

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Hoshizaki ROX-20TA-U* at our website: *Click HERE*

NO.	U8AA-554
ISSUED:	DEC. 29, 2000
REVISED:	————

HOSHIZAKI ELECTRIC CO.,LTD.

HOSHIZAKI
WATER ELECTROLYZER

MODEL ROX-20TA-U

SERVICE MANUAL

CONTENTS

PAGE

I. GENERAL INFORMATION ---- 1
1. SAFETY INSTRUCTIONS ---- 1
2. PRODUCT INFORMATION ---- 3
[a] FEATURES ---- 3
[b] MODEL NAME ---- 3
3. DIMENSIONS/CONNECTIONS ---- 4
4. FEATURES OF STRONG ACID WATER ---- 5
5. PRINCIPLE OF STRONG ACID WATER GENERATION ---- 6

II. CONSTRUCTION ---- 7
1. GENERAL ---- 7
2. CONTROL PANEL ---- 9
3. DISPLAY PANEL ---- 10
4. CONTROL BOX ---- 11
5. REMOTE CONTROLLER (OPTION) ---- 12
6. WATER TANK FLOAT SWITCHES (OPTION) ---- 12
7. OUTLET VALVES (OPTION) ---- 12

III. OPERATING INSTRUCTIONS ---- 13
1. FUNCTIONS AND ADJUSTMENT OF SET ITEMS ---- 13
2. FUNCTIONS AND ADJUSTMENT OF CHECK ITEMS ---- 21
3. OPERATION FLOW CHART ---- 24

IV. TECHNICAL INFORMATION ---- 25
1. WATER CIRCUIT ---- 25
2. WIRING DIAGRAM ---- 26
3. PERFORMANCE DATA ---- 27

V. SERVICE INFORMATION ---- 29
1. MAINTENANCE/INSPECTION ---- 29
2. SERVICE DIAGNOSIS ---- 31

I. GENERAL INFORMATION

1. SAFETY INSTRUCTIONS

The following instructions contain important safety precautions and should be strictly observed. The terms used here are defined as follows:

WARNING: There is a possibility of death or serious injury for the service person and a third party or the user due to improper service operations or defects in serviced products.

CAUTION: There is possibility of injury of the service person and a third party or the user or damage to their property* due to improper service operations or defects in serviced products.

* The term “damage to their property” here refers to extensive damage to houses, household effects, livestock and pets.

WARNING

1. When there is no need to energize the unit during disassembly or cleaning, be sure to unplug the unit or disconnect the main power supply before servicing the unit to prevent electric shocks.

2. If the unit must be energized for inspection of the electric circuit, use rubber gloves to avoid contact with any live parts, which may result in electric shocks.

3. Check for proper earth connections, and repair if necessary to prevent electric shocks.

4. Always use service parts intended for the applicable model for replacement of defective parts. Use proper tools to secure the wiring. Otherwise abnormal operation or trouble may occur and cause electric leaks or fire.

5. Check for proper part installations, wiring conditions and soldered or solderless terminal connections to avoid smoke, fire or electric shocks.

6. Be sure to replace damaged or deteriorated power cords and lead wires to prevent electric shocks, flames or smoke.

7. Lead wires using solderless terminals or the like must be bound with their closed ends up to avoid entrance of moisture that could lead to electric leaks or fire.

8. After servicing, always use a megohmmeter (DC500V) to check for the insulation resistance of minimum 1 megohm between the live part (attachment plug) and the dead metal part (earth terminal). Negligence in checking may cause electric leaks or shocks.

9. Do not service the electrical parts with wet hands to prevent electric leaks or shocks.

10. Always ask the user to keep children away from the work area. They may be injured by tools or disassembled products.

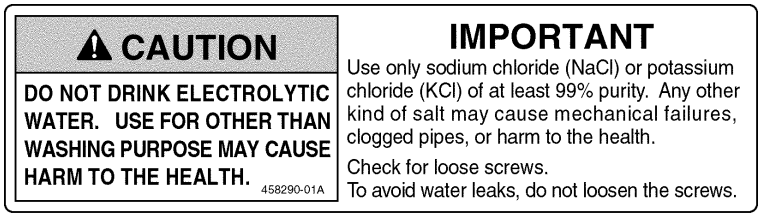
CAUTION

1. After servicing, be sure to check for water leaks from the water supply and drain lines to prevent wetting the surrounding properties.

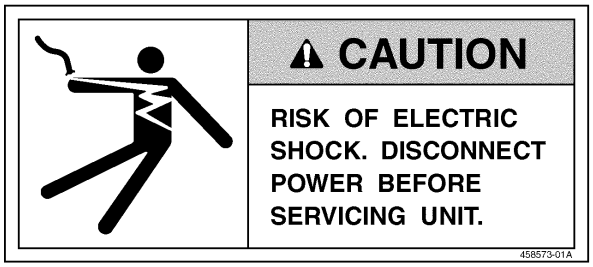
2. After servicing, always check for proper operation.

CAUTION LABEL LOCATION

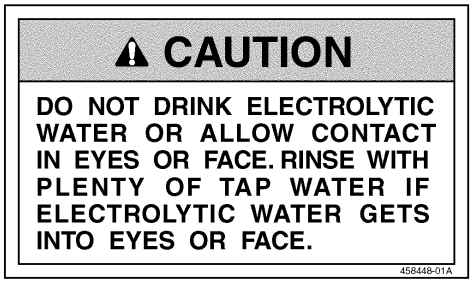
The following caution labels are attached where special care should be taken.



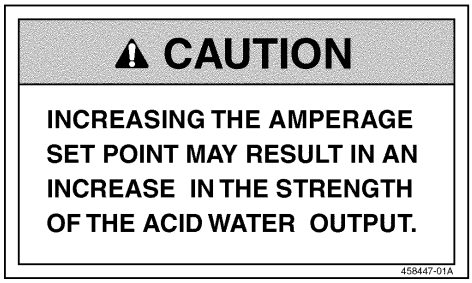
On top panel



Inside door



On remote controller (option)



On bottom front of control box

2. PRODUCT INFORMATION

[a] FEATURES

1) Space saving

The compact unit (W280 x D400 x H310 mm) allows for installation under sink.

2) Various optional parts available

Remote Controller: Makes the dispensing section remotely operable at hand.
Float Switch: Detects the tank water level to automatically start/stop operation.
Outlet Valve: Allows use of electrolyzed water stored in the tank, as required.

3) Concentrated salt water direct injection system

Direct addition of concentrated salt water held in the Salt Water Tank (accessory) into the water flow requires no tank for diluted salt water, resulting in reducing the space required.

4) Built-in current sensor

No salt concentration sensor is required. The built-in current sensor provides highly accurate control.

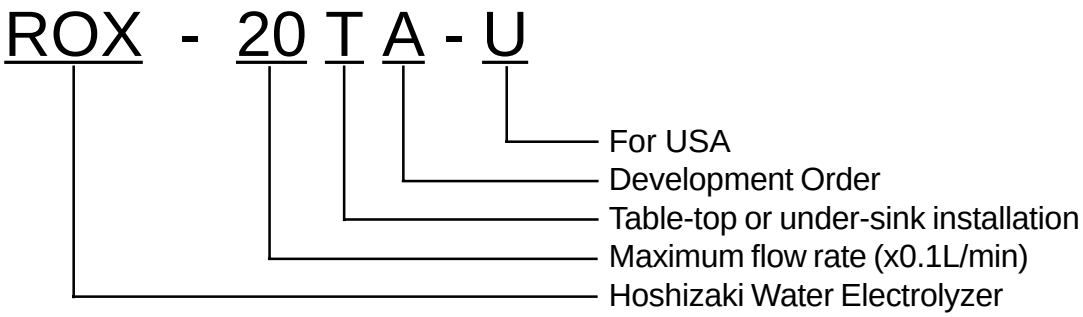
5) Constant-voltage DC power supply

Current control by a constant-voltage power supply uses the salt concentration to correct reduction of the electrolyzation efficiency, resulting in stable concentration of available chlorine.

