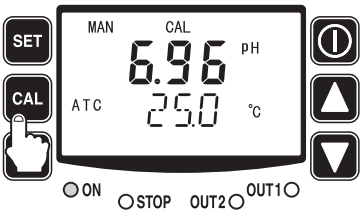
Operation

■ **Manual calibration**

1Pt or 2Pt calibration can be performed as immersing an electrode in buffer solution.

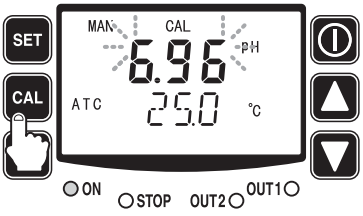
1 **Press and hold the CAL key for one second to enter the Cal mode.**

Immerse the electrode into a buffer solution. Keep a certain distance from a tank bottom and sidewalls.

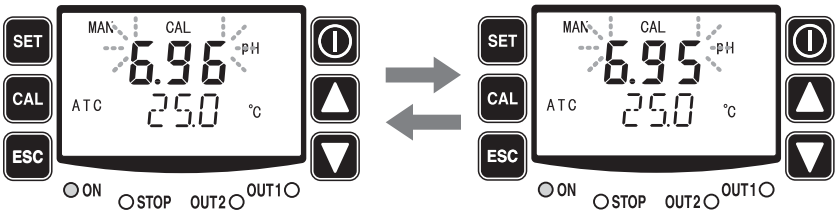


2 **Push the CAL key once for 1Pt calibration.**

The measured pH flushes.



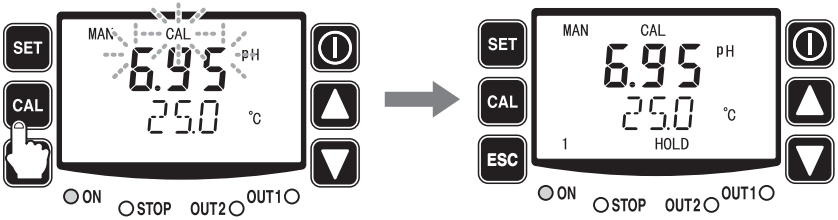
3 **Use the UP or DOWN key to adjust a value.**



4 **Push the CAL key to enter the value.**

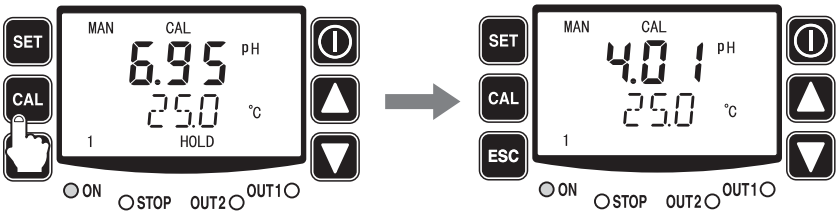
"CAL" blinks as pushing the CAL key. If "HOLD" is shown on the screen as blinking stops, the 1Pt calibration has finished.

If the 2Pt calibration is not required, push the start/stop key once to return to the wait state.



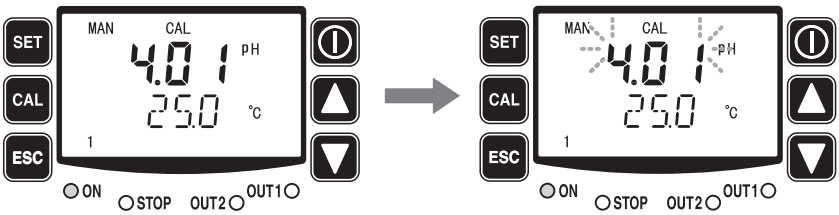
5 **Push the CAL key once for 2Pt calibration.**

Immerse the electrode into the next buffer solution.

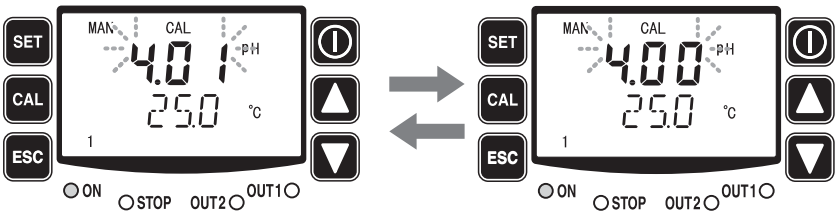


6 **Push the CAL key again.**

A measured value starts flashing.



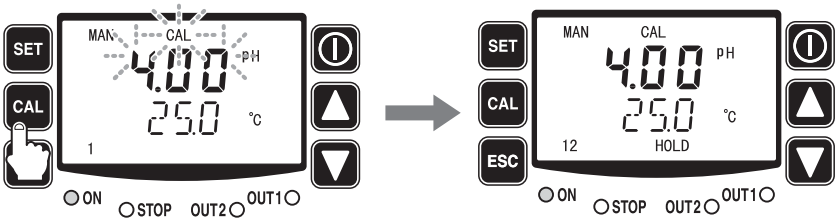
7 **Use the UP or DOWN key to adjust a value.**



8 **Push the CAL key to enter the value.**

If "HOLD" is shown on the screen as blinking stops, the 2Pt calibration has finished.

Push the start/stop key once to return to the wait state.



■ Calibration for ORP measurement (WPO type)

The calibration for ORP measurement is effective on the following.

• *Sensitivity check by ORP*
  Electrode sensitivity is checked if correct or not.

• *Man calibration*
  Readings are corrected to the actual process value.

Sensitivity check process by ORP

NOTE

In this process, the electrode is checked for its sensitivity. This process is different from the pH electrode sensitivity check that correct reading errors on the control unit.

a. Prepare a ORP buffer solution
   *mV in the buffer solution starts to reduced two hours after preparation (dissolving of ORP powders). First use is recommended. Do not preserve the buffer solution.
b. Dissolve ORP powders in 500ml of pure water.
c. Immerse the electrode into the solution.
d. Check the solution temperature is in between 10 and 30°C.
e. Check if mV is in the allowable range below.
   When using a saturated calomel reference electrode: 220±20mV
   When using a silver chloride reference electrode: 260±20mV

If the mV is out of the allowable range, take the steps below.
a. Remove contamination with a gauze.
b. Polish a metal pole carefully with a sandpaper of about #1000.
c. Immerse the electrode into dilute nitric acid (1:1) and then rinse with pure water.

Check if the mV is in the allowable range. If it is still out of range, replace the electrode.

f. Replace the electrode from the solution.
g. Rinse and wipe off the electrode.

■ **MAN calibration**

This process is different from the pH electrode sensitivity check that correct reading errors on the control unit, and the actual conductivity and mV reading will not be the same.

In this process, a reading range only is adjusted and 0mV is fixed.

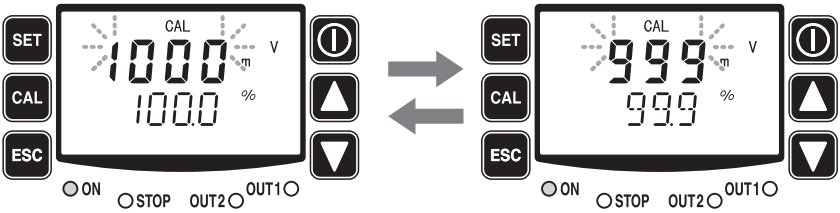
1 **Press and hold the CAL key for one second to enter the Cal mode.**

Immerse the electrode into a buffer solution.

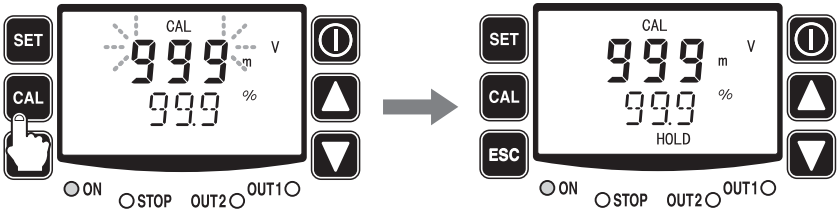
2 **Use the UP or DOWN key to adjust a value.**

The bottom line will display a reading range (Default value is 100.0%).

The settable range is 80.0 - 120.0%.

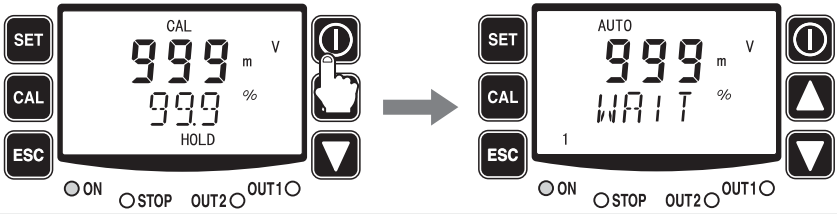


3 **Push the CAL key to enter the value.**



4 **Push the start/stop key once to return to the wait state.**

Once a value is entered, the bottom line displays "1" on the left hand side. "1" will disappear if the default range is entered.



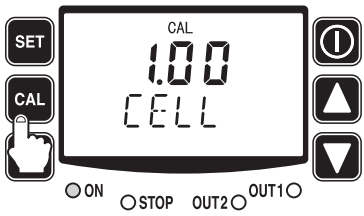
■ Conductivity calibration (WEC/WCT)

The following two are to be calibrated.

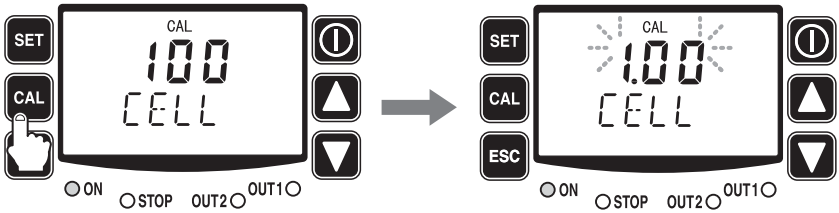
- *Cell constant*
- *Reading*

Cell constant

1 **Press and hold the CAL key for one second to enter the Cal mode.**

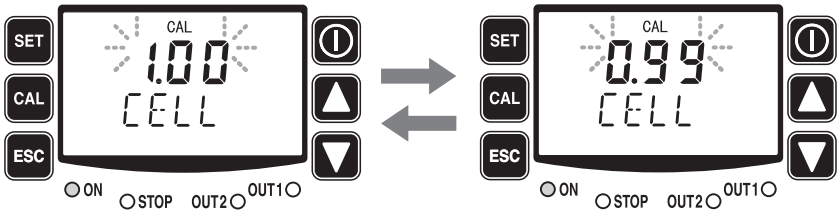


2 **Push the CAL key again.**



3 **Use the UP or DOWN key to adjust a value.**

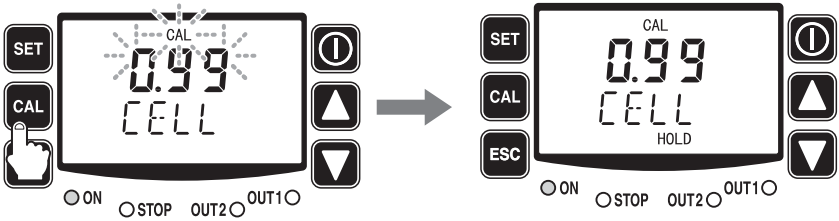
The setting range is 0.80 - 1.20.



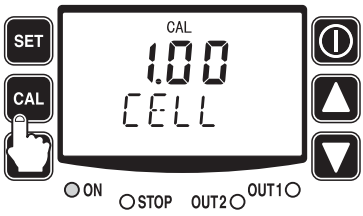
4 **Push the CAL key to enter the value.**

If "HOLD" is shown on the screen, the cell constant setting has finished.

Push the start/stop key once to return to the wait state.

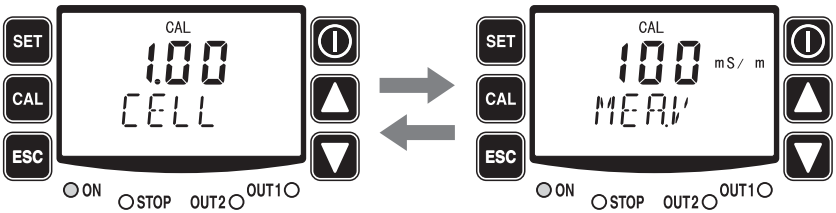


1 **Press and hold the CAL key for one second to enter the Cal mode.**

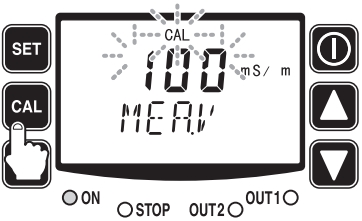


2 **Use the UP or DOWN key to select "MEA.V".**

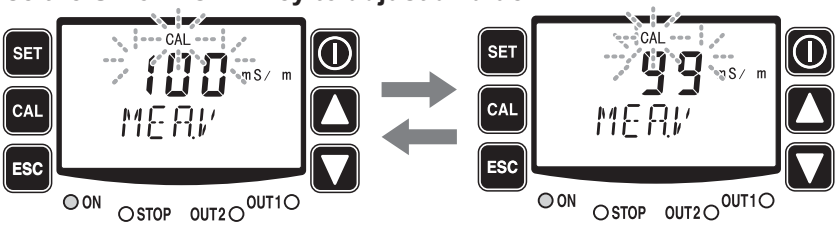
Immerse the sensor into a process solution.



