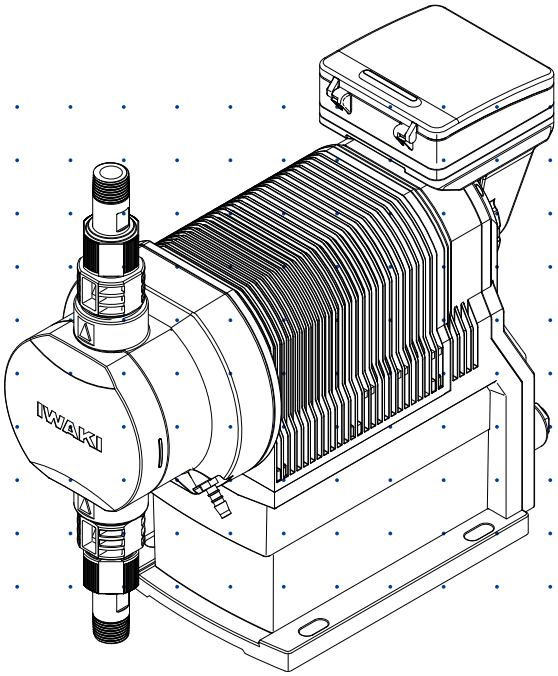
Hi-Techno Pump

IX-C series



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.

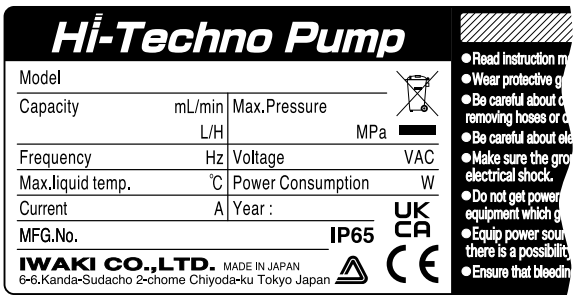
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Order confirmation

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.



The CE/UKCA markings on our product(s) are for us to market the product(s) into the European Union market / the Great Britain (England, Wales and Scotland) market, however, the CE/UKCA markings do not ensure any safety or conformity of the product(s) outside the EU/GB markets. When the pump is incorporated into the equipment marketed in the EU/GB markets, such equipment must meet all the requirements of applicable directives/regulations. In such a case, any person who places the equipment on the markets must carry CE/UKCA marks on the equipment as a manufacturer.

b. Check if the delivery is damaged or deformed.

Check for transit damage and loose bolts.

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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” and specific “Requirement”.

Caution marks



Caution



Electrical shock

Prohibition mark



Prohibition



Do not remodel

Requirement mark



Requirement



Wear protectors



Earthing

⚠ 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


Electrical shock

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.


Requirement

Stop operation

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


Prohibition

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.


Do not remodel

Do not modify the pump

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


Wear protectors

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 SDS precautions from the solution supplier.


Prohibition

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.


Prohibition

Do not operate the pump in a flammable atmosphere

Do not place explosive or flammable material near the pump.

⚠CAUTION


Requirement

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 management of the pump.


Prohibition

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.


Prohibition

Keep electric parts and wiring dry

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


Caution

Ventilation

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


Prohibition

Do not install/store the pump:

- In a flammable/corrosive atmosphere.
- In a dusty/humid environment.
- Where ambient temperature can exceed 0-50°C (32-122°F).
- In direct sunlight or wind & rain.


Requirement

Spill precautions

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


Prohibition

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.


Earthing

Grounding

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


Electrical shock

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.


Requirement

Preventative maintenance

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


Prohibition

Do not use a damaged pump

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


Requirement

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.


Caution

Check pump head bolts

Liquid may leak if any of the M8 or M5 pump head bolts become loose. Remove the bolt cover and tighten the bolts diagonally and evenly by the following torque before initial operation and at regular intervals.

Tightening torque

Model code	Torque	Bolts	Number of bolts
IX-C150	12 N•m	M8 hexagon head bolt	8
IX-C060	3.5 N•m	M5 hexagon head bolt	6


Prohibition

Do not close discharge line during operation

Solution may leak or pump and piping may break. Install a relief valve to ensure safety and prevent damaged plumbing.


Caution

Do not touch the pump or pipe with bare hands

Risk of burns. The surface temperature of the pump or piping becomes very high during and immediately after operation, depending on the liquid temperature.

Precautions for use

- Electrical work should be performed by a qualified electrician. Otherwise, personal injury or property damage may 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 0-50°C (32-122°F).


Requirement

- Select a level location, free from vibration, that won't hold liquid. Anchor the pump with four M8 bolts so it doesn't vibrate. If the pump is not installed level, output may be affected.


Requirement

- 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.


Requirement

- 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

- The suction line I.D. should be equal to or wider than the I.D. of the pump.


Requirement

- Build up a flooded suction system for the viscous liquid delivery of 300mPa•s or more.


Requirement

- Use measures to keep the pump connections free from stress. Weight and thermal expansion/contraction of the piping can stress connection points.


Caution

- Overload protection will stop pump operation when discharge pressures reach 1.3 to 2.0 times higher than the pump maximum. If the discharge line cannot conservatively handle the maximum pressure, use a relief valve to safely depressurize the discharge line.


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.


Caution

- 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.


Caution

- 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.


Requirement

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


Caution

- 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.



- In accordance with the European Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), this product features the crossed-out wheelie bin symbol. When this product is disposed of in household wastes, toxic components included in it can cause major environmental and human health problems. Use appropriate waste collection systems for recovery and recycling. Contact your local distributor or nearest Iwaki company for the detailed collection systems.



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

Introduction

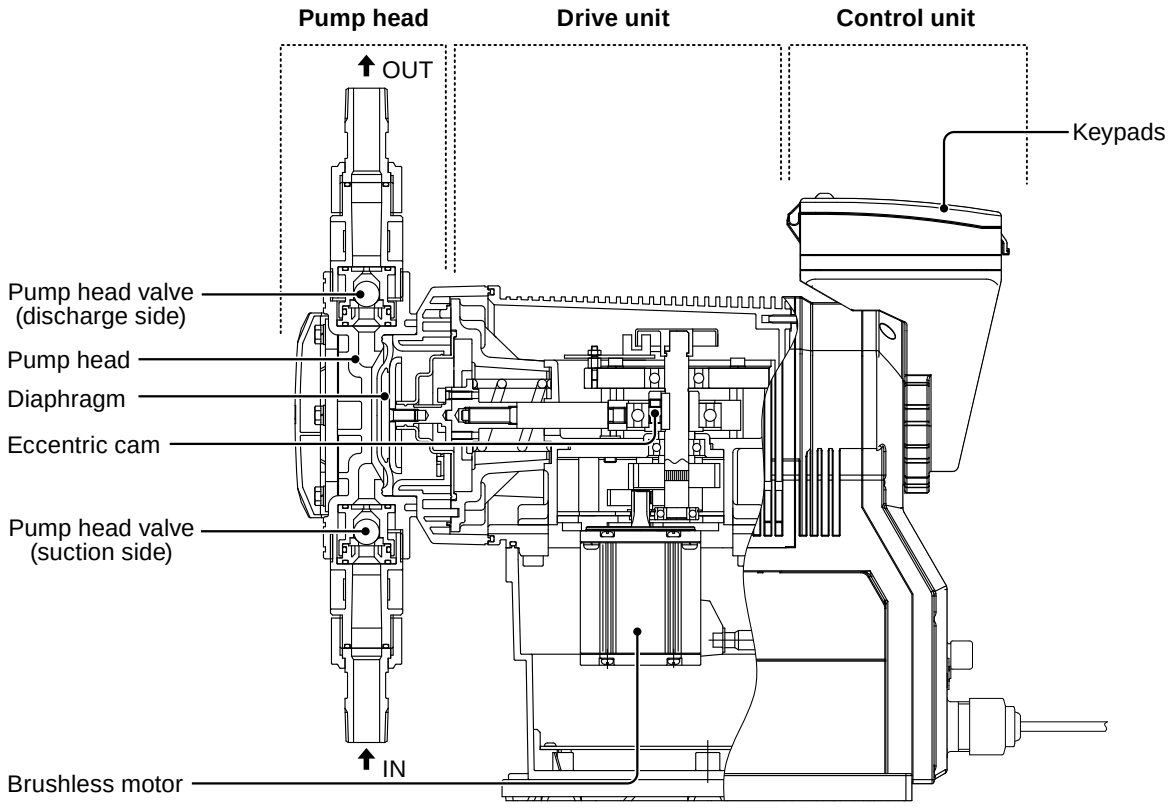
Pump structure & Operating principle

The IX series are diaphragm pumps with a brushless DC (BLDC) motor and feature a high turndown ratio & automatic controls.

Principle of operation

In the IX series design, a BLDC motor rotation controls the flow rate.

Motor rotation is transmitted to an eccentric cam through a reduction gear and then converted to reciprocating motion. Volumetric change occurs in the pump chamber as the diaphragm moves back and forth and liquid is pumped because of the suction and discharge check valves. Discharge speed changes the flow rate while the suction speed remains the same at any flow rate.



Features

● High turndown ratio

Use of a BLDC control motor enables accurate control with a wide turndown ratio.

● High repeatability

Highly-efficient valve design and accurate discharge-/suction-speed controls assure the high repeatability of chemical dosing (±1%).

● Energy-saving design

Use of helical gears and an assist spring reduces power consumption.

● Automatic control

The IX can automatically run along with analogue-, pulse-, batch- or interval batch-operation setting.

● Multivoltage operation

The IX series can be used in all countries thanks to the universal power voltage (100-240VAC).

● Safety design

A diaphragm rupture detection ensures user safety and a pressure overload detection protects the pump and pipework from an accidental discharge line pressure rise.

● Ingress protection rating of IP65

● User-friendly design

The rear case itself as well as the operation panel can be turned around to the best position.

● Fool-proof design (valve set)

The fool-proof design prevents the valve set installed upside down which upsets the pump operation.

● LED bar

The large LED bar on the control unit assists in knowing various operating status and alarm conditions.

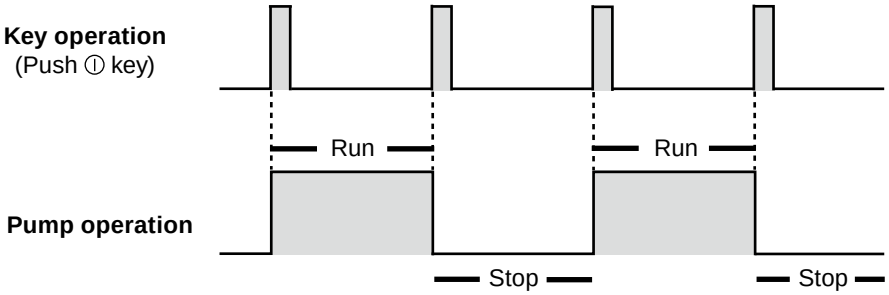
● Flow monitoring (pumps with the "Y" flow monitoring code)

The internal sensor monitors pressure, which serves multiple purposes:
Pressure tracking: Pressure data is used to estimate and monitor the pump's flow rate.
Feedback control: The system adjusts motor speed based on pressure readings to maintain the desired flow rate.
Gas detection: Abnormal pressure patterns help identify conditions where gas generated from volatile liquids is interfering with pump operation, as well as air entering from the suction piping and its connection points.

Operational functions

Manual mode

Run/stop the pump by key operation. The flow rate can be changed with the up and the down keys at any time during operation or stop. The green LED bar lights during operation. See page 69 for details.

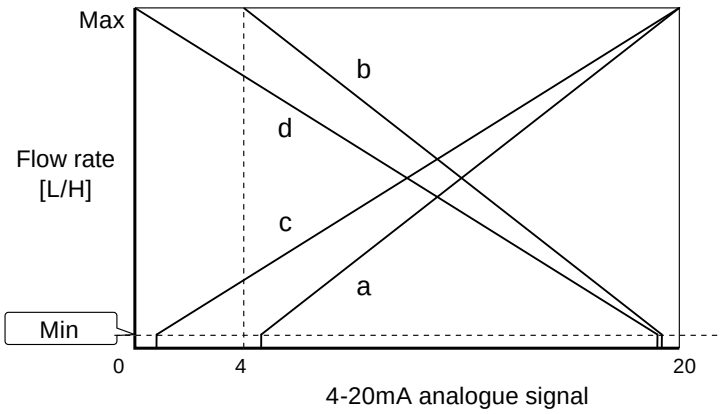


EXT mode

■ Analogue proportional control

ANA. P (analogue preset) setting (see pages 51 & 70)

Select a proportional control pattern. 4 - 20mA, 20 - 4mA, 0 - 20mA and 20 - 0mA are available. During operation, the display shows the current flow rate. To show the current value, push the → key. To return to the flow rate display, push the ← key.



The left graph shows the flow rate at each pattern.

a. 4 - 20mA

b. 20 - 4mA

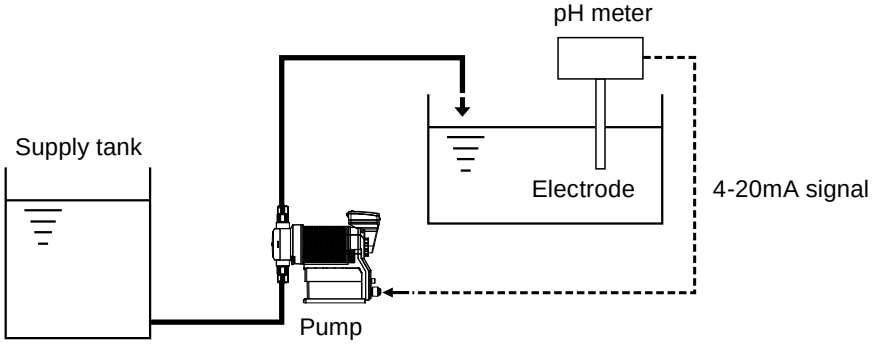
c. 0 - 20mA

d. 20 - 0mA

The flow rate falls to 0mL/H if the pump runs beneath the minimum rate.

The pump does not run over the maximum flow rate at any current value.

Example of use: pH control in a water treatment system



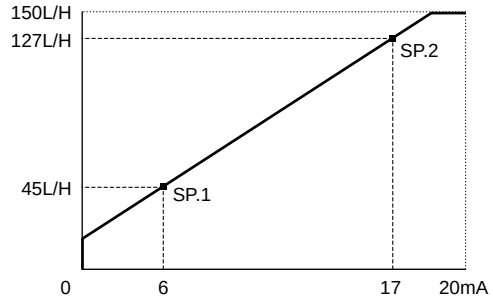
ANA. V (analogue variable) setting (see pages 51 & 70)

The pump increases/decreases a stroke/flow rate in proportion to 0-20mA. Determine the operational behaviour by setting two set points and choosing one of the LINEAR, BOX and LIMIT patterns.
To show the current value, push the → key. To return to the flow rate display, push the ← key.

<LINEAR>

A stroke/flow rate changes with a current value by a set line.

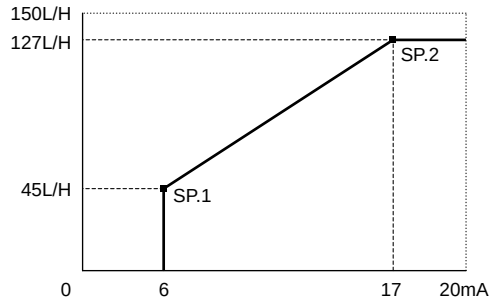
Condition:
Set Point 1 (SP.1) = Ampere: 6mA, Flow rate: 45L/H
Set Point 2 (SP.2) = Ampere: 17mA, Flow rate: 127L/H



<BOX>

A stroke/flow rate changes with a current value by a set line. The rate does not exceed the Set Point 2 but then falls to 0 before the Set Point 1.

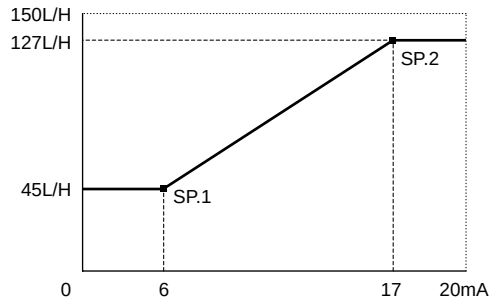
Condition:
Set Point 1 (SP.1) = Ampere: 6mA, Flow rate: 45L/H
Set Point 2 (SP.2) = Ampere: 17mA, Flow rate: 127L/H



<LIMIT>

A stroke/flow rate changes with a current value by a set line. The rate does not fall below the Set Point 1 or exceed the Set Point 2.

Condition:
Set Point 1 (SP.1) = Ampere: 6mA, Flow rate: 45L/H
Set Point 2 (SP.2) = Ampere: 17mA, Flow rate: 127L/H

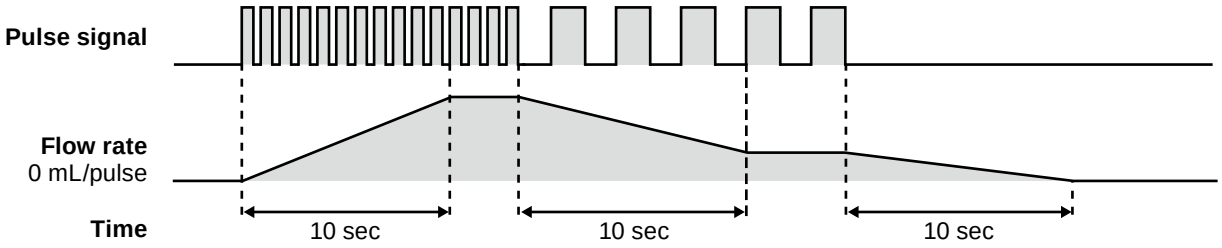


■ Pulse control

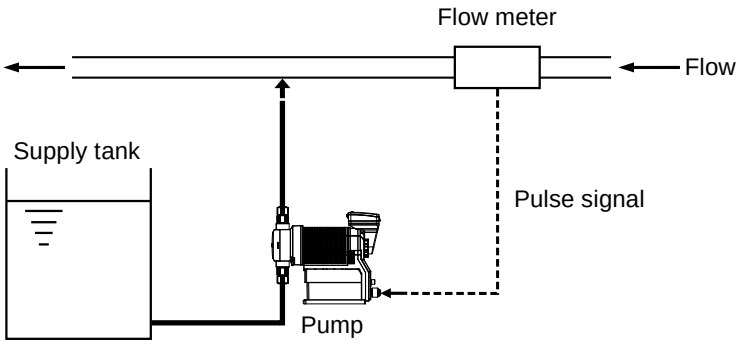
(See pages 51 & 70.)

The flow rate is automatically controlled by the flow volume (mL) per pulse and the pulse signal frequency from a flow meter.

It takes about 10 seconds for the IX to catch up with the change of the frequency. In other words, the pump stops 10 seconds after the pulse signal is stopped. Use the external interlock (or stop) signal to turn off the pump with no delay.



Example of use: Chemical dosing in a sewage treatment system



■ Batch control

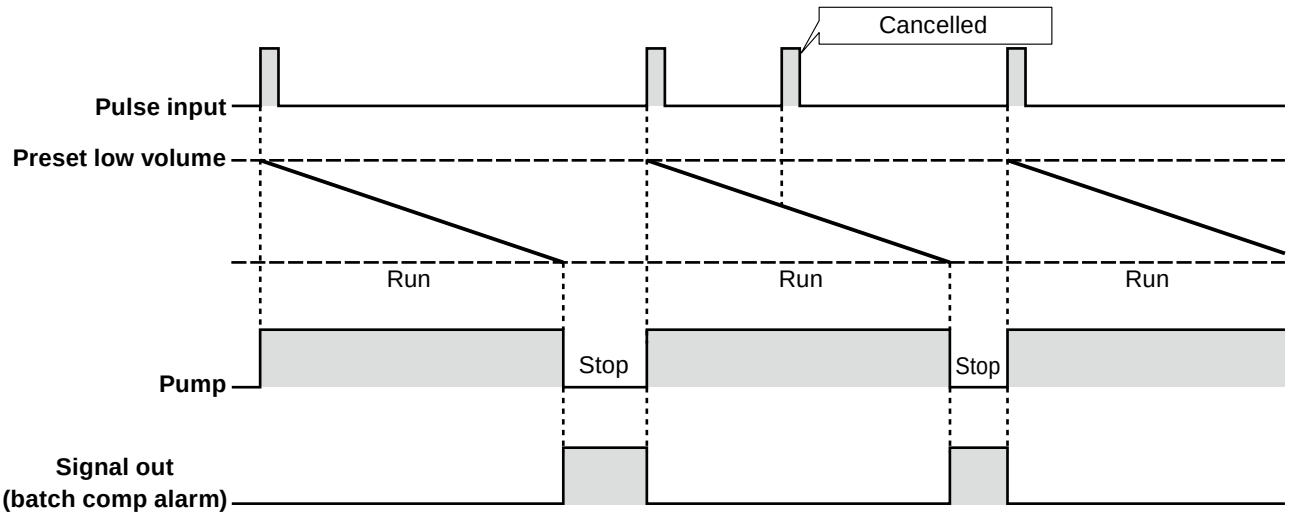
(See pages 51 & 70.)

The IX discharges a preset flow volume per pulse and stops when it is completed. The preset or remaining flow volume is shown on the controller until it has reduced to zero. In this control mode, the pump runs at the MAN speed (the pump speed in the manual mode). The pump behaviour can change depending on the setting of the buffer. See below.

When the buffer is OFF:

Any input of the external pulse signal will be cancelled when the pump is activated for the earlier pulse input. The next dosing becomes ready after the preset flow volume has been completed.

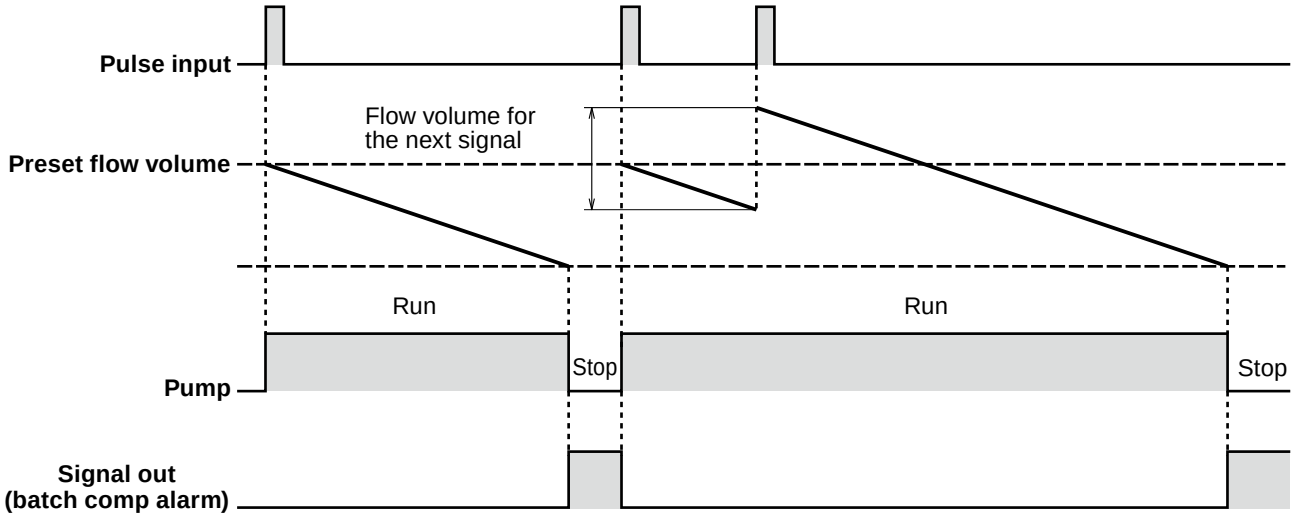
Note the control stops immediately when the ⏻ key is pushed once.



When the buffer is ON:

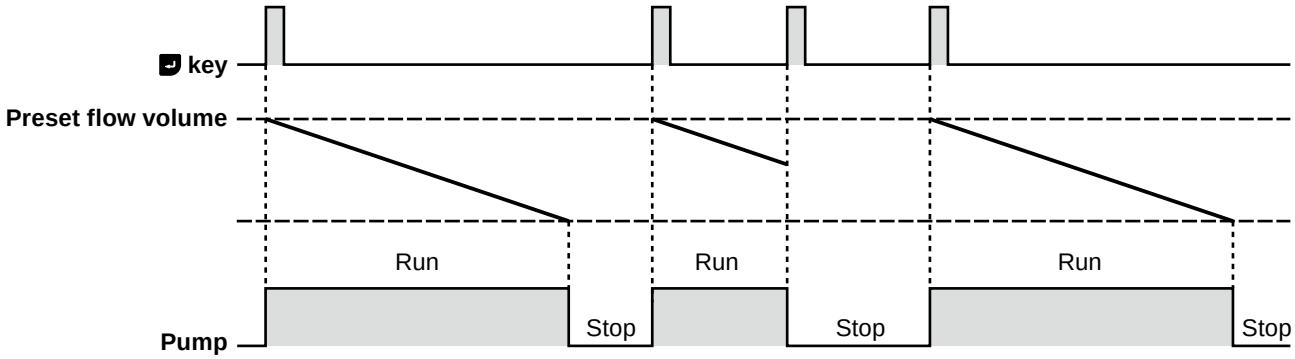
Every time the external pulse signal is input, the preset flow volume per pulse is accumulated (max 65535 pulses) even when the pump is activated for the earlier pulse input.

The control stops immediately and all the pulse accumulation is cleared when the ⓘ key is pushed once.

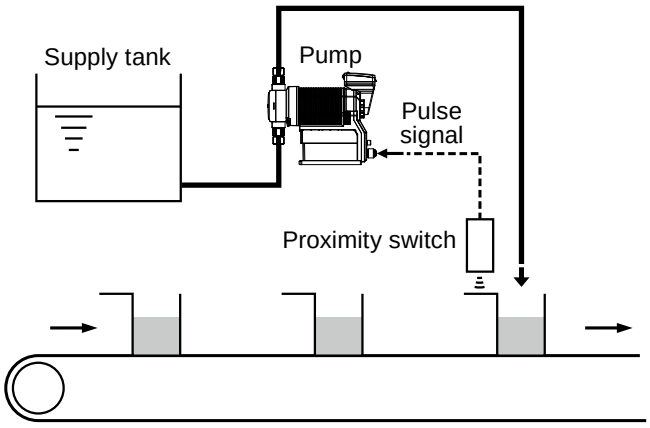


Pulse input with the ↵ key:

Instead of the pulse signal input, pushing the ↵ key can start or stop the batch control. In this case, the pump behaves as the control with the buffer OFF even when the buffer is set to ON in the batch control mode.



Example of use: Chemical dosing in a production line system

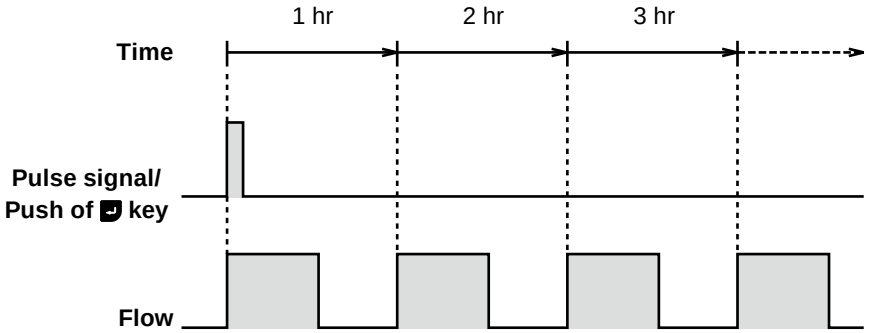


■ Interval batch control

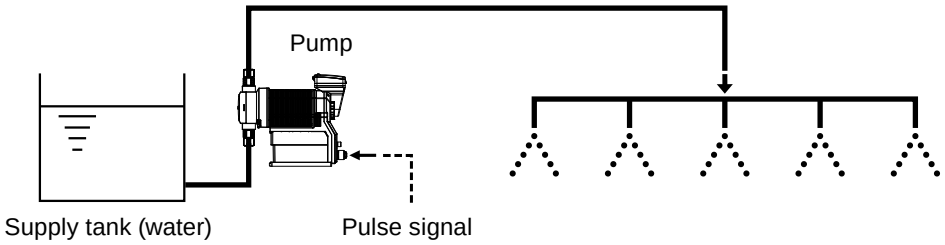
(See pages 51 & 70.)

To make an interval batch control, set a date and time interval and the flow volume. The IX discharges the pre-set flow volume at a set interval. In the diagram below, the interval is set to 1 hour.

The pump runs at the MAN speed. The control is triggered by either the external pulse signal or the push of the ↵ key. Push the ⏻ key to stop the control when it is triggered by the ↵ key.



Example of use: Water transfer for a sprinkler system



■ Modbus communication

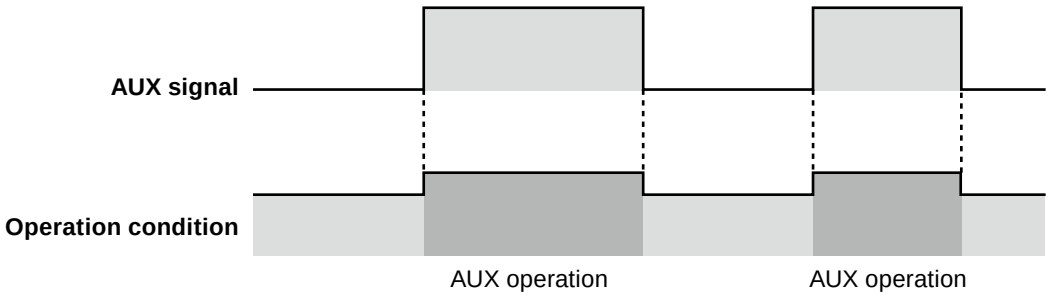
(See page 51.)

The master (PC or PLC) controls the slaves (IX-C pumps) via MODBUS-RTU communication over an RS-485 cable.

AUX function

The pump runs at the AUX speed while receiving the external signal via the AUX terminal. See page 70.

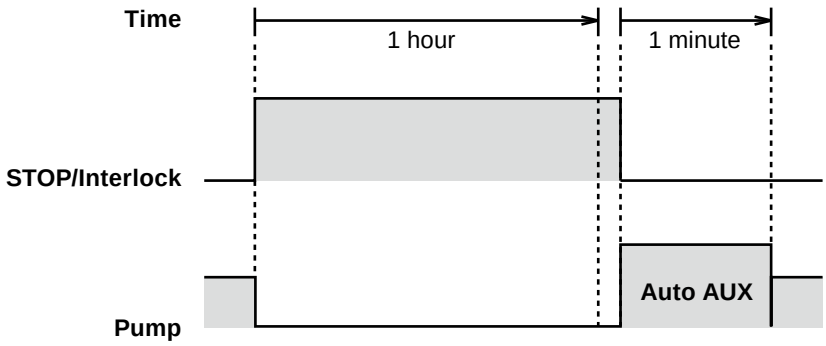
This function works only when the pump is running in either MAN or EXT mode (see page 49.). The pump returns to the MAN or EXT mode once the AUX signal stops.



■ Auto AUX

If pump operation is suspended by a STOP signal or an Interlock signal from an external device, and the suspension time exceeds the user-settable Auto AUX Off time, the pump will automatically resume operation for the user-settable Auto AUX Run time immediately after the STOP or Interlock signal is cleared.
This function operates when the pump is running in either MAN or EXT mode. An AUX signal from an external device is not required to trigger the function. If the Auto AUX Run time is set to zero seconds, the function is disabled.
Use this function when repriming the pump to initiate full operation after a prolonged system shutdown.

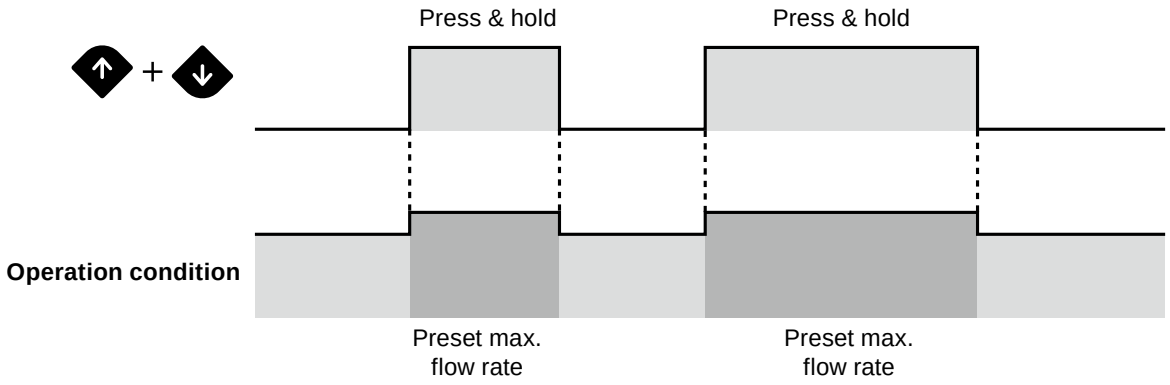
Condition:
Stop time: 1 hour
Restart duration: 1 minute



Priming function

The pump runs at the preset maximum flow rate (or the maximum stroke rate with the factory default setting) while both the UP and DOWN keys are pressed. Use this function for priming or degassing. The pump returns to normal flow rate after both the keys are released. See page 71 for details.

This function is available at any time when the pump is in a wait mode or in an operation mode (see page 49.).