6) Available chlorine concentration 20 - 30 mg/L or more

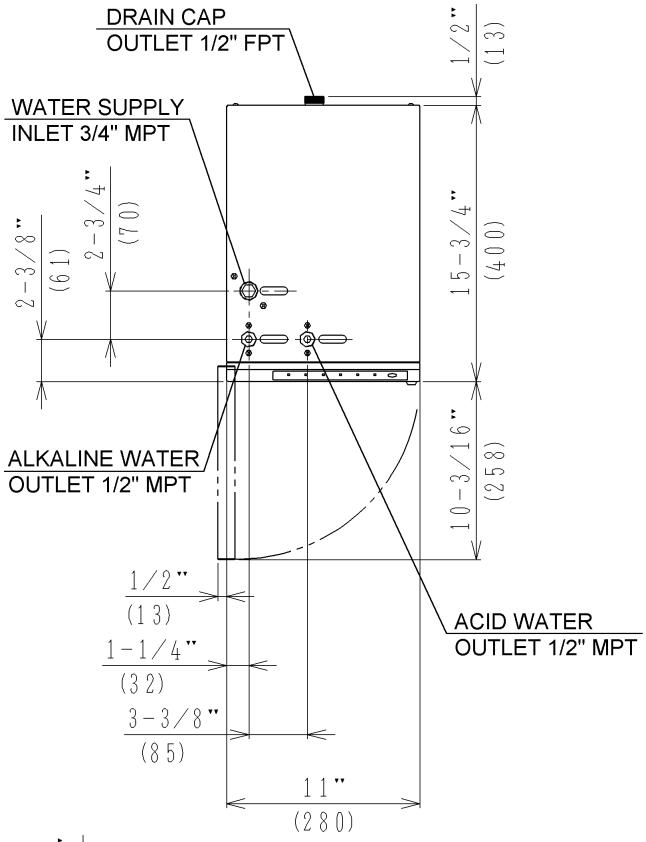
Acid water contains undissociated hypochlorous acid (HOCl) which sanitizes faster than sodium hypochlorite (NaOCl) and does not remain.

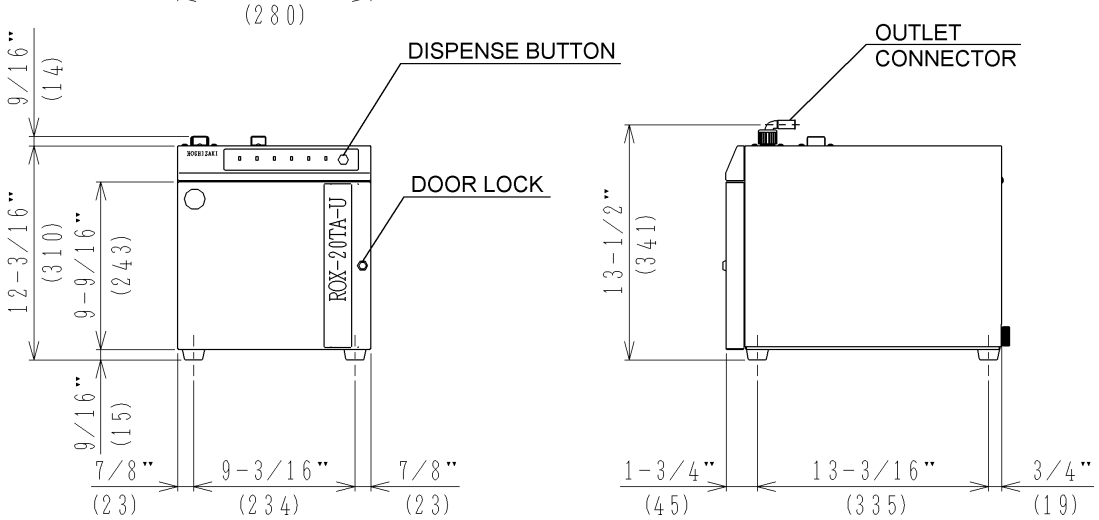
[b] MODEL NAME

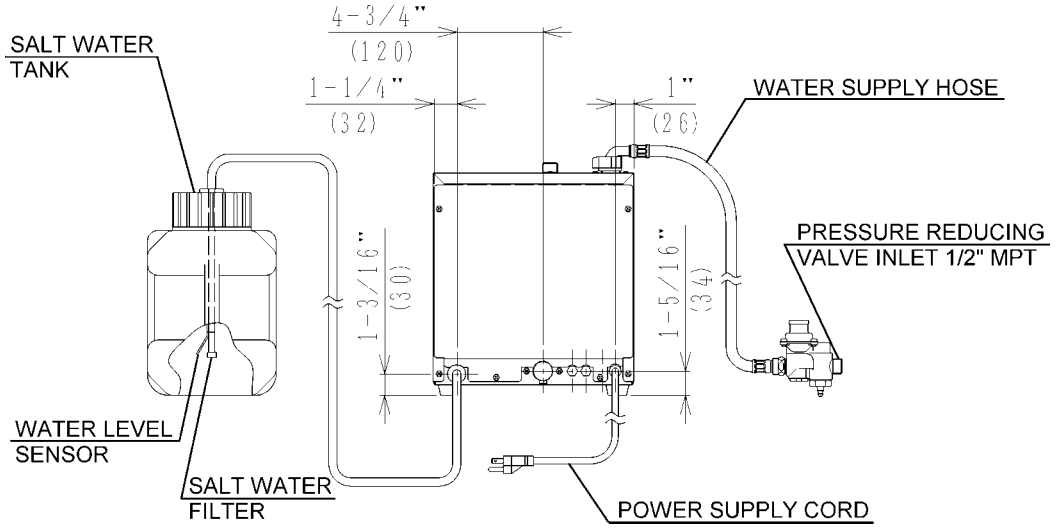


3. DIMENSIONS/CONNECTIONS

Unit: inch (mm)







4. FEATURES OF STRONG ACID WATER

Electrolyzed water (electrolyzed functional water) is a solution with useful functions caused by electrolyzation of thin salt water or tap water. Different conditions of electrolyzation produce various kinds of electrolyzed water whose applications are categorized into: [1] sanitation (strong acid water, strong alkaline water, weak acid water, hypochlorous acid water) and [2] consumption (alkaline ionized water). The Water Electrolyzer ROX-20TA-U produces strong acid water and strong alkaline water in the category [1].

Strong acid water has the following features:

(1) Main Ingredient:	Hypochlorous acid*1)
(2) pH:	2.2 - 2.7
(3) Oxidation-Reduction Potential*2):	Max. +1100mV
(4) Available Chlorine Concentration*3):	20 - 60mg/L
(5) Color:	None
(6) Others:	Stimulative smell of chlorine (contains un-electrolyzed salt)

*1) Hypochlorous acid (HOCl)

Dissolution of chlorine gas in water generates hypochlorous acid (HOCl) whose ratio to hypochlorous acid ion (ClO^-) varies with the pH of water. In the pH range for strong acid water, much more HOCl than ClO^- exists. Both HOCl and ClO^- have a bactericidal effect, but HOCl is much stronger than ClO^-.

*2) Oxidation-Reduction Potential (ORP)

Oxidizing (or reducing) effect of the solution. The larger positive number indicates the higher oxidizing effect.