3 **Push the CAL key again.**

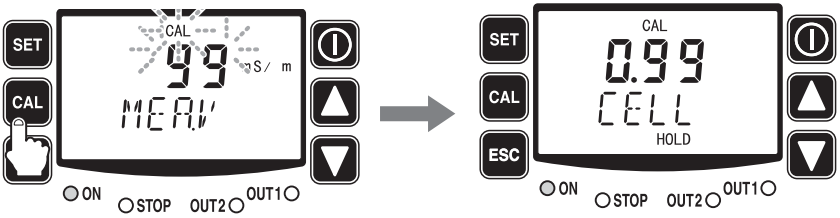


4 **Use the UP or DOWN key to adjust a value.**



5 **Push the CAL key to enter the value.**

If "HOLD" is shown on the screen, the reading calibration has finished.
Push the start/stop key once to return to the wait state.



User mode

Press and hold the SET key for one second in the wait state (the bottom line displays "WAIT".). The pump enters the User mode. Push the start/stop key when returning to the wait start.

■ User mode menu selection

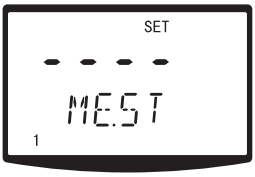
Use the UP and DOWN keys to scroll through menus and select with the SET key.

AUTO/MAN selection

Select AUTO or MAN operation. See page 61 for detail.

Control parameter programming

Program control parameters. See page 62 for detail.



Measurement parameter programming

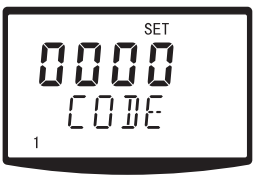
Program measurement parameters. See page 64 for detail.

Function programming

Program input/output parameters. See page 67 for detail.

Display selection

Select spm indication or a measurement unit. See page 73 for detail.

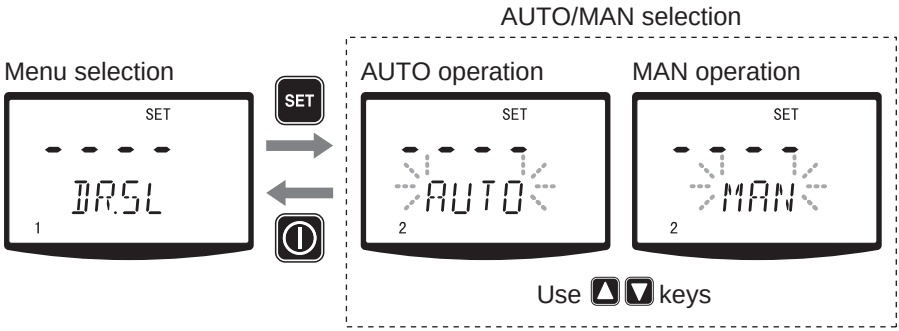


Pin number entry

Program pin number for release keypad lock function. See page 74 for detail.

■ AUTO/MAN selection

Select AUTO or MAN operation.

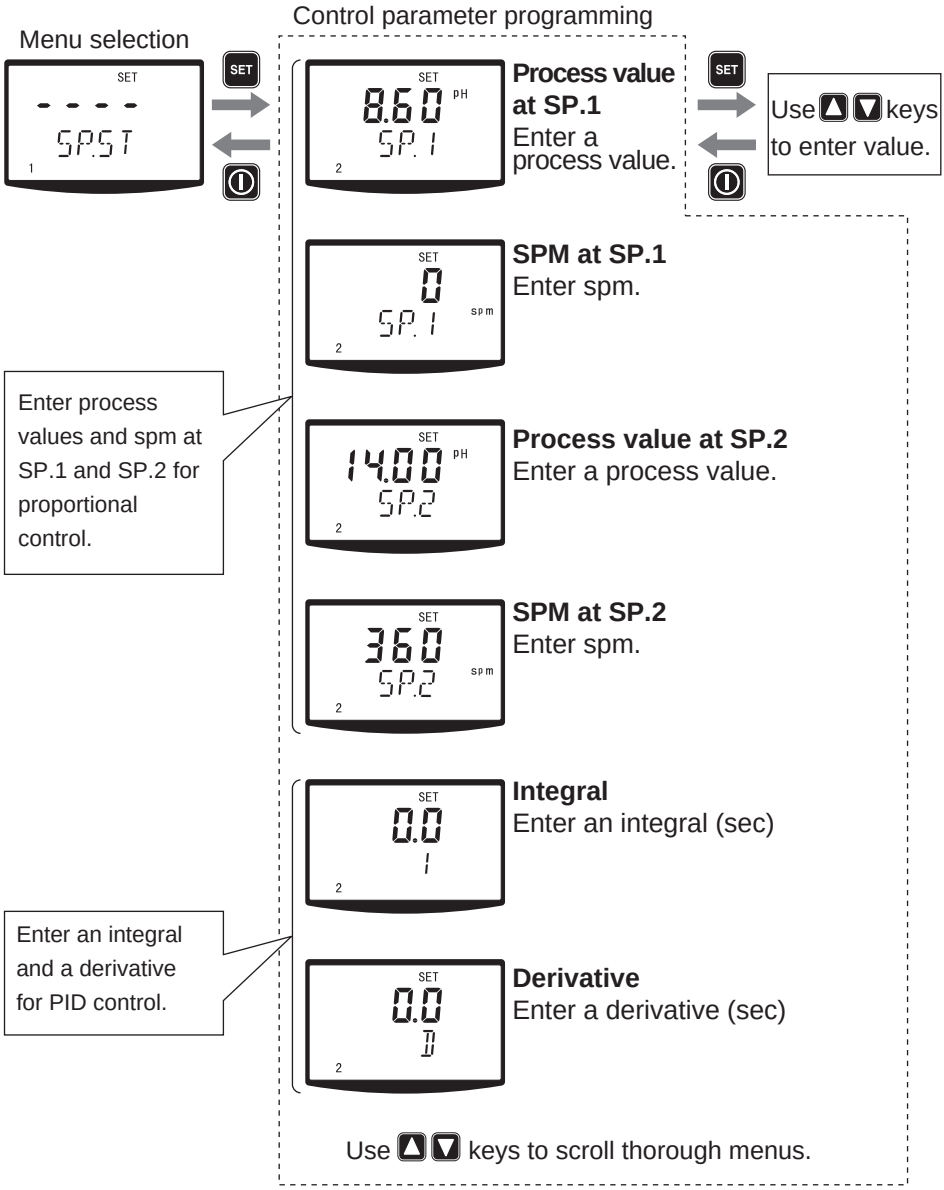


■ Control parameter programming

Program control parameters.

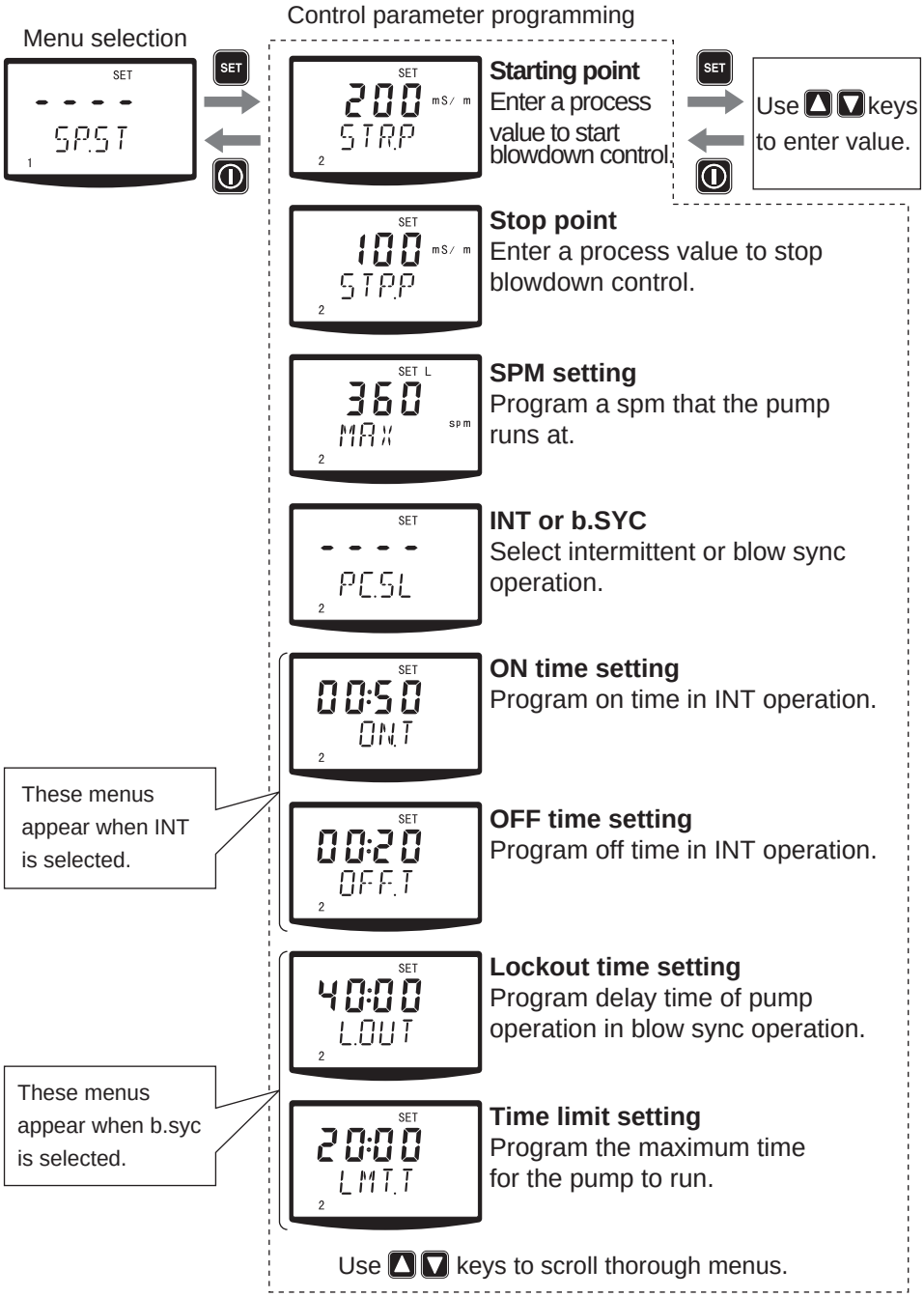
• *WPO/WEC types*

Programming for Proportional control and PID control



• *WCT type*

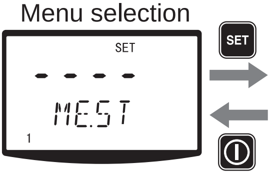
Programming for blowdown control



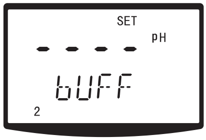
■ Measurement parameter programming

Program measurement parameters.

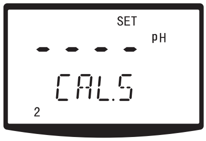
Menu selection



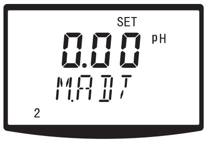
pH/ORP selection (WPO type)
Select pH or ORP.
See page 65 for detail.



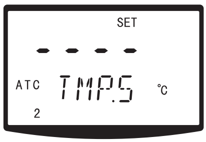
pH buffer selection (WPO type)
Select a pH buffer type for the automatic calibration.
See page 65 for detail.



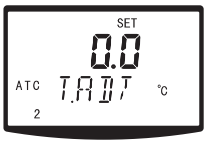
AUTO/MAN pH calibration selection (WPO type)
Select AUTO or MAN pH calibration.
See page 65 for detail.



Measured value adjustment
Adjust measured values.
See page 66 for detail.



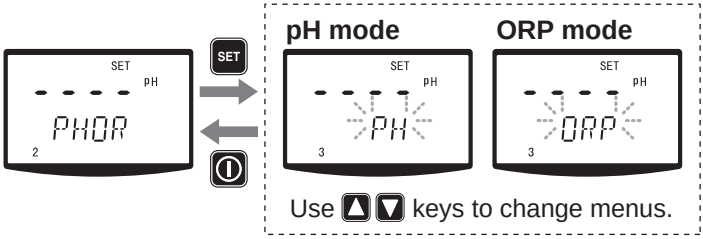
AUTO/MAN TC selection (WPO with pH/WEC/WCT types)
Select AUTO or MAN temperature compensation.
See page 66 for detail.