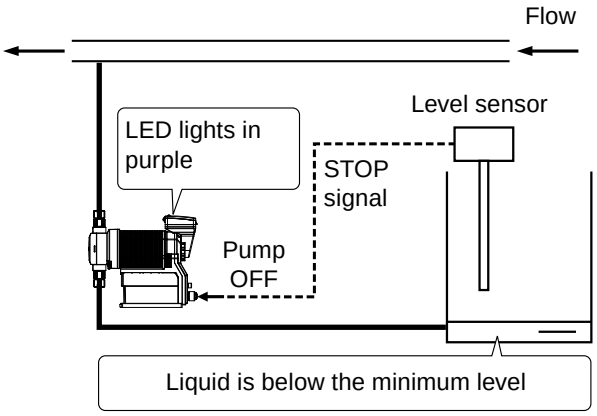
STOP functions

■ STOP function

(See page 56.)

The start/stop of operation can be controlled with the signal from a level sensor. The LED bar changes from orange to purple colour when the pump is receiving the STOP signal from a level sensor in operation.
See the “STOP IN” paragraph on page 38 for wiring diagram.

Example of use: Liquid level monitoring



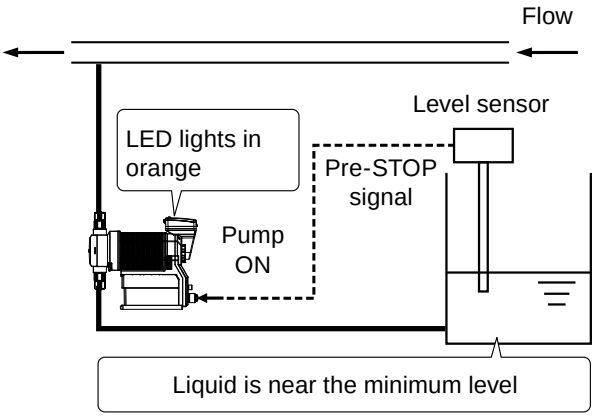
The pump stops when liquid has fallen below the minimum level.

■ Pre-STOP function

(See page 56.)

The liquid level in the supply tank can be monitored with the signal from a level sensor. The LED bar changes from green to orange colour when the pump is receiving the Pre-STOP signal from a level sensor in operation.
See the “STOP IN” paragraph on page 38 for wiring diagram.

Example of use: Liquid level monitoring



The orange LED bar lights to inform a user that liquid comes close to the minimum level in a supply tank.

Flow monitoring

The internal sensor monitors pressure to estimate the flow rate, perform feedback control, and detect the existence of gas.

*This function is available only on pumps with the 'Y' flow monitoring code.
*This function is disabled by default when shipped from the factory. Enable the function and configure the parameters before use.
*The pressure measurement/display range is 0.10 to 1.00 MPa (C060) or 0.05 to 0.40 MPa (C150).

Pressure tracking

(See page 57.)

Pressure data is used to estimate and monitor the pump's flow rate.

■ Feedback control

(See page 57.)

The system adjusts motor speed based on pressure readings to maintain the desired flow rate under conditions of pressure fluctuation.

■ Gas detection

(See page 67.)

Abnormal pressure patterns are used to identify conditions where gas generated from volatile liquids is interfering with pump operation, as well as air entering from the suction piping and its connection points. When detected, a notification appears on the pump's display.



You can also configure parameters to output an alarm signal to an external device. (Gas detection is not available in Batch control mode, Interval batch control mode, or Communication control mode.)

Protective functions

■ Interlock function

(See pages 38 & 56.)

The interlock function works in the same way as the STOP function. Use this function for an emergency stop.

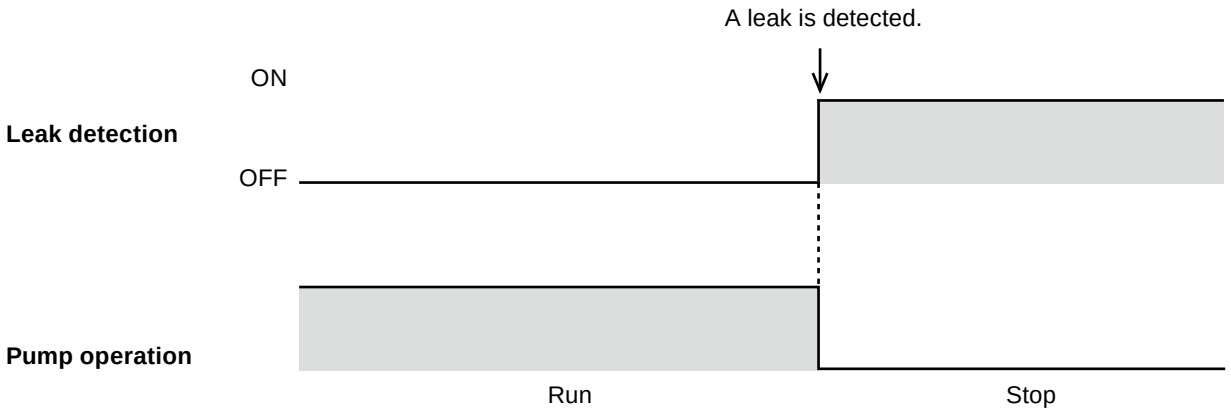
■ Diaphragm rupture detection

(See page 56.)

The pump stops right after a built-in sensor detects a leak in the compartment at the back of the diaphragm. In this condition, the red LED bar will flash. Replace a broken diaphragm as necessary. See page 80 for diaphragm replacement. To release this error condition, push the start/stop key.

NOTE

- This capacitance sensor does not work properly if liquid conductivity is 2 mS/m or below. Before sending pure water, oil or any other low-conductivity liquid, check the conductivity to see if it meets the minimum detection level. If it is not satisfied, a leak from the drain port is the only valid indicator. In either case, replace the diaphragm immediately when a leak is found.
- When the liquid temperature is much lower than the room temperature where the pump is installed, condensed water can build up in the compartment at the back of the diaphragm and the built-in leak sensor there can stop the pump even when no leak has occurred. Reduce the temperature difference between the liquid temperature and the room temperature or disable the “Leak Detection” option to remove this issue.



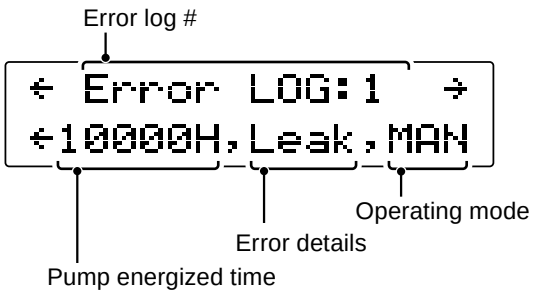
■ Error log

(See page 64.)

The pump’s controller stores information for the last 10 errors.
Each error log includes:

- Error log number
- Total pump energized time at the time of the error
- Error details
- Operating mode in which the error occurred

Also, when the error log is displayed, the green LED bar blinks.



■ Maintenance time notification

(See pages 68 and 76.)

When a specified operating time is reached, the Maintenance Alert message will appear to prompt you to perform pump maintenance.

```
MaintenanceAlert
ESC Key 3s=Clear
```

This message can appear when the pump is in MAN/EXT selection mode, MAN/EXT Run mode, or Stop mode.

*Once the message appears, the cumulative operating time for this alert is reset, and a new countdown will begin.

■ Failed rotation control detection (DRIVE ERROR!)

(See pages 60 and 62.)

This message appears when the hall IC which monitors the motor rotation has failed.

■ Pressure-overload detection (MOTOR OVERLOAD)

The pump stops and the red LED bar flashes when the controller circuit board detects a discharge pressure that is 1.3 to 2.0 times higher than the maximum allowable level.

Depending on the user settings, the suspended pump operation may automatically resume, and the pump will continue running in MAN or EXT mode under one of the following two recovery modes:

Recovery count mode

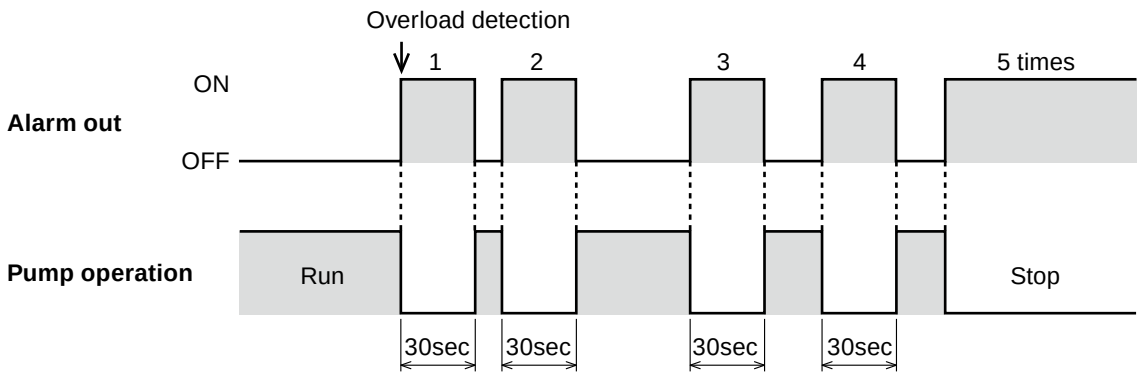
If the pump is suspended due to pressure overload detection, it will resume operation 30 seconds later. However, once the number of pressure overload detections reaches the user-defined limit (1 to 10 consecutive times), the pump will remain stopped and will not resume automatically.

For example:

If the allowable maximum suspended operation count is set to 5, and overload detection occurs 5 times, the pump will no longer resume operation.

To clear the recovery count, press the start/stop key once. Press the key once again to return the pump to MAN or EXT mode and continue normal operation. (The pressure overload detection count will restart.)

Cycling the pump's power also clears the recovery count and returns the pump to MAN or EXT mode to continue normal operation; however, this action cancels the pressure overload detection function.



Recovery time mode

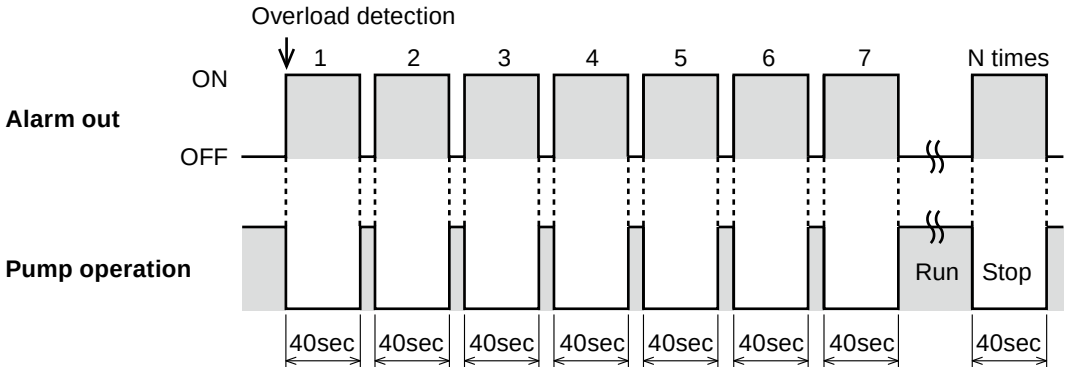
If the pump is suspended due to pressure overload detection, it will resume operation after the user-defined time has passed. This sequence continues an unlimited number of times unless the root cause of pressure overload is solved.

For example:

If the user-defined time is set to 40 seconds, the pump stops for 40 seconds while pressure overload is detected.

To clear the recovery time and stop the pump, press the start/stop key once. Press the key once again to return the pump to MAN or EXT mode to continue normal operation. (The pressure overload detection count will restart.)

Cycling the pump's power also clears the recovery time and returns the pump to MAN or EXT mode to continue normal operation; however, this action cancels the pressure-overload detection function.



NOTE

The discharge pressure can rise 1.3 to 2.0 times the maximum allowable level of the pump depending on operating conditions and piping layouts. If the pressure rises too sharply (with the closed discharge), it may not even be detected or controlled by the over-current protection.

If the user-defined time (recovery time) is set to 0 seconds, the pressure-overload detection function will be disabled. Disabling this function may result in damage to the pump and piping. Be sure to set up a relief valve to protect the pump and other equipment regardless of whether the function is enabled or disabled.

Output functions

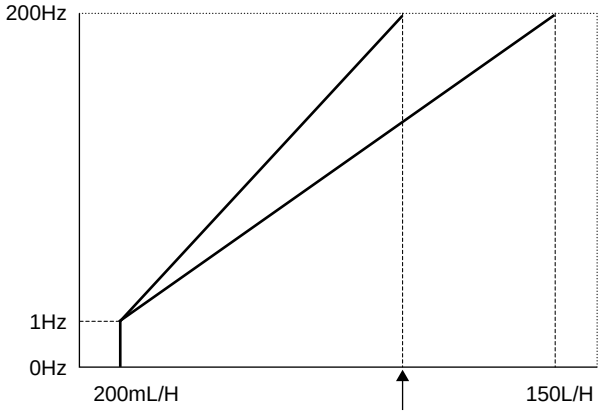
■ Alarm output function

(See page 60.)

Enable or disable the output of the Batch completion, Pump Run, STOP, Pre-STOP, Interlock, Diaphragm rupture detection, Gas detection, Pressure overload detection, and/or Drive error detection functions which is preset to the Alarm OUT 1 and 2, or the output of the Volume proportional pulse which is preset only to the Alarm OUT 2. See the "Alarm OUT (DIN connector)" paragraph on page 40 for wiring diagram.

The Pump Run output is used to send an alarm signal to an external device or equipment while the pump is operating.
If the Batch completion output or the Pump Run output is enabled to the Alarm OUT 1 or 2 (or if the Volume proportional pulse output enabled only to the Alarm OUT 2), the other outputs (STOP, Pre-STOP, Interlock, Diaphragm rupture detection, Gas detection, Pressure overload detection, and Drive error detection) turn disabled in that Alarm OUT.
The other outputs (STOP, Pre-STOP, Interlock, Diaphragm rupture detection, Gas detection, Pressure overload detection, and Drive error detection) can be enabled together (to the Alarm OUT 1 or 2), sharing the same output signal. See the controller display to tell which the signal it is.
With the factory default setting, the range of the Volume proportional pulse output is between 1Hz (at the min flow of the pump) and 200Hz (at the max flow rate of the pump). The max flow rate is manually reduced as shown below through the “Pump Max Rate” options in the “Other Features” menu.

IX-C150: Volume proportional pulse output behaviour



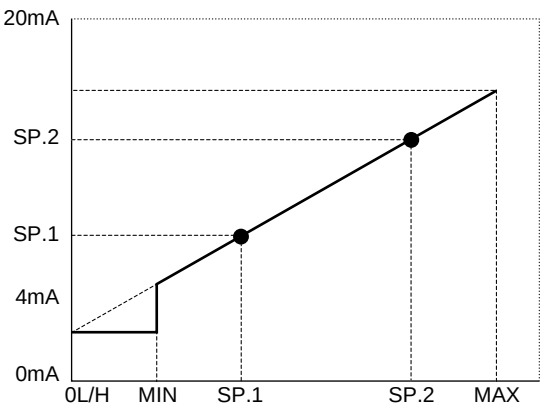
The max flow rate can be adjusted while it’s still 200Hz.

■ Analogue output function

(See page 58.)

The pump transmits the 0-20mA analogue signal in proportion to the preset flow rates (set point 1 and 2).

If the actual flow has fallen below the minimum flow at each model (see page 93), the amperage goes down to the 0L/H level.
The amperage does not fall below 0mA or exceed 20mA at any setting of the set point 1 and 2.



Other functions

■ Suction speed setting

(See page 65.)

Suction speed is adjustable by 4 levels depending on liquid property. Reduce suction speed so as to reduce inertia resistance for the delivery of viscous liquid or to prevent cavitation for gaseous liquid. Select 100% (default), 75%, 50% or 25%.

The max flow rate of the pump (determined through the “Pump MAX Rate” or “Pump AUX Rate” options) goes down to an appropriate level automatically when the suction speed is reduced from 100% to 75%, 50%, or 25%. Recover the max flow rate manually if the suction speed is returned (/increased).

■ Maximum flow rate setting

(See page 65.)

The maximum allowable flow rate of the IX can be reduced if necessary.
The factory default setting of the IX-C150 is 150L/H, and IX-C060 is 60L/H.

■ Diaphragm position adjustment

(See page 65.)

The plunger expands or contracts for easy diaphragm replacement. Select the “MAX OUT Pos.” option through the “Other Features” menu in order to extend the plunger to the maximum. Select the “MAX IN Pos.” option to contract it to the minimum and mount the pump head. See page 80 for details.

■ Anti chattering setting

(See page 65.)

Set a pulse recognition time for the IX not to be adversely affected by chattering or noise. The factory default setting is 5 msec. This means the pump recognizes the pulse length of 5 msec or more. The other options are 1 and 2 msec and should be selected for the shorter pulse length, however, note the shorter the recognition time is, the more susceptible to the interference of noise the pump becomes. Note the maximum allowable input frequency of the IX is 100Hz.

■ Output logic setting

(See page 65.)

Select “normally open” or “normally closed” for the Alarm OUT 1 (OUT 1) and 2 (OUT 2) outputs.

■ Flow unit setting

(See page 65.)

Select L/H or GPH for the flow rate indication.

■ Language setting

(See page 65.)

Select your language through the language selection.

■ Keypad lock

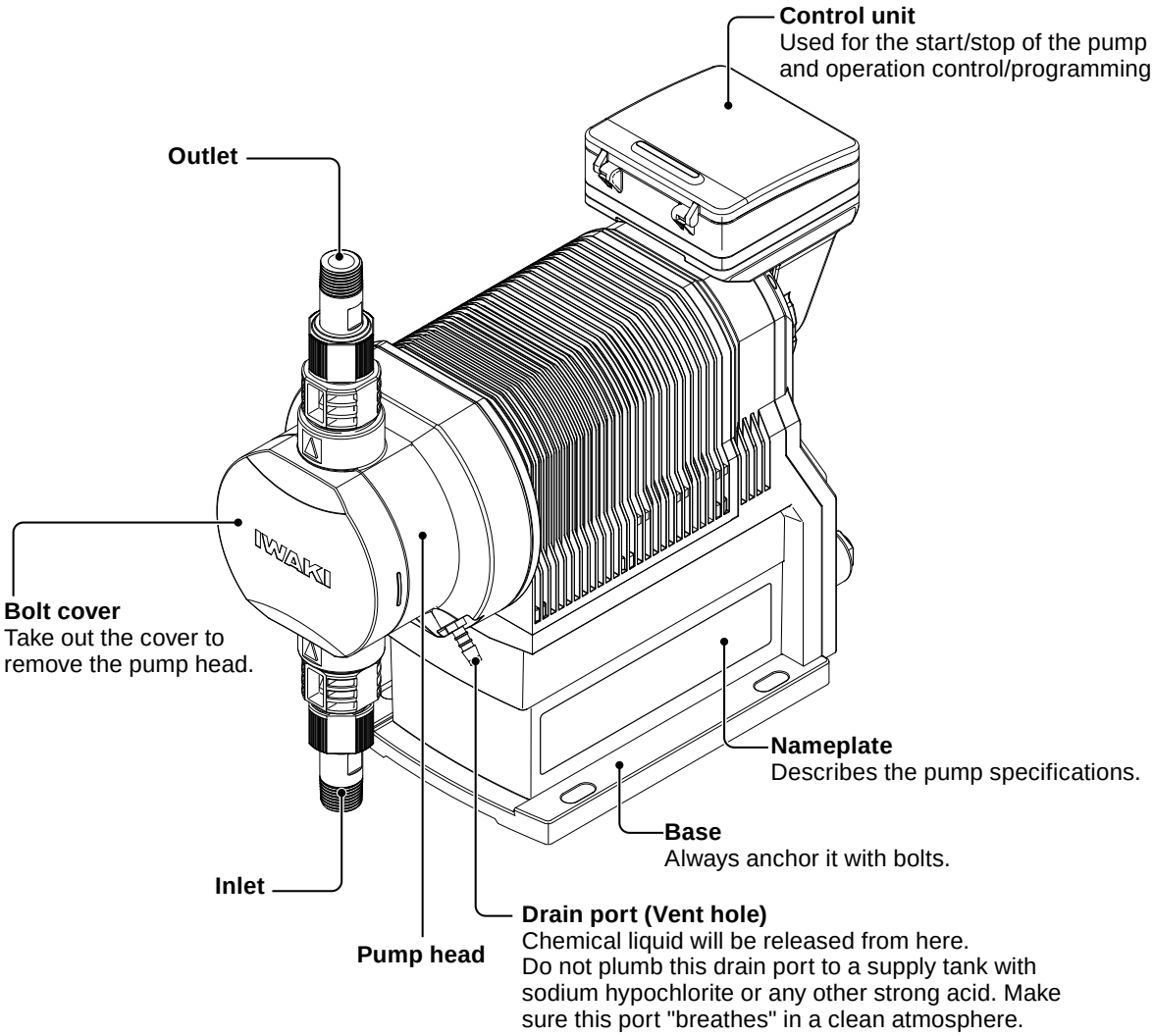
(See page 71.)

The IX-C is shipped with the access codes at default values (00000). In order to prevent against unauthorized tampering, you will need to change the access codes to your own values.

■ Factory default setting

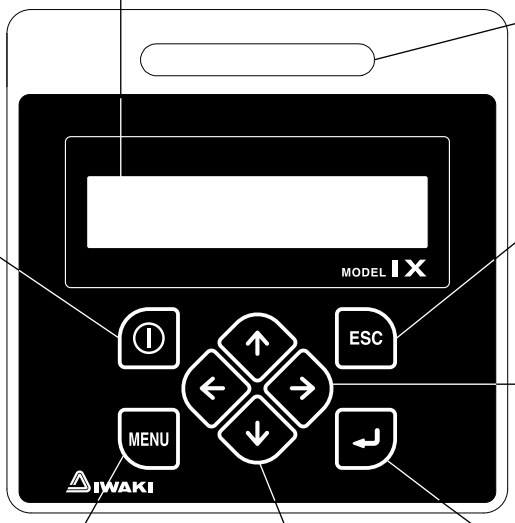
Power on the pump while pressing the ESC key to restore the factory default settings. The calibrated flow volume per stroke will be reset to its default value. After initialization, recalibrate the flow volume (see page 44).

Pump


Control unit
Used for the start/stop of the pump and operation control/programming.
Outlet
IWAKI
Bolt cover
Take out the cover to remove the pump head.
Nameplate
Describes the pump specifications.
Base
Always anchor it with bolts.
Inlet
Drain port (Vent hole)
Chemical liquid will be released from here.
Do not plumb this drain port to a supply tank with sodium hypochlorite or any other strong acid. Make sure this port "breathes" in a clean atmosphere.
Pump head

Operation panel

Display
An operational status, a selected mode and set values are shown here.



LED bar
The LED bar on the control unit will indicate various operating status and alarm conditions.

Start/Stop key
Used for starting/stopping the pump or moving back to the MAN/EXT selection in setting.

ESC key
Used for cancelling the current setting and moving back to a previous menu screen.

Left/Right key
Used for moving through items. Press and hold both keys for 3 seconds to disable keypads.

Enter key
Used for making a decision in the menu screen or MAN/EXT selection.

MENU key
Used in the MAN/EXT selection screen for calling up the menu screen.

UP/DOWN key
Used for changing numeric values or selecting an option.
The pump enters the priming mode while both the keys are pressed.

■ Basic displays & Pump states

	Display	Red LED bar	Green LED bar	Orange LED bar	White/Purple/Blue LED bar
Operation	Pump On (Manual) 150 L/H	—	Flows in MAN mode operation.	—	—
	Pump On (ANA.P) 150 L/H	—	Lights (waits) or Flows (runs) in EXT mode (Analogue control).	—	—
	AUX IN OVERRIDE! 150 L/H	—	Flows (runs) in AUX operation.	—	—
	PRIMING OVERRIDE @ 150 L/H	—	Flows in priming mode.	—	—
	Pre-Stop (MAN) 150 L/H	—	—	Lights (waits) or Flows (runs) when Pre-STOP function is active.	—
	Pump On (Manual) GAS DETECTED	—	—	—	—
	MaintenanceAlert ESC Key 3s=Clear	—	—	—	Blue LED bar flows.
Stop	Standby (Manual) 150 L/H	—	—	—	White LED bar lights (pump waits) in the MAN mode.
	Standby (EXT) Analog Preset	—	—	—	White LED bar lights (pump waits) in the EXT mode.
	SELECT OPERATION MAN← →EXT(ANA.P)	—	—	—	White LED bar lights (pump waits) in the MAN/EXT selection.
	MAIN MENU: ← Program EXT →	—	—	—	White LED bar lights (pump waits) in a main menu screen.
	MOTOR OVERLOAD! S/S Key = Clear	Blinks when the pressure overload protection is active.	—	—	—
	LEAK DETECTED! S/S Key = Clear	Blinks when the diaphragm is broken.	—	—	—
	DRIVE ERROR! S/S Key = Clear	Blinks when a rotation control is upset.	—	—	—
	STOPPED (Manual) -------	—	—	—	Purple LED bar lights.
	INTERLOCKED(MAN) -------	Lights (waits) when the pump is interlocked.	—	—	—

The white LED bar lights up when the pump is turned ON. In addition, the "GAS DETECTED" message appears on pumps equipped with the “Y” flow-monitoring code.

Identification codes

Each code represents the following information.

Pump

IX - C 150 TC R - EU Y ____
a b c d e f g h

a. Series name

IX

b. Drive unit

C

c. Pump unit (Max flow)

150 : 150 [L/H] 060 : 60 [L/H]

d. Wet end materials

Code	TC	TE	S6
Pump head	PVDF		SUS316
Valve	CE		SUS316 equivalent
Valve seat	FKM	EPDM	SUS316
O ring	FKM	EPDM	—
Valve gasket	—		PTFE
Diaphragm	PTFE bonded to EPDM		

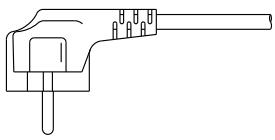
Material code

PVDF : Polyvinylidene difluoride
FKM : Fluorine-contained rubber
EPDM : Ethylene-propylene rubber
CE : Alumina ceramic
PTFE : Polytetrafluoroethylene
SUS316 : Austenitic stainless steel

e. Connection

R : R thread N : NPT thread F : Flange (TC/TE)
FJ : JIS flange FD : DIN flange FA : ANSI flange

f. Power plug

Code	EU
Plug shape	
	Europe (2000 mm length)

g. Flow monitoring

Y : Equipped with the flow monitoring
R : No flow monitoring

h. Special version

No code : Standard models
□□ : Customized models will be coded.

Installation

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

Points to be observed

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.
- 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 M8 bolts (pump mounting)
- Adjustable wrench or spanner

Floor mounting

1 Select a suitable place.

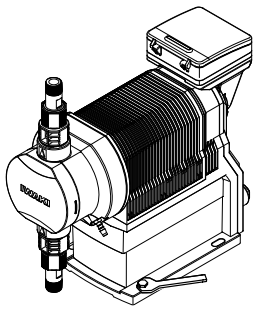
Always select a flat floor free of vibrations. See page 10 for details.

2 Anchor the pump with four M8 bolts.

Be sure to fix the pump at four points.

NOTE

Select a level location, or the flow may reduce.



Console positioning

The 4-position control unit and 5-position rear case can be adjusted to the best position.

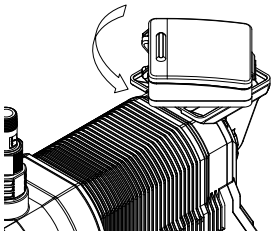
Necessary tools

- Phillips screwdriver

■ Control unit

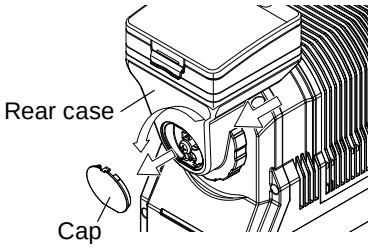
1 Turn the control unit to the best position.

It can turn clockwise and “sit” at the 3 o’clock position or anticlockwise at the 9 and 6 o’clock positions.



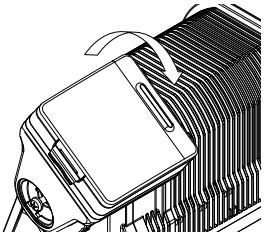
■ Rear case

1 Remove the cap and loosen the screw (a few turns).



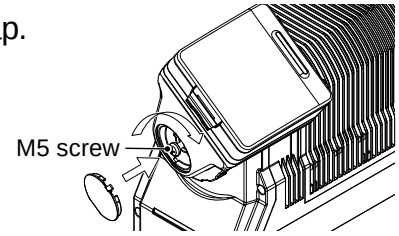
2 Adjust the rear case to the best direction.

It can turn clockwise/anti-clockwise and “sit” at the 35° and the 70° positions from the top position.

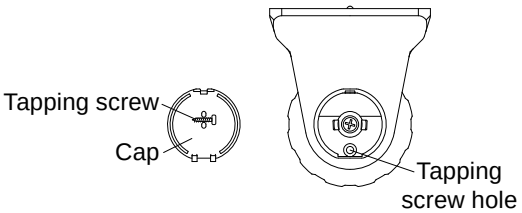


3 Tighten the rear case with the M5 screw and remount the cap.

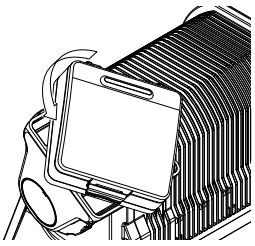
Make sure it is fastened tightly and won’t move.



4 Use the included tapping screw (located on the back side of the cap) to provide additional support and ensure that the rear casing is securely fastened.



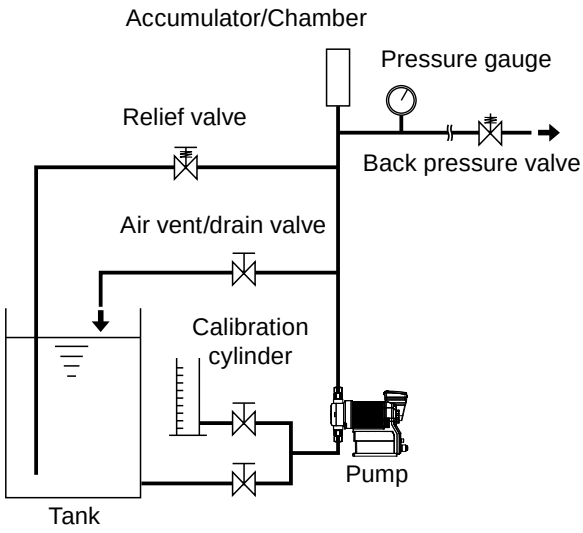
5 Turn the control unit to the upright position as necessary.



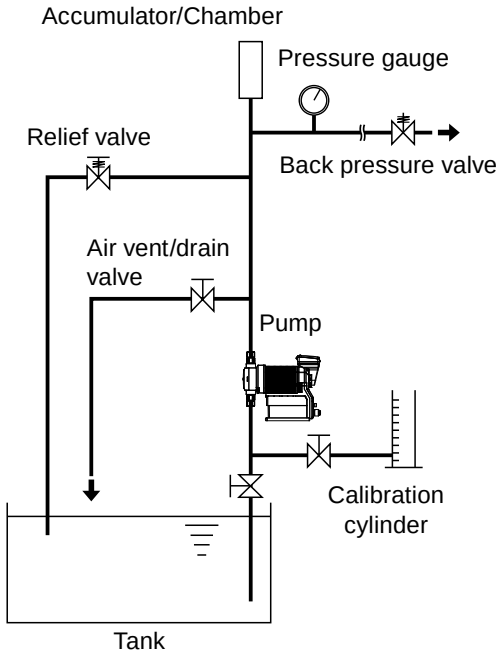
Plumbing

■ Piping layout

Flooded suction application



Suction lift application



NOTE

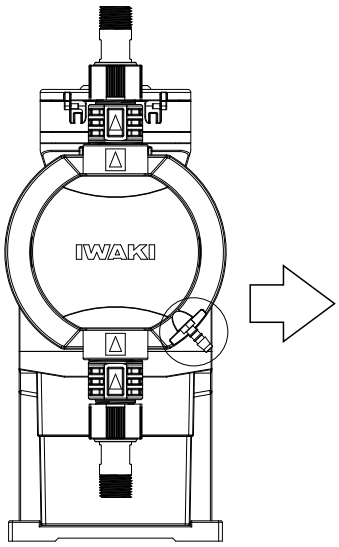
- The suction line I.D. should be equal to or wider than the I.D. of the pump.
- When handling liquids that generate gas bubbles (sodium hypochlorite or hydrazine solution), install the pump in a cool and dark place. Flooded suction installation is strongly recommended.

Drain port (vent hole)

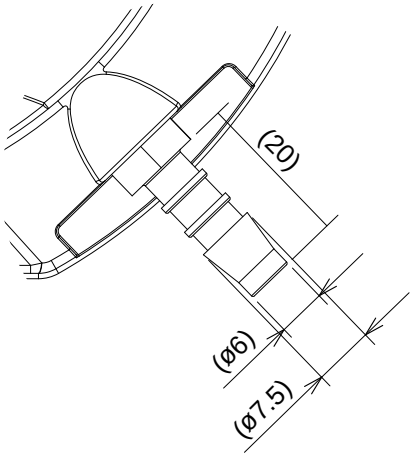
Leaked liquid drains off through the drain port if the diaphragm is ruptured accidentally. Use a chemically-resistant tube to the port and a drain tank to safely collect the liquid.