*3) Available Chlorine Concentration

Chlorine concentration contributing to the bactericidal activity. It indicates the amount of chlorine corresponding to iodine isolated in the following reaction:

$NaOCl + 2KI + 2CH_3 \bullet COOH \longrightarrow I_2 + 2CH_3 \bullet COOK + NaCl + H_2O$

Note: The terms related to chlorine are defined as below:

Residual Chlorine: Remaining chlorine as the result of excessive chlorine addition into tap water to optimize the bactericidal effect of chlorination.

Free Chlorine: Chlorine (Cl_2), hypochlorous acid (HOCl) and hypochlorous acid ion (OCl^-) generated by dissolution of chlorine in water.

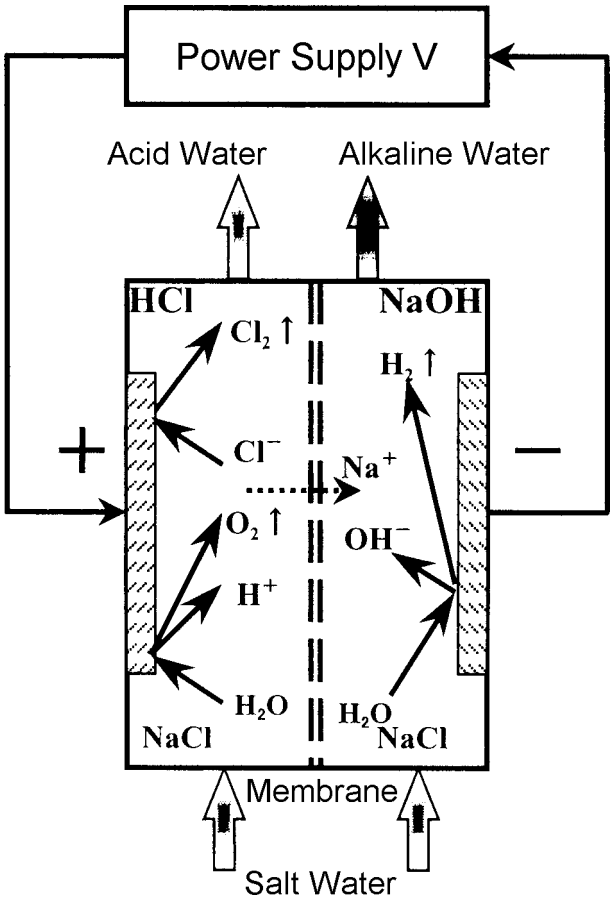
Combined Chlorine: Chloramine (NH_2Cl, $NHCl_2$, NCl_3) generated by dissolution of chlorine in water containing ammoniate or organic nitride. Combined chlorine is stable and durable, but not so effective in a quick bactericidal activity.

Available Chlorine: Combination of free chlorine and combined chlorine.

5. PRINCIPLE OF STRONG ACID WATER GENERATION

Strong acid water is generated at the anode inside the Electrolytic Cell where the membrane divides the anode and cathode, by electrolyzation of 0.1% or less salt water. See the figure below.

At the anode, chlorine ion (Cl^-) generates chlorine gas which reacts with H_2O to generate chloride and hypochlorous acid (HOCl). H_2O is also electrolyzed at the anode to become oxygen (O_2) and hydrogen ion (H^+). Eventually, the anolyte pH falls below 2.7, the oxidation-reduction potential (ORP) rises significantly, and the available chlorine concentration reaches 20 - 60 mg/L.



[Reaction Formula]