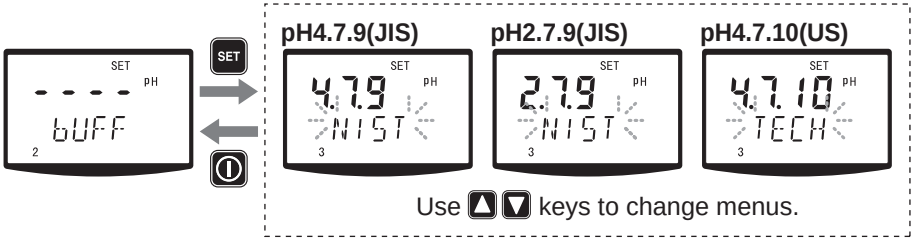
Temperature reading adjustment /Temperature setting (WPO with pH/WEC/WCT types)
Adjust temperature in AUTO temperature compensation.
Program temperature in MAN temperature compensation.
See page 66 for detail.

Use ▲▼ keys to scroll thorough menus.

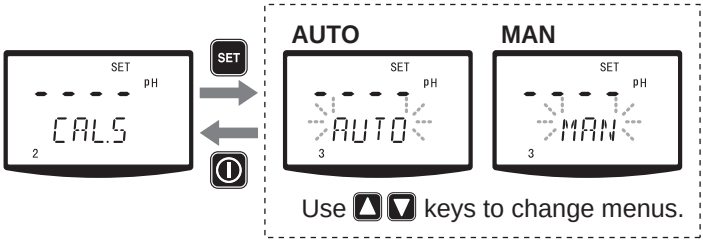
• *pH/ORP selection*



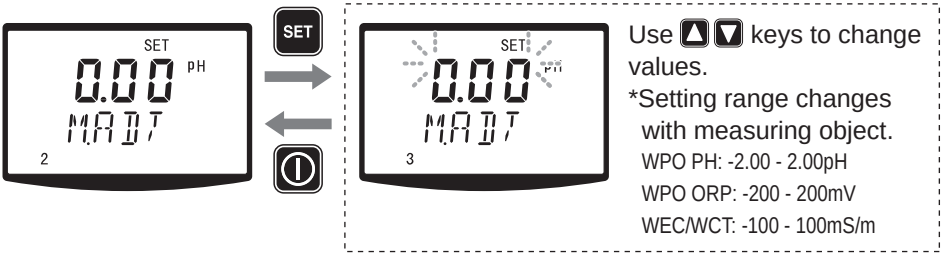
• *pH buffer selection (WPO type)*



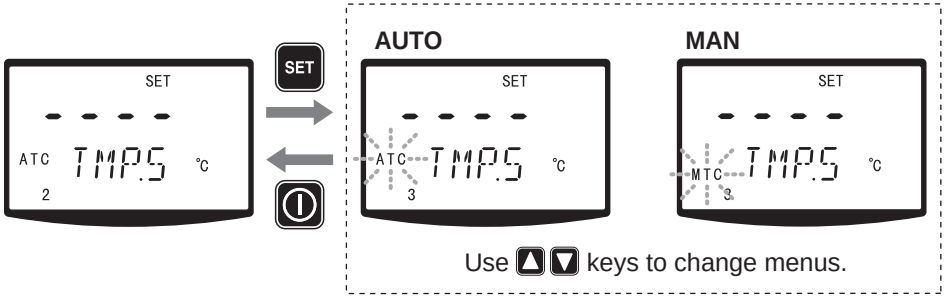
• *AUTO/MAN pH calibration (WPO type)*



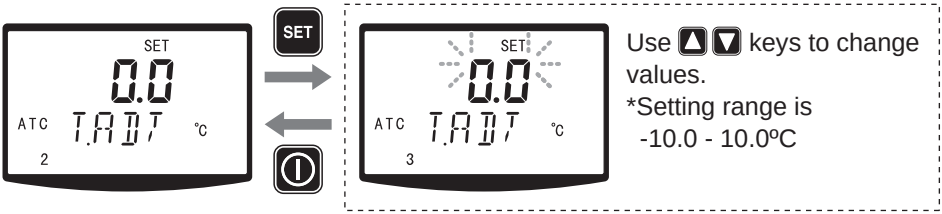
• *Measured value adjustment*



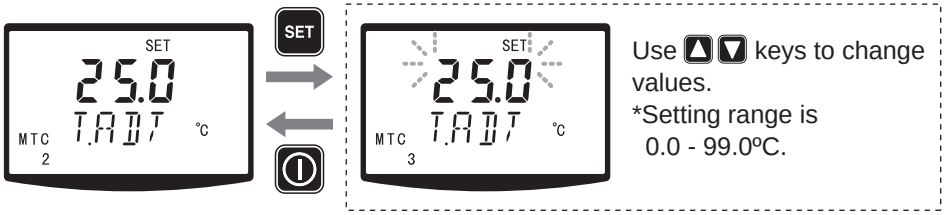
• *AUTO/MAN TC selection (WPO with pH/WCT types)*



• *Temperature reading adjustment (WPO with pH/WEC/WCT types) in AUTO TC*



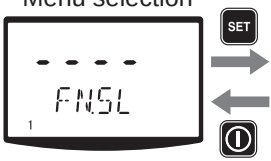
• *Temperature setting (WPO with pH/WEC/WCT types) in MAN TC*

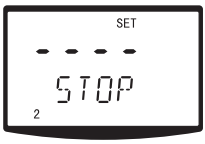


■ Function programming

Program input/output parameters.

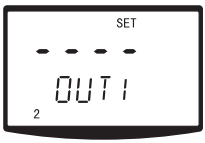
Menu selection





STOP function
Program ON-OFF operation via the STOP signal. See page 68.

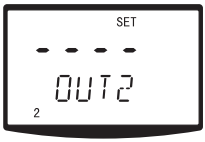
Interlock function
Program ON-OFF operation via the interlock signal. See page 68.



OUT1
Program alarm output.
See page 69.

OUT1 setting menu

Programing menus will be added depending on OUT1 setting.



OUT2
Program alarm and synchronous outputs. See page 69.

OUT2 setting menu

Programing menus will be added depending on OUT2 setting.

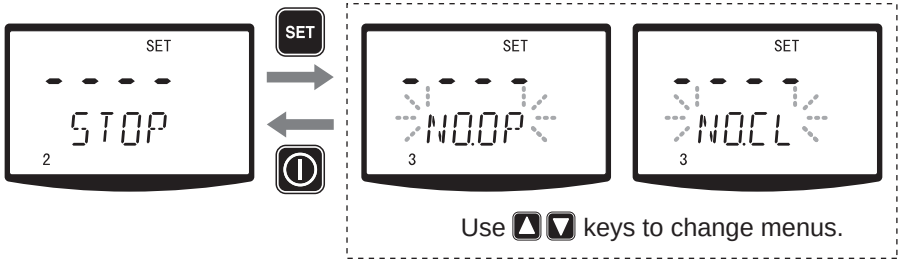
Use ▲ ▼ keys to scroll thorough menus.

• *STOP function*

Program ON-OFF operation via the STOP signal.

Selecting "NO.OP", the pumps stops when receiving the signal.

Selecting "NO.CL", the pumps runs when receiving the signal.



*"STOP" indication flashes when the STOP function is active.

To release the STOP function:

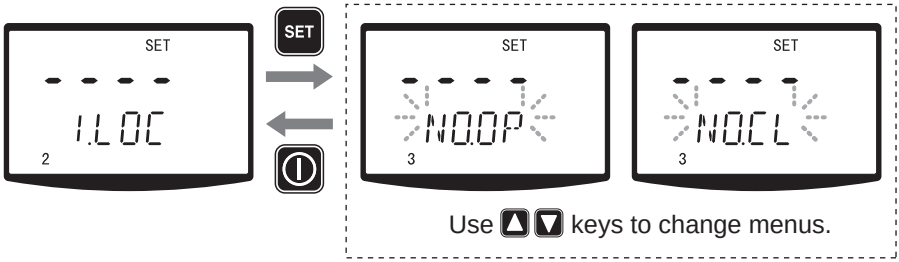
Just chose the opposite selection to the current one. For example, select "NO.CL" if "NO.OP" is selected.

• *Interlock function*

Program ON-OFF operation via the interlock signal.

Selecting "NO.OP", the pumps stops when receiving the signal.

Selecting "NO.CL", the pumps runs when receiving the signal.



*Note that "NO.OP" is selected for the WPO/WEC and "NO.CL" is for the WCT in factory default.

To release the interlock function:

Just chose the opposite selection to the current one. For example, select "NO.CL" if "NO.OP" is selected.

• *OUT1 and 2 function*

Program the upper/lower alarms or a batch alarm.

OUT2 can be set for Synchronous output. For the WCT type, OUT1 is designed for blowdown control only, so that it is not programmable.

Upper alarm (UP)

An alarm is sent at the upper point. Hysteresis and delay time can be set.

Lower alarm (DOWN)

An alarm is sent at the lower point. Hysteresis and delay time can be set.

Batch alarm (ALM)

An alarm is programmed for the interlock (I.LOC), STOP, Pre-STOP, AUX, Sensor failure (SENS).

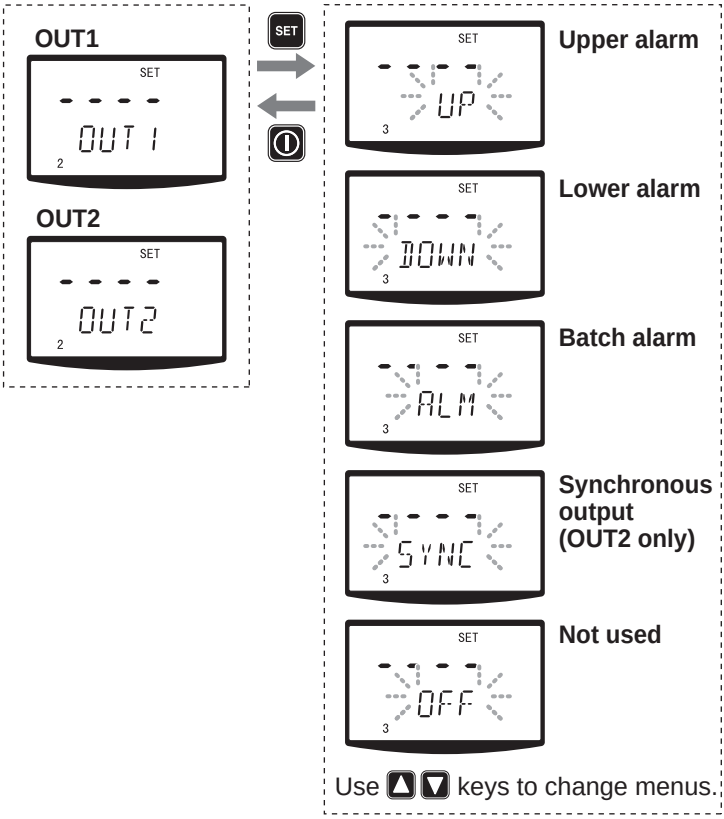
Synchronous output (SYNC)

The pulse signal is sent in sync with pumping action.

Disused (OFF)

Select "OFF" when not using this function

*OUT1(or OUT2) LED lights when OUT1(or OUT2) is programmed.