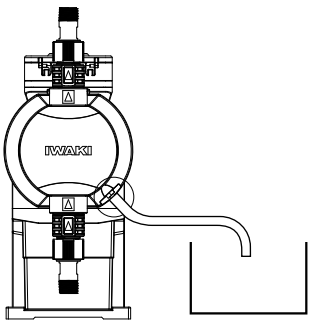
NOTE

- Do not plug the drain port. The port functions as a vent hole to keep the pressure behind the diaphragm back atmospheric.
- Do not immerse the end of a drain tube in drained liquid, or the liquid may be pumped up into the compartment behind the diaphragm back.
- Liquid in the drain tank is the sign of the damaged diaphragm. Immediate inspection or repair is necessary. Do not leave this condition as it is. Fumes or vapours from certain solutions may move up into the pump via the drain tube and attack its inside.



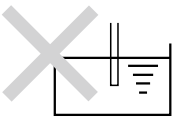
Drain port (vent hole)
Applicable tube size
Inner diameter: 6mm
Outer diameter: 12mm or below



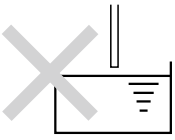


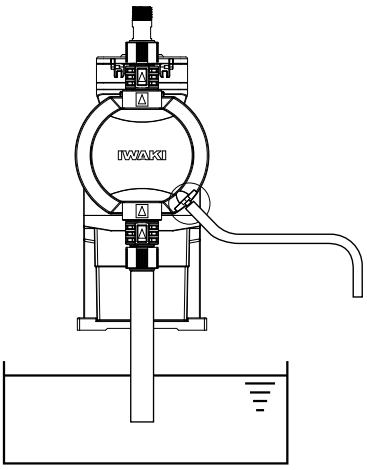
Empty drain tank

Do not locate the drain tube end below the liquid level.



Do not take in fumes from corrosive chemicals such as sodium hypochlorite.





Noncorrosive chemicals in a supply tank. The drain tube end must stay above the liquid level.

Wiring

Wiring for power voltage, earthing and external signals.

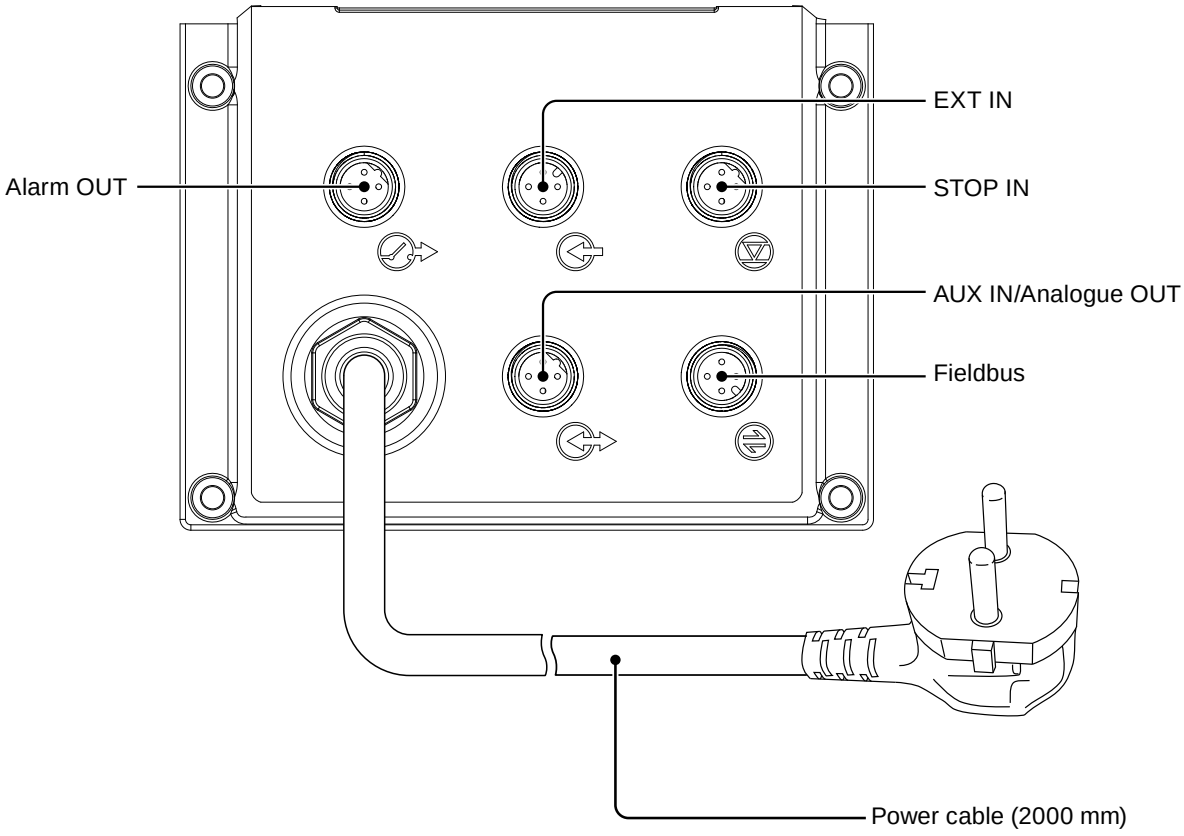
Points to be observed

Observe the following points during wiring work.

- Electrical work should be performed by a qualified electrician. Always observe applicable codes or regulations.
- Do not apply power other than that specified on the nameplate. Otherwise, failure or fire may result.
- Do not perform wiring work while electric power is on. Otherwise, an electrical shock or a short circuit may result. Be sure to turn off the power before wiring work.
- Be careful for electric power not to be turned on during work.
- Replacement of a power cable should be conducted by a manufacturer, his agency or a skilled person. Otherwise, an accident may result.

End terminals

See the following diagram for details.



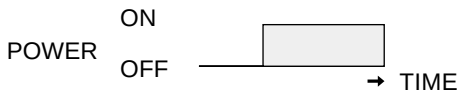
Power voltage/Earthing

Points to be checked
- Check that power voltage is turned off.

1 Insert the plug all the way seated in a socket.

NOTE
- Do not share a power source with a high power device which may generate a surge voltage. Otherwise an electronic circuit may fail. The conductive 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 37 for the precautions for ON-OFF control cycling power.

Apply power sharply



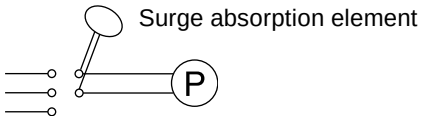
Do not apply gradually



Surge voltage

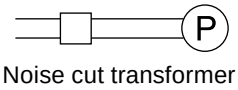
The electronic circuit in the control unit may fail due to a surge voltage. Do not place the pump close to a high power device of 200V or more which may generate a large surge voltage. Otherwise, take any of the following measures.

- Install a surge absorption element (such as a varistor with capacity of 2000A or more) via power cable or,



Recommended varistors:
Panasonic ERZV14D431
See manufacturer's catalogues for details.

- A noise cut transformer via the power cable.



Precautions for ON-OFF control by cycling power

The control unit is equipped with a CPU. To ensure the CPU to work properly, always start/stop the pump with 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.
- When using a mechanical relay for ON-OFF operation, its contact capacity should be 35A or more. Or a contact point may break.
- Even the large mechanical relay may not last forever. If further longer life is desirable, use a SSR (Solid State Relay) such as the OMRON G9H that does not have a mechanical contact point. See manufacturer's catalogues for details.

Signal wire connection

Points to be checked

- Check that power voltage is turned off.

Use our optional connector cables below or purchase DIN 4- and 5-pin female connector cables when using signal input and output.

Optional 5m DIN connector cables for:

The EXT input signal or Fieldbus communication (or Binder 99-0436-10-05 Series 713)
The STOP input/Alarm output signals (or Binder 99-0430-15-04 Series 715)
The AUX input/Analogue output signals (or Binder 99-0436-15-05 Series 715)

NOTE

- Do not lay on these signal cables in parallel with a power cable. Otherwise the electromagnetic induction noise is generated and malfunction or failure may result.
- When using an external SSR for signal input, such a semiconductor relay must be capable of handling the maximum applied voltage from the pump.
  See specs of the selected SSR. The following SSRs at least meets the requirement.
  - OMRON G3FD-102S or G3FD-102SN
  - OMRON G3TA-IDZR02S or G3TA-IDZR02SM
- When using an external mechanical relay for signal input, its minimum application load should be 5mA or below.
- Insert the DIN 4- or 5-pin female connector as far as it will go and then tighten the skirt to make a secure connection.

Use either an external no-voltage contact or an external open collector for the EXT input signal.

■ EXT IN

To make pulse-, batch-, interval batch- and analogue-control operation or to activate interlock function, connect signal wires to the EXT terminals via the DIN 5-pin connection.

When using an open collector:

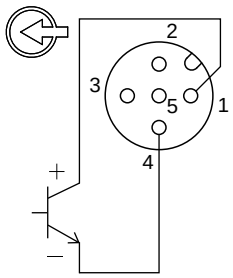
Pay attention to polarity. The pulse (1) pin and the interlock (2) pin are plus (+), and the COM (4) pin is minus (-).

When using analogue control:

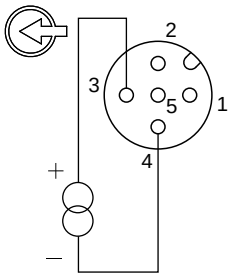
Pay attention to polarity. The analogue (3) pin is plus (+), and the COM (4) pin is minus (-). Internal resistance is 200Ω.

When using a no-voltage contact:

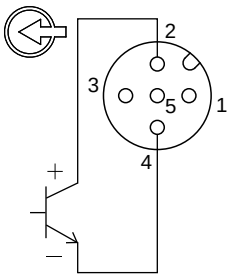
Use a mechanical relay designed for an electronic circuit. Its minimum application load should be 5mA or less.



Wiring for Pulse-, Batch-, Interval batch-control



Wiring for Analogue control



Wiring for Interlock function

1 : Pulse (Brown)
2 : Interlock (White)
3 : Analogue (Blue)
4 : COM (Black)
5 : 12VDC30mA or below (Grey)

Each wire of our optional cable is coloured as above. The terminal pin 5 is an output and is not used. Do not short-circuit the pin 5 and pin 4 (COM).

■ STOP IN

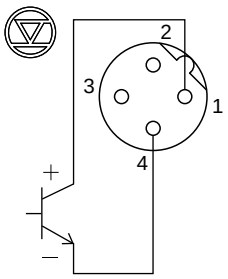
To activate STOP function, connect signal wires to the STOP terminal via the DIN 4-pin connection.

When using an open collector:

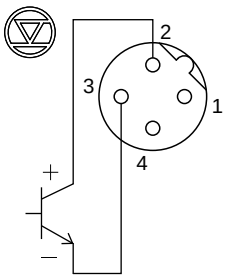
Pay attention to polarity. The STOP (1) pin and the Pre-STOP (2) pin are plus (+), and the COMs (3 and 4) pins are minus (-).

When using a no-voltage contact:

Use a mechanical relay designed for an electronic circuit. Its minimum application load should be 5mA or less.



Wiring for STOP function



Wiring for Pre-STOP function

1 : STOP (Brown)
2 : Pre-STOP (White)
3 : COM (Blue)
4 : COM (Black)

Each wire of our optional cable is coloured as above.

NOTE

Our optional cable has 5 wires. Cut off the grey wire to use it with the DIN 4-pin connector.

■ AUX IN/Analogue OUT

To activate the AUX function or to use the analogue output, connect signal wires to the AUX terminal or the 0-20mA output terminal via the DIN 5-pin connection.

When using an open collector (for AUX IN):

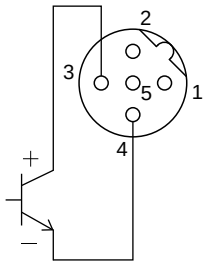
Pay attention to polarity. The AUX (3) pin is plus (+), and the COM (4) pin is minus (-).

When using a no-voltage contact (for AUX IN):

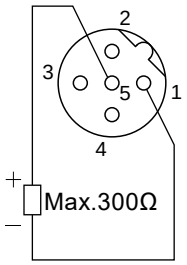
Use a mechanical relay designed for an electronic circuit. Its minimum application load should be 5mA or less.

When using analogue output:

Pay attention to polarity. The 0-20mA (1) pin is minus (-), and the 0-20mA (5) pin is plus (+). The max load resistance is 300Ω.



Wiring for AUX function



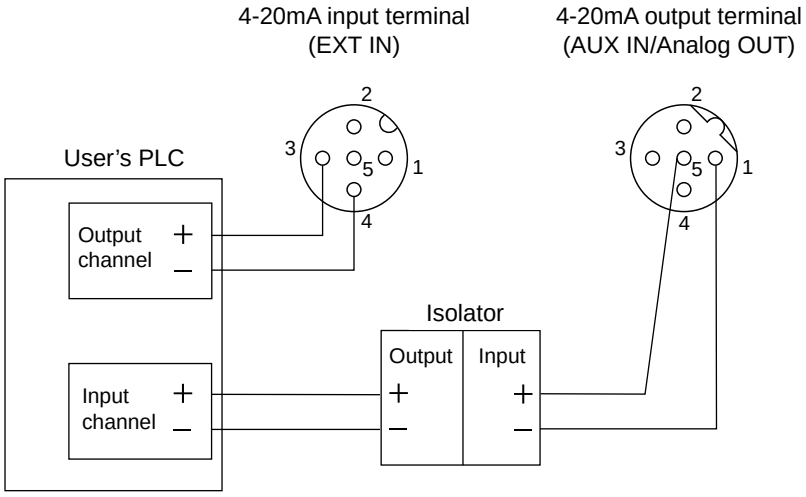
Wiring for 0-20mA output

1 : 0-20mA (Brown)
2 : N.C. (White)
3 : AUX (Blue)
4 : COM (Black)
5 : 0-20mA (Grey)

Each wire of our optional cable is coloured as above
Do not use the N.C. pin which is used for maintenance service.

NOTE

When both the 4-20mA input terminal (EXT IN) and the 4-20mA output terminal (AUX IN/Analogue OUT) are electrically-connected to the same external device such as user's PLC, channels of such a device must be electrically-isolated each other. Otherwise, use the isolator to either (or both) current signal line(s).



■ Alarm OUT

To transmit the signal to an external device, connect signal wires to the OUT terminal via the DIN 4-pin connection.

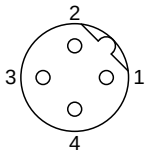
Alarm OUT 1 (OUT 1): Enable or disable the alarm outputs of Batch completion, Pump Run, STOP, Pre-STOP, Interlock, Leak detection, Gas detection and Motor overload (/Drive error) individually.

*The leak detection option and motor overload option are enabled at the factory default setting.

Alarm OUT 2 (OUT 2): Enable or disable the alarm outputs of the Volume proportional pulse, Batch completion, Pump Run, STOP, Pre-STOP, Interlock, Leak detection, Gas detection, and Motor overload (/Drive error) individually.

*The interlock option and motor overload option are enabled at the factory default setting.

*Gas detection is enabled on IX-C pumps equipped with the flow monitoring feature.



1 : Alarm OUT 1 (Brown)
2 : Alarm OUT 1 (White)
3 : Alarm OUT 2 (Blue)
4 : Alarm OUT 2 (Black)
Each wire of our optional cable is coloured as above.

NOTE

Our optional cable has 5 wires. Cut off the grey wire to use it with the DIN 4-pin connector.

Operation

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

Before operation

First check piping and wiring are correct. And then make commissioning before starting operation.

Points to be checked

Before operation, check if:

- Liquid level in a supply tank is enough.
- Piping is securely connected and is free from leakage and clogging.
- Discharge/suction valves are opened.
- Power voltage range is correct.
- 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. This could lead to a chemical leak. Tighten the bolts diagonally and evenly by the rated torque at each model before initial operation and at regular intervals (every three months).

Tightening torque

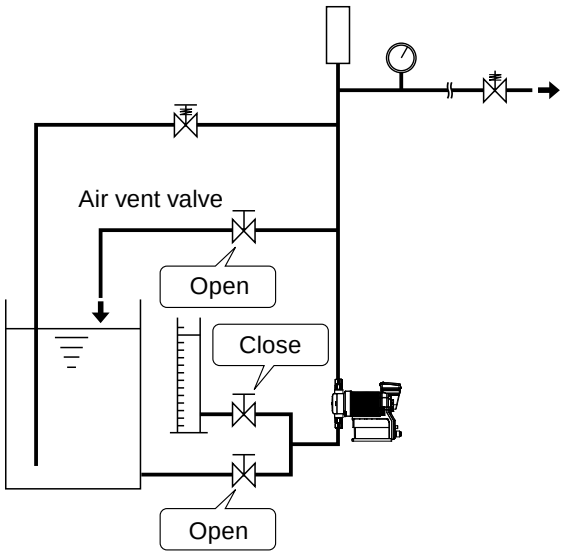
Model code	Torque	Bolts	Number of bolts
IX-C150	12 N•m	M8 hexagon head bolt	8
IX-C060	3.5 N•m	M5 hexagon head bolt	6

Commissioning

Always make commissioning when first mounting the pump in your system or resuming operation after a long period of stoppage.

1 Open an air vent and a suction line.

Do not open a calibration line if any.



2 Supply the rated power voltage to the pump.

3 Start the pump at a low flow rate and gradually increase it to a target rate.

Continue operation for 10 minutes and check the pump and plumbing for any abnormality.

4 Close an air vent line to introduce liquid to a main line.

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

Clean wet ends and the inside of piping.

• 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. Or the last key operation may not be put in memory, and 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 matter.

• If air is in the pump head, expel air through the above commissioning procedure.

Perform a calibration

Periodically make calibration to monitor an accurate flow through control display.
The pump is calibrated by pumping clean water at the maximum operating pressure before shipping (in the absence of a designation by a user), however, make calibration again in an actual operating condition as necessary. Follow the calibration process on the next page.

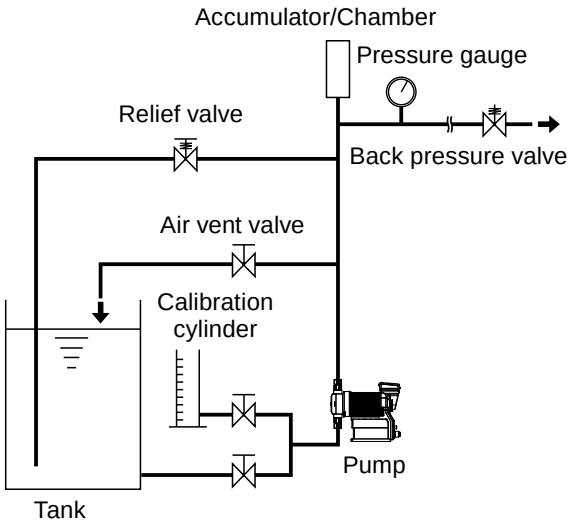
NOTE

The flow rate shown on the screen is a calculated value based on the previous calibration and may not be an actual flow rate.

Calibration is made to determine liquid volume per stroke. Arrange your piping system according to the guide below to ensure the calibration is made correctly.

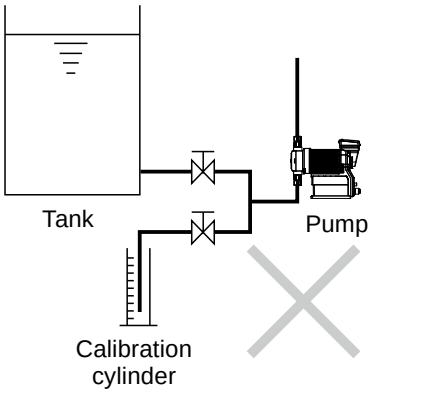
Suggested piping layout

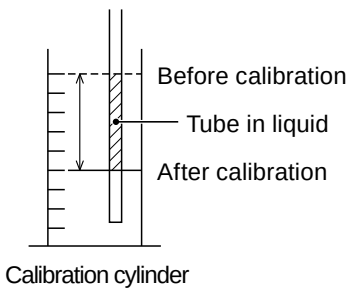
Use a calibration cylinder connected to a suction line.



Bad example

Do not immerse a calibration tube into liquid in a calibration cylinder. Tube volume is added to the liquid volume to be measured, and calibration will be upset.





Calibration process

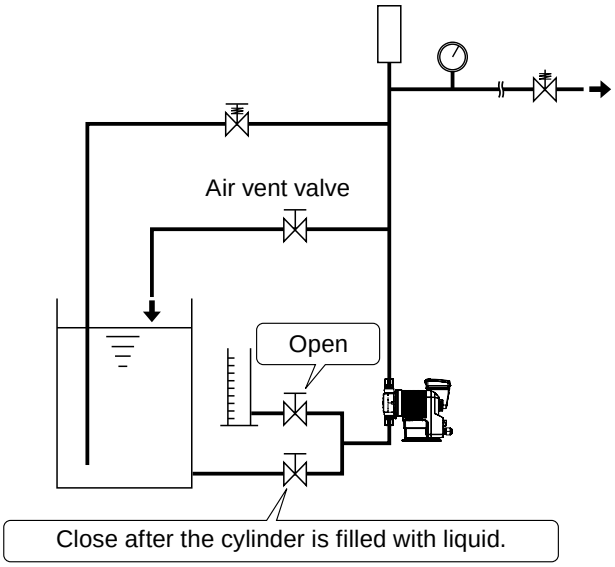
This pump offers two calibration methods: flow rate calibration and pressure-based calibration. If the internal sensor is disabled through the input selection menu (page 57), pressure-based calibration is not available.

*Pressure-based calibration is available on pumps equipped with flow monitoring.
*See page 21 for details of the flow monitoring feature.
*See page 57 for steps to enable or disable the flow monitoring.

■ Preparation for flow calibration

1 Fill a calibration cylinder with liquid.

Open a calibration line to lead liquid from a supply tank to a calibration cylinder. And then close the suction line and measure liquid volume in the cylinder.



2 Supply the rated voltage to the pump and set the flow rate to 100% in manual mode.

See page 14 for details.

NOTE

To achieve optimal performance, set the flow rate to the value required by your application.

■ Flow rate calibration

Obtain accurate flow volume per stroke by dividing the delivered liquid volume by the number of strokes.

1 Select the 'Calibration' option through the menu screen.

See page 55 for details.

*For pumps with the flow monitoring feature, ensure that the 'Internal Sensor' option is enabled in the 'Program Inputs' selection menu. If it is disabled, the pressure-based calibration will be unavailable.

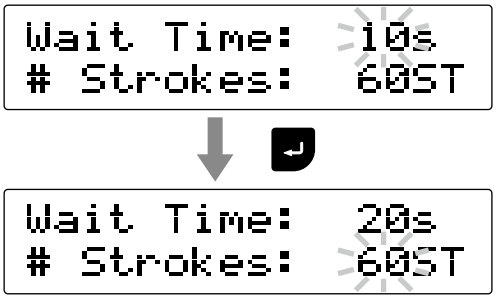
2 Choose the Flow option over the Select Cal. Mode option.

3 Calibration operation setting

Set a waiting time and the number of strokes. The number of strokes should be determined depending on liquid volume in the calibration cylinder.

Waiting time to start calibration operation: 10s (default) to 999s

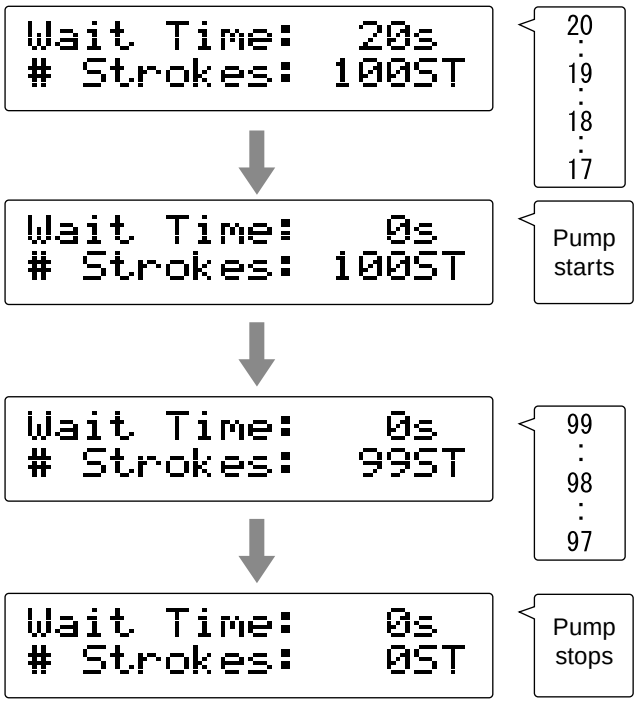
Number of strokes: 60ST (default) to 120ST



Use UP and DOWN keys to set a waiting time.

Use UP and DOWN keys to set the number of strokes.

4 Start calibration operation.



Push the enter key after setting the number of strokes. The pump starts the countdown.

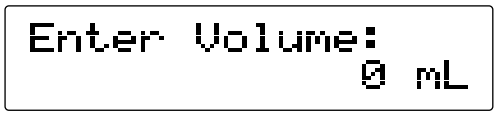
The pump starts to run for the set number of strokes as it comes to zero.

NOTE

If you already know a reliable mL-per-stroke value, press the Enter key once during the countdown or while the pump is running. You can then skip to step 6 to enter that value and complete the calibration process.

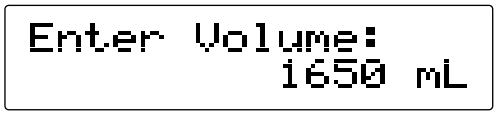
5 Measure liquid volume in the calibration cylinder again.

6 Enter how much liquid has reduced.



Use the UP and DOWN keys to set the volume reduction.





The screen shows “ERROR! Volume Out Of Range!!” if the reduction is too little or too large. Enter correct liquid volume or recalibrate it.

Calibration with high viscosity liquid at a full suction speed will often give rise to this error. Reduce a suction speed along with viscosity. The pump is calibrated with clean water before leaving the factory. The IX-C150 model is set to deliver 16 mL per stroke, while the IX-C060 model is set to deliver 6 mL per stroke.





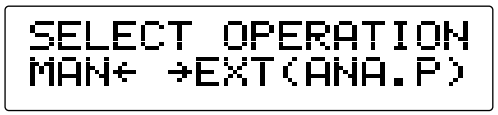
Push the enter key once. The screen shows flow volume per stroke.

If the ESC key is pressed inadvertently before the Enter key, the measured value will not be saved.









Push the ESC key to return to the wait mode.

■ Pressure-based calibration

This calibration is available only for pumps equipped with the flow monitoring function. If the measured value differs significantly from the pressure gauge reading, perform a pressure-based calibration to ensure both pressures correspond to each other.

1 Select the 'Calibration' option through the menu screen.

See page 55 for details.

*For pumps with the flow monitoring feature, ensure that the 'Internal Sensor' option is enabled in the 'Program Inputs' selection menu (see page 57.). If it is disabled, the 'Calibration' option will be unavailable.

2 Choose the 'Pressure' option over the 'Select Cal. Mode' option.

3 Press the Enter key to start the pump.

The pump operates at MAN speed while the internal sensor monitors the discharge pressure in the piping. The pressure is displayed on the controller screen.

4 Press the Enter key to confirm the measured value.

The pump stops.

5 Press the Enter key again to save the measured value to the pump’s memory and return to the main menu for calibration selection.

*If the ESC key is pressed inadvertently before the Enter key, the measured value will not be saved.

Operation setting

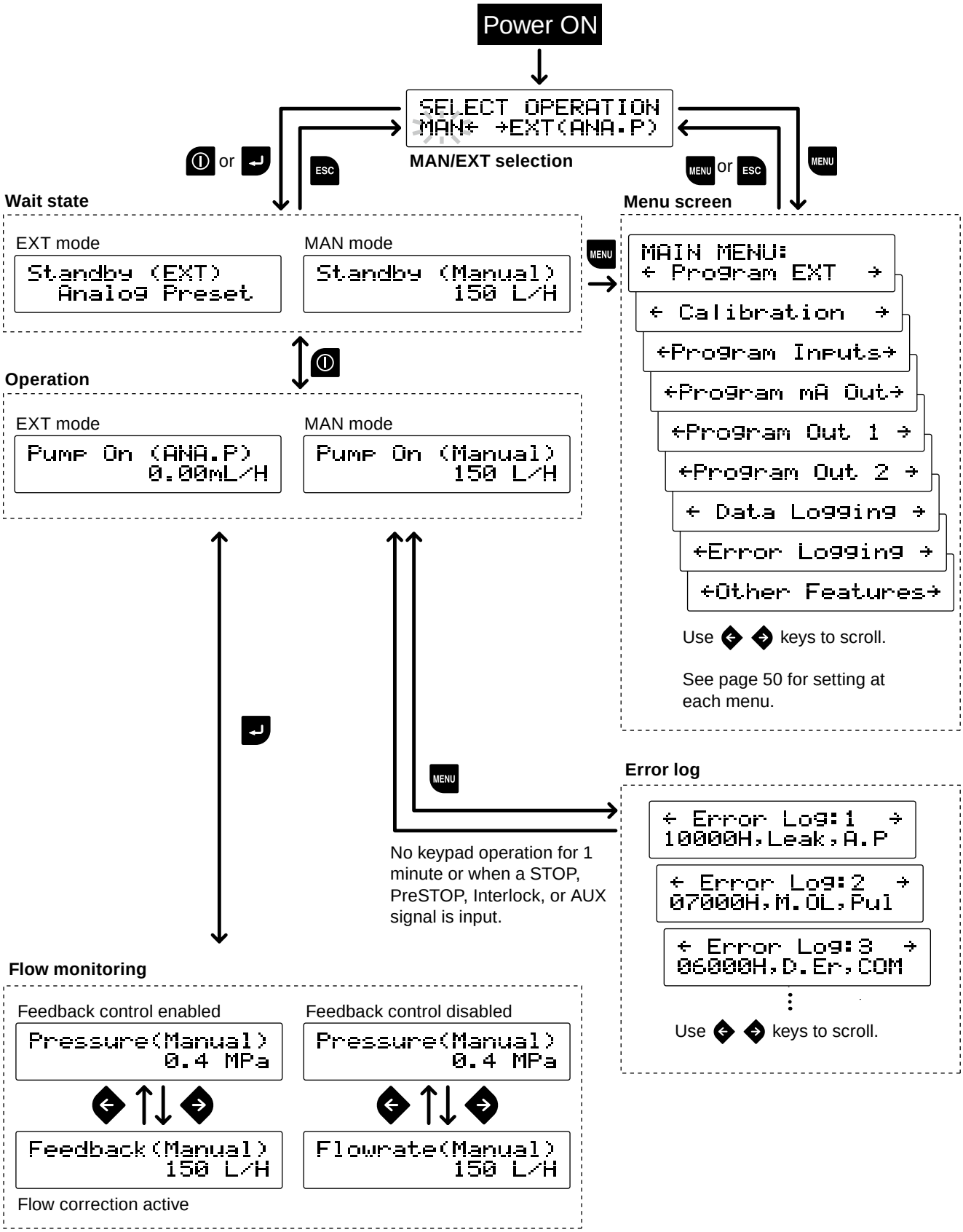
The setting is configured using the pump. Pump's behaviour varies with the selected control mode.