Anode $H_2O \longrightarrow 1/2O_2 + H^+ + 2e^-$

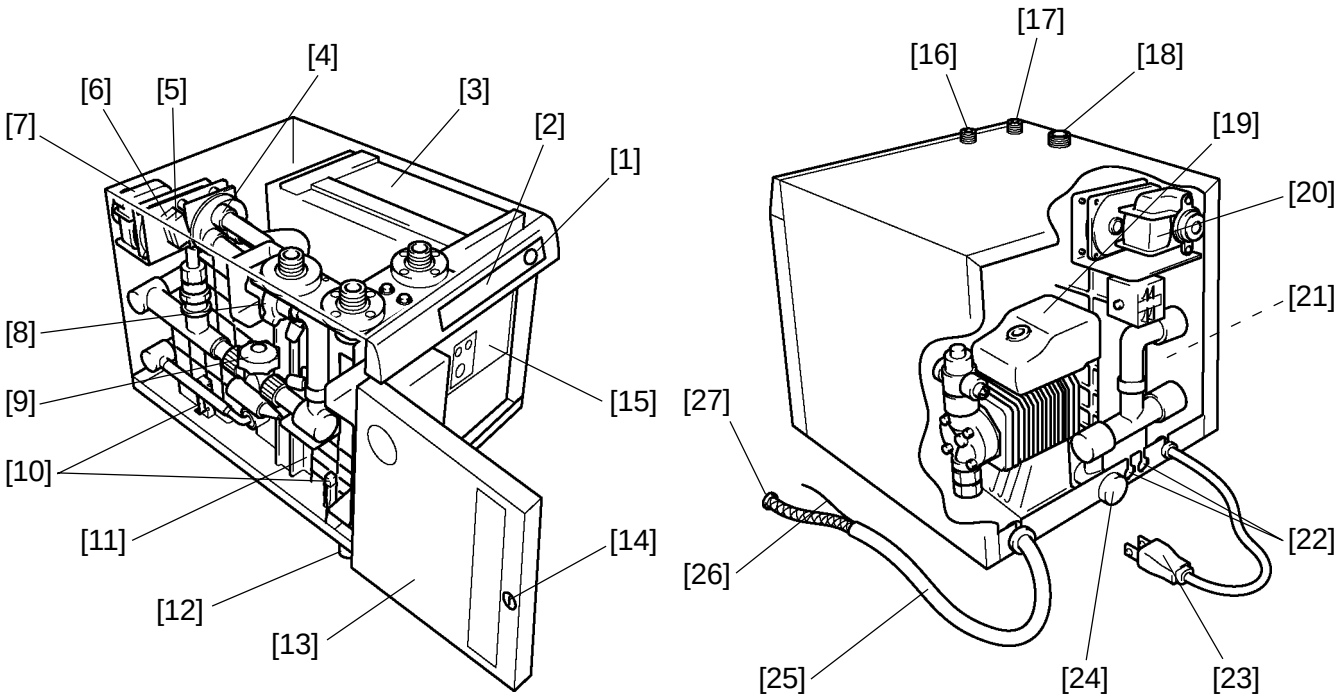
$2Cl^- \longrightarrow Cl_2 + 2e^-$

$Cl_{2(aq)} + H_2O \rightleftharpoons HCl + HOCl$

Cathode $H_2O + 2e^- \longrightarrow 1/2H_2 + OH^-$

II. CONSTRUCTION

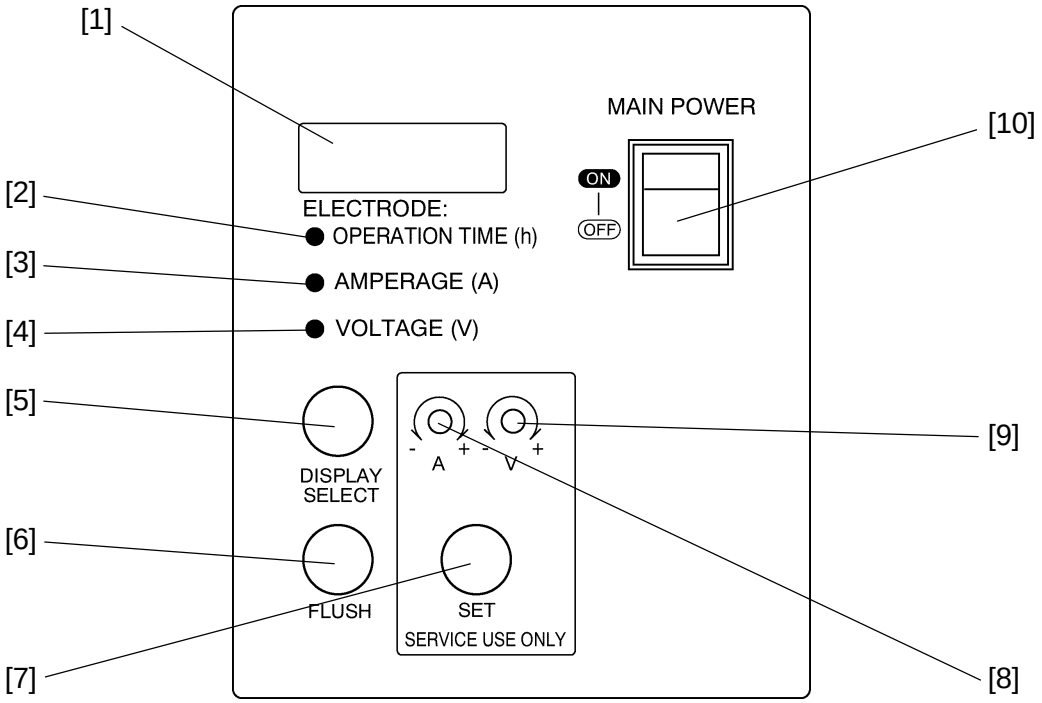
1. GENERAL



[1] Display Panel
See “3. DISPLAY PANEL“.
[2] Lamp Board
Board with lamps indicating unit status.
[3] Control Box
See “4. CONTROL BOX”.
[4] Flow Switching Valve
Changes the flow direction of electrolyzed water.
[5] Microswitch [Direction]
Senses the direction of the Flow Switching Valve.
[6] Microswitch [Location]
Senses the location of the Flow Switching Valve.
[7] Gear Motor
Rotates the Impeller inside the Flow Switching Valve.
[8] Water Valve
Supplies potable water to the Electrolytic Cell.
[9] Flow Rate Sensor
Senses potable water flow.
[10] Surge Absorber
Interrupts a temporary voltage surge.
[11] Electrolytic Cell
Electrolyzes diluted salt water and generates acid and alkaline water.
[12] Leg
Not adjustable.

[13] Door
Provided with Door Lock.
[14] Door Lock
Locks the Door.
[15] Control Panel
See “2. CONTROL PANEL”.
[16] Acid Water Outlet
Dispenses acid water during the normal operation and alkaline water during the flushing process.
[17] Alkaline Water Outlet
Dispenses alkaline water during the normal operation and acid water during the flushing process.
[18] Water Supply Inlet
Inlet for potable water supplied to the unit.
[19] Electromagnetic Metering Pump
Supplies salt water to the unit.
[20] Terminal Block
Used when the Water Tank (sold separately) is installed.
[21] Rear Panel (not shown)
Removed when the Water Tank Float Switches are connected to the Terminal Block or the Remote Controller is connected to the Control Box.
[22] Blind Bushing
Removed when the Water Tank Float Switches are connected to the Terminal Block or the Remote Controller is connected to the Control Box.
[23] Power Supply Cord
Flexible cord with a grounding conductor and grounding type attachment plug.
[24] Drain Cap
Used for draining the pipes.
[25] Salt Water Hose
Includes the PVC hose and the Water Level Sensor.
[26] Water Level Sensor
Senses the level of salt water inside the Salt Water Tank.
[27] Salt Water Filter
Removes foreign substances in salt water.

2. CONTROL PANEL



[1] Display Window
Displays the operation time, amperage or voltage during the normal operation and error codes in case of trouble.

[2] Operation Time Lamp
Display Window displays operation time (h) when this lamp is on.

[3] Amperage Lamp
Display Window displays amperage (A) when this lamp is on.

[4] Voltage Lamp
Display Window displays voltage (V) when this lamp is on.

[5] Display Select Button
Switches the display of the Display Window.

[6] Flush Button
Functions as a switch to flush the pipes beyond the acid and alkaline water outlets.

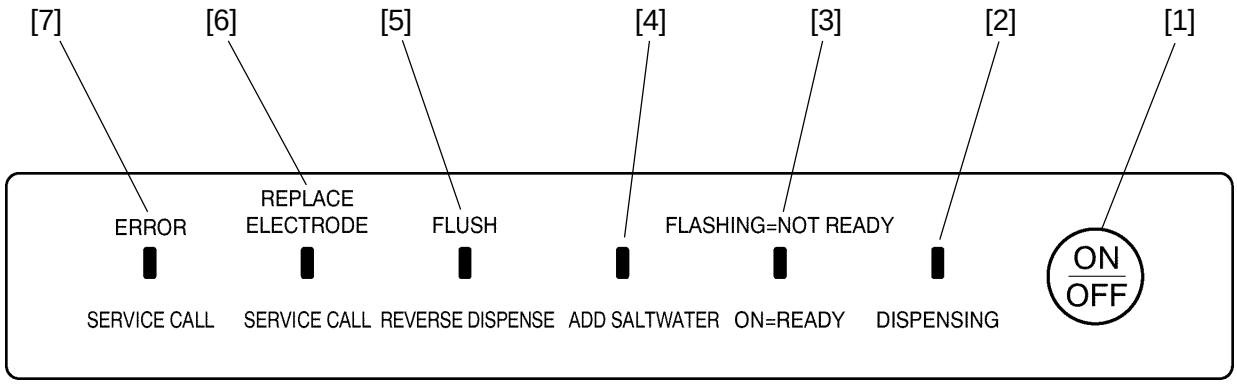
[7] Set Button
Only qualified service personnel or installer may press this button to adjust various set values.

[8] Amperage Control Volume
Only qualified service personnel may turn this control to change the set amperage.

[9] Voltage Control Volume
Only qualified service personnel may turn this control to change the set voltage.

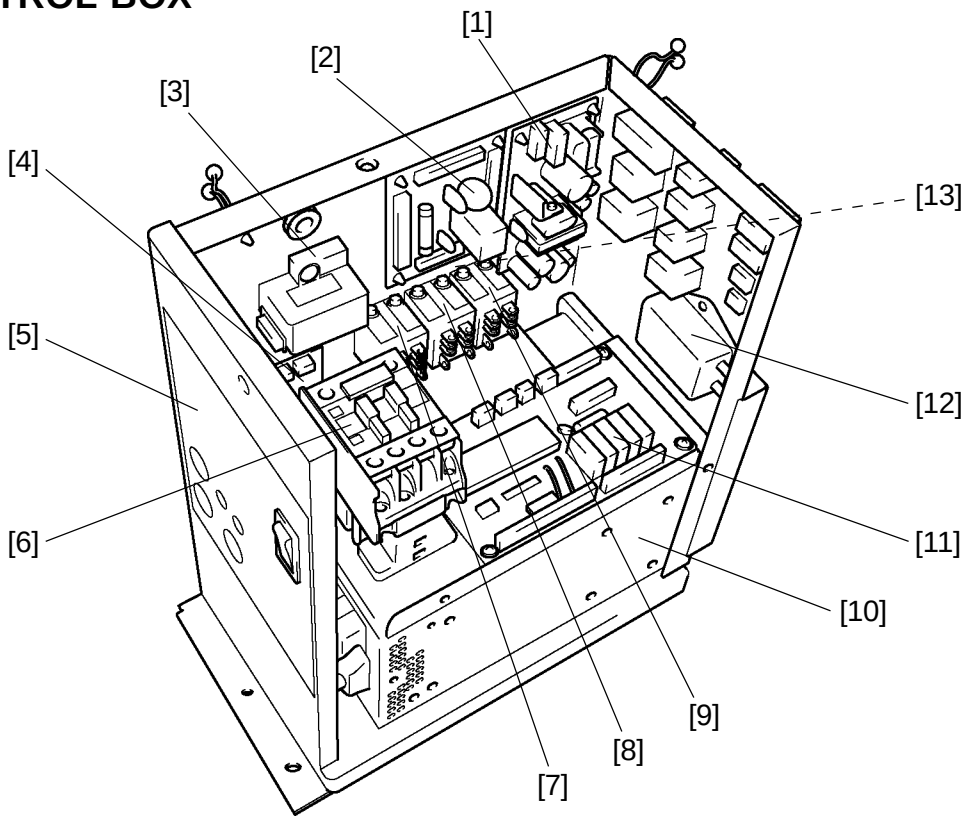
[10] Power Switch
Turns the unit on and off.