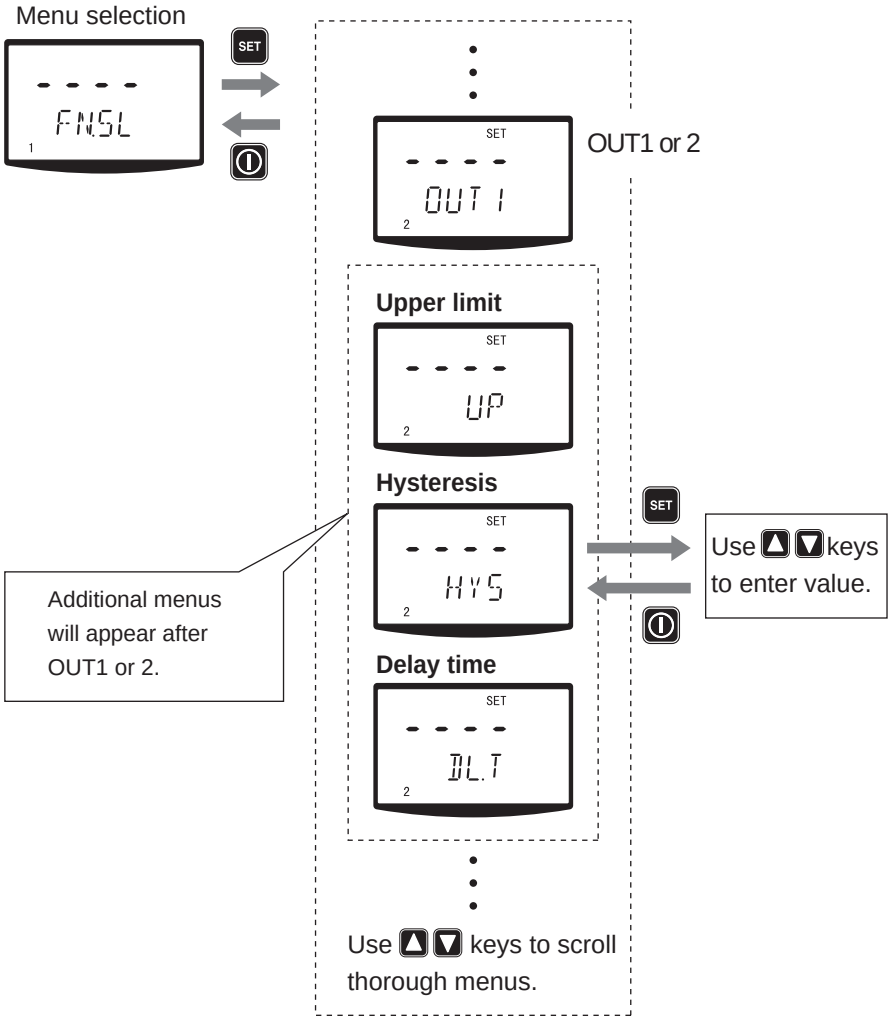


• *Upper alarm, lower alarm and batch alarm programming*

Program each alarm individually.

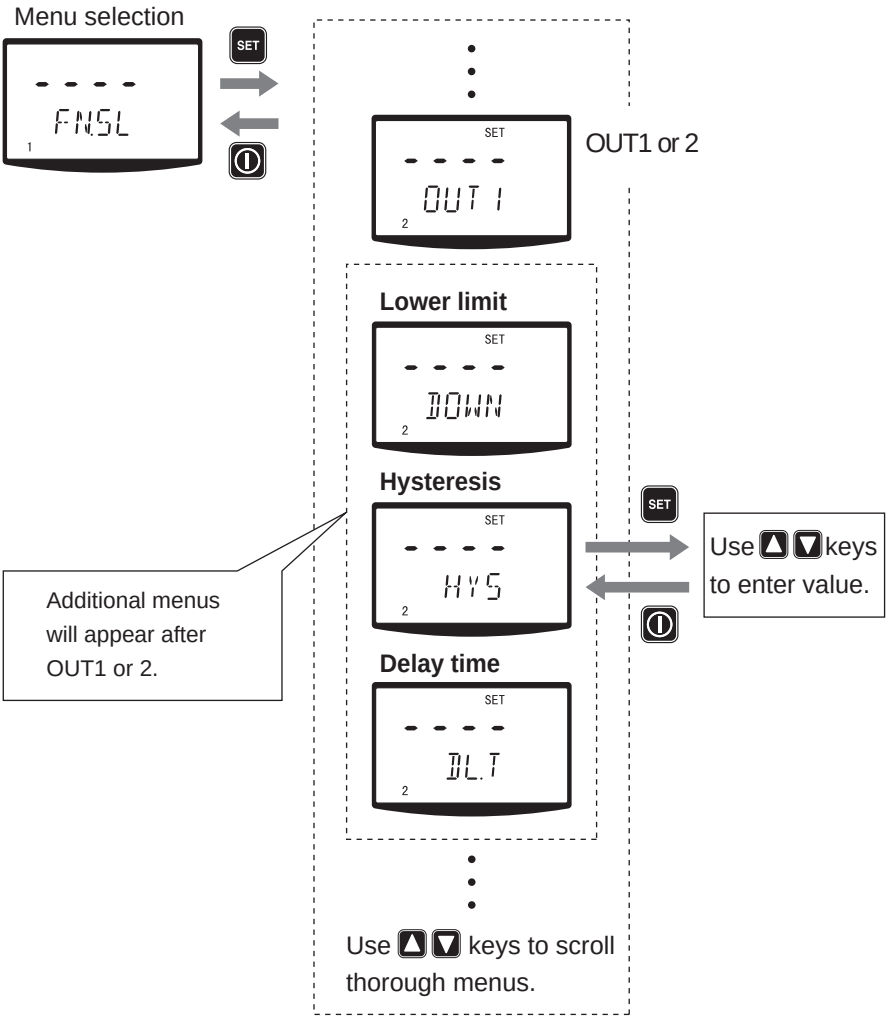
Upper alarm

Program the upper limit, hysteresis and delay time when selecting an upper alarm to OUT1 or 2.



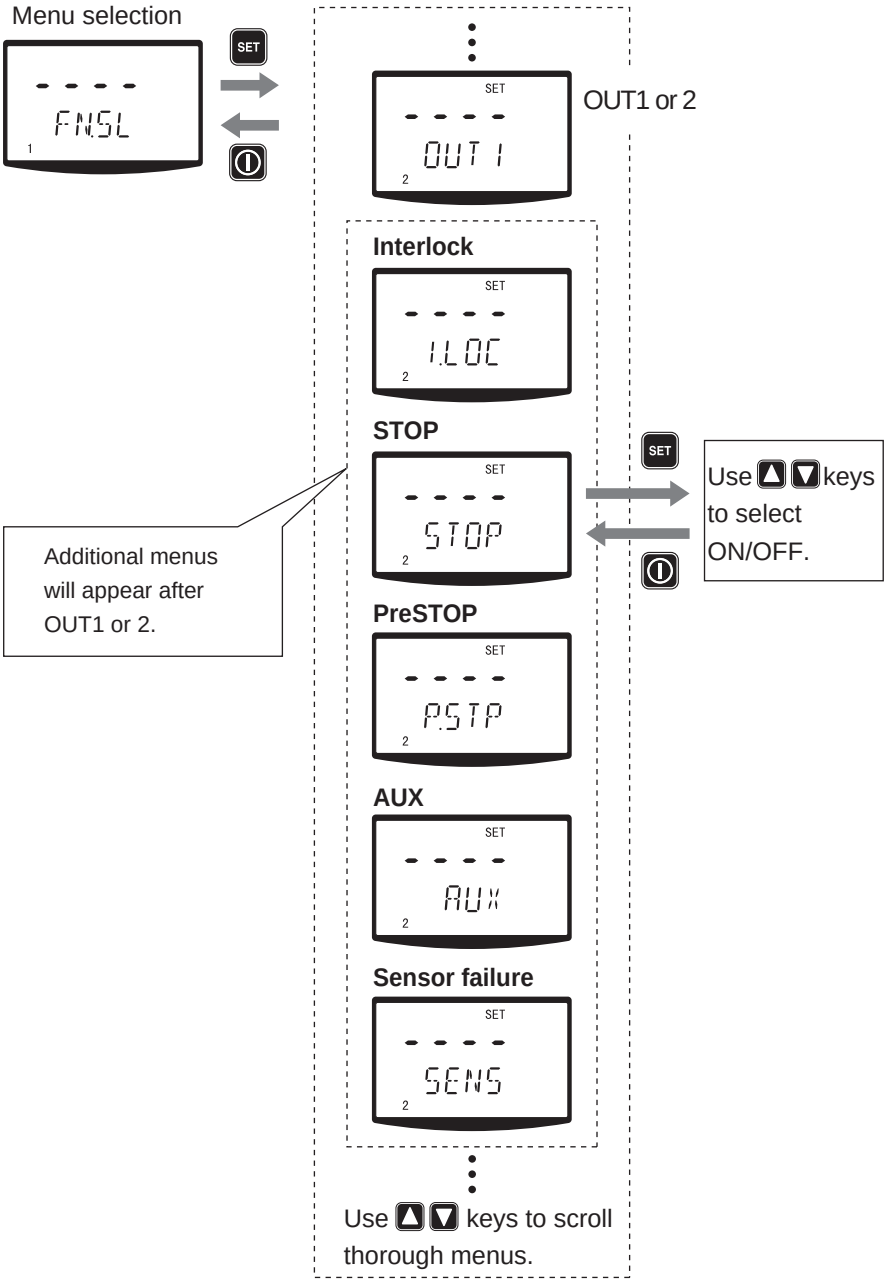
Lower alarm

Program the lower limit, hysteresis and delay time when selecting an upper alarm to OUT1 or 2.



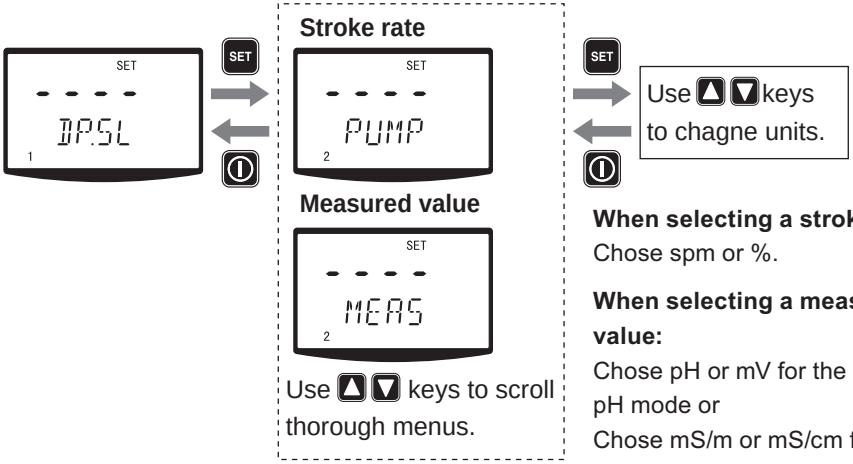
Batch alarm

An alarm is programmed for the interlock (I.LOC), STOP, Pre-STOP, AUX, Sensor failure (SENS) when selecting a batch alarm to OUT1 or 2.



■ Display selection

Select spm indication or a measurement unit.



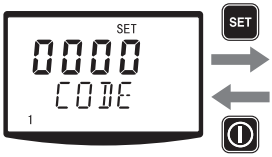
When selecting a stroke rate:
Chose spm or %.

When selecting a measured value:
Chose pH or mV for the WPO in pH mode or
Chose mS/m or mS/cm for the WEC/WCT types.

■ Pin number entry

Enter pin number to release the keypad lock state.

*Factory default value is "0000".

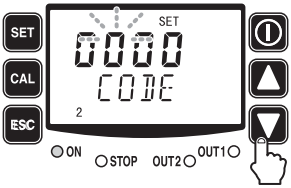


Entry screen

Pine number entry

Push ▼ key to move to next digit.

Push ▲ key to change values.



Read this section before operation.

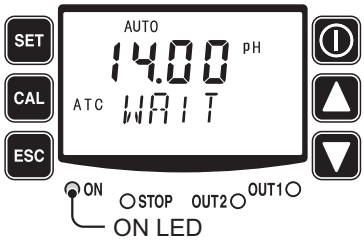
AUTO operation

The pump monitors and controls process solution automatically.

1 **Turn on power.**

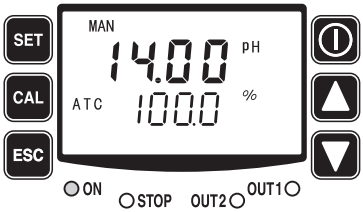
The ON LED lights and a display related to the current mode appears on the screen.

*The pump waits in the manual mode when turning on power with a default setting or calls up a previous mode at the last shutoff.



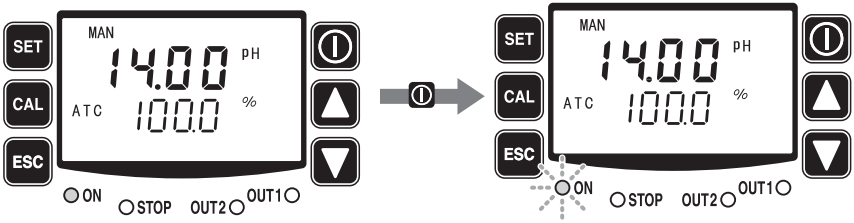
2 **Check that the pump is in AUTO mode.**

*If the screen displays "MAN", it means the pump is in manual mode. In this case select "AUTO" in the user mode. See page 61 for detail.



3 **Push the start/stop key to stay ready**

The ON LED lights green and the pump starts control automatically.



MAN operation

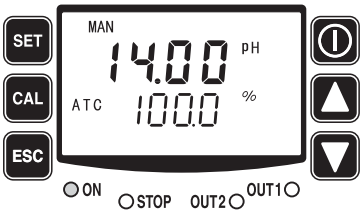
Run or stop operation manually.