Menu	Control mode/Function	Parameter		Factory default
Mode selection	—	MAN/EXT		MAN
External controls	Analogue preset control	4-20mA/ 0-20mA/ 20-4mA/ 20-0mA		4-20mA
	Analogue variable control	SP1 current	0.0mA-20.0mA	4.0mA
		SP1 flow rate	0mL/H-60L/H (C060)	0mL/H
			0mL/H-150L/H (C150)	0mL/H
		SP2 current	0.0mA-20.0mA	20.0mA
		SP2 flow rate	0mL/H-60L/H (C060)	60L/H
			0mL/H-150L/H (C150)	150L/H
	Pulse control*1	0.00625mL/PLS-120mL/PLS (C060)		0.00625mL/PLS
		0.0156mL/PLS-300mL/PLS (C150)		0.01562mL/PLS
	Batch control*1	6.25mL/PLS-120L/PLS (C060)		6.25mL/PLS
		1.56mL/PLS-300L/PLS (C150)		15.62mL/PLS
	Interval batch control*	0-9 days/ 0-23 hr/ 1-59 min		0D: 0H: 1M
		6.25mL - 120L (C060) 15.6mL - 300L (C150)		6.25mL/PLS 15.62mL/PLS
	Communication control	Address: 1-127		50
Inputs	STOP	Closed=Pump OFF, Closed=Pump ON		Closed=Pump OFF
	PreSTOP	Closed=Pump OFF, Closed=Pump ON		Closed=Pump OFF
	Interlock	Closed=Pump OFF, Closed=Pump ON		Closed=Pump OFF
	Leak detection	Enable, Disable		Enable
	Flow monitor	Enable, Disable		Disable
		Smoothing level	1 to 5 levels	Level 3
		Flow feedback	Enable, Disable	Disable
		Pressure overload	Enable, Disable	Disable
Alarm	OUT1	Batch Complete, Pump Run, Stop, Pre-Stop, Interlock, Leak Detection, Gas Detection*2, Motor Overload, Drive Error		Leak Detection/Motor overload: Enabled Other alarms: Disabled
	OUT2	Volume Prop. PLS, Batch Complete, Pump Run, Stop, Pre-Stop, Interlock, Leak Detection, Gas Detection*2, Motor Overload, Drive Error		Interlock/Motor overload: Enabled Other alarms: Disabled
Analogue output		SP1 current	0.0mA-20.0mA	4.0mA
		SP1 flow rate	0mL/H-60L/H (C060)	0mL/H
			0mL/H-150L/H (C150)	0mL/H
		SP1 pressure*2	0MPa-1.0MPa (C060)	0MPa
			0MPa-0.4MPa (C150)	0MPa
		SP2 current	0.0mA-20.0mA	20.0mA
		SP2 flow rate	0mL/H-60L/H (C060)	60L/H
			0mL/H-150L/H (C150)	150L/H
		SP2 pressure*2	0MPa-1.0MPa (C060)	1.0MPa
			0MPa-0.4MPa (C150)	0.4MPa
Others	Suction speed	100%/ 75%/ 50%/ 25%		100%
	Max flow rate	80mL/H-60L/H (C060)		60L/H
		200mL/H-150L/H (C150)		150L/H
	AUX speed	80mL/H-60L/H (C060)		60L/H
		200mL/H-150L/H (C150)		150L/H
		Auto AUX Off time	Days: 0 to 9	0
			Hours: 0 to 23	0
			Minutes: 0 to 59	0
		Aut AUX Run time	Seconds: 0 to 999	0
	Diaphragm position	MAX OUT Pos./ MAX IN Pos.		MAX OUT Pos.
	Buffer	Enable, Disable		Disable
	Anti-Chattering	1 msec, 2 msec, 5 msec		5 msec
	Output logic (OUT1)	Normally Open / Normally Close		Normally Open
	Output logic (OUT2)	Normally Open / Normally Close		Normally Open
	Pressure tracking	Retry Count, Interval Time		Retry Count
		Retry Count	1 to 10	5
		Interval Time	0 to 60	30
	Gas detection	Enable, Disable		Disabled
		Detection time	1, 3, 10	3
	Maintenance time notification	Enable, Disable		Disabled
		Time to notification	100 to 9900 H	2000 H
	Unit	Litre, US Gallon		Litre
	Keypad lock	00000-99999		00000
	Language	English, Dutch, French, Danish, Spanish, German		English

*1 For these control modes, the calibrated flow volume per stroke is applied to the minimum settable flow volume.

*2 This option is available only on pumps equipped with the flow monitoring feature.

Setting flow chart

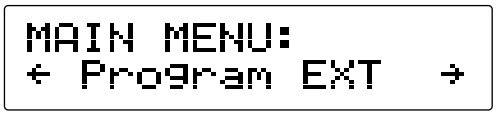


*To revert back to the factory default setting, turn on power while pressing the ESC key. The calibrated flow volume per stroke will be reset to its default value. After initialization, recalibrate the flow volume (see page 44).

*The Flow monitoring menu appears when the 'Internal Sensor' option is enabled in the 'Program Input' sub menu.

Menu screen

Push the MENU key in the MAN/EXT selection mode and call up the menu screen. Use the right and left keys to scroll through each menu item and then push the enter key to make a selection. Pushing the MENU key again or ESC key in the menu screen, the previous mode will be recalled.



EXT mode selection
The pump can run in five different operating modes of Analogue, Pulse, Batch, Interval Batch, and Communication control for the external signal. See pages 14-18 and 51 for details.



Calibration
Calibrate the pump to obtain a correct flow rate on the screen. See pages 44 and 55.



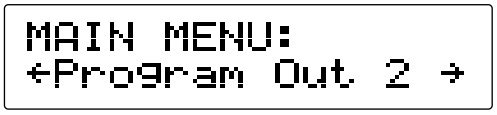
Signal input setting
Set the inputs of the STOP, Pre-STOP, Interlock functions, Diaphragm rupture detection, and Flow monitoring. See page 20 and the following pages.



Analogue output setting
Set the output current at SP1 and 2 flow rates to configure the analogue signal output behaviour. See pages 25 and 58.



Alarm output setting (OUT 1)
Enable or disable the output of the Batch Completion, Pump Run, STOP, Pre-STOP, Interlock, Leak Detection, Gas Detection, Motor Overload and Drive Error options. See pages 25 and 60.



Alarm output setting (OUT 2)
Enable or disable the output of the Batch Completion, Pump Run, STOP, Pre-STOP, Interlock, Leak Detection, Gas Detection, Motor Overload, Drive Error, and Volume Proportional PLS options. See pages 25 and 62.



Data logging
The pump can display operating time, total flow volume, power-on time, the number of ON/OFF and software version. See page 63.

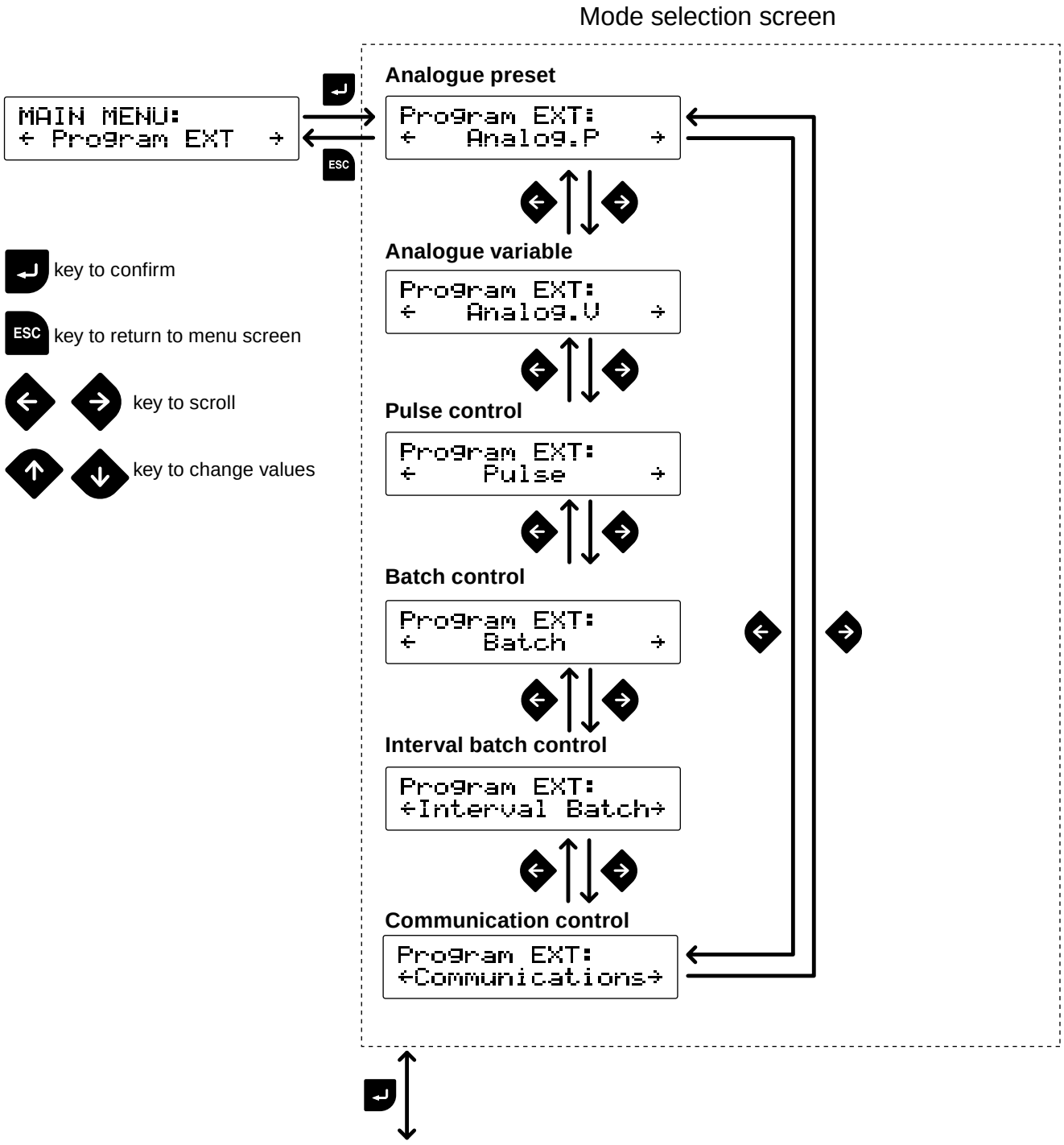


Error logging
The pump can display the last 10 errors in operation. See page 64.



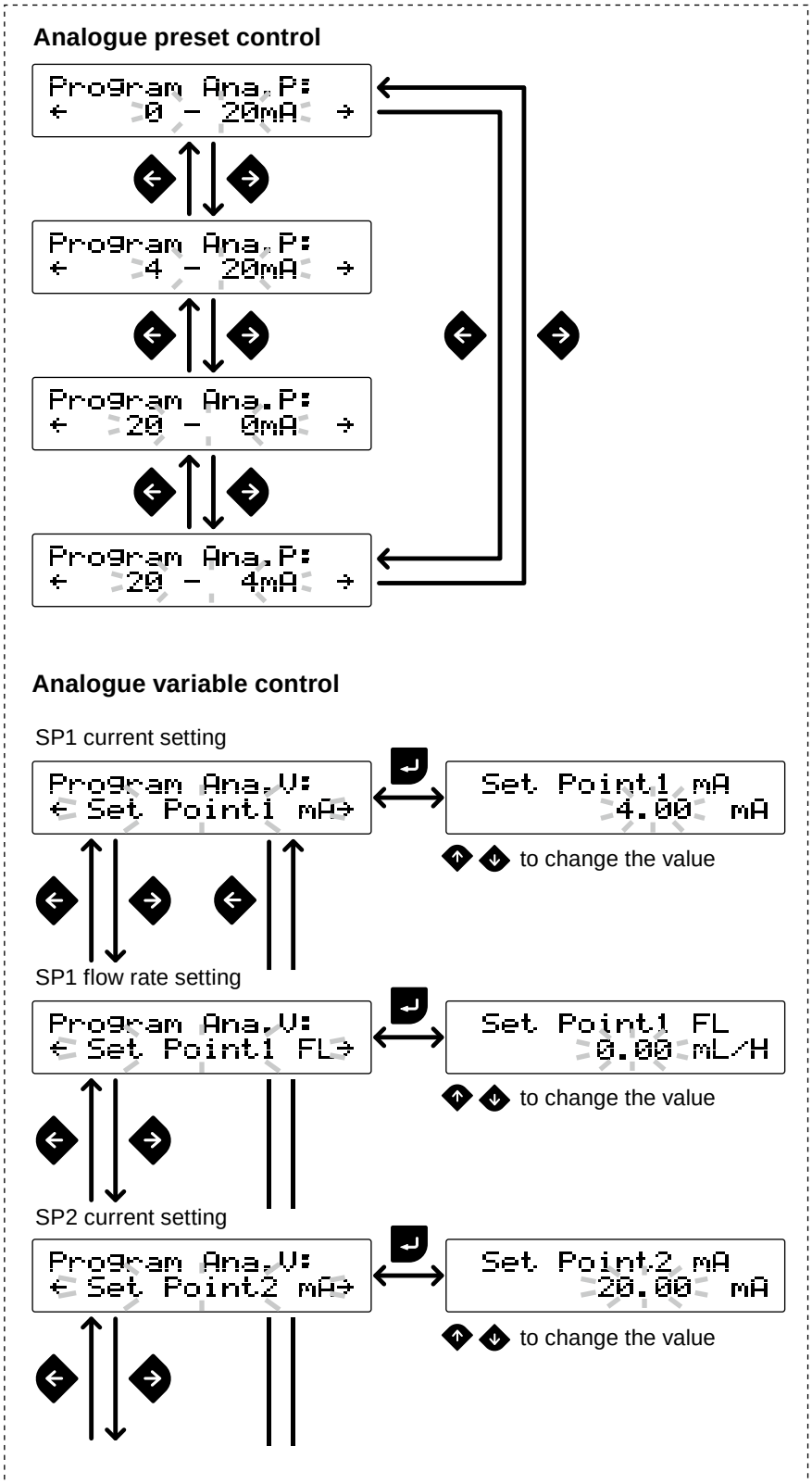
Setting of other functions
Set a suction speed, a max flow rate, an AUX speed, a diaphragm position, buffer ON/OFF, an anti-chattering time, output logics, a flow rate unit and your language or so. See pages 26, and 65-68.

■ EXT mode selection



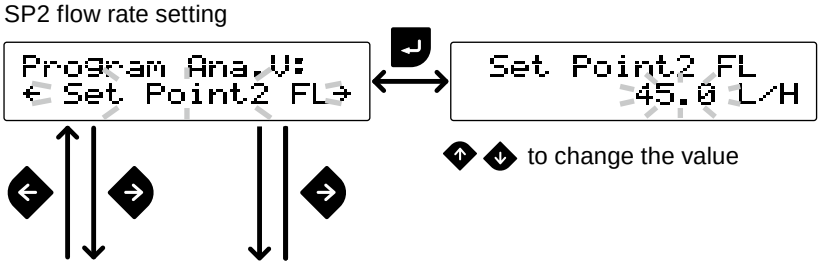
<To next page>

Mode setting screen

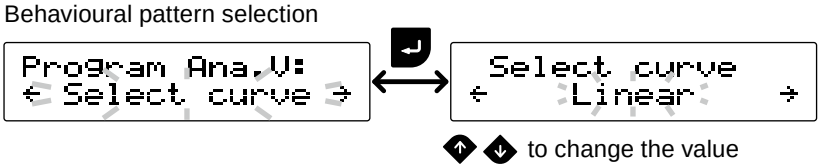


<To next page>

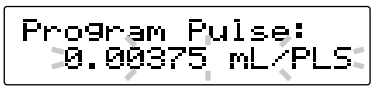
SP2 flow rate setting



Behavioural pattern selection



Pulse control



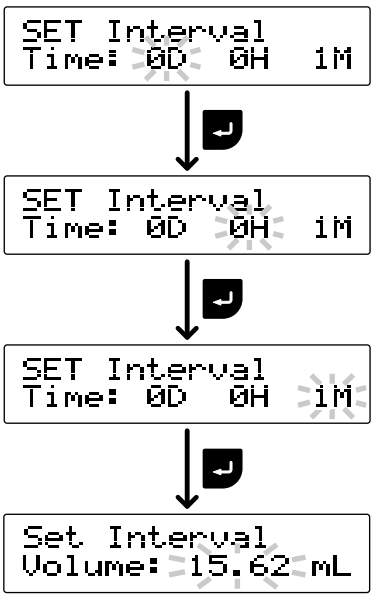
Set flow volume per pulse.

Batch control



Set flow volume per pulse.

Interval batch control



Set “Day”.

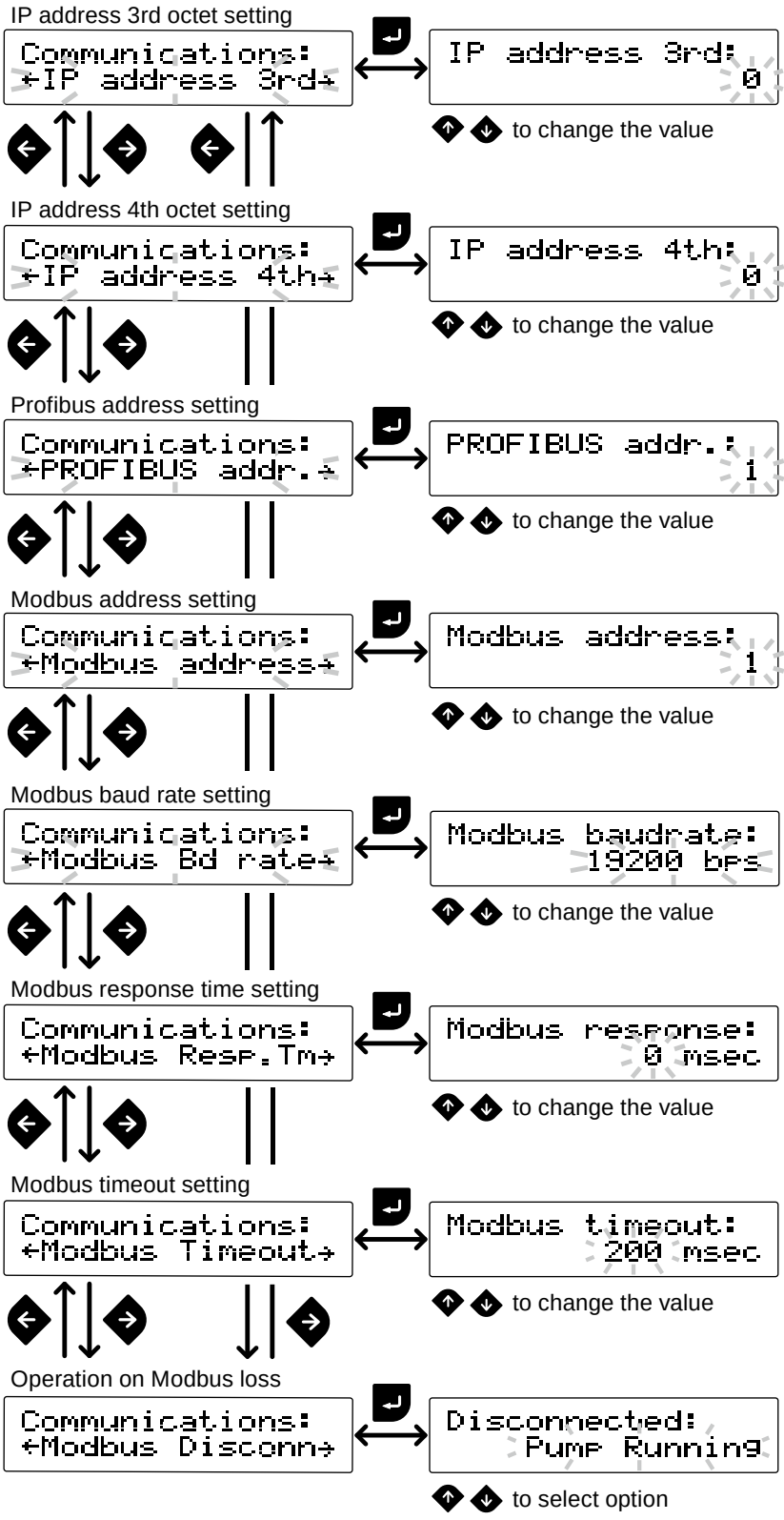
Set “Hour”.

Set “Minute”.

Set a flow rate.

<To next page>

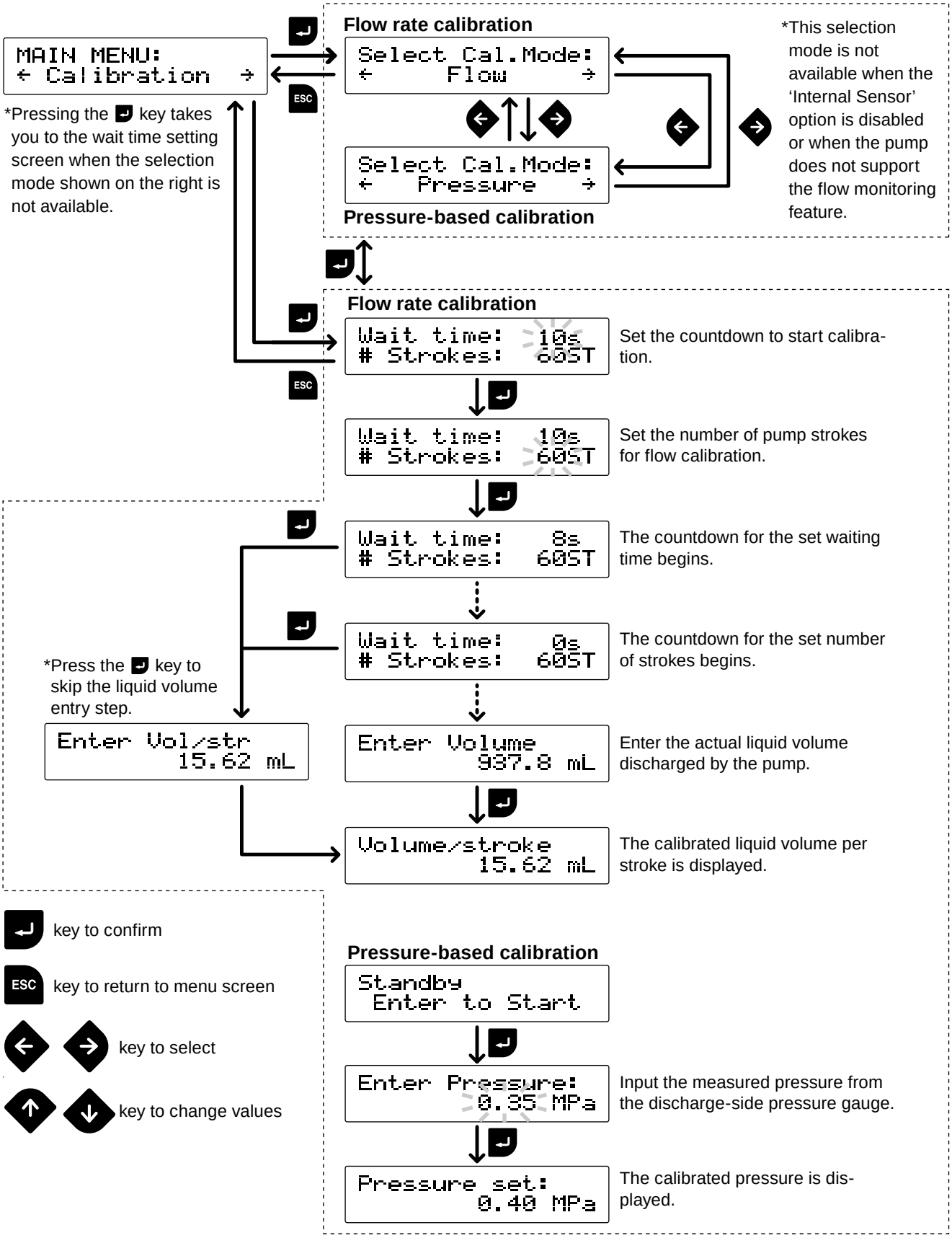
Communication control



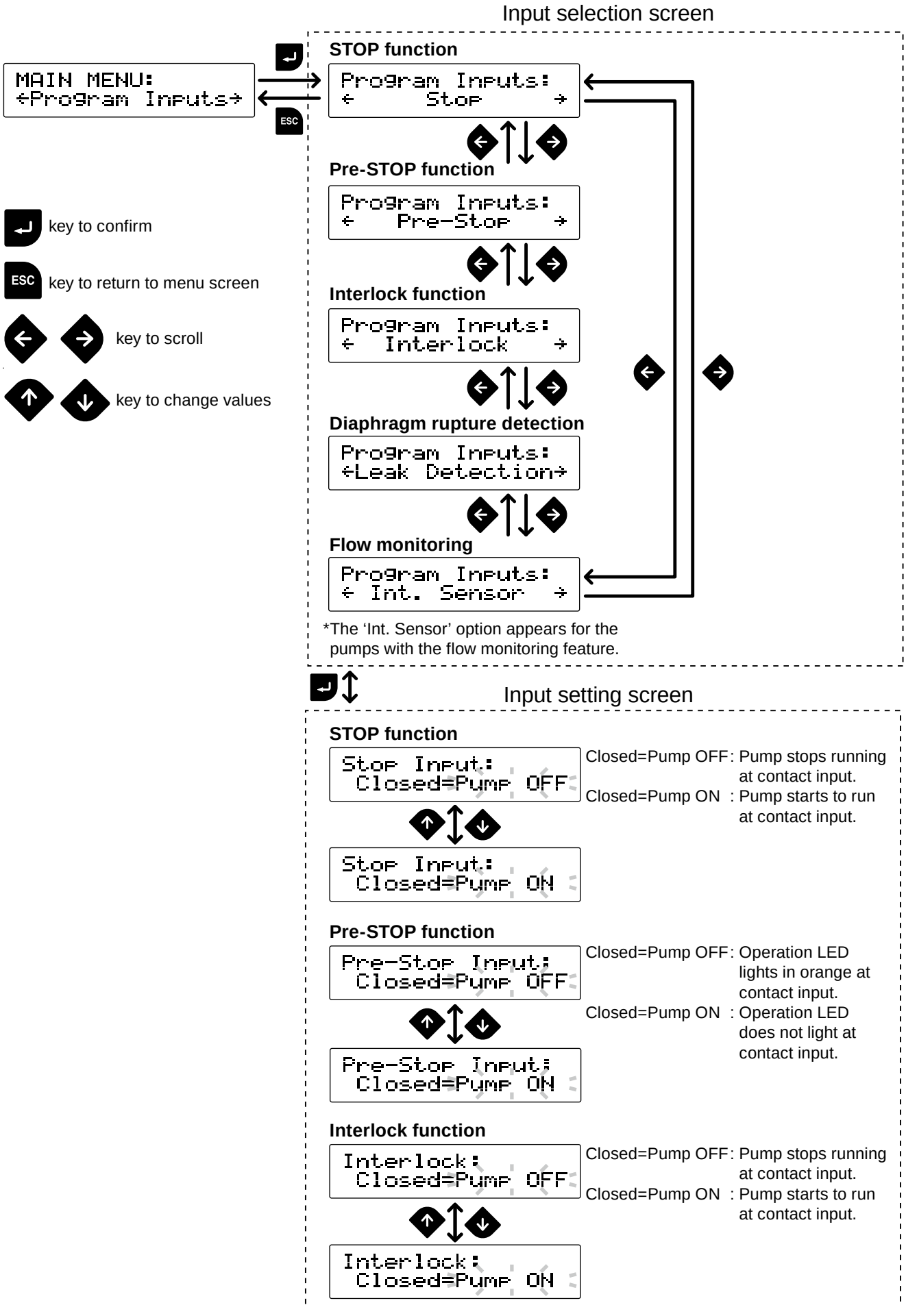
*The optional ICC (Iwaki Communication Converter) is required to enable Modbus communication with this pump.

■ Calibration

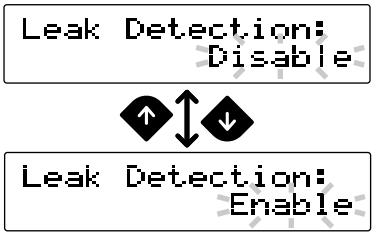
See page 43 for the practical calibration procedure. For pumps with the flow monitoring feature, ensure that the 'Internal Sensor' option is enabled in the 'Program Inputs' selection menu (see page 57.). If it is disabled, the pressure-based calibration will be unavailable.



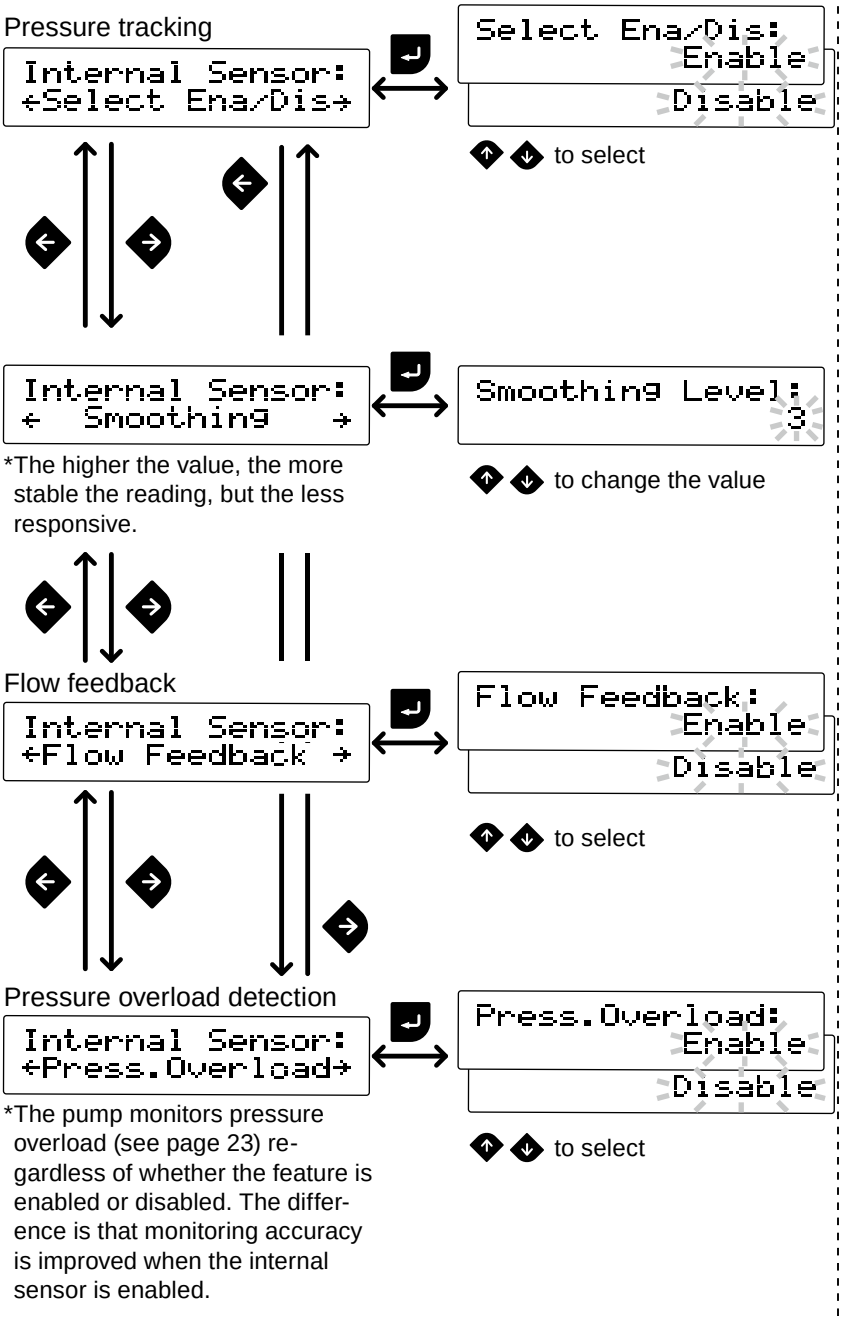
■ Signal input setting



Diaphragm rupture detection



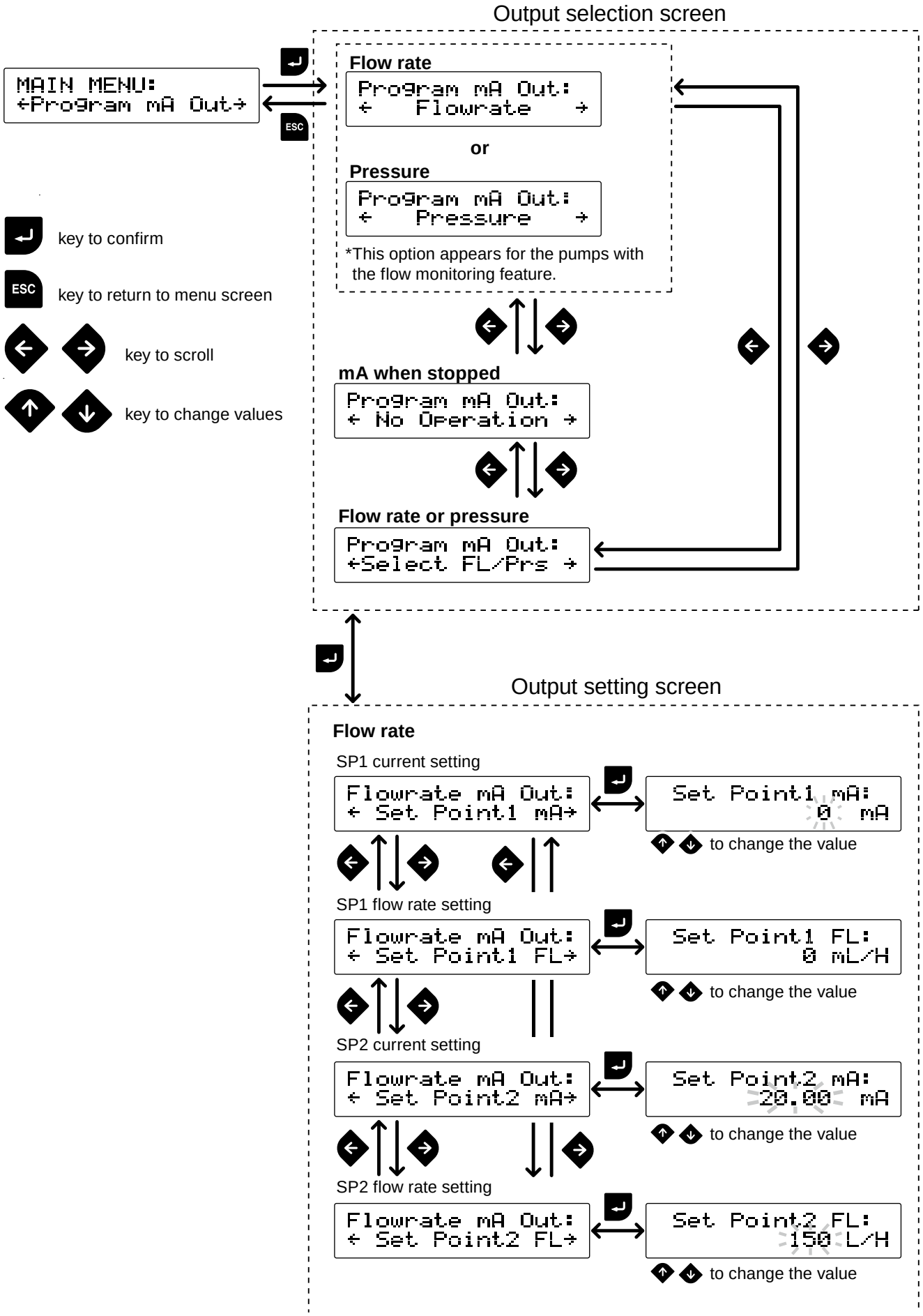
Flow monitoring



*The higher the value, the more stable the reading, but the less responsive.