3. DISPLAY PANEL



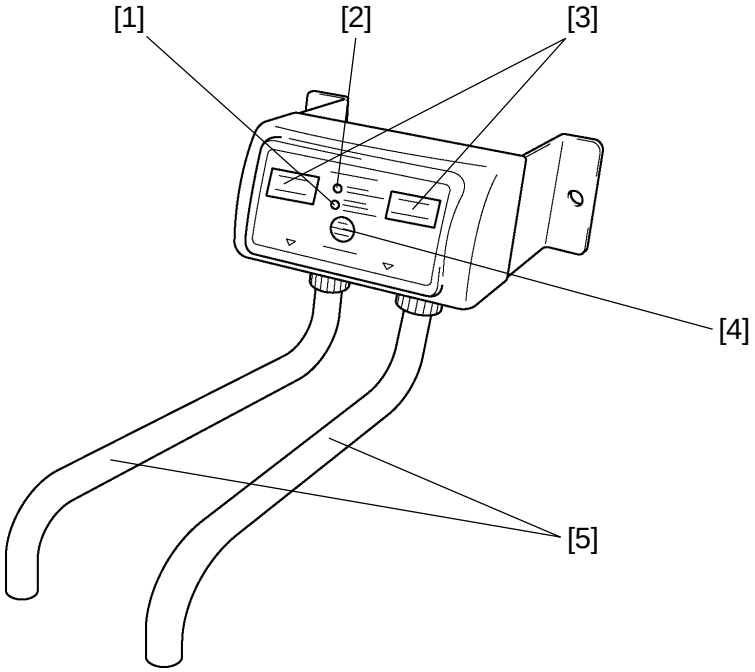
[1] Dispense Button
Starts and stops dispensing electrolyzed water.
[2] Dispensing Lamp (Green)
Indicates that the unit is producing water.
[3] Ready Lamp (Green)
Flashes until the desired settings are achieved and stays on when the unit is dispensing electrolyzed water.
[4] Add Salt Water Lamp (Red)
Indicates that the Salt Water Tank level is too low.
[5] Flush Lamp (Red)
Stays on during the flush operation. Indicates that the unit is in flush cycle.
[6] Electrolytic Cell Replace Lamp (Red)
Indicates that the cell life is near completion. Flashes continuously from 2900 hours to 3000 hours and stays on after 3000 hours.
[7] Service Call Lamp (Red)
Indicates that there is trouble detected.

4. CONTROL BOX



[1] Switching Regulator
Supplies power to start the Programmable Controller, etc.
[2] Noise Board
Board to remove noise in the unit.
[3] Current Sensor
Reads amperage in the Electrolytic Cell.
[4] Water Level Sensor Board
Board to control the Water Level Sensor.
[5] Operation Board
Board with switches to operate the Control Panel, etc.
[6] Magnetic Contactor
Switches polarity of the Electrolytic Cell.
[7] Relay 1
For [10] DC Power Supply.
[8] Relay 2
Controls the water level in the Water Tank.
[9] Relay 3
Switches the electrolyzed water display of the Remote Controller.
[10] DC Power Supply
Power supply for cells to generate electrolyzed water.
[11] Programmable Controller
Manages all controls of the unit.
[12] Noise Filter
Removes noise from 1. [19] Electromagnetic Metering Pump.
[13] Ferrite Core (not shown)
Removes noise in the unit.

5. REMOTE CONTROLLER (OPTION)



[1] Ready Lamp (Green)
Flashes until the desired settings are achieved and stays on when the unit is dispensing electrolyzed water.

[2] Add Salt Water Lamp (Red)
Indicates that the Salt Water Tank level is too low.

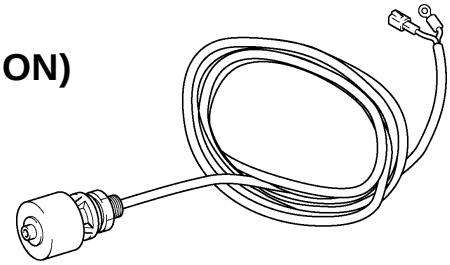
[3] Electrolyzed Water Lamp (Green)
The upper lamps will function during the normal operation. Alkaline water is dispensed from the left outlet and acid from the right. The lower lamps will function during the flush operation only. Acid water is dispensed from the left outlet and alkaline water from the right.

[4] Dispense Button
Starts and stops dispensing electrolyzed water.

[5] Electrolyzed Water Outlet
Transports electrolyzed water.

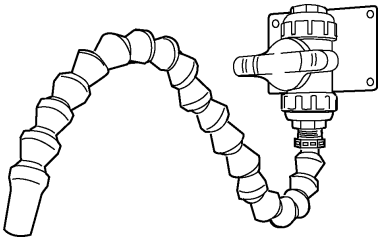
6. WATER TANK FLOAT SWITCHES (OPTION)

Includes the Upper and Lower Acid Water Tank Level Float Switches and Upper and Lower Alkaline Water Tank Level Float Switches.



7. OUTLET VALVES (OPTION)

Connected with the Electrolyzed Water Outlets (for acid and alkaline water outlets) on the Water Tank. Use as needed.



III. OPERATING INSTRUCTIONS

1. FUNCTIONS AND ADJUSTMENT OF SET ITEMS

The water electrolyzer is provided with the nine set items of the following functions:

No.	Set Items	Functions
A1	Cell Lifecycle (h) 3000 - 8000	Adjustment is required if the electrode lifecycle gets longer (Initial: 3000 h).
A2	Amperage (A) 0.0 - 18.0	Changes the pH value (Initial: 14.0 A). To increase the pH value, raise the amperage.
A3	Voltage (V) 0.0 - 18.0	Changes the available chlorine concentration (Initial: 10.0 V). To reduce the residual chlorine concentration, raise the voltage.
A4	Cell Reverse Time (h) 0 - 150	Adjustment is required if the electrode lifecycle gets longer (Initial: 12 h, 0 means no reversal).
A5	Amperage Accumulation Time (s) 1 - 90	Changes the reaction to the varying amount of additional concentrated salt water (Initial: 3 s). To delay the amperage feedback reaction, extend the time setting.
A6	Storage Mode/ Hand-washing Mode	Chooses between hand-washing mode using the optional remote controller and storage mode to store water in the tank (Initial: hand-washing mode).
A7	Cell Running/ Reverse Time Reset	Resets the built-in timer for replacing the Electrolytic Cell.
A8	Initial Flush Cycle (s) 0 - 120	Changes the time to supply water for flushing away non-electrolyzed water in the Electrolytic Cell in the initial operation (Initial: 3 s).
A9	Automatic Dispensing Control 10 s - 4 m	Adjusts the dispensing time for automatic dispensing control (Initial: continuous). Continuous: Continuously dispenses until the Dispensing Button is pushed for the second time. Automatic: Automatically stops when the adjusted time has passed since the Dispensing Button is pushed.