1 **Select MAN mode in the user mode.**

*See page 61 for detail.

2 **Push the start/stop key to ON or OFF operation.**

Use the UP or DOWN key to adjust a stroke rate.

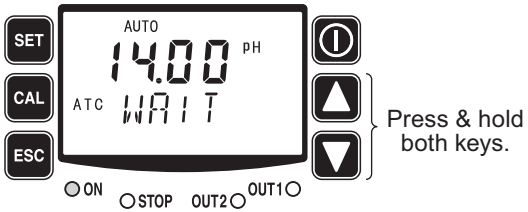


Priming function

This key operation runs the pump at the maximum stroke rate in operation.

1 **Press and hold both the UP and DOWN keys.**

The pump runs at the maximum stroke rate while both keys are pressed.



Keypad lock

Keypad lock can be active for the prevention of erroneous key operation.

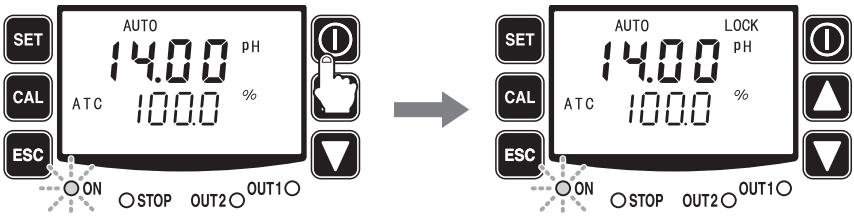
NOTE

- Any key operation is not acceptable when the keypad lock is active. In an emergency, pressing the start/stop key for three seconds, the pump enters a wait state and stops running. Pressing the same key once again will resume operation.

■ Keypad lock activation

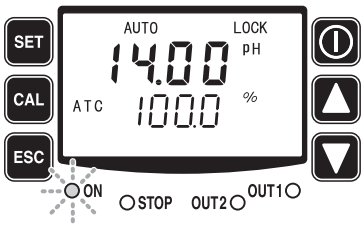
1 **Press and hold the start/stop key for more than three seconds.**

"LOCK" indication appears on the screen.



■ Keypad lock release

1 **Push any key other than the start/stop.**

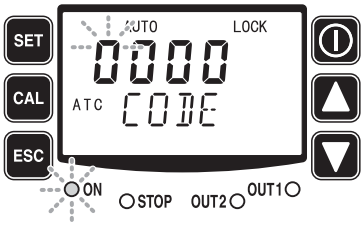


2 **Enter pin number.**

Push the down key to move to the next digit.

Push the UP key to change values.

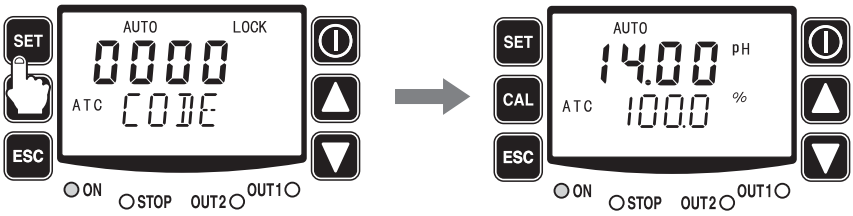
Always enter the pin number which is programmed in the user mode.



3 **Push the SET key**

The keypad lock state then will be released.

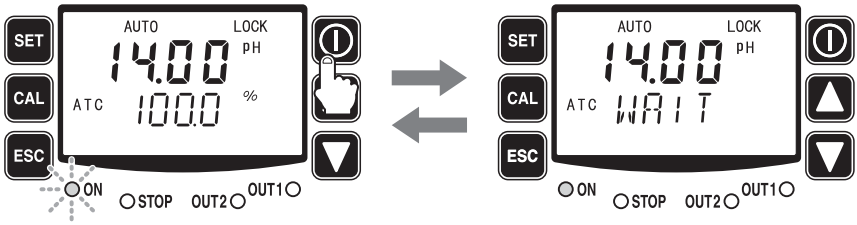
*If the pin number is not correct, "FAIL" will be shown and the lock state will continue.



■ **Emergency stop with a keypad lock state**

1 **Press and hold the start/stop key for three seconds.**

The pump enters a wait state and stops running in the keypad lock state. Pressing the same key once again will resume operation with keypad lock active.



Maintenance

*This section describes troubleshooting, electrode/sensor maintenance, **wear part replacement, exploded views and specifications.***

Important

- Follow instructions in this manual for replacement of wear parts. Do not disassemble the pump beyond the extent of the instructions.
- Always wear protective clothing such as an eye protection, chemical resistant gloves, a mask and a face shield during disassembly, assembly or maintenance work. The specific solution will dictate the degree of protection. Refer to MSDS precautions from the solution supplier.
- Risk of electrical shock. Be sure to turn off power to stop the pump and related devices before service is performed.

Before unplugging the pump

Always stop the pump by key operation. And wait for three seconds before unplugging the pump. Otherwise, the last key operation to stop the pump may not be put in memory. In this case the pump unintentionally starts to run as powered on, discharging liquid.

NOTE

- It is not manufacturer's responsibility for material suitability for the liquid used in the field or any failure due to corrosion or erosion.
- Contact us or your nearest distributor for repair or contact a manufacturer of the host machine which our product is built in.
- Be sure to drain chemicals and clean the inside of the pump before return so that a harmful chemical does not spill out in transit.

Troubleshooting

First check the following points. If the following measures do not help removing problems, contact us or your nearest distributor.

■ Pump

States	Possible causes	Solutions
The pump does not run. (LED does not light. Blank screen.)	Power voltage is too low.	• Observe the allowable voltage range of 90-264VAC
	The pump is not powered.	• Check the switch if it is installed. • Correct wiring • Replace a breaking wire to new one.
Liquid can not be pumped up.	Air lock in the pump	• Expel air. See page 44.
	Stroke length is too short.	• Run the pump at 100% stroke length and adjust it to proper length.
	Air ingress through suction line.	• Correct tubing.
	A valve set is installed upside down.	• Reinstall the valve set.
	Valve gaskets are not installed.	• Install valve gaskets.
	Foreign matters are stuck in the pump head valves.	• Dismantle, inspect and clean the valves. Replace as necessary.
	A ball valve is stuck on a valve seat.	• Dismantle, inspect and clean the valve. Replace as necessary.
The flow rate fluctuates.	Air stays in the pump head.	• Expel air. See page 44.
	Overfeeding occurs.	• Mount a check valve. See page 28.
	Foreign matters are stuck in the pump head valves.	• Dismantle, inspect and clean the valves. Replace as necessary.
	Diaphragm is broken.	• Replace the diaphragm. See page 92.
	Pressure fluctuates at an injection point.	• Maintain a pressure constant at an injection point by optimizing piping or by relocating the point.
Liquid leaks.	Loose fit of the fitting or the air vent body	• Retighten them.
	Loose fit of the pump head	• Retighten the pump head. See page 43.
	O rings or valve gaskets are not installed.	• Install O rings and valve gaskets.
	Diaphragm is broken.	• Replace the diaphragm. See page 92.
	Excessive discharge pressure	• Check that a discharge line is not closed. • Check if tubing is not clogged.

■ Electrode/Sensor

WPO type

States	Possible causes	Solutions
Reading fluctuates	Air bubbles are trapped within the sensing area.	• Position the electrode such that air bubbles will not be trapped and a flow is sufficient.
	A liquid level fluctuates.	• Mount the sensor below the minimum liquid level.
	A electrode signal wire is laid on close to other cables.	• Keep it away from other cables or pass it into a conduit.
	Power noise affects a reading.	• Optimise power line or install a noise cut transformer.
The electrode is not responding to changes.	Contamination on a probe	• Clean the probe.
	A scratched or damaged probe	• Replace the electrode.
Reading failure	Contamination on a probe	• Clean the probe.
	An electrode is in air.	• Mount the sensor below the minimum solution level.
	A scratched or damaged probe, or life end.	• Replace the electrode as necessary.
	Wiring failure	• Check wiring of G(M) and R wires for the pH sensor. Replace as necessary.
	Sensor cable connection is loose or disconnected.	• Secure the connection.
	Poor calibration	• Perform calibration again. See page 51.
	A prove is covered with a protective cap.	• Remove the cap.
	A glass membrane stays dry in air.	• A dry glass membrane reduces responsibility. Immerse it into pure water for 24 hours and then calibrate it with a buffer.
	Sample liquid temperature and buffer solution temperature is much different.	Wait until TC on the electrode becomes stable. See page 51.
	A glass membrane is broken.	• Replace as necessary.
	Internal liquid failure.	• Check the internal liquid.

WEC/WCT type

States	Possible causes	Solutions
Reading fluctuates	Air bubbles are trapped within the sensing area.	• Position the sensor such that air bubbles will not be trapped and a flow is sufficient. See page 30.
	A liquid level fluctuates. The distance of 30mm from the all sides is not maintained for the sensor.	• Mount the sensor below the minimum liquid level. • Keep the distance. See page 30.
	A sensor signal wire is laid on close to other cables.	• Keep it away from other cables or pass it into a conduit.
	Power noise affects a reading.	• Optimise power line or install a noise cut transformer.
The sensor is not responding to changes.	Contamination on a probe	• Clean the probe. See page 86.
	A scratched or damaged probe	• Replace the sensor.
Reading failure	Contamination on a probe	• Clean the probe. See page 86.
	An sensor is in air. The distance of 30mm from the all sides is not maintained for the sensor.	• Mount the sensor below the minimum solution level. • Keep the distance. See page 30.
	A scratched or damaged probe, or life end.	• Replace the sensor as necessary.
	Wiring failure	• Check wiring of G(M) and R wires for the pH sensor. Replace as necessary.
	Sensor cable connection is loose or disconnected.	• Secure the connection.
	Cell constant failure	• Check the cell constant of the sensor. See page 58.
Blowdown control is upset.	A starting or stop point is improper.	• Correct each point. See page 63.

Error codes

Error codes will be shown when this product is in a faulty condition. See below for the meanings of error codes and countermeasures.

■ Error code information

WPO type

Error code	Possible cause	Description	Error message is shown in:
Hi*	Out of a measurement range	A reading is more than pH14.0 or 2000mV.	Measurement
Lo*	Out of a measurement range	A reading is lower than pH0.00 or -2000mV.	
ERR2	Response speed anomaly	Slow response speed of the pH electrode	Calibration
ERR3	Asymmetry potential anomaly	Asymmetry potential at pH7 buffer solution is not correct.	
ERR4	Electrode sensitivity anomaly	pH electrode sensitivity is reduced.	
ERR5	Buffer solution anomaly	Unspecified buffer solution is used.	
ERR6	Calibration failure	Calibration is done at the 3Pt.	
ERR7	Temperature sensor anomaly	• Sensor wire is disconnected or short-circuited. • Liquid temperature is 99.1°C or above or -0.1°C or below.	Measurement or calibration
ERR8	Setting error	The same value is set to setting points.	Setting

*In ORP mode only these error codes appear.

WEC/WCT type

Error code	Possible cause	Description	Error message is shown in:
Hi	Out of a measurement range	A reading is more than 401mS/m.	Measurement
Lo	Out of a measurement range	A reading is lower than 0mS/m.	
ERR7	Temperature sensor anomaly	• Sensor wire is disconnected or short-circuited. • Liquid temperature is 99.1°C or above or -0.1°C or below.	Measurement or calibration
ERR8	Setting error	• When a stop point is at or above a starting point in upper limit control. • When a stop point is at or below a starting point in lower limit control. • When the total ON-OFF time exceeds 23:59.* • When ON or OFF time is set to 0:00.*	Setting
ERR9	Temperature error	Liquid temperature is beyond0.0-50.1°C	Measurement

*These conditions are possible only for the WCT type.