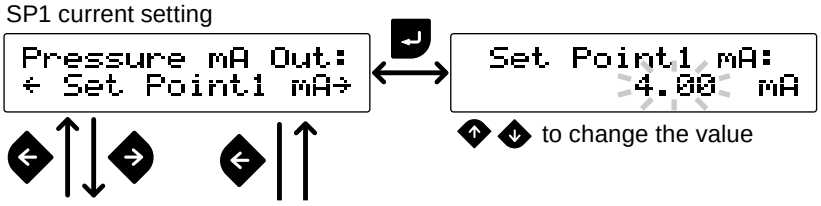
*The pump monitors pressure overload (see page 23) regardless of whether the feature is enabled or disabled. The difference is that monitoring accuracy is improved when the internal sensor is enabled.

■ Analogue output setting

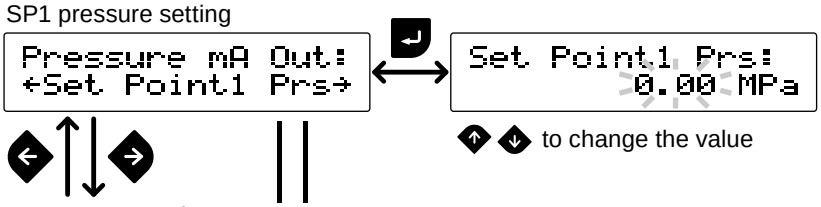


Pressure

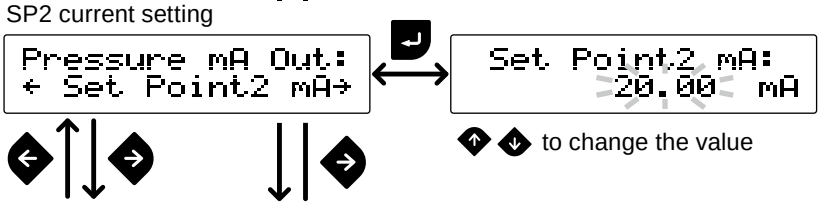
SP1 current setting



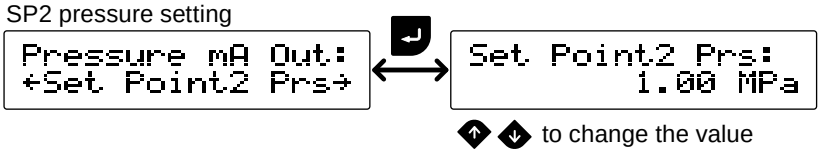
SP1 pressure setting



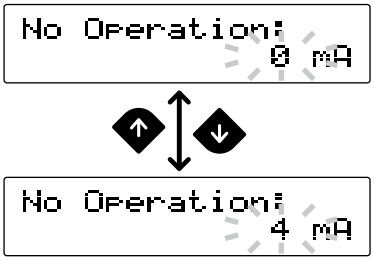
SP2 current setting



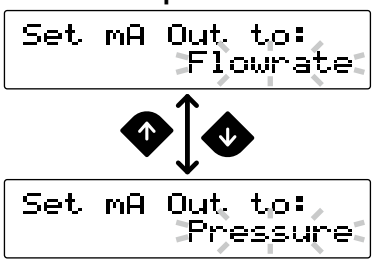
SP2 pressure setting



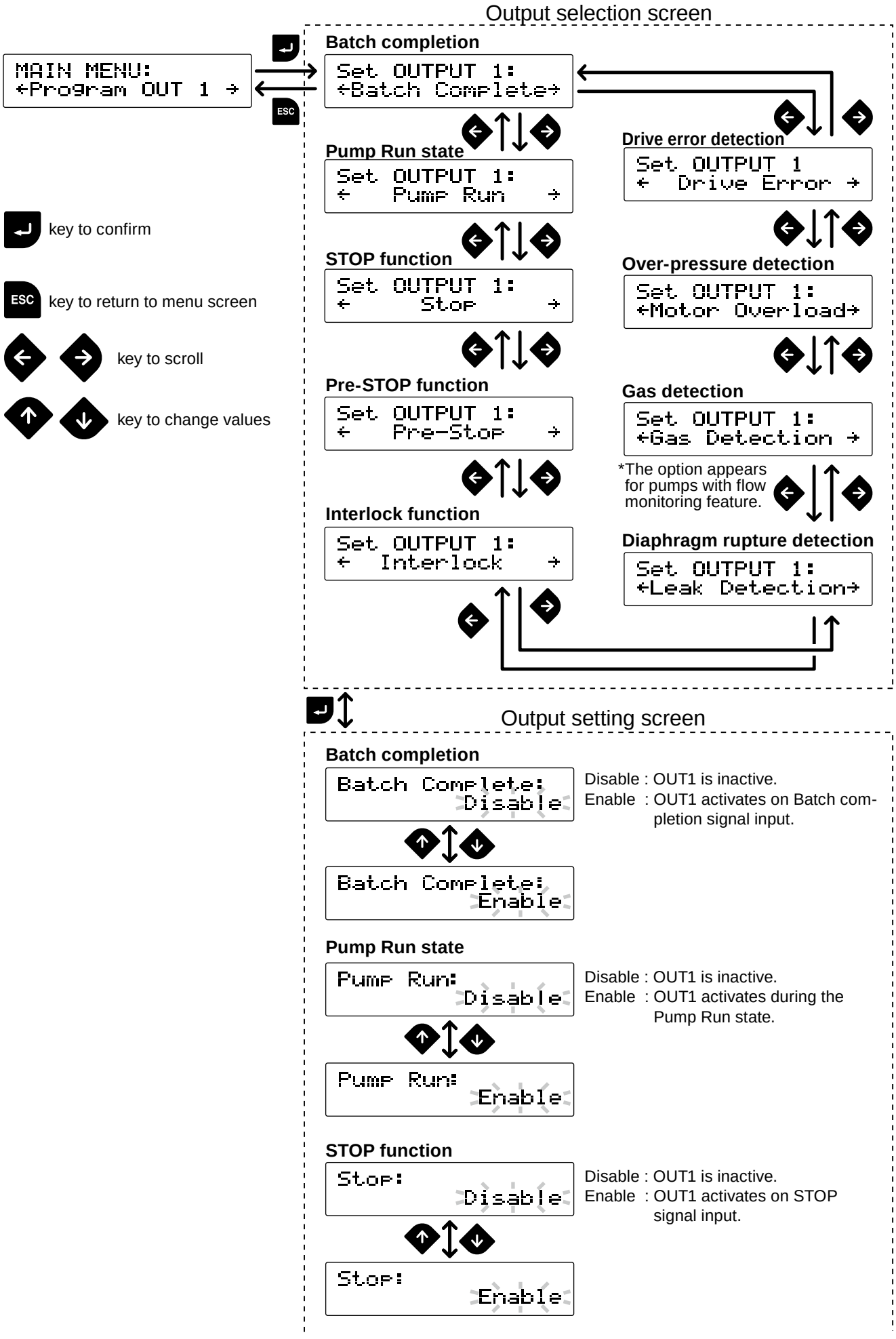
mA when stopped



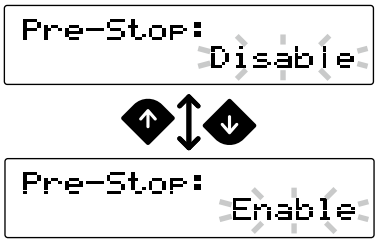
Flow rate or pressure



■ Alarm output setting (OUT 1)

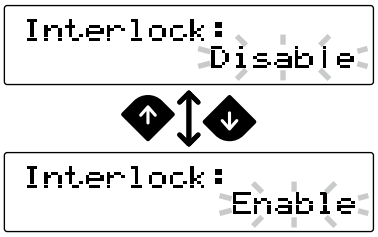


Pre-STOP function



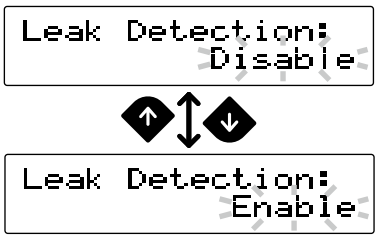
Disable : OUT1 is inactive.
Enable : OUT1 activates on Pre-STOP signal input.

Interlock function



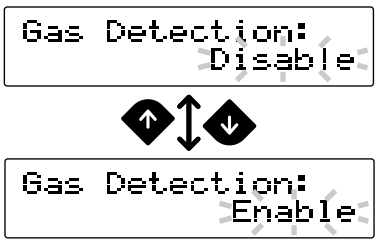
Disable : OUT1 is inactive.
Enable : OUT1 activates on Interlock signal input.

Diaphragm rupture detection



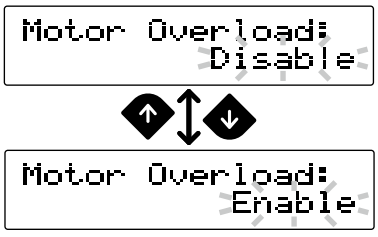
Disable : OUT1 is inactive.
Enable : OUT1 activates on the detection signal input.

Gas detection



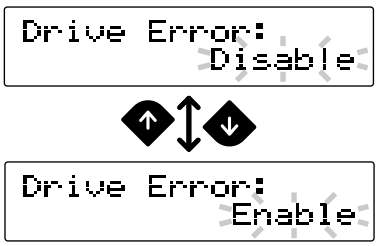
Disable : OUT1 is inactive.
Enable : OUT1 activates on the detection signal input.

Over-pressure detection



Disable : OUT1 is inactive.
Enable : OUT1 activates on the detection signal input.

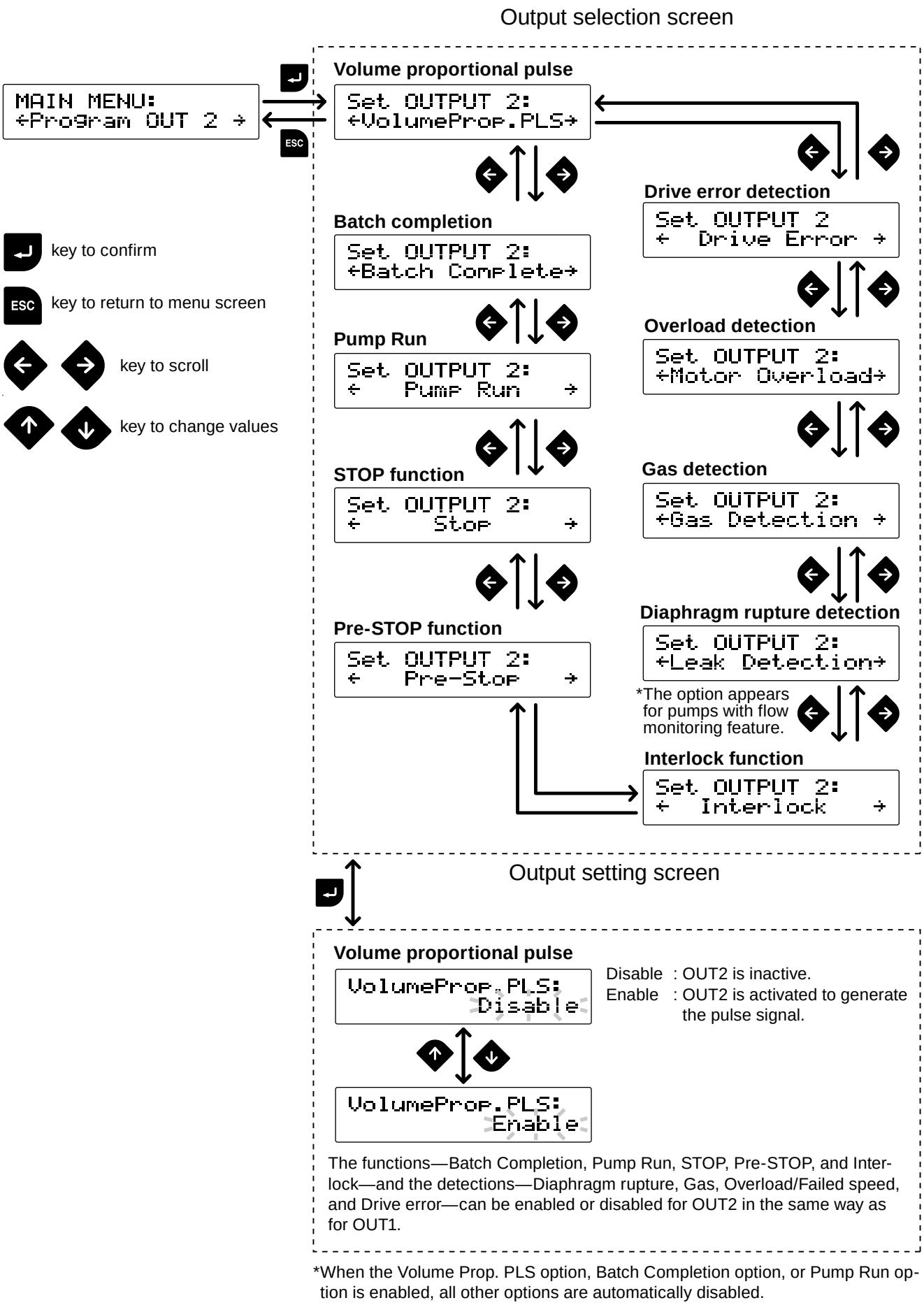
Drive error detection



Disable : OUT1 is inactive.
Enable : OUT1 activates on the detection signal input.

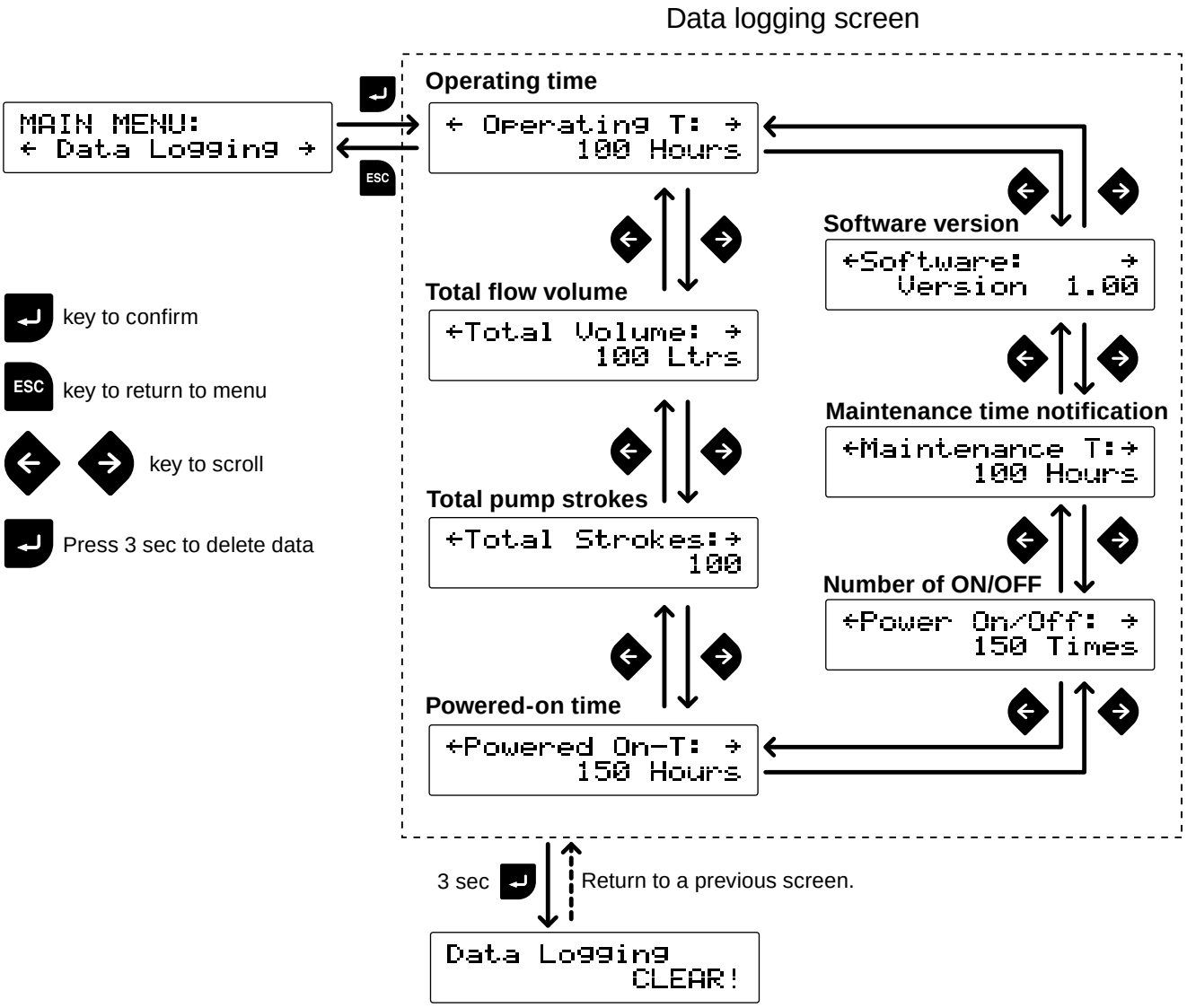
*When either the Batch Completion option or the Pump Run option is enabled, other options are disabled automatically.

■ Alarm output setting (OUT 2)



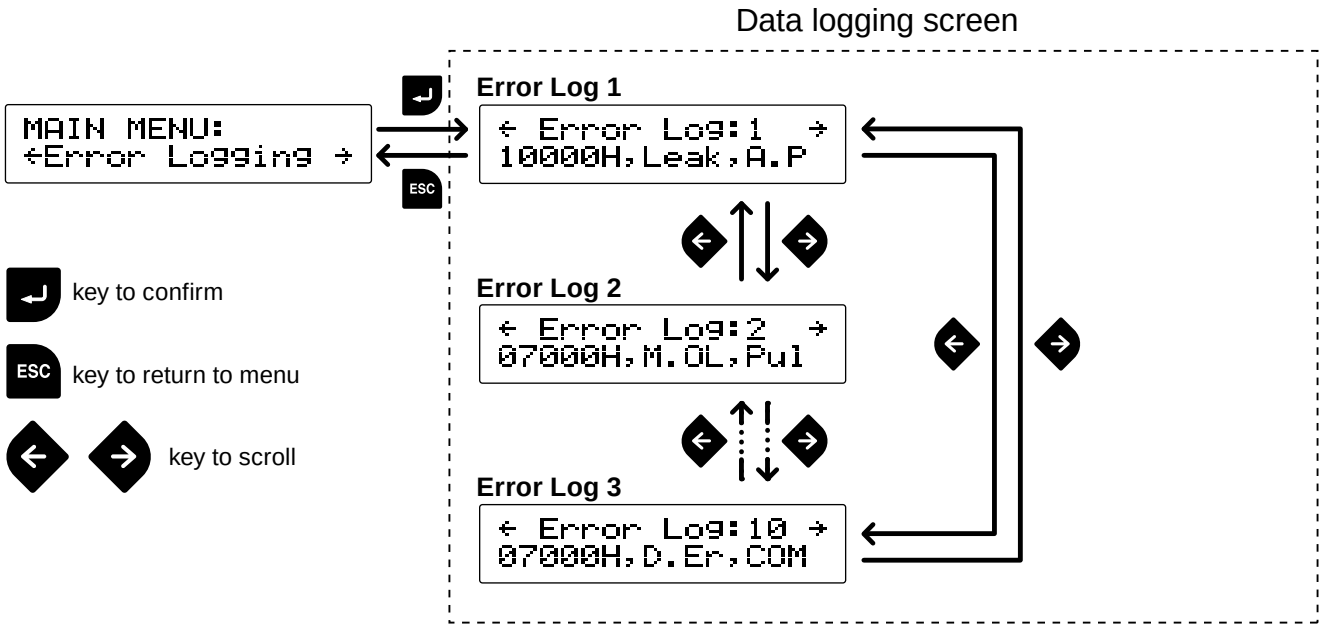
*When the Volume Prop. PLS option, Batch Completion option, or Pump Run option is enabled, all other options are automatically disabled.

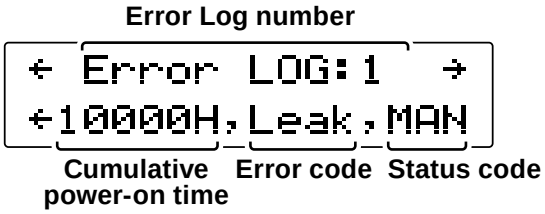
■ Data logging



*A selected data will be cleared except the version information.

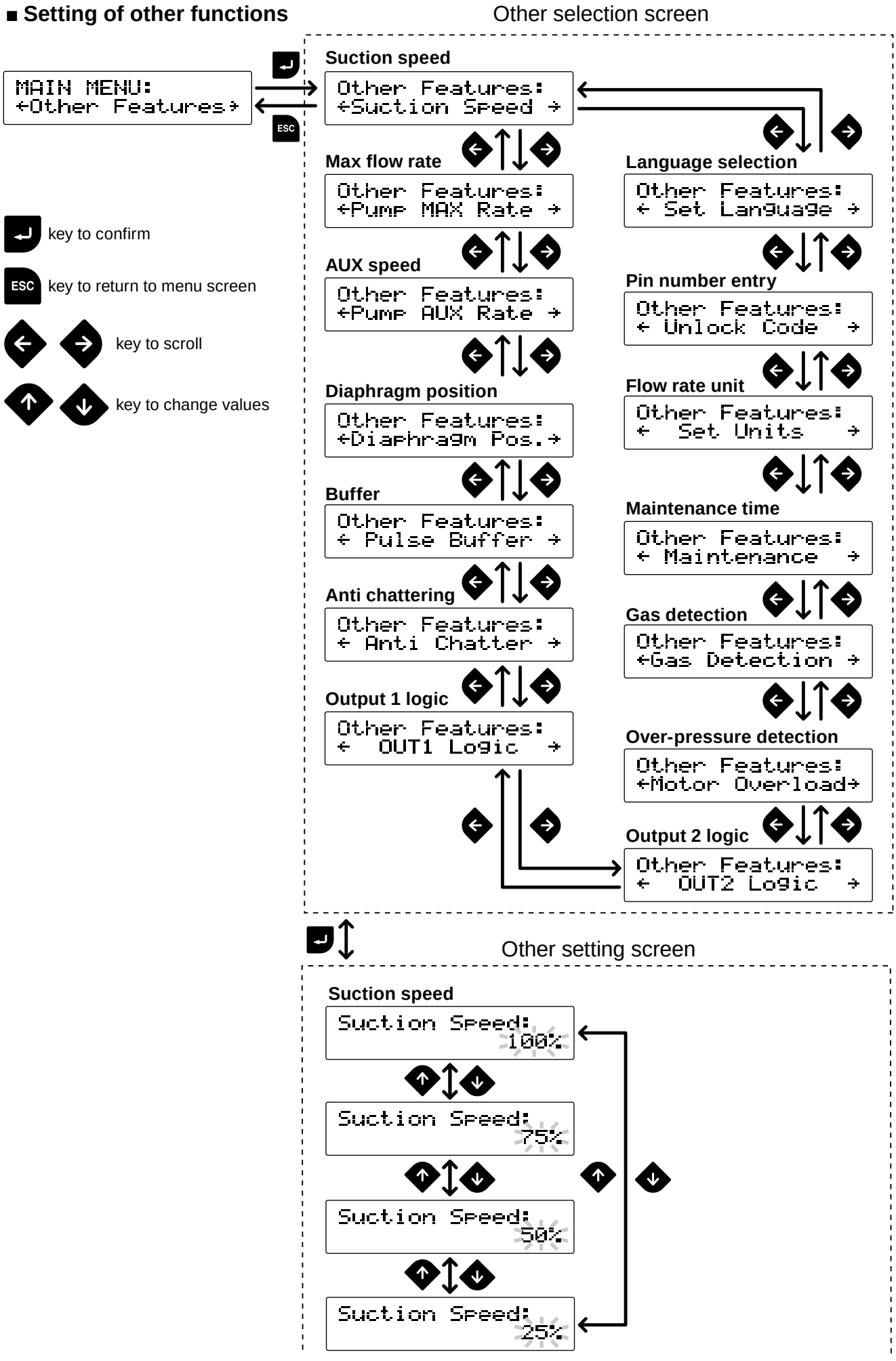
■ Error logging



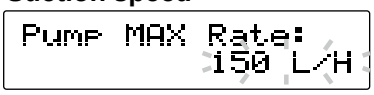


Error information		Pump status	
Code	**Details**	**Code**	**Mode**
Leak	Diaphragm rupture	MAN	Manual
M.OL	Over pressure	A.P	Analogue proportional control
Drv	Drive error	A.V	Analogue variable control
Gas	Gas from volatile liquid/ Air entrainment	Pul	Pulse control
Rst.	Reset	Bat.	Batch control
INIT	Pump initialized (when powered on)	INT	Interval batch control
		COM	Communication control
		WAI	MAN/EXT mode selection (standby)

■ Setting of other functions



Suction speed



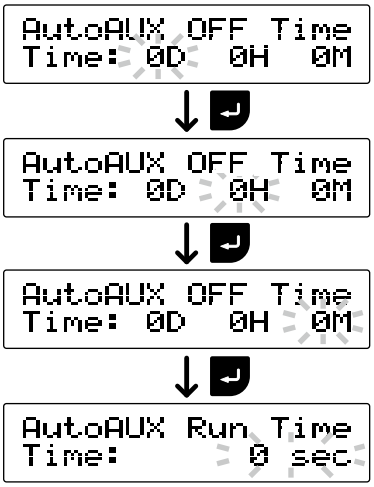
Set the flow rate.

AUX speed



Set the AUX speed.

Auto AUX



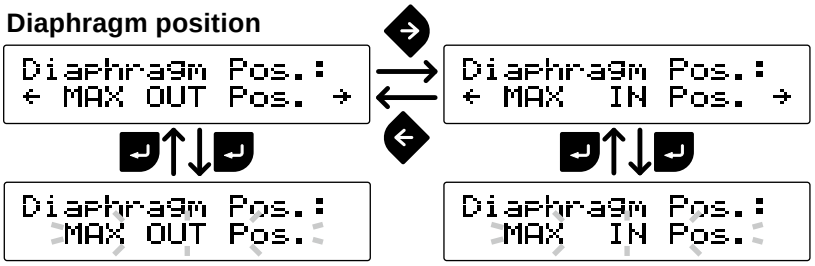
Number of days to wait

Hours to wait

Minute to wait

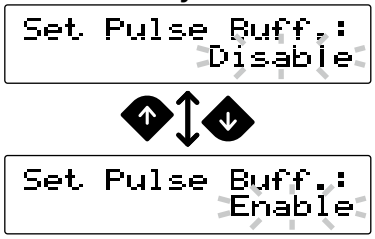
Set the Auto AUX run time.

Diaphragm position



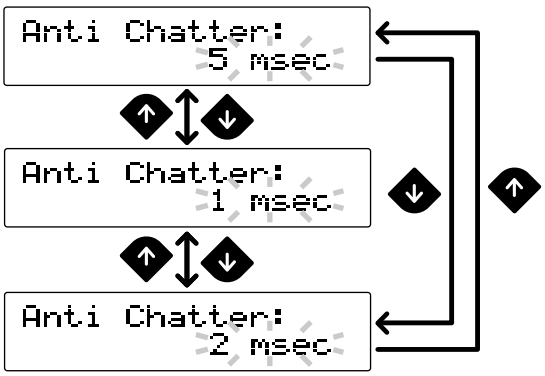
MAX OUT Pos. : The diaphragm comes to the top dead point.
MAX IN Pos. : The diaphragm comes to the bottom dead point.
Either one of the above indication keeps flashing as long as the diaphragm is at either end. See page 80 for diaphragm replacement.

Buffer memory

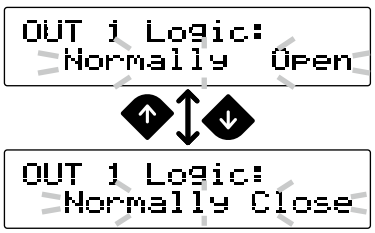


<To next page>

Anti chattering

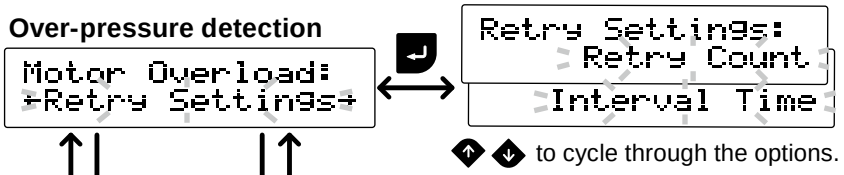


Output 1 logic

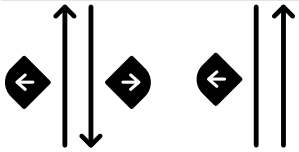


*Choose Output 2 logic following the same method as Output 1.

Over-pressure detection

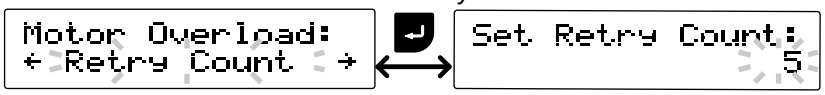


to cycle through the options.



Recovery count mode

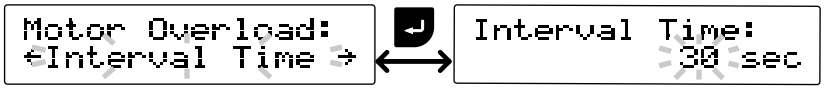
Enter the allowable maximum recovery count.





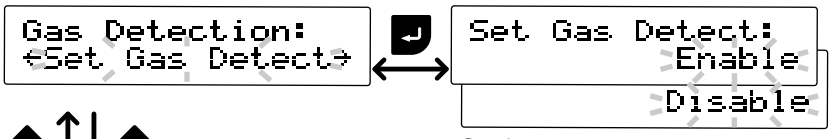
Recovery time mode

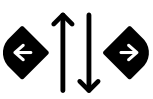
Set the recovery time for the pump to restart.



Gas detection

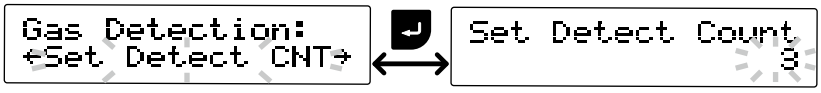
*This option appears for the pumps with the flow monitoring feature.



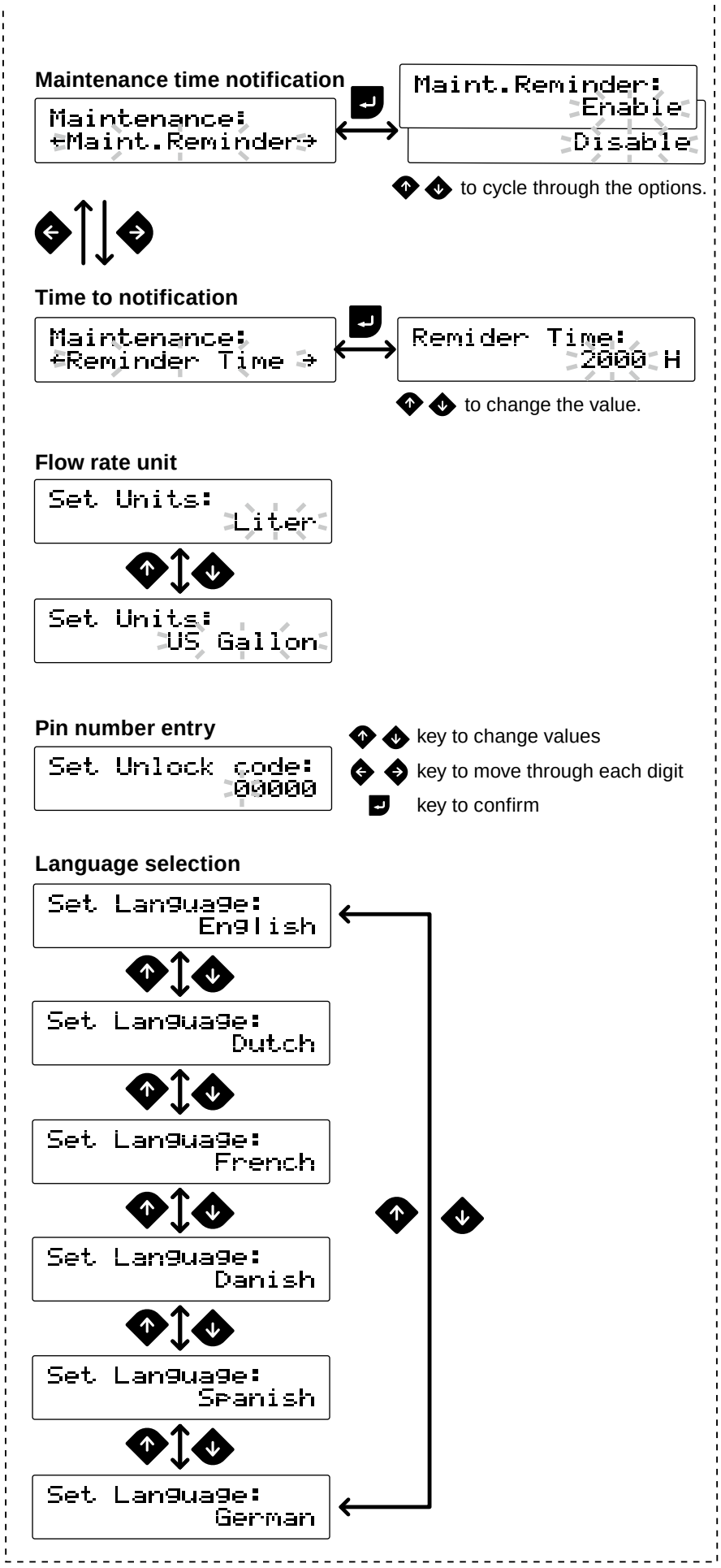


to cycle through the options.