IMPORTANT

1. The set items A1, A4, A5, A8 and A9 should not be changed unless directed by an engineer.

2. The set item A7 should be used only when the Electrolytic Cell is replaced.

Note: 1. The set amperage and voltage can be changed just by turning each control volume. For more accurate adjustment, however, always use the A2 and A3 adjust modes

and turn the volume while watching the Display Window on the Control Panel.

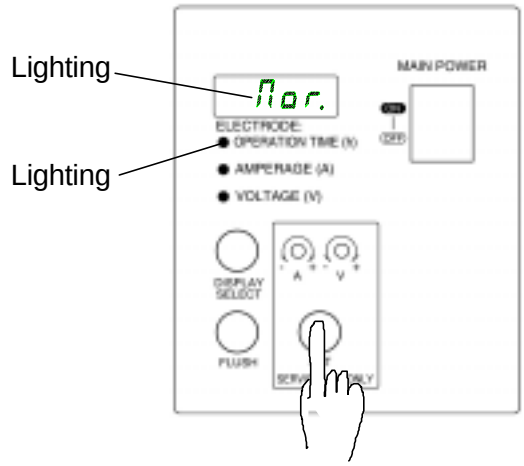
2. Do not change the amperage and voltage extremely from the initial set values. The unit may shut down by the error code E42 or E43.

ADJUSTMENT PROCEDURE

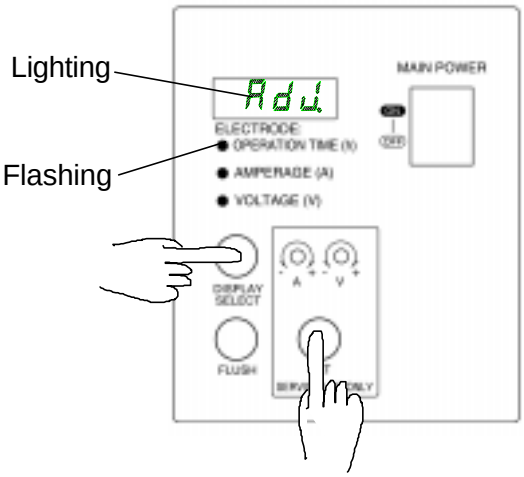
Adjust the above set items while electrolyzed water is being dispensed, the Add Salt Water Lamp is on, or the Service Call Lamp is on.

A1: Cell Lifecycle

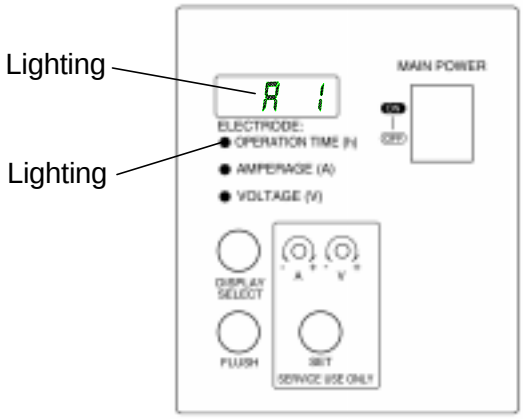
1) Run the electrolyzer to dispense electrolyzed water or to turn on the Add Salt Water Lamp or the Service Call Lamp.
2) Open the Door.
3) The Display Window on the Control Panel shows the present cell lifecycle, amperage (A) or voltage (V), or an error code. Keep on pushing the Set Button.
4) Check that the Display Window reads “Nor.”, which means the unit is in the normal mode.



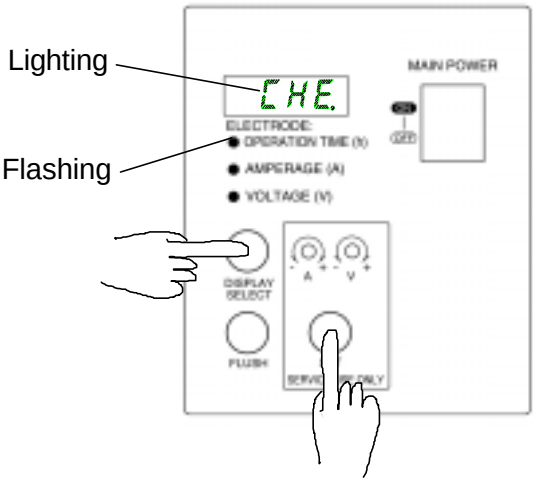
5) Keep on pushing the Set Button, and press the Display Button one time.
6) Check that the Display Window reads “AdJ.”, which means the unit is in the adjust mode.



7) Release the Set Button.
8) Check that the Display Window reads “A 1”, which means the unit is in the adjust mode No. 1.



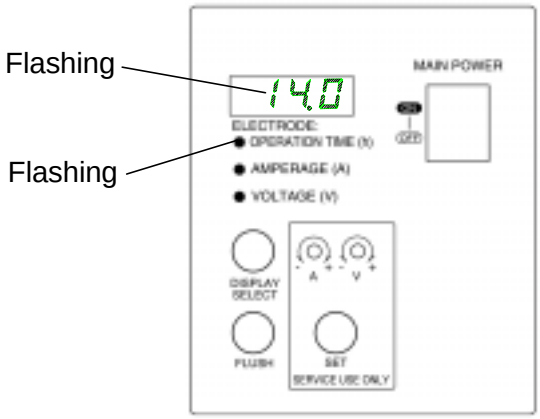
9) Push the Flush Button one time. The Display Window will flash the present cell lifecycle (factory setting: 3000 h). Now it is ready for adjustment.
10) To raise the set value, push the Display Button. To lower the set value, push the Flush Button. The Display Window will flash the changing set value. (For a rapid change, keep on pushing the Display Button or Flush Button for more than 1 sec.)
11) To determine the set value, press the Set Button one time. The Display Window will stop flashing and show the set value, then “A 1” which means completion of the adjustment. To cancel the adjustment, press the Display Button and Flush Button together to show “A 1” in the Display Window.
12) When the Display Window shows “A 1”, keep on pushing the Set Button. Check that the Display Window reads “AdJ.”
13) While pushing the Set Button, press the Display Button one time.
14) Check that the Display Window reads “CHE.”, which means the unit is in the check mode.



15) While pushing the Set Button, press the Display Button one more time.
16) Check that the Display Window reads “Nor.”, which means the unit is in the normal mode.
17) Release the Set Button.
18) This is the end of adjustment.

A2: Amperage

1) Follow the steps 1) to 8) in “A1: Cell Lifecycle” to show “A 1” in the Display Window on the Control Panel.
2) Push the Set Button one time to show “A 2” in the Display Window.
3) Push the Flush Button one time. The Display Window will flash the present amperage (factory setting: 14.0 A). Now it is ready for adjustment.



4) Use a precision screwdriver to turn the Amperage Control Volume. The Display Window will flash the changing set value.
5) When the Display Window shows the desired set value, push the Set Button one time. The Display Window will stop flashing and show the set value, then “A 2” which means completion of the adjustment.
6) When the Display Window shows “A 2”, keep on pushing the Set Button. Check that the Display Window reads “AdJ.”
7) While pushing the Set Button, press the Display Button one time.
8) Check that the Display Window reads “CHE.”, which means the unit is in the check mode.
9) While pushing the Set Button, press the Display Button one more time.
10) Check that the Display Window reads “Nor.”, which means the unit is in the normal mode.
11) Release the Set Button.
12) This is the end of adjustment.