■ Countermeasures

WPO type

Error code	Possible cause	Counter measures
Hi* Out of a measurement range Lo* Out of a measurement range	• Is the electrode is in a liquid? • Is the protective cap removed from the measuring surface? • Is electrode wire connection proper? Pay extra attention to check if the wire G(M) and R is not disconnected. • Is junction cable is connected properly?	• Study your system so that the electrode is always in the liquid at any liquid level. • Remove the protective cap. • Check the terminal block on the control unit and multibox to see if connection is correct and secured by screws.
ERR2 Response speed anomaly	• Is the electrode clean? • Has the measuring surface been kept dry for a long period? • Is the temperature difference between the measured liquid and buffer solution too wide?	• Clean the electrode. • The responsibility deteriorates once glass membrane becomes dry. In this case immerse the electrode into pure water for 24 hours and then calibrate it with buffer solution. • Wait until the temperature sensor comes at liquid temperature and then perform calibration.
ERR3 Asymmetry potential anomaly	• Is the electrode clean? • Is the measuring surface broken? • Does pH buffer solution not have problem? Is it fresh? Is pH7 selected?	• Clean the electrode. • Replace it if it is broken. • If it is not fresh use new buffer solution.
ERR4 Electrode sensitivity anomaly	• Is electrode clean? • Is the measuring surface broken?	• Clean the electrode. • Replace if it is broken.
ERR5 Buffer solution anomaly	• Is proper buffer solution (JIS: pH4, 7, 9) or (US: pH4, 7, 10) is selected? Check the pH difference between buffer solutions is 2pH. • Check the electrode to see if: The electrode is contaminated. The measuring surface is broken. Inner solution is deteriorated.	• Use proper buffer solution. • Clean or replace as necessary.
ERR6 Calibration failure	• Calibration is done at the 3rd point.	• Perform 1 or 2Pt calibration only.
ERR7 Temperature sensor anomaly	• Is the resistance between T-T in proper range? 1097Ω at 25°C 1000-1385Ω at 0-100°C • The sensor cable and junction cable wiring are correct?	• Disconnect electrode and measure resistance. If resistance is out of the proper range shown left, electrode failure is possible. Replace electrode. • Check the terminal block on the control unit and multibox to see if connection is correct and secured by screws.
ERR8 Setting error	• Erroneous setting	• Correct setting.

*In ORP mode only these error codes appear.

WEC/WCT type

Error code	Possible cause	Counter measures
Hi Out of a measurement range	• A reading is more than 401mS/m. • Is sensor cable connection proper?	• Check if a specified sensor is used. • Check the terminal block on the control unit to see if connection is correct and secured by screws.
Lo Out of a measurement range	• Is sensor cable connection proper?	• Check the terminal block on the control unit to see if connection is correct and secured by screws.
ERR7 Temperature sensor anomaly	• Is the resistance between T-T in proper range? 1097Ω at 25℃ 1000-1193Ω at 0-50℃ • The sensor cable wiring is correct?	• Disconnect sensor connection and measure resistance. If resistance is out of the proper range shown left, electrode failure is possible. Replace electrode. • Check the terminal block on the control unit to see if connection is correct and secured by screws.
ERR8 Setting error	• Erroneous setting.	• Correct setting.
ERR9 Temperature error	• Liquid temperature is out of measurement range.	• Observe the measurement range.

Daily inspection

■ Conductivity sensor cleaning

Contamination on a probe reduces sensitivity. Clean a probe periodically to keep a good sensing condition.

• *Cleaning process*

a. Remove a cover from the probe and flush the sensor with tap water.
b. Use neutral detergent to a soft cloth and wipe off contamination. Be careful not to damage the probe.
c. Repeat this process until contamination is removed.

NOTE

A conductivity sensor is wear parts. If there is heavy contamination or damage on a probe, replace it with new one. Otherwise, reading failure or malfunction may result.

■ Precautions

Clean the conductivity sensor periodically. A best cleaning time is depending on operating conditions. Note that the maximum cleaning frequency is once a month.

Always remove the sensor and clean a probe when it is not used. Do not leave it in system.

Inspection

Perform daily and periodic inspection to keep pump performance and safety.

Daily inspection

Check the following points. If you notice any abnormal or dangerous conditions, suspend operation immediately and inspect/solve problems.
When wear parts come to the life limit, replace them with new ones. Contact us or your nearest distributor for detail.

No.	States	Points to be checked	How to check
1	Pumping	• If liquid is pumped.	Flow meter or visual inspection
		• If the suction and discharge pressure are normal.	Check specifications.
		• If liquid has deteriorated, crystallized or precipitated.	Visual or audio inspection
2	Noise and vibration	• If abnormal noise or vibration occurs. They are signs of abnormal operation.	Visual or audio inspection
3	Air ingress from pump head joints and a suction line	• If leakage occurs. • If pumped liquid includes air bubbles, check lines for leakage and retighten as necessary.	Visual or audio inspection

Periodic inspection

Retighten the pump head mounting bolts every three months evenly to the following torque in diagonal order.

*Mounting bolts may loosen in operation. How fast the bolts start to loosen is depending on operating conditions.

Tightening torque

Model code	Torque	Bolts
EWN-B09/-B11/-B16/-B21	2.16 N•m	M4 Hex. socket head bolt
EWN-B31	2.55 N•m	M4 Hex. socket head bolt
EWN-C16/-C21	2.16 N•m	M4 Hex. socket head bolt
EWN-C31	2.55 N•m	M4 Hex. socket head bolt
EWN-C36	2.55 N•m	M5 Hex. socket head bolt

*A hexagon wrench can be used for a torque wrench. See page 44.

Wear part replacement

To run the pump for a long period, 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 distributor for detail.

Precautions

- Solution in the discharge line may be under pressure. Release the pressure from the discharge line before disconnecting plumbing or disassembly of the pump to avoid solution spray.
- Rinse wet ends thoroughly with tap water.
- Each time the pump head is dismantled, replace the diaphragm, O rings, valve gaskets and valve sets with new ones.

Wear part list

	Parts		# of parts	Estimated life
Pump	Valve set	VC•VH•(PC/PH)-H•TC	2 sets	8000 hours
	Diaphragm		1	

*The high compression types have a rear diaphragm sheet on the back side of the diaphragm.

*Wear part duration varies with the pressure, temperature and characteristics of liquid.

*The estimated life is calculated based on the continuous operation with clean water at ambient temperature.

Before replacement

First release pressure from the pump head.

1 **Stop the pump operation.**

2 **Rotate the adjusting screw two revolutions anticlockwise to open the air vent port.**

NOTE

Do not rotate it three revolutions or more. Otherwise, the adjusting screw may come off with solution spray.

3 **Check that liquid comes out from the air vent port and gas/liquid pressure has been released.**

NOTE

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

Valve set replacement

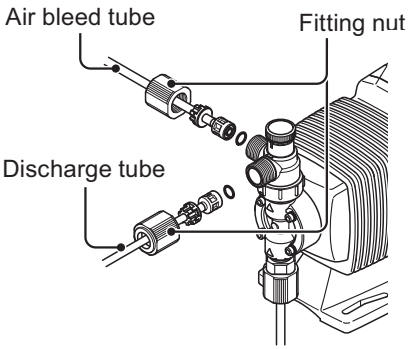
■ Discharge valve set dismantlement/assembly

Necessary tools

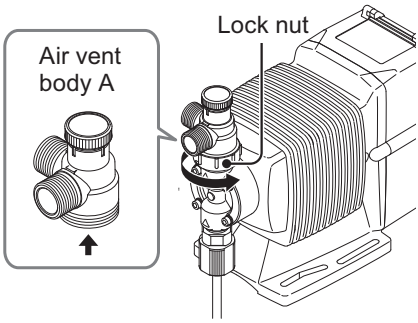
- Adjustable wrench or spanner
- 21mm box wrench
- A pair of tweezers

*Unfix the pump base before disassembly.

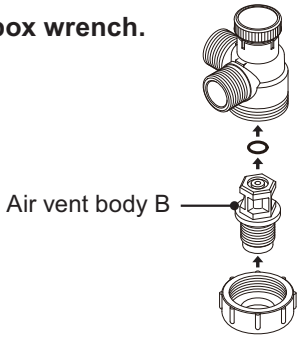
1 **Loosen the fitting nut to remove a discharge tube and an air bleed tube.**



2 **Turn the lock nut anticlockwise by an adjustable wrench and remove the air vent body A.**



3 **Remove the air vent body B by the 21mm box wrench.**



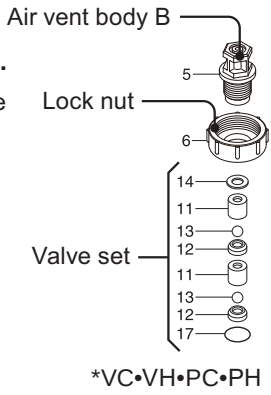
4 **Pull out the valve set by a pair of tweezers.**

5 **Place a new valve set into the pump head and screw the air vent body B through the lock nut.**

*Be careful not to misarrange the valve set or misplace upside down. Otherwise, leakage or flow rate reduction may result.

*Do not forget to fit O rings and gaskets.

*Keep the valve set free from dust or foreign matters.



*VC•VH•PC•PH

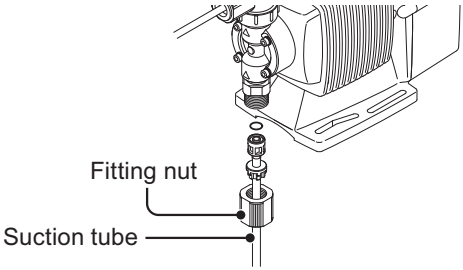
6 **Remount the air vent body A and connect tubes.**

■ Suction valve set dismantlement/assembly

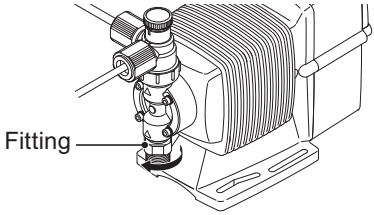
NOTE

Be careful not to drop the valve set.

1 **Remove the fitting nut to remove the suction tube.**



2 **Remove the fitting by an adjustable wrench or a spanner.**



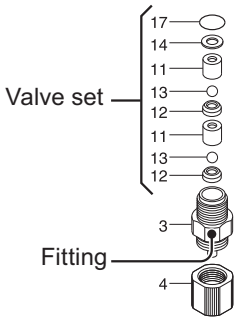
3 **Pull out the valve set by a pair of tweezers.**

4 **Hand-tighten the fitting with the valve set in it into the pump head as far as it will go. Retighten it by a further 1/4 turn with an adjustable wrench or a spanner.**

*Be careful not to misarrange the valve set or misplace upside down. Otherwise, leakage or flow rate reduction may result.

*Do not forget to fit O rings and gaskets.

*Keep the valve set free from dust or foreign matters.



*VC•VH•PC•PH

5 **Reconnect the suction tube.**

Diaphragm replacement

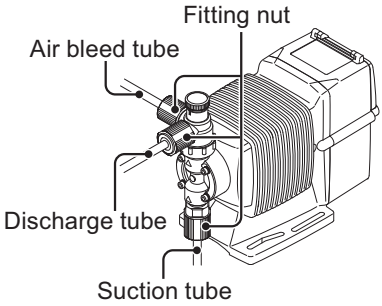
Necessary tools

- Adjustable wrench or spanner
- Hexagon wrench
- Torque wrench

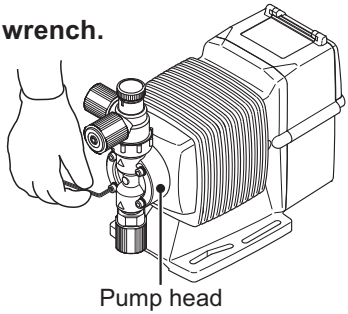
NOTE

Pay attention not to loose 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.

1 **Loosen the fitting nuts and remove a suction tube, a discharge tube and an air bleed tube.**

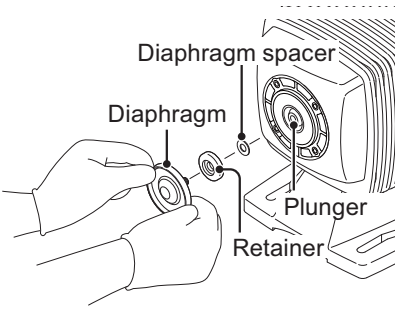


2 **Remove the pump head with a hexagon wrench.**



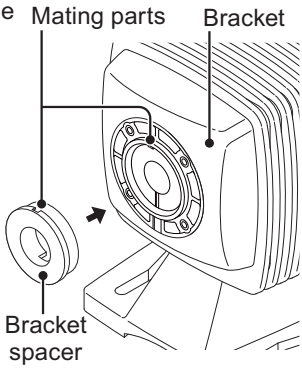
3 **Rotate and remove the diaphragm from the plunger (pump shaft).**

4 **Slide a retainer and diaphragm spacer(s) onto the screw of a new diaphragm.**



NOTE

- Fit the retainer to the diaphragm with its round edge to the diaphragm.
- Check that the bracket spacer is in place. Refit the bracket spacer into the bracket, combining mating parts as necessary.
- The B/C-31 & -36 types do not have a bracket spacer.



5 **Screw the new diaphragm into the plunger as far as it will go.**

6 **Mount the pump head.**

Tighten the pump head fixing bolts evenly to the following torque in diagonal order.