Gas detection count



to change the value.


Maintenance time notification
Maintenance:
←Maint.Reminder→
Maint.Reminder:
Enable
Disable
to cycle through the options.
Time to notification
Maintenance:
←Reminder Time →
Remider Time:
2000 H
to change the value.
Flow rate unit
Set Units:
Liter
Set Units:
US Gallon
Pin number entry
Set Unlock code:
00000
key to change values
key to move through each digit
key to confirm
Language selection
Set Language:
English
Set Language:
Dutch
Set Language:
French
Set Language:
Danish
Set Language:
Spanish
Set Language:
German

Operation

Read this section before operation.

Manual operation

Run or stop the pump by keypad operation.

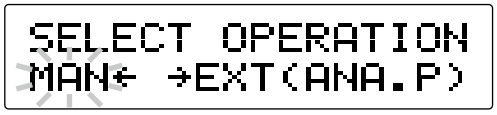
1 Supply the rated power voltage to the pump.

The white LED bar flashes and the pump turns on.

*The pump enters the MAN/EXT selection mode when the power is turned on with the factory default setting.

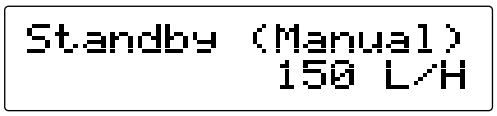
2 Push the ESC key to enter the MAN/EXT selection mode.

Push the start/stop key to stop operation and then the ESC key if the IX is running in the MAN mode.



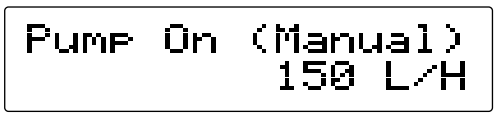
3 Push the left key to select the “MAN” option and the enter key for confirmation.

The pump enters a waiting state. Use the UP and DOWN keys to set the flow rate.



4 Push the start/stop key to run the pump in the MAN mode.

The green LED bar lights/runs during operation.



EXT operation

The pump operation is controlled with the external signal.

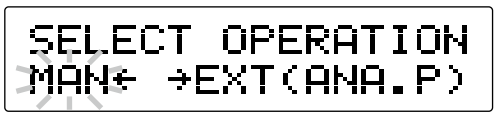
1 Supply the rated power voltage to the pump.

The white LED bar flashes and then lights in the EXT mode.

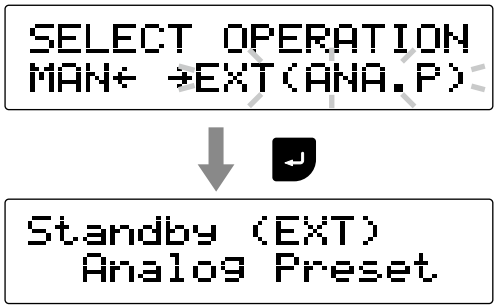
*The pump enters the MAN/EXT selection mode when the power is turned on with the factory default setting.

2 Push the ESC key to enter MAN/EXT selection mode.

Push the start/stop key to stop operation and the ESC key if the IX is running in the EXT mode.



3 Push the right key to select “EXT” and the enter key for confirmation.



Waiting state display

*The pump enters the analogue preset, analogue variable, pulse, batch, interval batch, or Profibus mode.

4 Push the start/stop key to start the EXT operation. The pump runs along with operation settings and the external signal. Pushing the same key again stops operation.

In the analogue preset/variable control mode, the current value will show up when the → key is pushed. Push the ← key to return.



The green LED lights/runs during operation.

AUX function

Operation at an AUX speed starts while receiving the external signal via the AUX terminal when the IX is running in manual mode or EXT mode. Set an AUX speed before operation. See page 65 for details.

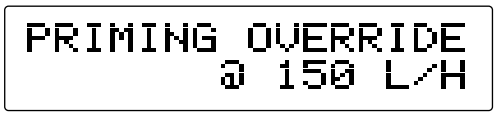
Priming function

This key operation runs the pump at the preset maximum flow rate.

1 Press and hold both the UP and DOWN keys.

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

*This function is available at any time when the pump is in the waiting mode or the operation mode.



Keypad lock

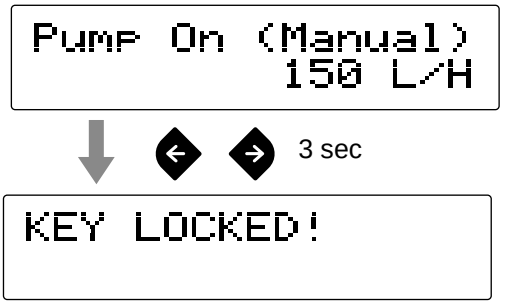
Keypad lock can be active for the prevention of erroneous key operation.

NOTE

Any key operation is not acceptable when the keypad lock is active. In an emergency, however, pressing the start/stop key for two seconds or a longer period will stop the pump. Enter the PIN number to unlock keypads before resuming operation. Keypads can be locked at any time except when the menu screen is opened.

■ Keypad lock activation

1 Press and hold both the right and left keys for 3 seconds.



"KEY LOCKED!" appears on the screen for one second.

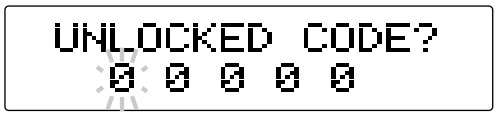
*This indication comes up every time any key is pushed.

■ Keypad lock release

1 Push the ESC key.



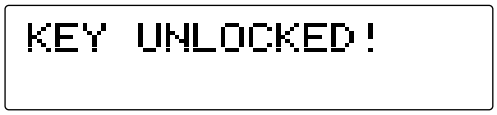
2 Enter the PIN number.



key to change value

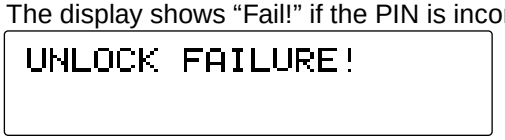
key to move through each digit





The display shows “Fail!” if the PIN is incorrect.

or



■ Emergency stop

1 Press and hold the start/stop key for 2 seconds to stop the pump.

Unlock keypads to resume operation.

Maintenance

This section describes troubleshooting, maintenance, wear part replacement, exploded views and specifications.

Points to be observed

Observe the following points during maintenance work:

- Observe instructions in this manual for maintenance, inspection, disassembly and assembly. Do not take apart 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 SDS 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, so the pump can save the stop command for sure. If the stop command is not saved properly, the pump may unintentionally start to run when it is powered on.

NOTE

- It's not the manufacturer's responsibility for any failure due to corrosion or erosion occurred in your operating condition.
- For the need of repair, contact your distributor of Iwaki or the manufacturer of equipment in which our product is built.
- Be sure to drain chemicals and flush 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 remove problems, contact your nearest distributor.

States	Possible causes	Solutions
Pump does not run (the LED bar does not light, or the screen is blank.).	Power voltage is too low.	• Observe the allowable voltage range of 90-264VAC.
	The pump is not powered.	• Check the pump is switched on. • Correct wiring. • Replace a broken wire with a new one.
Liquid can not be pumped up.	Air lock in the pump	• Expel air. See page 42.
	Entrained air from a suction line connection	• Fix the connection/reroute the suction line as necessary.
	A missing O ring from a valve set.	• Fit the O ring to the valve set.
	Debris is stuck in the pump head valves.	• Disassemble, inspect and clean the valves. Replace as necessary.
	A valve ball is stuck on a valve seat.	• Disassemble, inspect and clean the valves. Replace as necessary.
	A valve seat has been pressed in the valve guide.	• Do not push the valve seat into the valve guide. See page 79.
A flow rate fluctuates.	Air trapped in the pump head.	• Expel air. See page 42.
	Overfeeding occurs.	• Mount a back pressure valve to keep the discharge line pressure constant.
	Debris is stuck in the pump head valves.	• Disassemble, inspect and clean the valves. Replace as necessary.
	The diaphragm is broken.	• Replace the diaphragm. See page 80.
	Pressure fluctuates at the injection point.	• Maintain the pressure constant by optimizing piping or by relocating the injection point. • Calibrate the pump using the actual liquid and in its intended operating environment.
Liquid leaks.	The nut is loose.	• Tighten the nut to fix the fitting.
	Loose fit of the pump head	• Retighten the pump head. See page 41.
	A missing O ring from a valve set.	• Fit O ring to the valve set. See page 79.
	The diaphragm is broken. A leak from the drain port (vent hole)	• Replace the diaphragm. See page 80.
Pump operates inadvertently.	Auto-AUX sequence is running in background.	• Refer to page 66 and verify Auto-AUX setting.

Error messages

Take measures below when any of the error messages appears during operation. Contact us or your nearest distributor as necessary.

Error messages	Possible causes	Measures
MOTOR OVERLOAD! S/S Key = Clear ⬍ shows up in turn CHECK PLUMBING BEFORE CLEARING!	The pressure overload protection is active.	• Check a discharge line for clogging and remove it as necessary. If this error happens during the transfer of high viscosity liquid, make a discharge line I.D. wider and its length shorter.
LEAK DETECTED! S/S Key = Clear	The diaphragm is broken.	• Replace the broken diaphragm with the new one. See page 80 for details.
DRIVE ERROR! S/S Key = Clear	Rotation control has failed.	• If this error state is removed by pushing the start/stop key, a possible cause is an instantaneous surge of discharge line pressure. Inspect/solve the problem and then restart. • If not, motor rotation detector failure or a blown fuse may occur. Contact us or your nearest distributor.
Pump On (Manual) GAS DETECTED	Air has been entrained in the suction line.	• Suction line end submerged below tank water level • No leaks in suction line • For gaseous liquid, increase recovery count to appropriate level or disable Gas detection via main menu (see page 64 for details)
Pressure(Manual) Overpressure!	Pressure exceeded the pump's rated value, so the internal sensor has been disabled.	• Check that the discharge line is not clogged or closed. • If high liquid viscosity is causing overpressure, use corrective measures such as installing a wider pipe or tubing.
Int.Sensor ERROR Enable → Disable	A faulty internal sensor makes the flow monitoring feature unusable.	• Contact us or your nearest distributor for assistance. • Setting the internal sensor option to 'Disable' temporarily resolves this error message. Refer to page 57 for details. • This message is not displayed on pumps without the flow-monitoring feature.

Inspection

Perform daily and periodic inspection to keep the best 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. See the "Troubleshooting" section as necessary. When wear parts come to the life limit, replace them with new ones. Contact us or your distributor for details.

No.	States	Points to be checked	How to check
1	Pumping	• If liquid is pumped.	Flow meter, pressure gauge or visual inspection
		• If discharge pressure is normal.	Pressure gauge
		• If liquid is deteriorated, crystallized or settled.	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	Entrained air from the pump head joints and the suction line	• If pumped liquid includes air bubbles, check the line for leakage and loose connection and retighten as necessary.	Visual or audio inspection

Periodic inspection

Retighten the pump head mounting bolts evenly to the following torque in diagonal order at regular intervals (every three months).

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

Tightening torque

Model code	Torque	Bolts	Number of bolts
IX-C150	12 N•m	M8 hexagon head bolt	8
IX-C060	3.5 N•m	M5 hexagon head bolt	6

Maintenance time notification

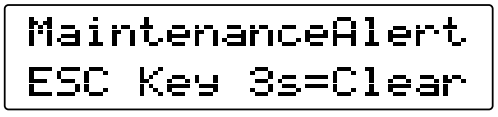
If this function is enabled, the pump displays the "Maintenance Alert" message to indicate that the user-settable time has elapsed and it is time to replace certain wear parts.

When this message appears, the cumulative operating time countdown is reset and the notification cycle is restarted from the beginning.

■ Cancelling notification

1 Press and hold the ESC for 3 seconds.

This operation cancels the notification status at any pump mode.



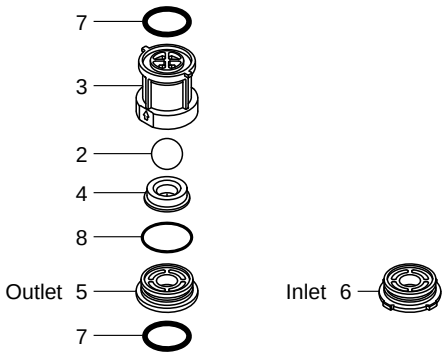
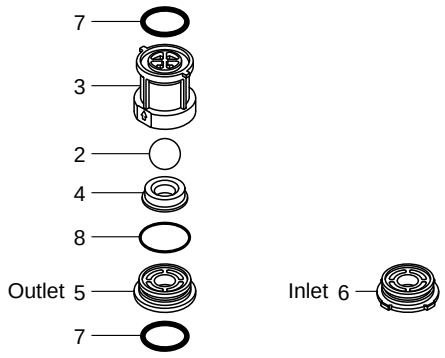
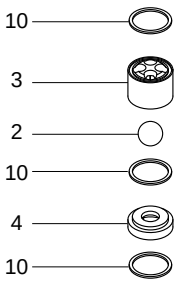
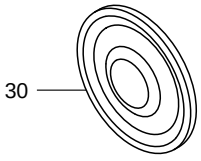
Wear part replacement

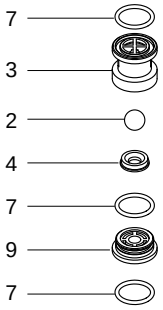
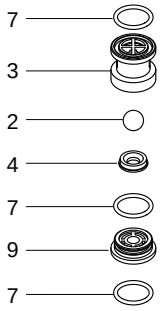
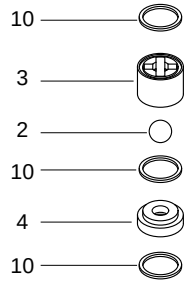
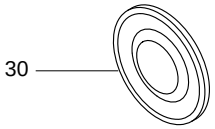
To run the pump for a long period, wear parts need to be replaced periodically.
It is recommended that the following parts are always stocked for immediate replacement.
Contact your nearest distributor for details.

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.
- Every time the pump head is disassembled, replace the diaphragm and the valve sets with new ones.

Wear part list

Pump head	Parts		# of parts	Estimated life
C150	Valve set TC type		2 sets (inlet/outlet)	8000 hours
	Valve set TE type		2 sets (inlet/outlet)	8000 hours
	Valve set S6 type		2 sets	8000 hours
	Diaphragm		1	4000 hours

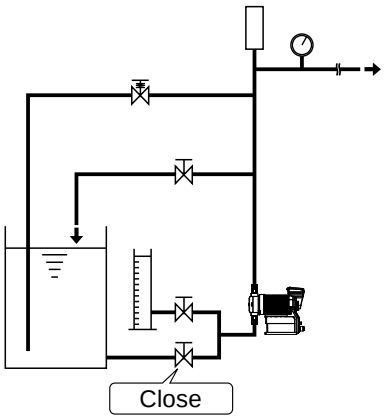
Pump head	Parts		# of parts	Estimated life
C150	Retainer		1	8000 hours
C060	Valve set TC type		2 sets	8000 hours
	Valve set TE type		2 sets	8000 hours
	Valve set S6 type		2 sets	8000 hours
	Diaphragm		1	4000 hours
	Retainer		1	8000 hours

*Wear part duration varies with the pressure, temperature and characteristics of liquid.
*The estimated life is calculated based on pumping clean water at ambient temperature.

Before replacement

1 Stop the pump operation.

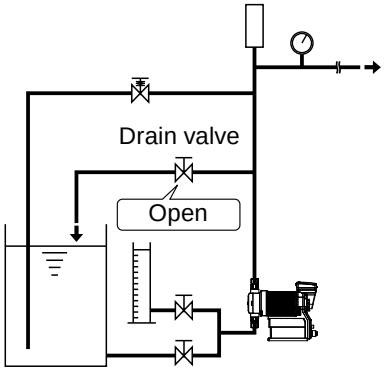
2 Close the suction line.



3 Open the drain valve to release liquid out of the discharge line.

NOTE

Open the valve gradually. Solution flows out fast if solution in the discharge line is under pressure.



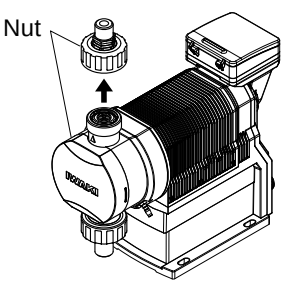
Valve set replacement

1 Remove pipes from the pump.

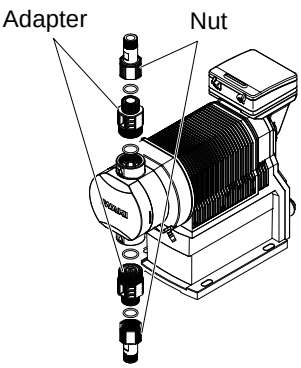
NOTE

- Be careful not to get wet with residual chemicals in piping.
- Rinse chemicals or crystals off the parts as necessary.
- Use care handling the valve set. Do not drop it especially when the suction pipe is removed from the pump inlet.
- For the IX-C 060 with TC/TE wet ends, remove the nuts while holding the adapter with a spanner.

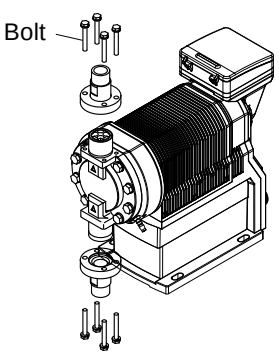
IX-C150 TC/TE



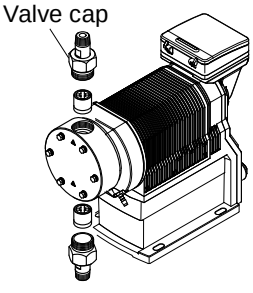
IX-C060 TC/TE



IX-C150 S6

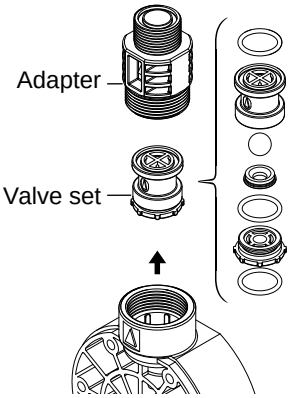


IX-C060 S6



2 Take out valve sets from the pump head and take them apart to replace worn parts as necessary.

Clean the pump head as necessary.

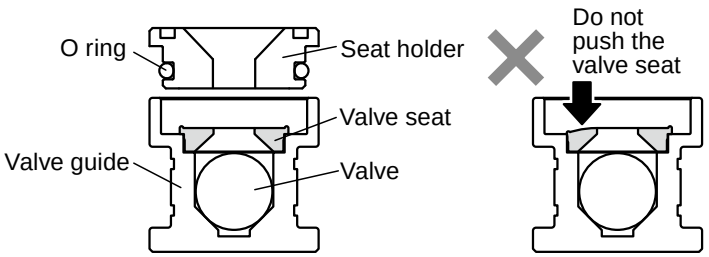


3 Reassemble and remount the valve sets in the pump head.

Observe the mounting order and direction of valve set components. See the exploded view as well.

NOTE

- Observe the mounting direction of the valve set.
- The valve seat must be held in the Valve guide by the seat holder when assembling an IX TC/TE type valve set. Do not push the valve seat down into the valve guide. Otherwise, a leak may result.



4 Secure the valve sets in the pump head.

- For IX-C060 TC/TE R/N/F, tighten the IN adapter (17) and the OUT adapter (18) to 4.4 Nm to secure the discharge-side valve set and suction-side valve set. Since it is made of resin, be careful not to overtighten.
- For IX-C150 S6 R/N, tighten the setting flange (55) to 5.0 N•m to secure the valve sets.
- For IX-C150 S6 FJ/FD/FA, tighten the flange unit (45) to 5.0 N•m to secure the valve sets.
- For IX-C060 S6 R/N, tighten the valve cap (13) to 25 N•m to secure the valve sets.
- For IX-C060 FJ/FD/FA, tighten the valve cap (13) of the flange unit (45) to 25 N•m to secure the valve sets.

5 Connect pipes and the pump.

Diaphragm replacement

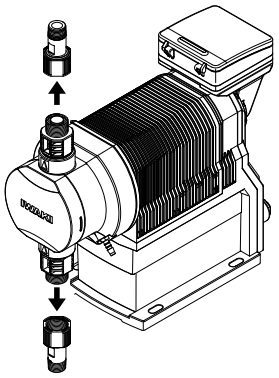
Necessary tools

- 13 mm (C150) or 8 mm (C060) spanner
- Torque wrench

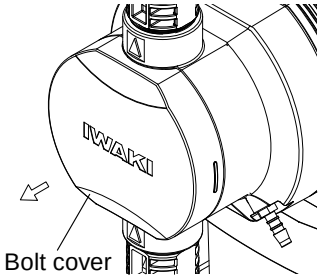
1 Remove pipes from the pump.

NOTE

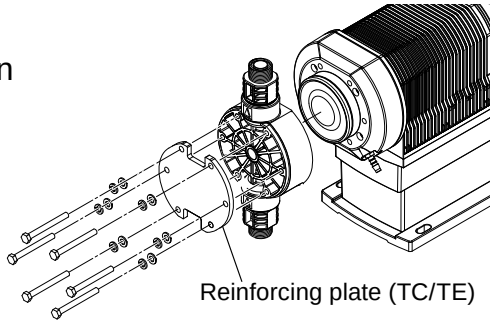
- Use care handling the valve set. Do not drop it especially when the suction pipe is removed from the pump inlet.
- Be careful not to get wet with residual chemicals in the pump head or the discharge pipe.



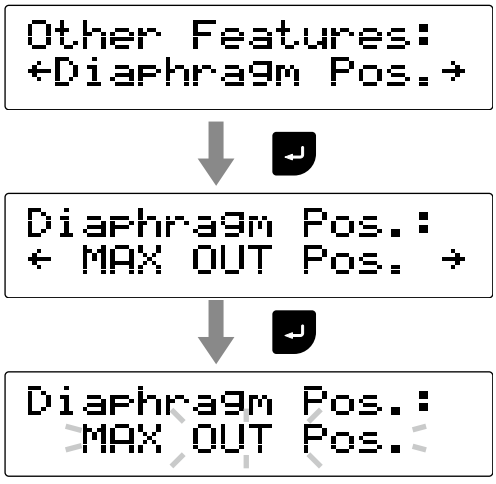
2 Remove the bolt cover (pumps with TC/TE wet ends).



3 Use the 13 mm or 8 mm spanner to remove the eight M8 bolts (IX-C150) or the six M5 bolts (IX-C060), then detach the pump head from the reinforcing plate.



4 Extend the plunger by keypad operation.

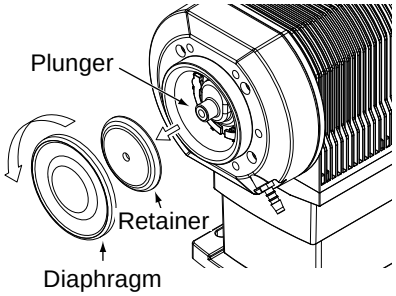


Select the “Diaphragm Pos.” option through the menu screen and push the enter key. See page 65 for details.

Select the “MAX OUT Pos.” option with the right and left keys and push the enter key.

The diaphragm extends to the maximum and the “MAX OUT Pos.” option blinks on the screen.

5 Rotate and remove the Diaphragm and Retainer.



6 Clean the retainer or replace it with a new one. Apply the grease (Dow Corning Toray MOLYKOTE® HP-500) on its surface and the screw burning protective agent to the shaft of a new diaphragm.

7 Fit a new diaphragm and the retainer into the plunger.

Slide the retainer, dome end first, onto the diaphragm shaft. And then screw the shaft into the plunger and tighten it until bottoms out and will not turn further.

NOTE

If it is fitted loose, failure may result.

8 Retract the plunger by keypad operation.

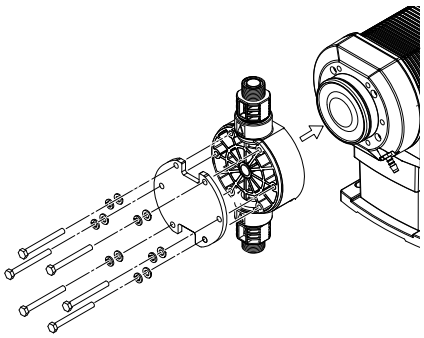
Diaphragm Pos.: MAX OUT Pos.	Push the enter key.
Other Features: ←Diaphragm Pos.→	Select the “Diaphragm Pos.” option and push the enter key.
Diaphragm Pos.: ← MAX OUT Pos. →	Select the “MAX IN Pos.” option with the right and left keys.
Diaphragm Pos.: ← MAX IN Pos. →	Push the enter key.
Diaphragm Pos.: MAX IN Pos.	The diaphragm contracts and the “MAX IN Pos.” option flashes.

9 Mount the pump head.

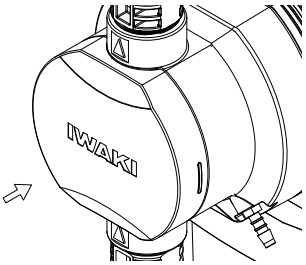
Tighten the bolts evenly to 12 N•m for the C150 or 3.5 N•m for the C060 in diagonal order.

NOTE

- Check the plunger has contracted to the full before mounting the pump head, or a leak or damage may result.
- Note that the reinforcing plate, which is installed on pumps with TC/TE wet ends, has a specific mounting direction.



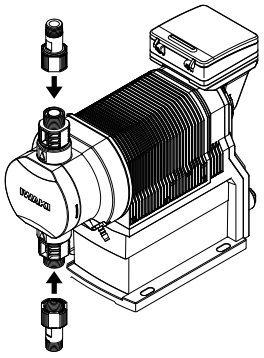
10 Remount the bolt cover (pumps with TC/TE wet ends).



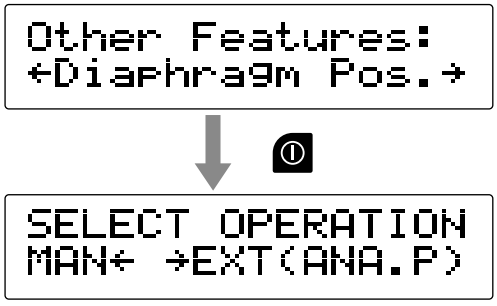
11 Connect pipes to the fittings and then tighten the nuts.

NOTE

- Check if the valve set mounting direction is correct. Both the valve sets must be oriented to the same direction.
- Make sure O rings and gaskets are fitted properly.
- For the pumps with TC or TE wet ends, do not use excessive force when tightening the plastic nut.



12 Go back to the waiting state.



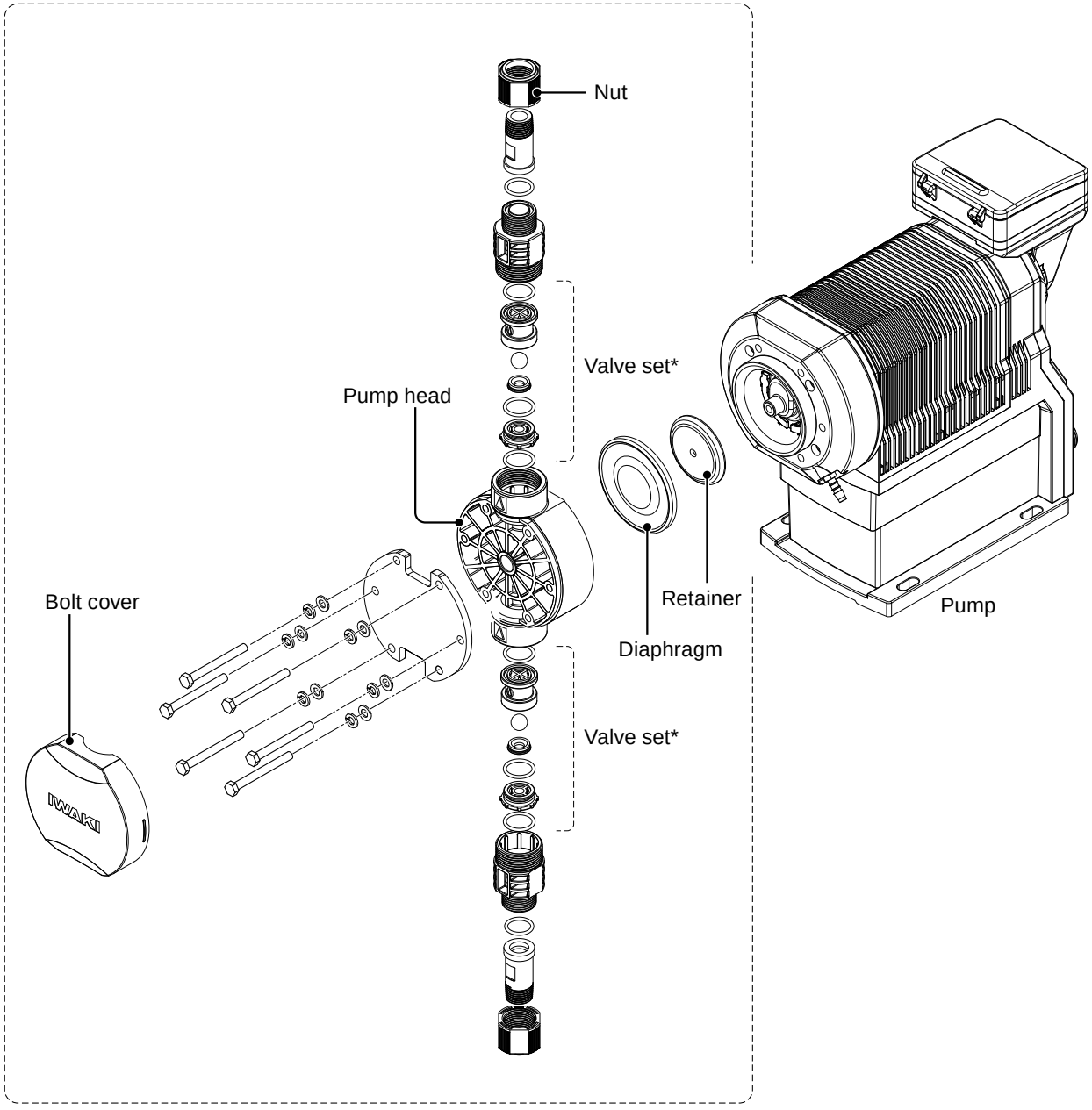
Push the enter key once to return.

Push the start/stop key to return to the MAN/EXT selection.

Exploded view

Pump head, Drive unit & Control unit

Do not disassemble the pump beyond the extent shown in the diagram below.

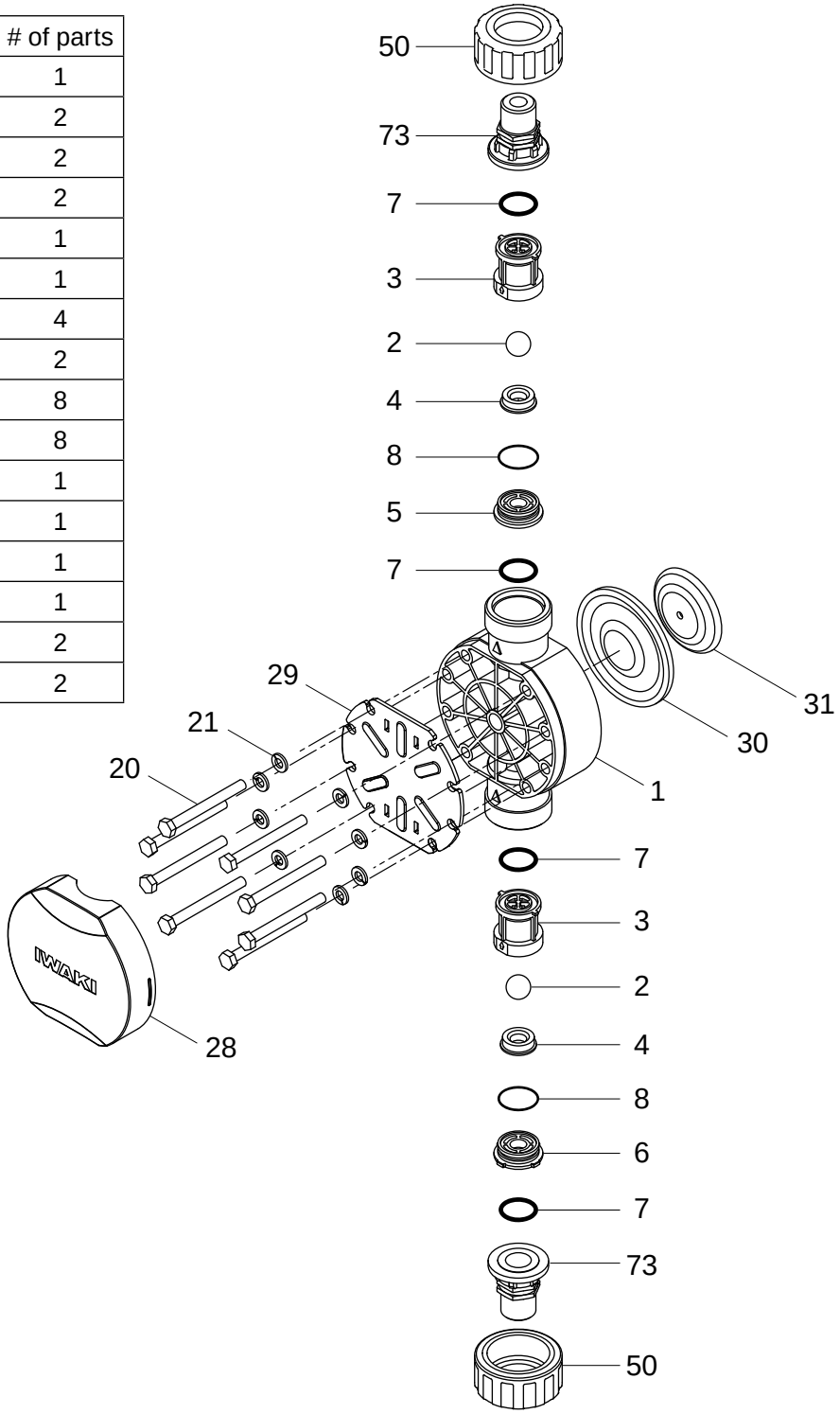


*Valve set sizes and materials vary by model.