A3: Voltage

1) Follow the steps 1) to 8) in “A1: Cell Lifecycle” to show “A 1” in the Display Window on the Control Panel.
2) Push the Set Button two times to show “A 3” in the Display Window.
3) Push the Flush Button one time. The Display Window will flash the present voltage (factory setting: 10.0 V). Now it is ready for adjustment.
4) Use a precision screwdriver to turn the Voltage Control Volume. The Display Window will flash the changing set value.
5) When the Display Window shows the desired set value, push the Set Button one time. The Display Window will stop flashing and show the set value, then “A 3” which means completion of the adjustment.
6) When the Display Window shows “A 3”, keep on pushing the Set Button. Check that the Display Window reads “AdJ.”

7) While pushing the Set Button, press the Display Button one time.
8) Check that the Display Window reads “CHE.”, which means the unit is in the check mode.
9) While pushing the Set Button, press the Display Button one more time.
10) Check that the Display Window reads “Nor.”, which means the unit is in the normal mode.
11) Release the Set Button.
12) This is the end of adjustment.

A4: Cell Reverse Time

1) Follow the steps 1) to 8) in “A1: Cell Lifecycle” to show “A 1” in the Display Window on the Control Panel.
2) Push the Set Button three times to show “A 4” in the Display Window.
3) Push the Flush Button one time. The Display Window will flash the present cell reverse time (factory setting: 12 h). Now it is ready for adjustment.
4) To raise the set value, push the Display Button. To lower the set value, push the Flush Button. The Display Window will flash the changing set value. (For a rapid change, keep on pushing the Display Button or Flush Button for more than 1 sec.)
5) To determine the set value, press the Set Button one time. The Display Window will stop flashing and show the set value, then “A 4” which means completion of the adjustment. To cancel the adjustment, press the Display Button and Flush Button together to show “A 4” in the Display Window.
6) When the Display Window shows “A 4”, keep on pushing the Set Button. Check that the Display Window reads “AdJ.”
7) While pushing the Set Button, press the Display Button one time.
8) Check that the Display Window reads “CHE.”, which means the unit is in the check mode.
9) While pushing the Set Button, press the Display Button one more time.
10) Check that the Display Window reads “Nor.”, which means the unit is in the normal mode.
11) Release the Set Button.
12) This is the end of adjustment.

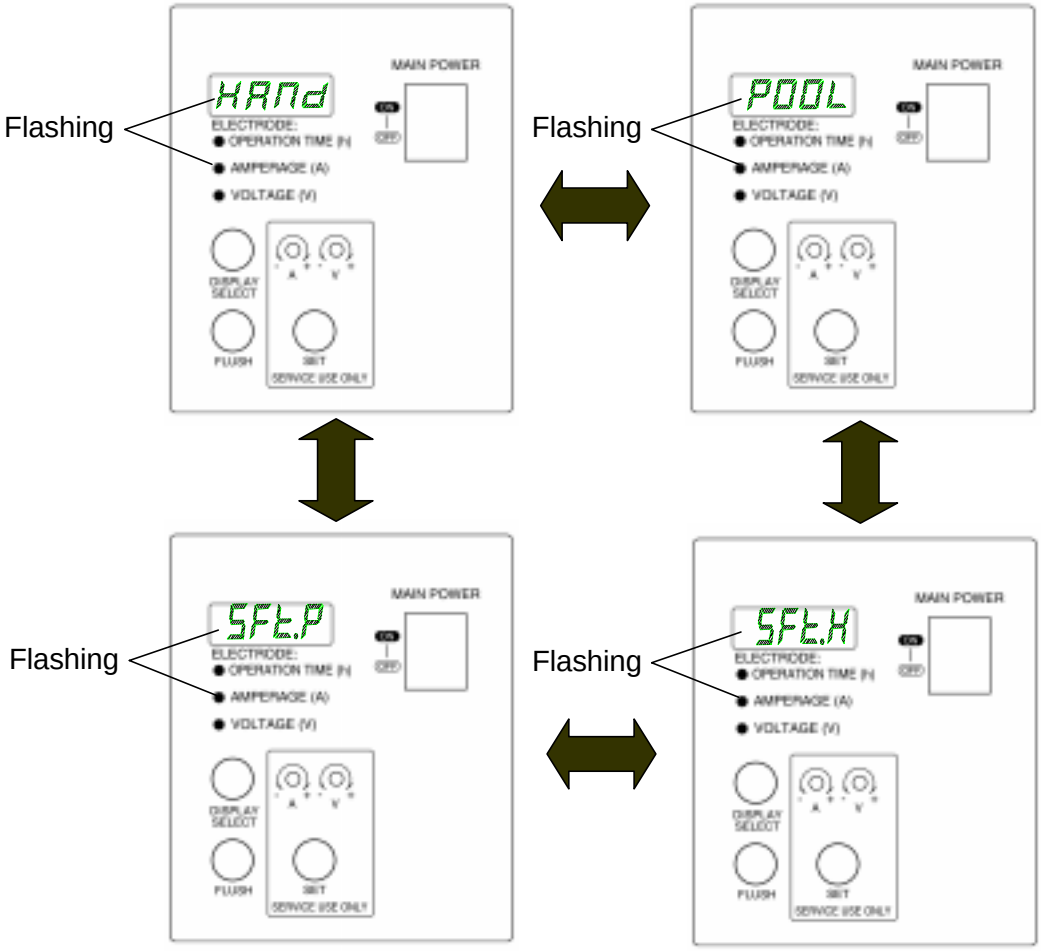
A5: Amperage Accumulation Time

1) Follow the steps 1) to 8) in “A1: Cell Lifecycle” to show “A 1” in the Display Window on the Control Panel.
2) Push the Set Button four times to show “A 5” in the Display Window.
3) Push the Flush Button one time. The Display Window will flash the present amperage accumulation time (factory setting: 3 s). Now it is ready for adjustment.
4) To raise the set value, push the Display Button. To lower the set value, push the Flush Button. The Display Window will flash the changing set value. (For a rapid change, keep on pushing the Display Button or Flush Button for more than 1 sec.)
5) To determine the set value, press the Set Button one time. The Display Window will stop flashing and show the set value, then “A 5” which means completion of the adjustment. To cancel the adjustment, press the Display Button and Flush Button together to show “A 5” in the Display Window.
6) When the Display Window shows “A 5”, keep on pushing the Set Button. Check that the Display Window reads “AdJ.”

7) While pushing the Set Button, press the Display Button one time.
8) Check that the Display Window reads “CHE.”, which means the unit is in the check mode.
9) While pushing the Set Button, press the Display Button one more time.
10) Check that the Display Window reads “Nor.”, which means the unit is in the normal mode.
11) Release the Set Button.
12) This is the end of adjustment.

A6: Storage Mode/Hand-washing Mode

1) Follow the steps 1) to 8) in “A1: Cell Lifecycle” to show “A 1” in the Display Window on the Control Panel.
2) Push the Set Button five times to show “A 6” in the Display Window.
3) Push the Flush Button one time. The Display Window will flash the following patterns:
   HANd --------- With the Remote Controller installed
   POOL -------- With the Water Tank installed
   SFt.H --------- Do not set.
   SFt.P --------- Do not set.



4) Push the Display Button or Flush Button. The Display Window will flash the other set mode.
5) To determine the set mode, press the Set Button one time. The Display Window will stop flashing and show the set mode, then “A 6” which means completion of the adjustment.

To cancel the adjustment, press the Display Button and Flush Button together to show “A 6” in the Display Window.

6) When the Display Window shows “A 6”, keep on pushing the Set Button. Check that the Display Window reads “AdJ.”
7) While pushing the Set Button, press the Display Button one time.
8) Check that the Display Window reads “CHE.”, which means the unit is in the check mode.
9) While pushing the Set Button, press the Display Button one more time.
10) Check that the Display Window reads “Nor.”, which means the unit is in the normal mode.
11) Release the Set Button.
12) This is the end of adjustment.