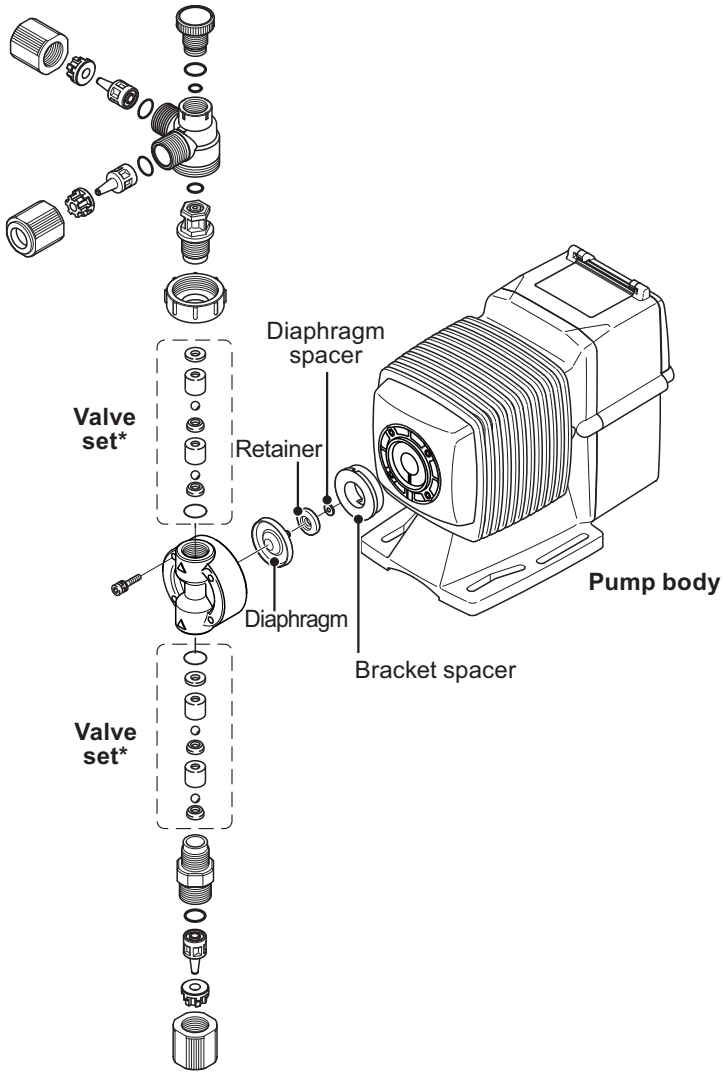
Tightening torque

Model code	Torque	Bolts
EWN-B09/-B11/-B16/-B21	2.16 N•m	M4 Hex. socket head bolt
EWN-B31	2.55 N•m	M4 Hex. socket head bolt
EWN-C16/-C21	2.16 N•m	M4 Hex. socket head bolt
EWN-C31	2.55 N•m	M4 Hex. socket head bolt
EWN-C36	2.55 N•m	M5 Hex. socket head bolt

*A hexagon wrench can be used for a torque wrench. See page 44.

Pump head, Drive unit & Control unit

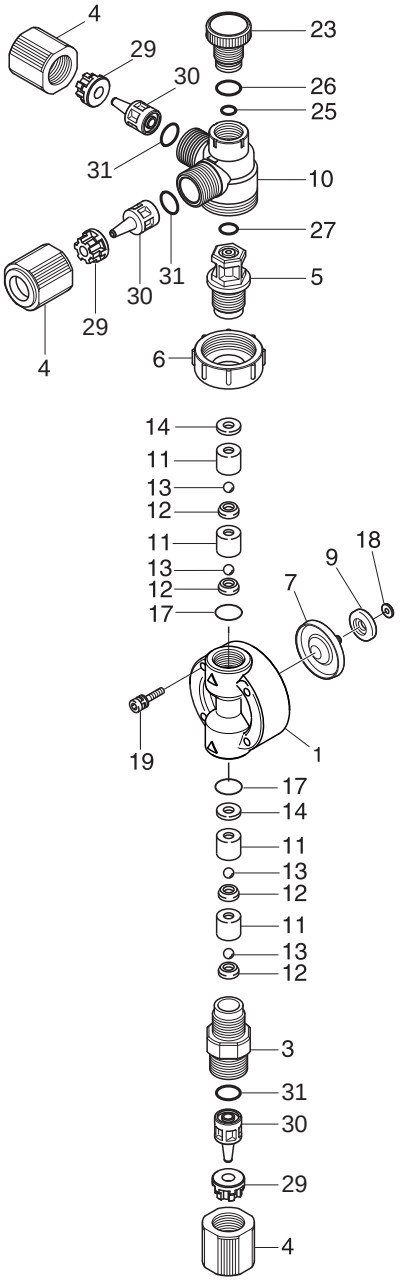
The pump in the diagram below is completely dismantled. Do not dismantle the pump beyond the extent shown in this instruction manual.



*Wet end materials and their sizes differ with models.

Pump head

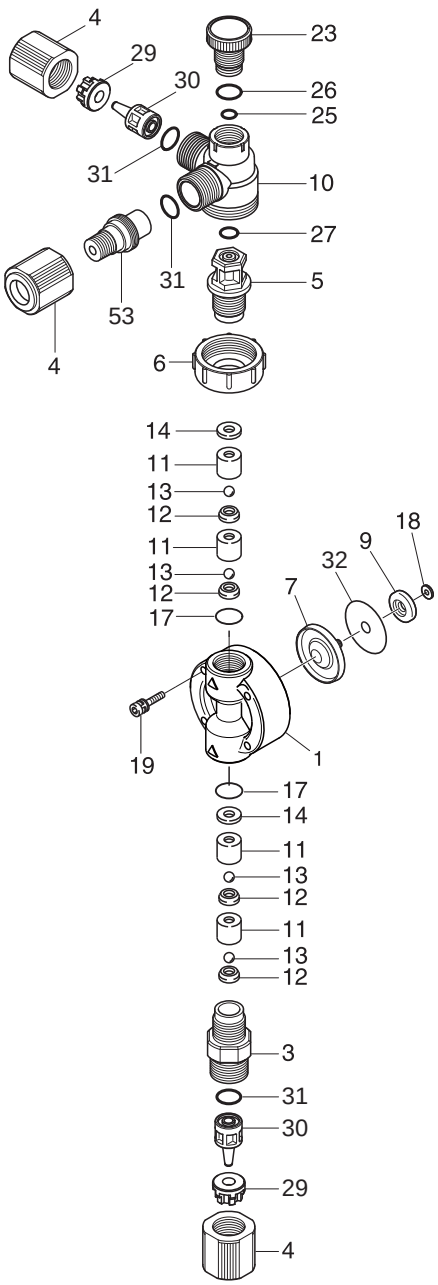
■ **EWN-□ VC/VH**



No.	Part names	# of parts
1	Pump head	1
3	Fitting	1
4	Fitting nut	3
5	Air vent body B	1
6	Lock nut	1
7	Diaphragm	1
9	Retainer	1
10	Air vent body A	1
11	Valve guide	4
12	Valve seat	4
13	Valve	4
14	Valve gasket	2
17	O ring	2
18	Diaphragm spacer	*
19	Hex. socket head bolt [PW•SW]	4
23	Adjusting screw	1
25	O ring	1
26	O ring	1
27	O ring	1
29	Hose stopper	3
30	Hose adaptor	3
31	O ring	3

*The number of diaphragm spacers varies with pump model.

■ EWN-B11/-C16 PC-H/PH-H



No.	Part names	# of parts
1	Pump head	1
3	Fitting	1
4	Fitting nut	3
5	Air vent body B	1
6	Lock nut	1
7	Diaphragm	1
9	Retainer	1
10	Air vent body A	1
11	Valve guide	4
12	Valve seat	4
13	Valve	4
14	Valve gasket	2
17	O ring	2
18	Diaphragm spacer	*
19	Hex. socket head bolt [PW•SW]	4
23	Adjusting screw	1
25	O ring	1
26	O ring	1
27	O ring	1
29	Hose stopper	2
30	Hose adaptor	2
31	O ring	3
32	Rear diaphragm seat	1
53	Fitting adapter	1

*The number of diaphragm spacers varies with pump model.

Specifications

Information in this section is subject to change without notice.

■ Pump unit

VC•VH

Model code	Flow rate L/H mℓ/min	Discharge pressure MPa	Stroke rate % (spm)	Power consumption W	Current value A	Weight kg
EWN-B11	2.28 (38)	1.0	0.1-100 (1-360)	20	0.8	2.5
EWN-B16	3.9 (65)	0.7				
EWN-B21	6.0 (100)	0.4				
EWN-B31	12.0 (200)	0.2				
EWN-C16	4.8 (80)	1.0		24	1.2	3.5
EWN-C21	7.8 (130)	0.7				
EWN-C31	16.2 (270)	0.35				
EWN-C36	25.2 (420)	0.2				

VC•VH (High compression type)

Model code	Flow rate L/H mℓ/min	Discharge pressure MPa	Stroke rate % (spm)	Power consumption W	Current value A	Weight kg
EWN-B09	0.72 (12)	1.0	0.1-100 (1-180)	20	0.8	2.5
EWN-B11	1.38 (23)	1.0				
EWN-B16	2.40 (40)	0.7				
EWN-B21	3.78 (63)	0.4				
EWN-C16	3.24 (54)	1.0		24	1.2	3.5
EWN-C21	4.68 (78)	0.7				

PC•PH (High pressure type)

Model code	Flow rate L/H mℓ/min	Discharge pressure MPa	Stroke rate % (spm)	Power consumption W	Current value A	Weight kg
EWN-B11	1.50 (25)	1.7	0.1-100 (1-240)	20	0.8	2.5
EWN-C16	2.4 (40)	1.7		24	1.2	3.5

*The above information is based on pumping clean water at rated voltage and ambient temperature.

*Flow rates were collected at the maximum discharge pressure and 360spm (VC/VH-C type: 180spm, PC/PH-H type: 240spm). A flow rate increases as a discharge pressure decreases.

*Allowable room temperature: -10 - 40°C

*Allowable liquid temperature: -10 - 40°C (-10 - 60°C for the PC•PH)

*Allowable power voltage deviation: ±10% of the rated range

*Maximum noise level: 70dB at 1m (A scale)

■ Control unit

Types		WPO	WEC	WCT
Functions	Operation mode	Operation at a manual spm		
		AUTO proportional or PID control		AUTO blowdown control
	Mode change	Key operation		
Measurement	Measuring object	pH/ORP	Conductivity	
	Measurement range	0.00 - 14.00pH -2000 - 2000mV	0 - 400mS/m	
	Calibration	AUTO (1 or 2Pt calibration) MAN (1 or 2Pt calibration)	Cell constant setting Reading correction	
	Temp. compensation	AUTO Pt1000 (0 - 50°C) MAN (fixed)		
Keypad		SET, CAL, ESC, START/STOP, UP, DOWN		
Control functions	STOP	Operation stop at contact input[*1]		
	Interlock	Operation stop at contact input[*1]		
	Priming	Max spm operation by pressing the UP and DOWN keys		
	Keypad lock	Keypad lock and release		
Monitors	LCD	7×4, 14×4 backlit LCD indicates information such as measured values, operating conditions and units		
	LED	ON Green/Orange ×1 Lights green as powered on. Lights green while ready for operation Flash green during operation STOP Red/Orange ×1 Lights red at STOP signal input Lights orange at PreSTOP signal input OUT Red ×2 Lights at each output		
Input	STOP/PreSTOP	No voltage contact or Open collector[*2]		
	AUX	No voltage contact or Open collector[*2]		
	Interlock	No voltage contact or Open collector[*2]		
Output	OUT1	No voltage contact (mechanical relay) 250VAC, 3A(resistance load) Upper/Lower/Batch[*3] alarm are settable. (Factory default is: Upper alarm)		Open collector For blowdown control only Used with a relay type multibox)[*5]
	OUT2	No voltage contact (photoMOS) 24VAC/DC 0.1A Upper/Lower/Batch[*3]/Synchronous alarm are settable. (Factory default: Batch alarm turns on at STOP signal input)		
Buffer		Nonvolatile memory		
Power voltage[*4]		100-240VAC 50/60Hz		

*1 Operation resumption at contact input is also programmable.
*2 The maximum applied voltage is 12V at 2.3mA. The minimum application load should be 2.3mA or below when using a relay.
*3 Interlock, STOP, PreSTOP, AUX and Sensor failure can be set to the batch alarm at once.
*4 Observe the allowable voltage range of 90-264VAC. Otherwise failure may result.
*5 The contact capacity of the multibox (relay type) is 250VAC 3A(resistive load)

■ Power cable

WPO/WEC type

Conduction section area	0.75 [mm^2] Triplex cable(L/N/PE)	Standard	H03VV-F
Length	1950 [mm]	Terminal treatment	European plug