Pump head

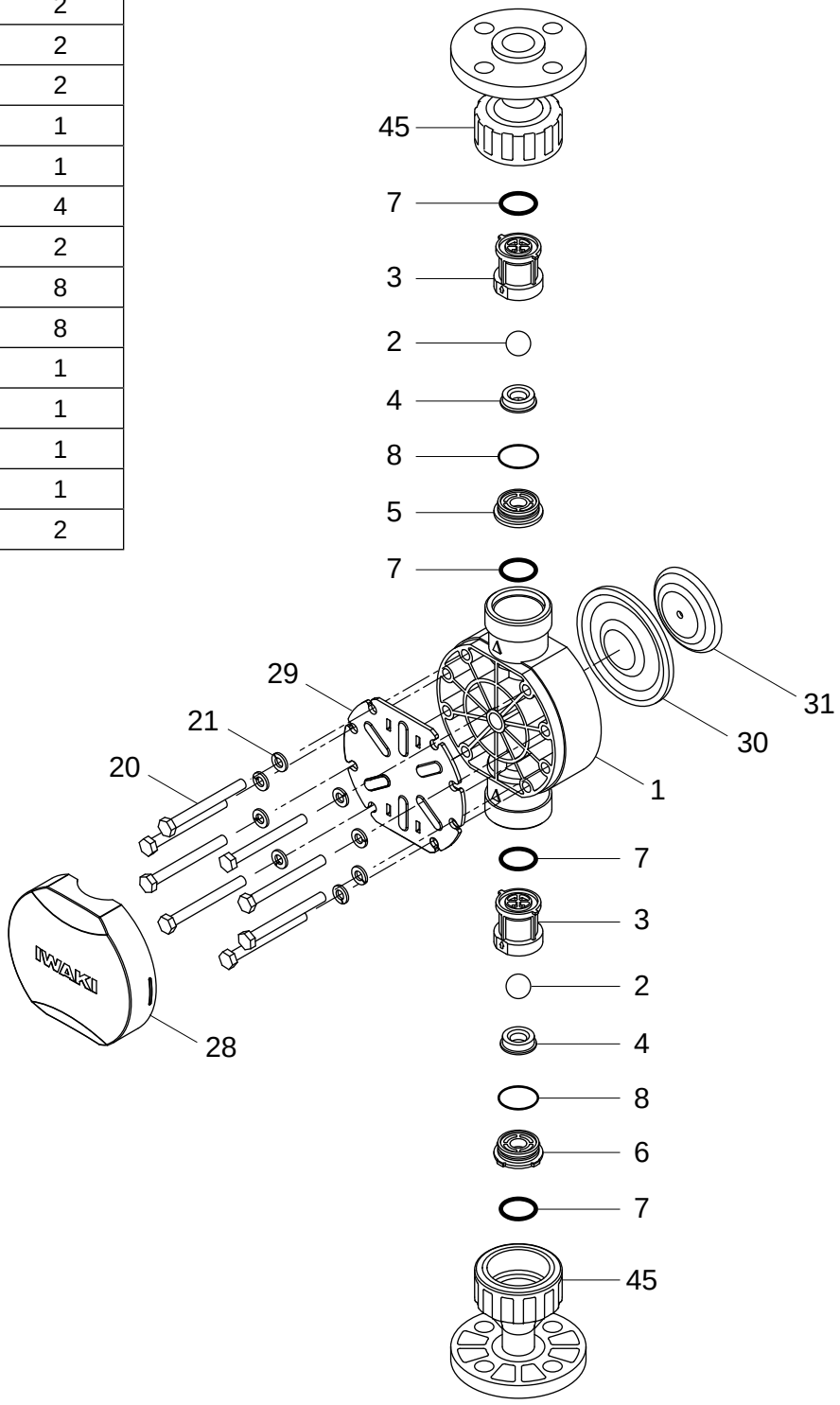
■ IX-C150 TC/TE R/N

No.	Part names	# of parts
1	Pump head	1
2	Valve	2
3	Valve guide	2
4	Valve seat	2
5	Out seat holder	1
6	In seat holder	1
7	O ring	4
8	O ring	2
20	Hexagon head bolt	8
21	Spring washer	8
28	Bolt cover	1
29	Reinforcing plate	1
30	Diaphragm	1
31	Retainer plate	1
50	Nut	2
73	Fitting	2



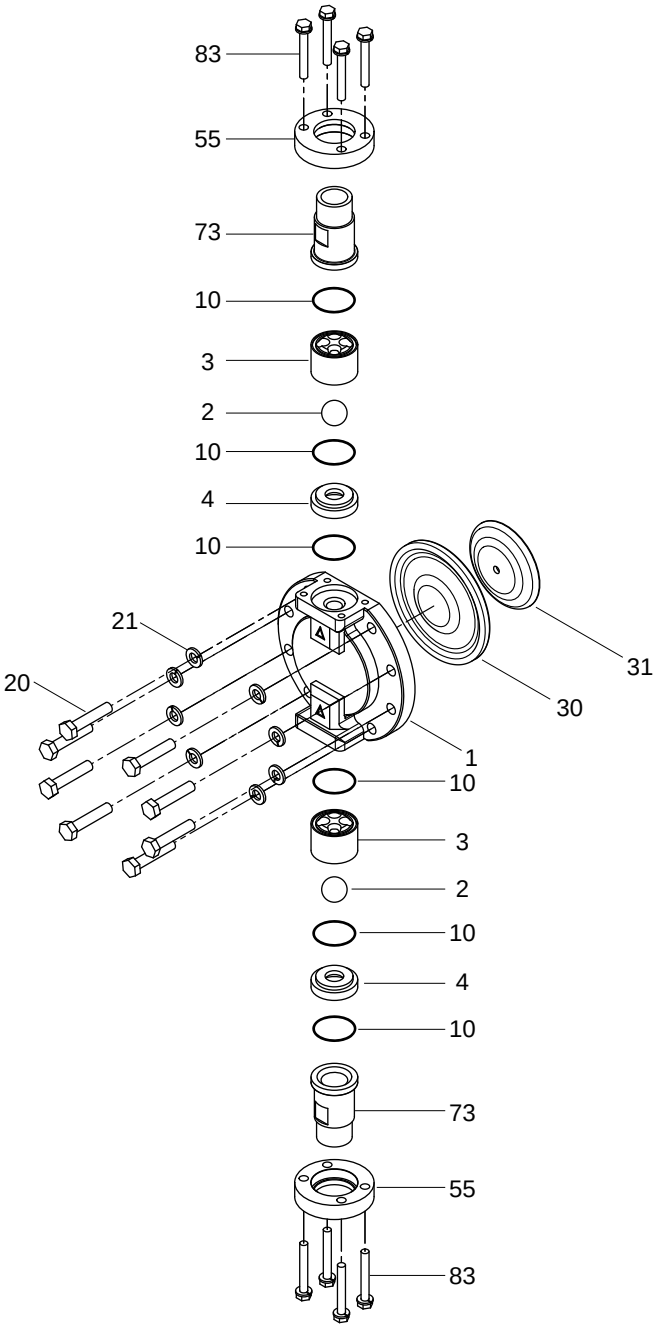
■ IX-C150 TC/TE FJ/FD/FA

No.	Part names	# of parts
1	Pump head	1
2	Valve	2
3	Valve guide	2
4	Valve seat	2
5	Out seat holder	1
6	In seat holder	1
7	O ring	4
8	O ring	2
20	Hexagon head bolt	8
21	Spring washer	8
28	Bolt cover	1
29	Reinforcing plate	1
30	Diaphragm	1
31	Retainer plate	1
45	Flange unit	2



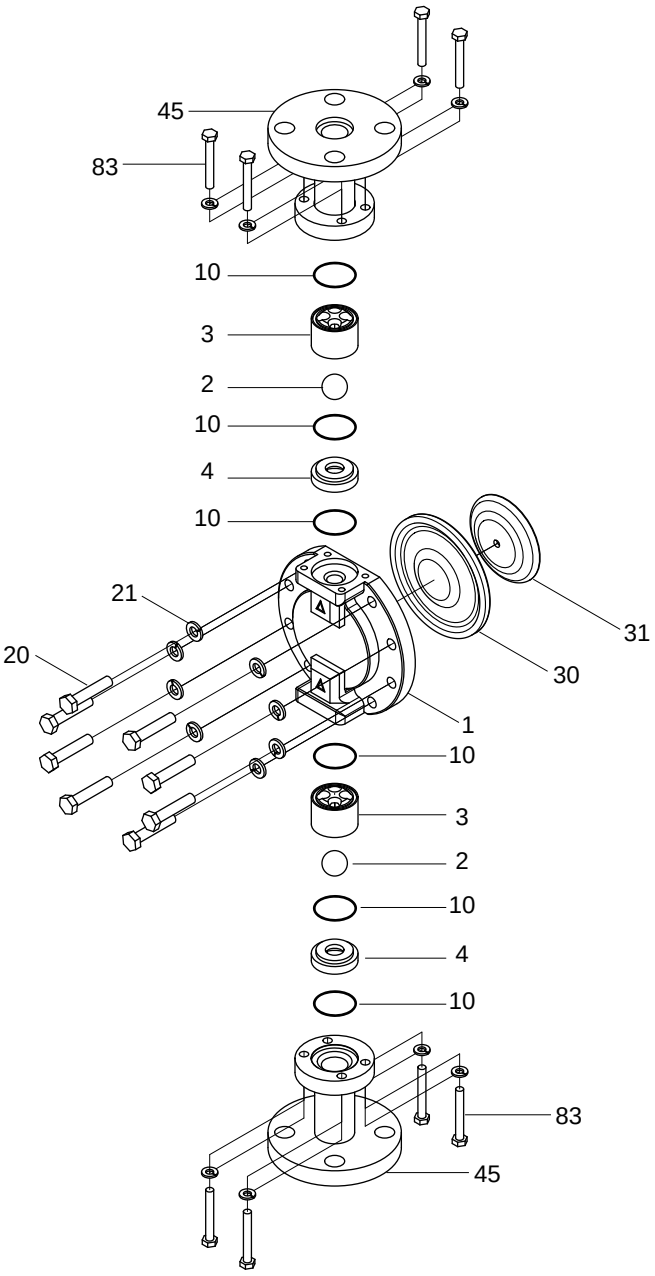
■ IX-C150 S6 R/N

No.	Part names	# of parts
1	Pump head	1
2	Valve	2
3	Valve guide	2
4	Valve seat	2
10	Valve gasket	6
20	Hexagon head bolt	8
21	Spring washer	8
30	Diaphragm	1
31	Retainer plate	1
55	Setting flange	2
73	Fitting	2
83	Hexagon head bolt	8



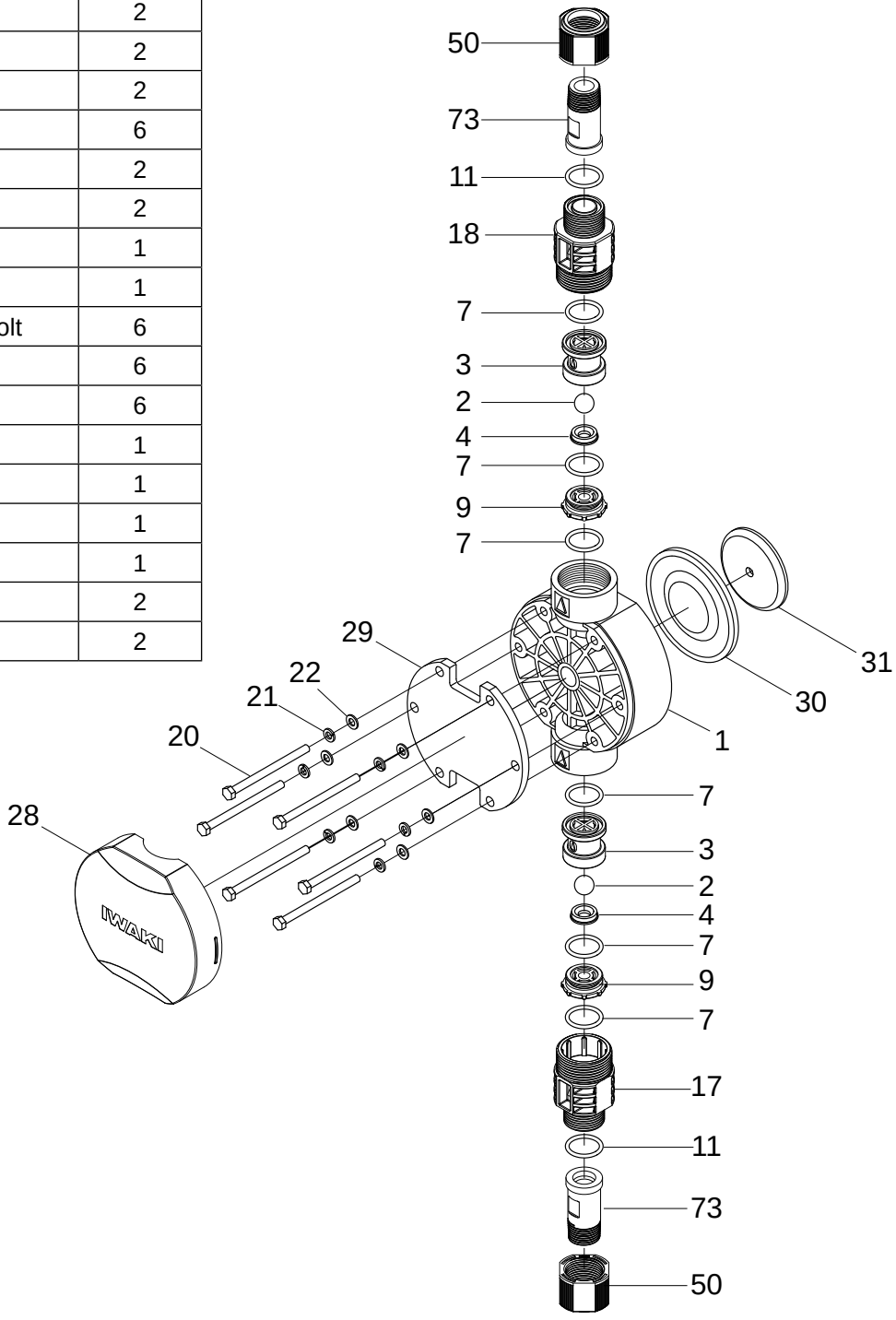
■ IX-C150 S6 FJ/FD/FA

No.	Part names	# of parts
1	Pump head	1
2	Valve	2
3	Valve guide	2
4	Valve seat	2
10	Valve gasket	6
20	Hexagon head bolt	8
21	Spring washer	8
30	Diaphragm	1
31	Retainer plate	1
45	Flange unit	2
83	Hexagon head bolt	8



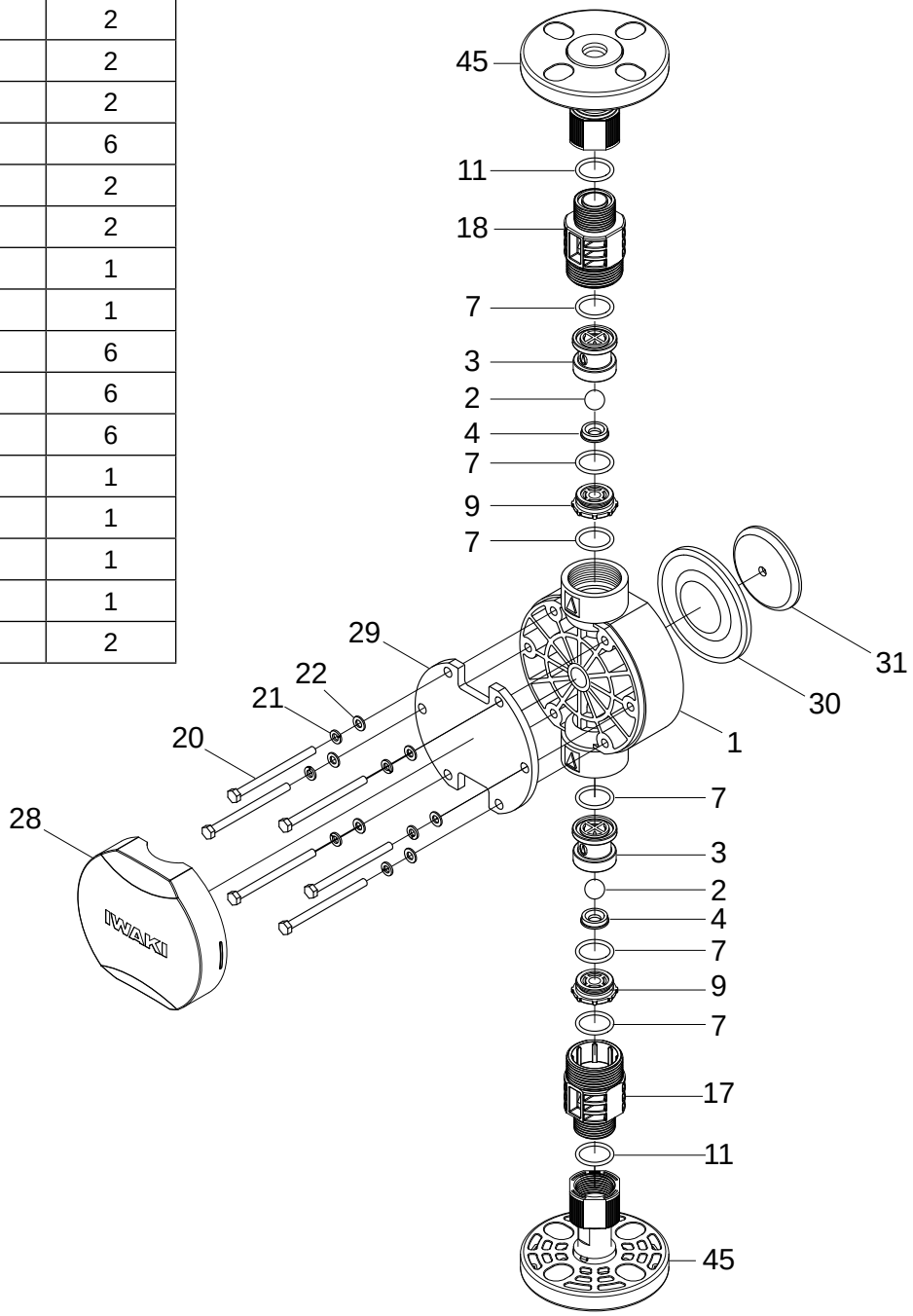
■ IX-C060 TC/TE R/N

No.	Part names	# of parts
1	Pump head	1
2	Valve	2
3	Valve guide	2
4	Valve seat	2
7	O ring	6
9	Seat holder	2
11	O ring	2
17	In adapter	1
18	Out adapter	1
20	Hexagon head bolt	6
21	Spring washer	6
22	Plain washer	6
28	Bolt cover	1
29	Reinforcing plate	1
30	Diaphragm	1
31	Retainer plate	1
50	Nut	2
73	Fitting	2



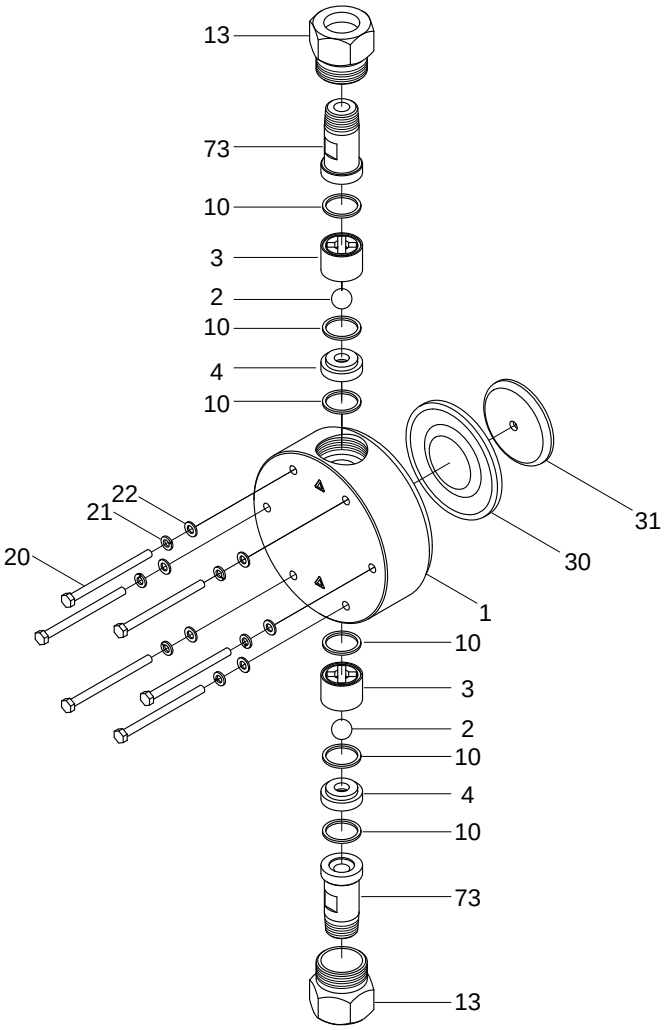
■ IX-C060 TC/TE F

No.	Part names	# of parts
1	Pump head	1
2	Valve	2
3	Valve guide	2
4	Valve seat	2
7	O ring	6
9	Seat holder	2
11	O ring	2
17	In adapter	1
18	Out adapter	1
20	Hexagon head bolt	6
21	Spring washer	6
22	Plain washer	6
28	Bolt cover	1
29	Reinforcing plate	1
30	Diaphragm	1
31	Retainer plate	1
45	Flange unit	2



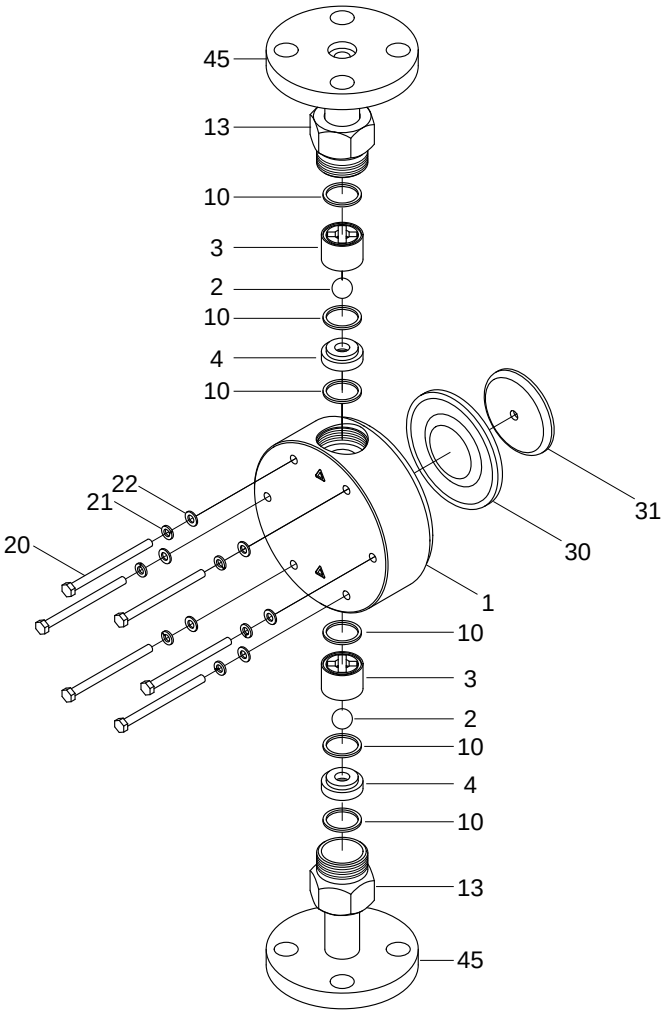
■ IX-C060 S6 R/N

No.	Part names	# of parts
1	Pump head	1
2	Valve	2
3	Valve guide	2
4	Valve seat	2
10	Valve gasket	6
13	Valve cap	2
20	Hexagon head bolt	6
21	Spring washer	6
22	Plain washer	6
30	Diaphragm	1
31	Retainer plate	1
73	Fitting	2



■ IX-C060 S6 FJ/FD/FA

No.	Part names	# of parts
1	Pump head	1
2	Valve	2
3	Valve guide	2
4	Valve seat	2
10	Valve gasket	6
13	Valve cap	2
20	Hexagon head bolt	6
21	Spring washer	6
22	Plain washer	6
30	Diaphragm	1
31	Retainer plate	1
45	Flange unit	2



Specifications/Outer dimensions

Specifications

Information in this section is subject to change without notice.

■ Pump

Model code		Flow rate L/H	Max. discharge pressure MPa	Avg. power consumption W	Current value A	Connection	Weight kg
IX-C150 TC/TE	R	0.2 - 150	0.4	62	0.8	R3/4	8
	N					3/4-14 NPT	
	FJ					JIS 10K 20A	
	FD					DIN PN10 DN20	
	FA					ANSI 150 lb 3/4″	
IX-C150 S6	R					R3/4	10
	N					3/4-14 NPT	
	FJ					JIS 10K 20A	11
	FD					DIN PN10 DN20	
	FA					ANSI 150 lb 3/4″	
IX-C060 TC/TE	R	0.08 - 60	1.0	62	0.8	R1/2	8
	N					1/2-14 NPT	
	F					Flange*	
IX-C060 S6	R					R1/2	9
	N					1/2-14 NPT	
	FJ					JIS 10K 15A	11
	FD					DIN PN10 DN15	
	FA					ANSI 150 lb 1/2″	

*For the asterisked 'Flange', the connection is compatible with JIS 10K 15A, DIN PN10 DN15, and ANSI 150 lb 1/2″.
*The above information is based on pumping clean water at rated voltage and ambient temperature.
*When operating the IX-C150 S6 at 1.0 L/h or lower, or the IX-C060 S6 at 0.4 L/h or lower, the actual flow rate may not reach the target value.
*Pressure overload protection stops the pump when the discharge pressure reaches 1.3 to 2 times the maximum specified level.
*Allowable room temperature: 0-50°C (32-122°F)
*Allowable liquid temperature: 0-50°C (32-122°F) for the TC/TE type, 0-80°C (32-176°F) for the S6 type
*Allowable power voltage deviation: Within ±10% of the rated range
*Ambient humidity: 30-90%RH (non condensing)
*Noise level: 70dB(A) for the TC and TE types and 80dB(A) for the S6 type.

■ Control unit

Operation modes	MAN (Manual)		A flow rate is set with ↑ (Up) and ↓ (Down) keys.
	EXT	Analogue preset	4-20/0-20/20-4/20-0mA (proportional control of a flow by current patterns)
		Analogue variable	0-20mADC (proportional control of a flow by user-settable two points)
		Pulse control*1	0.00625mL/PLS - 120mL/PLS (C060)
			0.01560mL/PLS - 300mL/PLS (C150)
		Batch control*1	6.25mL/PLS - 120L/PLS (C060)
			15.6mL/PLS - 300L/PLS (C150)
		Interval batch control*1	0-9day, 0-23hr, 1-59min
			6.25mL - 120L/PLS (C060)
			15.6mL - 300L/PLS (C150)
		Communication control	An optional dedicated converter is required.
Monitors	LCD	16×2 backlit LCD	
	LED	OPERATE	Lights white during pump stop.
			Lights green during pump operation.
			Lights orange when a Pre-STOP signal is input.
			Lights red when the pump has stopped or flashes when pressure over-load, diaphragm rupture, or drive error is detected.
Operation	Key-pads	⏻ (Start/Stop), MENU, ESC, ↵ (Enter), ↑ (Up), ↓ (Down), ← (Left) and → (Right) keys	
Control functions	STOP		Pump OFF at contact input*2
	PRIME		Max spm operation while the UP and DOWN keys are pressed.
	Keypad lock		PIN entry unlocks keypads.
	Interlock		Pump OFF at contact input*2
	AUX		Pump ON at AUX speed at contact input
	Maximum flow rate setting		The max flow rate can be set at each control mode.
	Buffer		Accumulates the entered external pulse signal with buffer ON.
	Current value indication		Input current is displayed during operation in ANA.R/ANA.V modes.
Input	Stop/ Pre-STOP		No-voltage contact or open collector*3
	AUX		No-voltage contact or open collector*3
	Interlock		No-voltage contact or open collector*3
	Analogue		0-20mADC (internal resistance is 200Ω.)
	Pulse		No-voltage contact/open collector (max 100Hz, min ON time: 5msec)
Output	Alarm (OUT 1)		No voltage contact, AC/DC24VDC 0.1A (resistive load) Enable or disable the Pump Run*4, STOP, Pre-STOP, Interlock, Leak Detection (default: ON), Gas detection, Motor Overload (default: ON), Batch Complete*5, and Drive Error.
	Alarm (OUT 2)		No voltage contact, AC/DC24VDC 0.1A (resistive load) Enable or disable the Pump Run*4, STOP, Pre-STOP, Interlock, Leak Detection (default: ON), Gas detection, Motor Overload (default: ON), Batch Complete*5, Drive Error, Volume Prop. PLS*6.
	Power supply		12VDC 30mA or below
	Analogue		User-settable between 0-20mADC (allowable load resistance: 300Ω)
Power voltage*7			100-240VAC 50/60Hz

*1 For these control modes, the calibrated flow volume per stroke is applied to the minimum settable flow volume per stroke.

*2 The setting can be changed to "pump ON at contact input".

*3 The maximum applied voltage from the IX to an external contact is 12V at 5mA. When using a mechanical relay, its minimum application load should be 5mA or below.

*4 Once the Pump Run output is set to enabled, other output functions turn disabled.

*5 Once the Batch Complete output is set to enabled, other output functions turn disabled.
*6 Once the Volume Prop. PLS output is set to enabled, other output functions turn disabled.
*7 Observe the specified power voltage range. Otherwise failure may result. The allowable power voltage range is 90-264VAC.
*8 The optional ICC converter (Iwaki Communication Converter) is required for Modbus communication and must be purchased separately.