WCT type

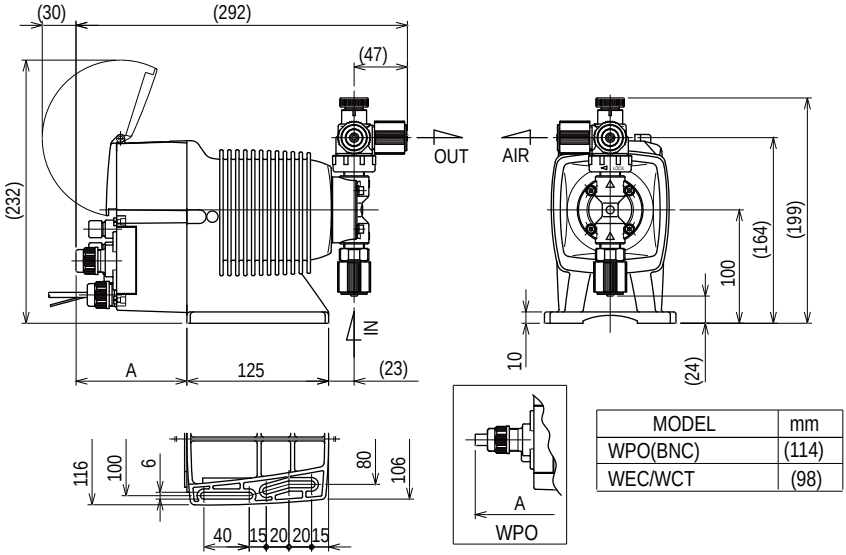
Conduction section area	0.75 [mm^2] Triplex cable(L/N/PE)	Standard	H03VV-F
Length	1950 [mm]	Terminal treatment	Power: Spade terminal (V1.25-YS4A or equivalent) Earth: Bare wire

■ Pump colour

Blue	Munsell colour system 7.5PB 3/8
Red	Munsell colour system 5R 3/10

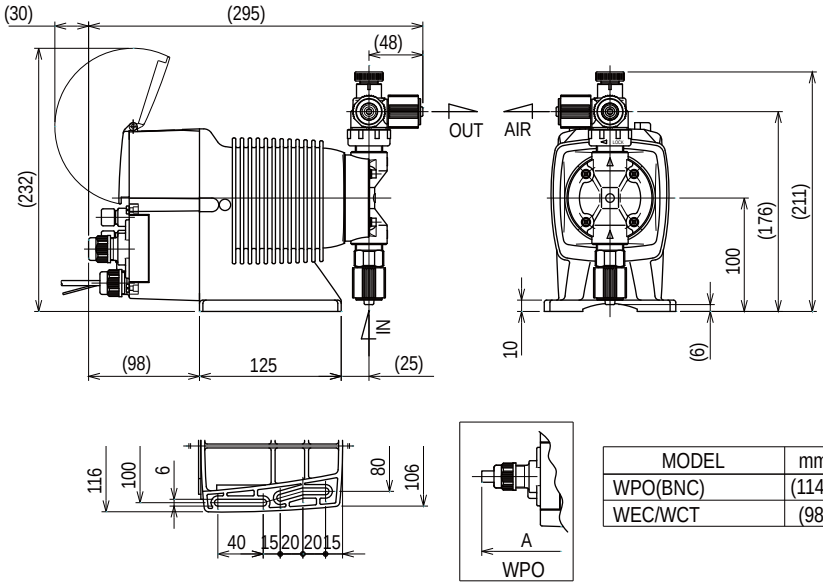
Outer dimensions

■ EWN-B09/-B11/-B16/-B21/-C16/-C21 VC-C/VH-C



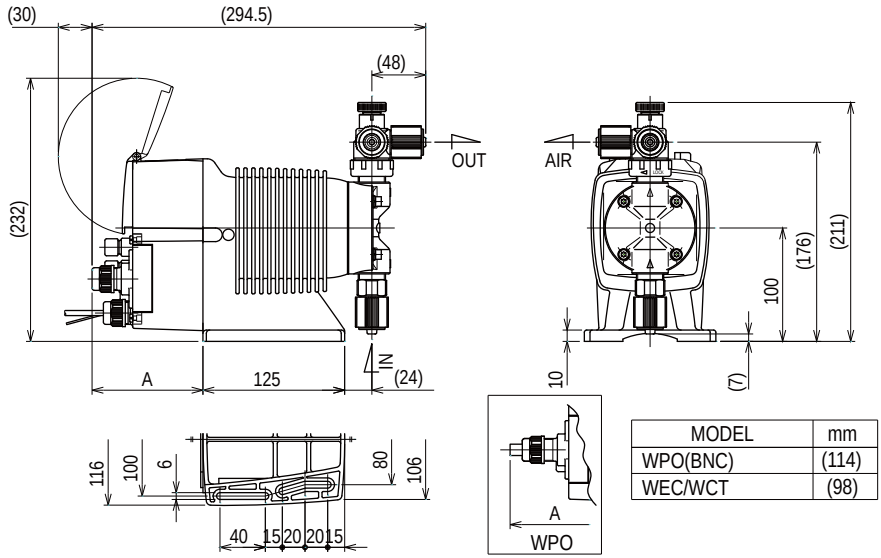
MODEL	mm
WPO(BNC)	(114)
WEC/WCT	(98)

■ EWN-B31/-C31 VC/VH



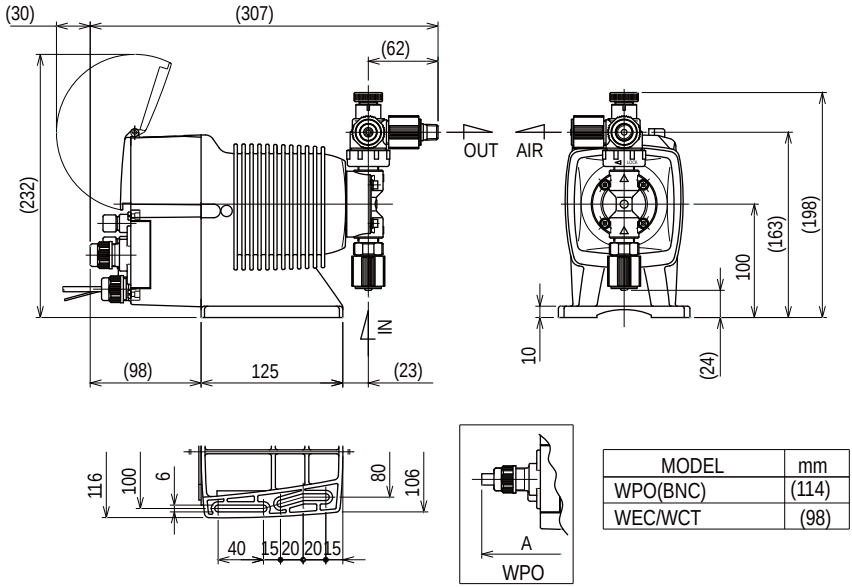
MODEL	mm
WPO(BNC)	(114)
WEC/WCT	(98)

■ EWN-C36 VC/VH



MODEL	mm
WPO(BNC)	(114)
WEC/WCT	(98)

■ EWN-B11/-C16 PC-H/PH-H



MODEL	mm
WPO(BNC)	(114)
WEC/WCT	(98)

EC DECLARATION OF CONFORMITY

ORIGINAL VERSION

(SUPPLIER'S NAME)

WE

IWAKI CO.,LTD.

(ADDRESS)

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(PRODUCT)

DECLARE UNDER OUR SOLE RESPONSIBILITY THAT THE PRODUCTS

ELECTROMAGNETIC METERING PUMP

(MODEL NAME)

EWN SERIES

TO WHICH THIS DECLARATION RELATES ARE IN CONFORMITY WITH THE FOLLOWING STANDARDS OR DIRECTIVES AS FAR AS APPLICABLE

(DIRECTIVES)

MACHINERY DIRECTIVE 2006/42/EC (ANNEX IIA)
EMC DIRECTIVE 2014/30/EU
RoHS DIRECTIVE 2011/65/EU

(STANDARDS)

EN ISO12100	EN61000-6-2	EN50581
EN809	EN61000-6-3	

(A PERSON WHO IS AUTHORISED TO COMPILE THE TECHNICAL FILE IN THE COMMUNITY)

IWAKI EUROPE GMBH
SIEMENSRING 115 D-47877 WILLICH GERMANY

NOTE: THIS DECLARATION BECOMES INVALID IF TECHNICAL OR OPERATIONAL MODIFICATIONS ARE INTRODUCED WITHOUT THE MANUFACTURER'S CONSENT.

K. Nishikubo

KAZUNARI NISHIKUBO

SENIOR GENERAL MANAGER, QUALITY ASSURANCE HEAD OFFICE

Tokyo, Apr. 5, 2018

(PLACE AND DATE OF ISSUE) **(NAME AND SIGNATURE OR EQUIVALENT MARKING OF AUTHORIZED PERSON)**

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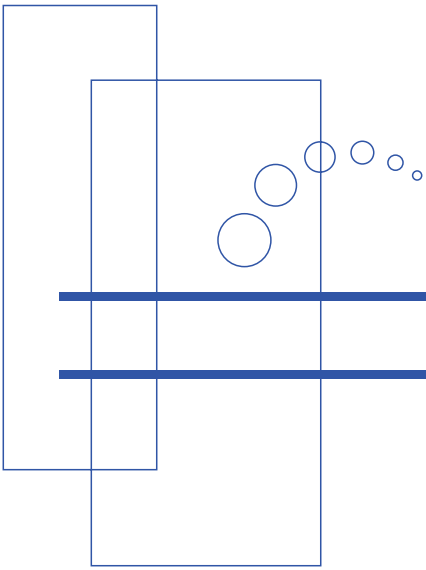

IWAKI PUMPS

http://www.iwakipumps.jp

IWAKI CO.,LTD. 6-6 Kanda-Sudacho 2-chome Chiyoda-ku Tokyo 101-8558 Japan
TEL: +81 3 3254 2935 FAX: +81 3 3252 8892

European office / IWAKI Europe GmbH
TEL: +49 2154 9254 0 FAX: +49 2154 9254 48

Germany / IWAKI Europe GmbH
TEL: +49 2154 9254 50 FAX: +49 2154 9254 55

Holland / IWAKI Europe GmbH (Netherlands Branch)
TEL: +31 74 2420011 FAX: +49 2154 9254 48

Italy / IWAKI Europe GmbH (Italy Branch)
TEL: +39 0444 371115 FAX: +39 0444 335350

Spain / IWAKI Europe GmbH (Spain Branch)
TEL: +34 93 37 70 198 FAX: +34 93 47 40 991

Belgium / IWAKI Belgium N.V.
TEL: +32 13 670200 FAX: FAX: +32 13 672030

Denmark / IWAKI Nordic A/S
TEL: +45 48 242345 FAX: +45 48 242346

Finland / IWAKI Suomi Oy
TEL: +358 9 2745810 FAX: +358 9 2742715

France / IWAKI France S.A.
TEL: +33 1 69 63 33 70 FAX: +33 1 64 49 92 73

Norway / IWAKI Norge AS
TEL: +47 23 38 49 00 FAX: +47 23 38 49 01

Sweden / IWAKI Sverige AB
TEL: +46 8 511 72900 FAX: +46 8 511 72922

U.K. / IWAKI Pumps (U.K.) LTD.
TEL: +44 1743 231363 FAX: +44 1743 366507

U.S.A. / IWAKI America Inc.
TEL: +1 508 429 1440 FAX: +1 508 429 1386

Argentina / IWAKI America Inc. (Argentina Branch)
TEL: +54 11 4745 4116

Singapore / IWAKI Singapore Pte Ltd.
TEL: +65 6316 2028 FAX: +65 6316 3221

Indonesia / IWAKI Singapore (Indonesia Branch)
TEL: +62 21 6906606 FAX: +62 21 6906612

Malaysia / IWAKIm SDN. BHD.
TEL: +60 3 7803 8807 FAX: +60 3 7803 4800

Australia / IWAKI Pumps Australia Pty Ltd.
TEL: +61 2 9899 2411 FAX: +61 2 9899 2421

China (Hong Kong) / IWAKI Pumps Co., Ltd.
TEL: +852 2607 1168 FAX: +852 2607 1000

China (Guangzhou) / GFTZ IWAKI Engineering & Trading Co., Ltd.
TEL: +86 20 84350603 FAX: +86 20 84359181

China / IWAKI Pumps (Shanghai) Co., Ltd.
TEL: +86 21 6272 7502 FAX: +86 21 6272 6929

Korea / IWAKI Korea Co., Ltd.
TEL: +82 2 2630 4800 FAX: +82 2 2630 4801

Taiwan / IWAKI Pumps Taiwan Co., Ltd.
TEL: +886 2 8227 6900 FAX: +886 2 8227 6818

Thailand / IWAKI (Thailand) Co., Ltd.
TEL: +66 2 322 2471 FAX: +66 2 322 2477

Vietnam / IWAKI Pumps Vietnam Co., Ltd.
TEL: +84 613 933456 FAX: +84 613 933399

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