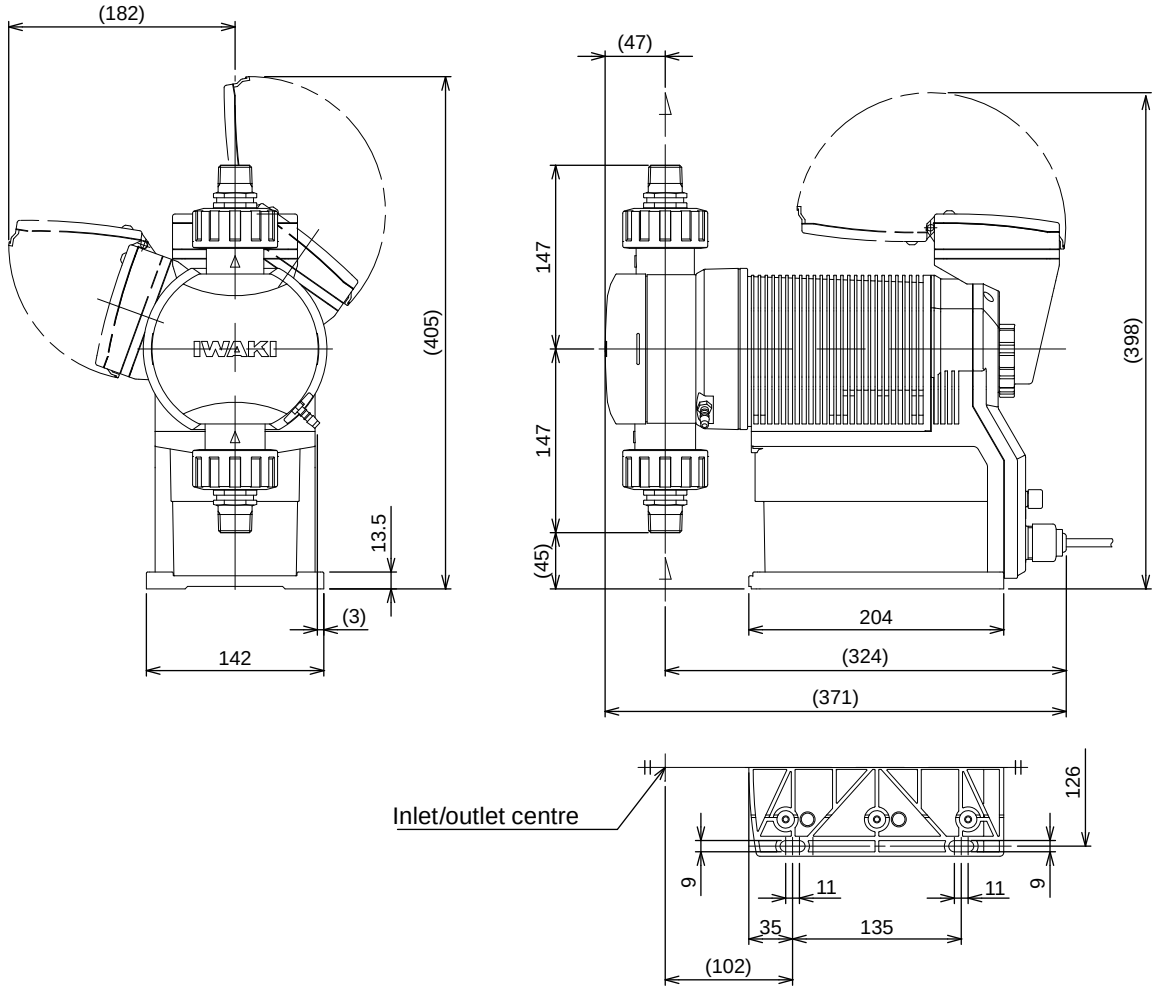
■ Power cable

Wire size (Cross section area)	0.75 [mm^2] 3-conductor (L/N/PE)
Length	2000 [mm]
Cable type/Standard	H05VV-F
Terminal end	European plug

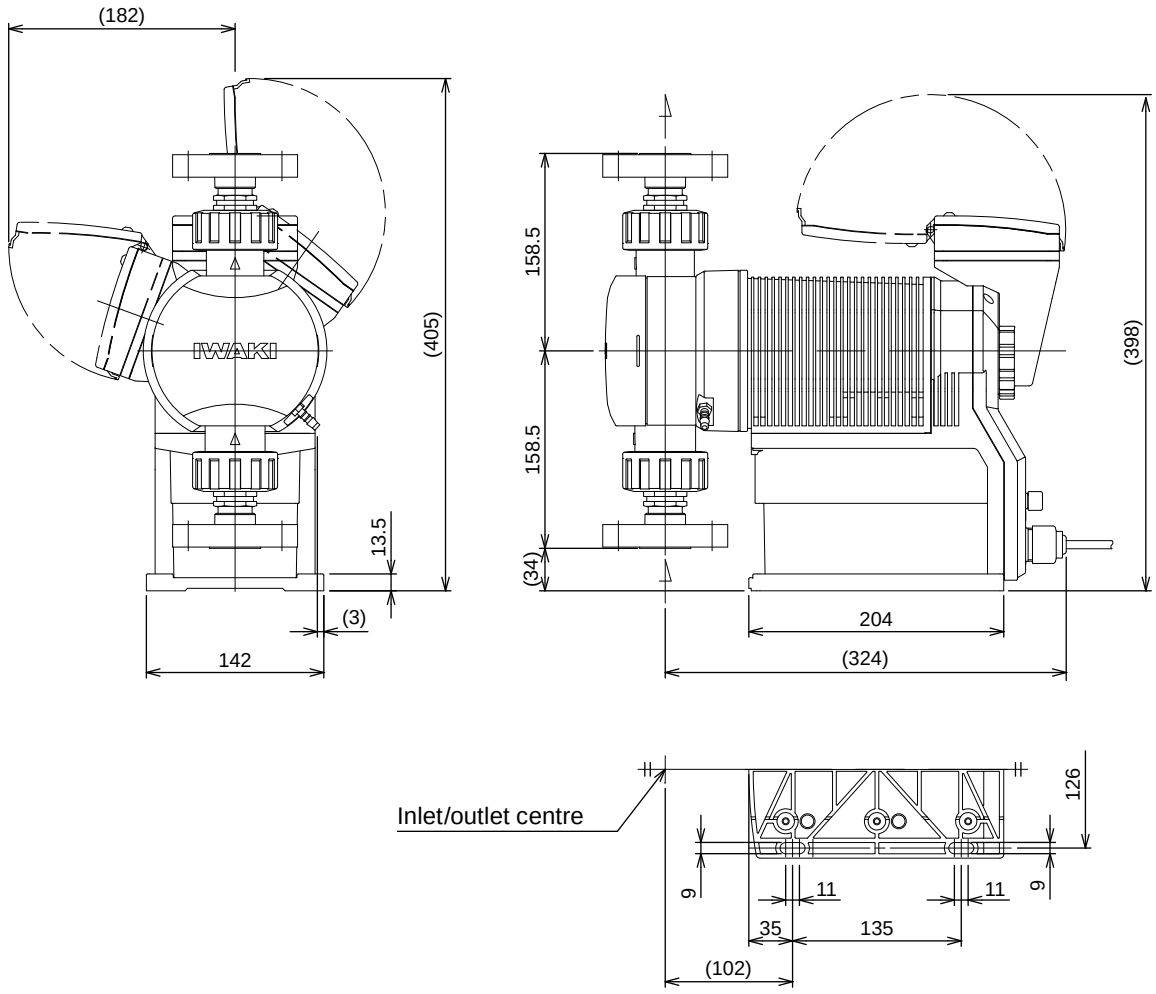
■ Body colour

Blue	Munsell colour system 7.5PB 3/8

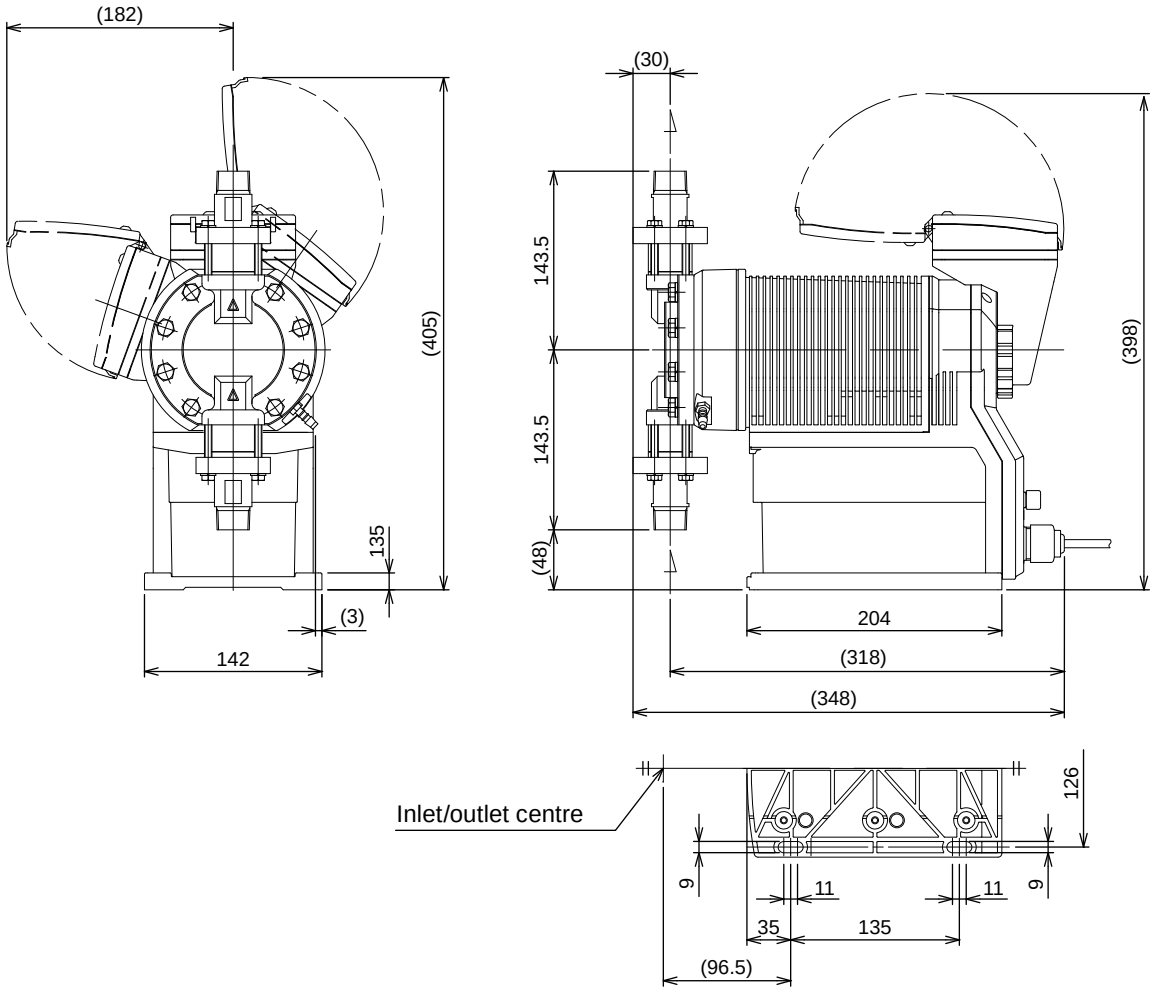
■ IX-C150 TC/TE R/N



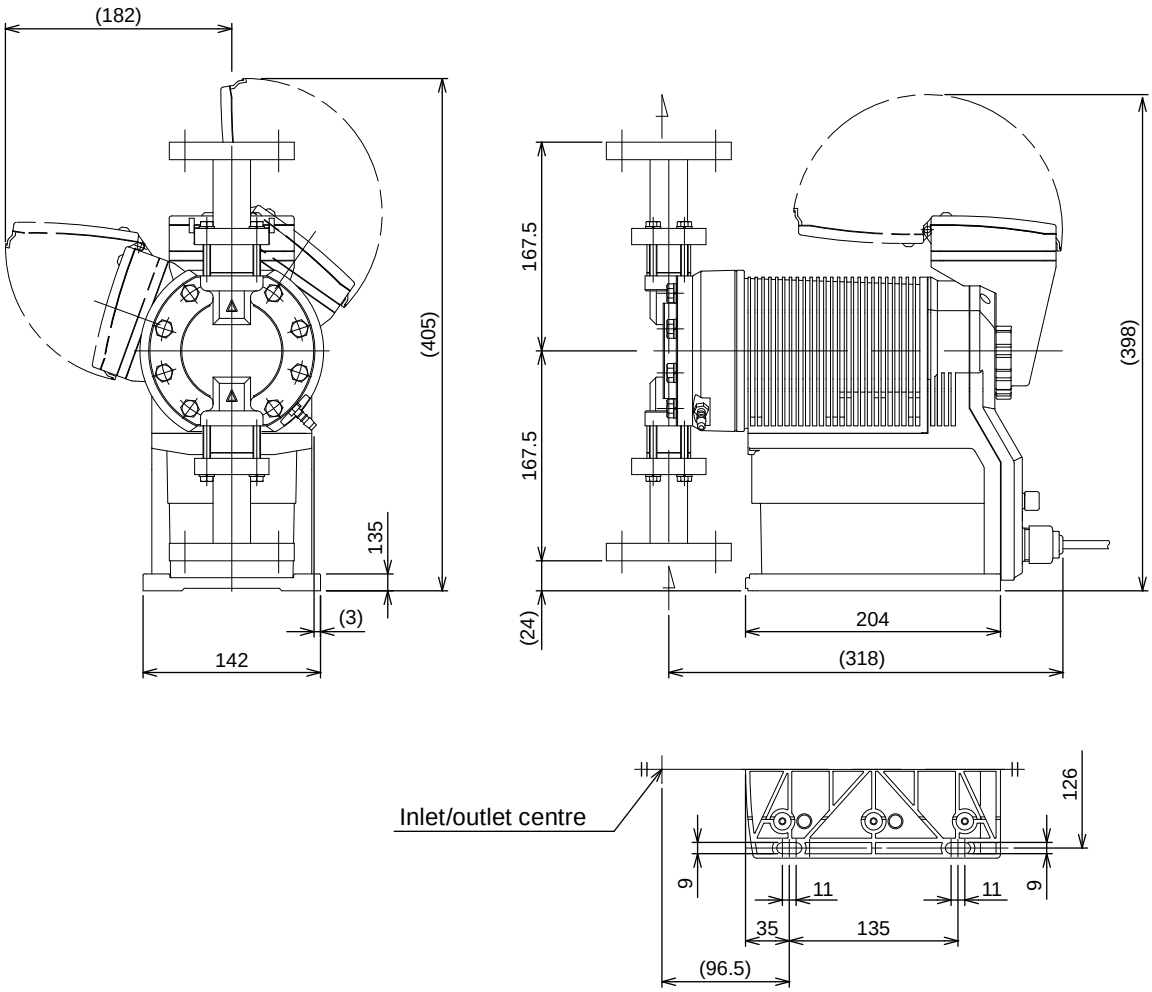
■ IX-C150 TC/TE FJ/FD/FA



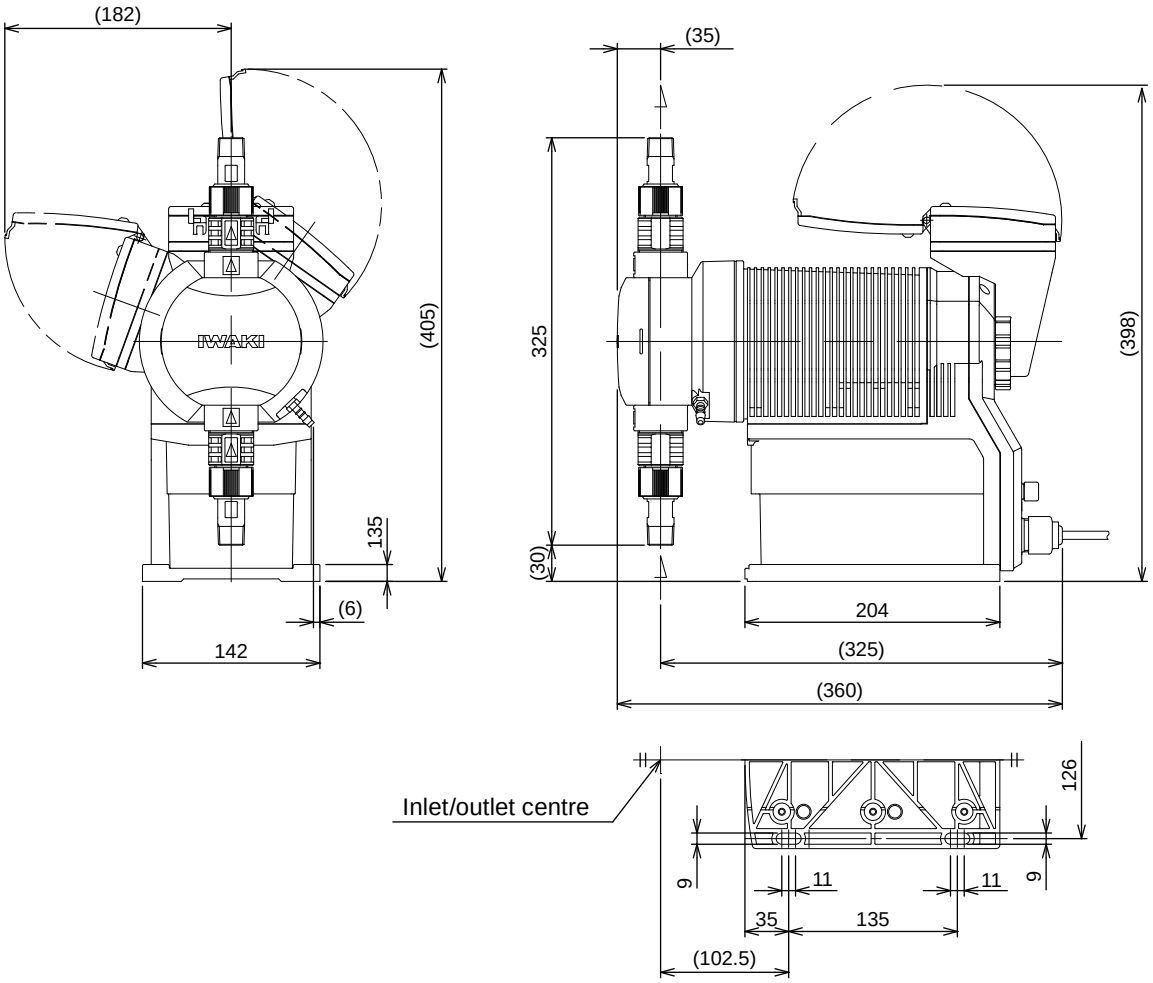
■ IX-C150 S6 R/N


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(3)
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143.5
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204
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(348)
Inlet/outlet centre
126
9
11
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35
135
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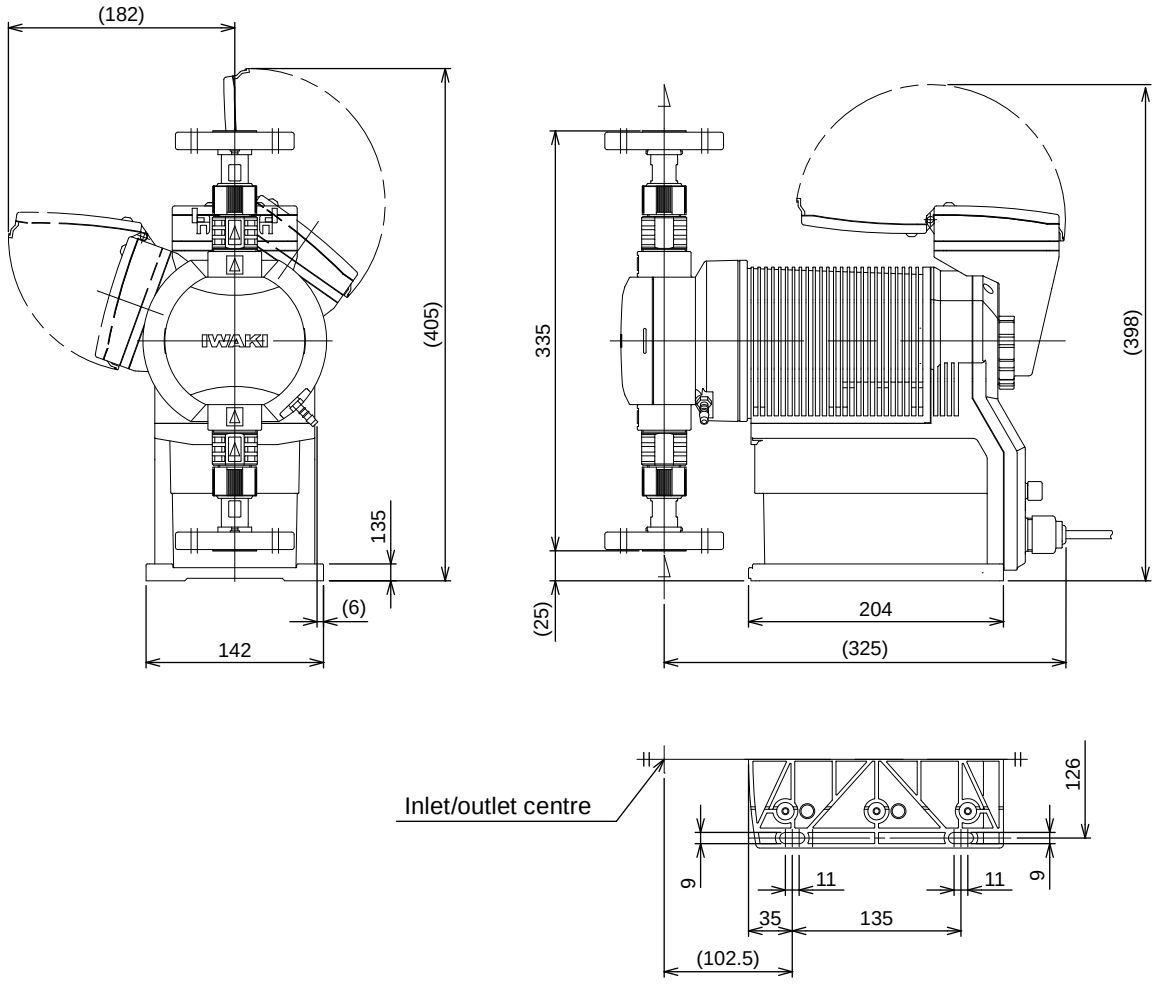
■ IX-C150 S6 FJ/FD/FA



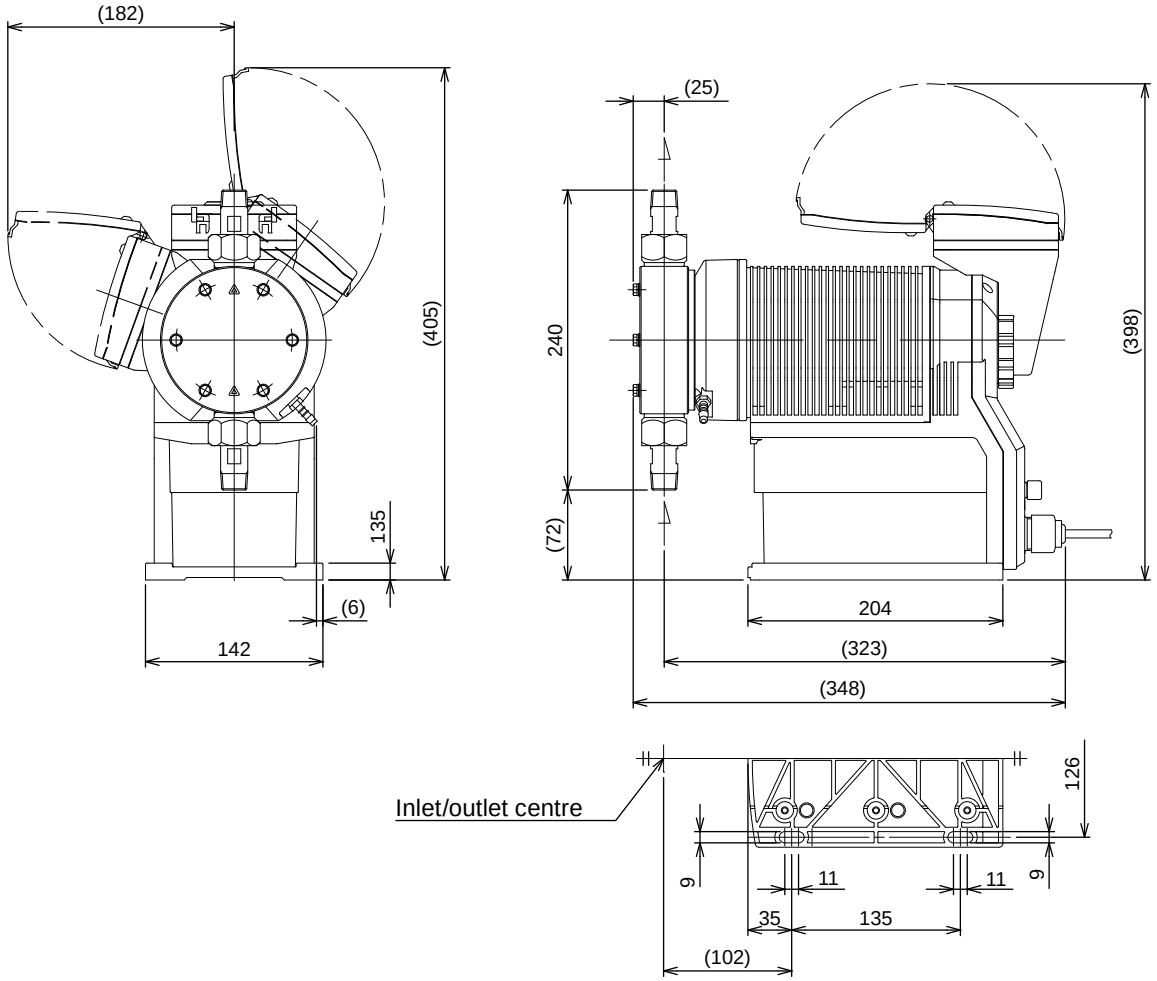
■ IX-C060 TC/TE R/N



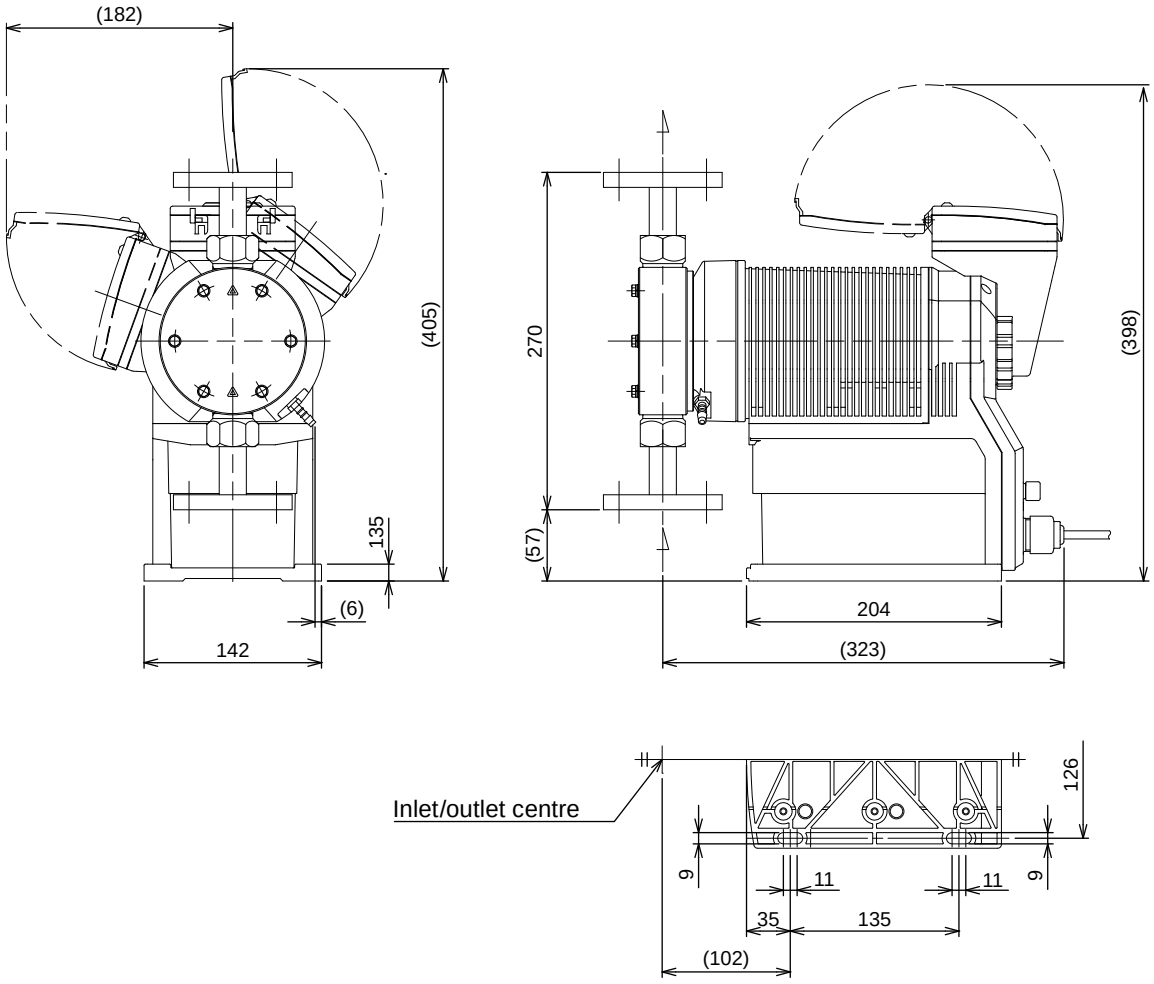
■ IX-C060 TC/TE F



■ IX-C060 S6 R/N


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■ IX-C060 S6 FJ/FD/FA



EC DECLARATION OF CONFORMITY

A copy of the original Declaration of Conformity

(SUPPLIER'S NAME)

WE

IWAKI CO.,LTD.

(ADDRESS)

6-6 2-CHOME KANDA-SUDACHO CHIYODA-KU TOKYO JAPAN

(PRODUCT)

DECLARE UNDER OUR SOLE RESPONSIBILITY THAT THE PRODUCTS

HI-TECHNO PUMP

(MODEL NAME)

IX-C 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: 2010 EN61000-6-2: 2005 EN IEC63000: 2018
EN809: 1998 + A1: 2009 EN61000-6-4: 2007 + A1: 2011

(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.

T. Sawada.

TSUTOMU SAWADA

DEPUTY SENIOR GENERAL MANAGER,

QUALITY ASSURANCE HEAD OFFICE

Tokyo, Sep. 2, 2021

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

DOCUMENT NO. IS-51K-410-4

UK DECLARATION OF CONFORMITY

A copy of the original Declaration of Conformity

(SUPPLIER'S NAME)

WE

IWAKI CO.,LTD.

(ADDRESS)

6-6 2-CHOME KANDA-SUDACHO CHIYODA-KU TOKYO JAPAN

(PRODUCT)

DECLARE UNDER OUR SOLE RESPONSIBILITY THAT THE PRODUCTS

HI-TECHNO PUMP

(MODEL NAME)

IX-C SERIES

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

(REGULATIONS)

S.I. 2008/1597 SUPPLY OF MACHINERY (SAFETY)
S.I. 2016/1091 ELECTROMAGNETIC COMPATIBILITY
S.I. 2012/3032 RESTRICTION OF HAZARDOUS SUBSTANCES

(STANDARDS)

EN ISO12100: 2010 EN61000-6-2: 2005 EN IEC63000: 2018
EN809: 1998 + A1: 2009 EN61000-6-4: 2007 + A1: 2011

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SENSYS LIMITED
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STEVENAGE HERTS SG1 3QP UK

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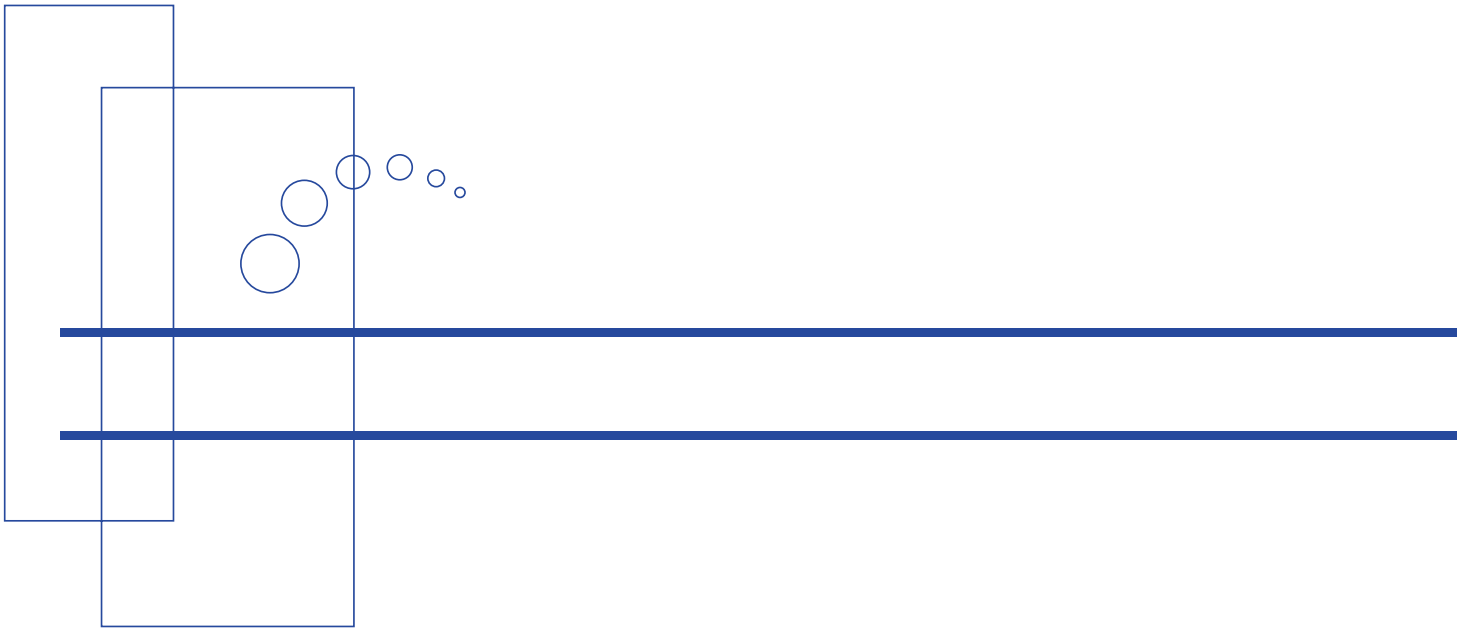
T. Sawada.

TSUTOMU SAWADA
DEPUTY SENIOR GENERAL MANAGER,
QUALITY ASSURANCE HEAD OFFICE

Tokyo, Sep. 6, 2021

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

DOCUMENT NO. IS-51K-589



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