A7: Cell Running/Reverse Time Reset

1) Follow the steps 1) to 8) in “A1: Cell Lifecycle” to show “A 1” in the Display Window on the Control Panel.
2) Push the Set Button six times to show “A 7” in the Display Window.
3) Push the Flush Button one time. The Display Window will flash “ ≡ ≡ ≡ ≡”. Now it is ready to reset the cell running/reverse time.
4) To reset, press the Set Button for 10 sec. The Display Window will stop flashing “ ≡ ≡ ≡ ≡” and show “Good”, then “A 7” which means completion of the resetting. To cancel the resetting, press the Display Button and Flush Button together to show “A 7” in the Display Window.
5) When the Display Window shows “A 7”, keep on pushing the Set Button. Check that the Display Window reads “AdJ.”
6) While pushing the Set Button, press the Display Button one time.
7) Check that the Display Window reads “CHE.”, which means the unit is in the check mode.
8) While pushing the Set Button, press the Display Button one more time.
9) Check that the Display Window reads “Nor.”, which means the unit is in the normal mode.
10) Release the Set Button.
11) This is the end of resetting.

A8: Initial Flush Cycle Time

1) Follow the steps 1) to 8) in “A1: Cell Lifecycle” to show “A 1” in the Display Window on the Control Panel.
2) Push the Set Button seven times to show “A 8” in the Display Window.
3) Push the Flush Button one time. The Display Window will flash the present initial flash cycle (factory setting: 3 s). Now it is ready for adjustment.
4) To raise the set value, push the Display Button. To lower the set value, push the Flush Button. The Display Window will flash the changing set value. (For a rapid change, keep on pushing the Display Button or Flush Button for more than 1 sec.)
5) To determine the set value, press the Set Button one time. The Display Window will stop flashing and show the set value, then “A 8” which means completion of the adjustment. To cancel the adjustment, press the Display Button and Flush Button together to show “A 8” in the Display Window.

6) When the Display Window shows “A 8”, keep on pushing the Set Button. Check that the Display Window reads “AdJ.”
7) While pushing the Set Button, press the Display Button one time.
8) Check that the Display Window reads “CHE.”, which means the unit is in the check mode.
9) While pushing the Set Button, press the Display Button one more time.
10) Check that the Display Window reads “Nor.”, which means the unit is in the normal mode.
11) Release the Set Button.
12) This is the end of adjustment.

A9: Automatic Dispensing Control

1) Follow the steps 1) to 8) in “A1: Cell Lifecycle” to show “A 1” in the Display Window on the Control Panel.
2) Push the Set Button eight times to show “A 9” in the Display Window.
3) Push the Flush Button one time. The Display Window will flash the present automatic dispensing control (factory setting: continuous “CoNt.”). Now it is ready for adjustment.
4) To raise the set value, push the Display Button. To lower the set value, push the Flush Button. The Display Window will flash the changing set value. (For a rapid change, keep on pushing the Display Button or Flush Button for more than 1 sec.)
5) To determine the set value, press the Set Button one time. The Display Window will stop flashing and show the set value, then “A 9” which means completion of the adjustment. To cancel the adjustment, press the Display Button and Flush Button together to show “A 9” in the Display Window.
6) When the Display Window shows “A 9”, keep on pushing the Set Button. Check that the Display Window reads “AdJ.”
7) While pushing the Set Button, press the Display Button one time.
8) Check that the Display Window reads “CHE.”, which means the unit is in the check mode.
9) While pushing the Set Button, press the Display Button one more time.
10) Check that the Display Window reads “Nor.”, which means the unit is in the normal mode.
11) Release the Set Button.
12) This is the end of adjustment.

Note: If the automatic dispensing control setting is short, the unit may stop automatically in the middle of the next adjustment. In this case, adjust the setting as follows:
1) Turn on the Power Switch. While the Display Window shows nothing, push the Flush Button for more than 10 sec.
2) Select the desired mode, and adjust the setting.

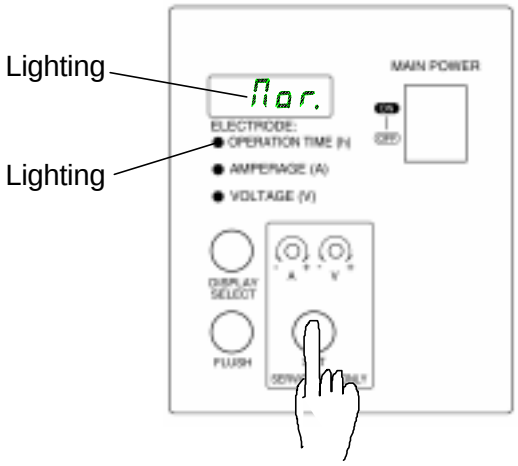
2. FUNCTIONS AND ADJUSTMENT OF CHECK ITEMS

The water electrolyzer is provided with the ten check items of the following functions:

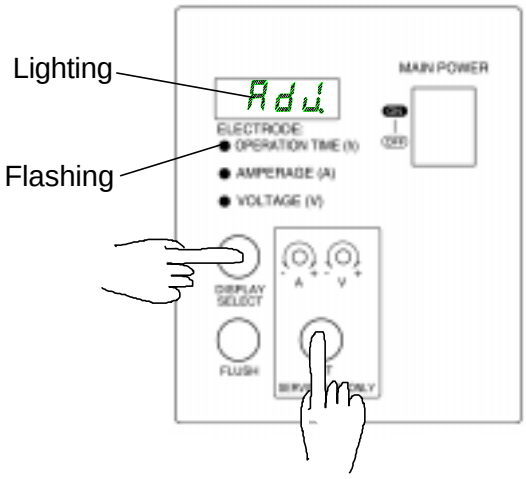
No.	Check Items	Functions
C1	Output Conditions	Displays all the present output conditions in the Display Window on the Control Panel.
C2	Input Conditions	Displays all the present input conditions in the Display Window on the Control Panel.
C3	Present Average Amperage (A)	Displays the average amperage at present.
C4	Present Stroke Speed (spm)	Displays the stroke speed at present.
C5	Present Cell Reverse Time (h)	Displays the cell reverse time at present.
C6	Last Error Code	Displays the error code of the last error.
C7	Last Error Cell Running Time (h)	Displays the cell running time of the last error.
C8	Last Error Cell Reverse Time (m)	Displays the cell reverse time of the last error.
C9	Last Error Average Amperage (A)	Displays the average amperage of the last error.
C10	Last Error Stroke Speed (spm)	Displays the stroke speed of the last error.

CHECKING PROCEDURE

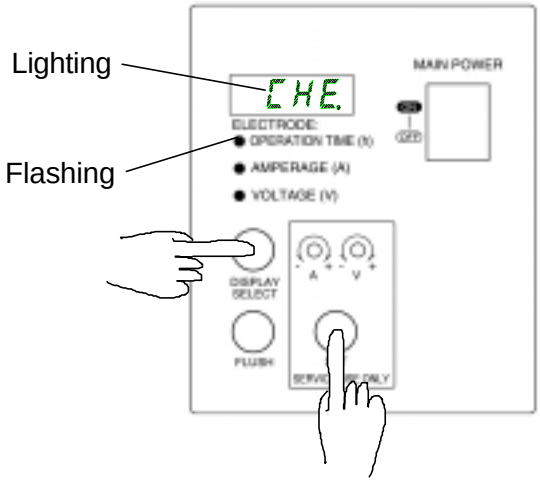
1) Run the electrolyzer to dispense electrolyzed water or to turn on the Add Salt Water Lamp or the Service Call Lamp.
2) Open the Door.
3) The Display Window on the Control Panel shows the present cell lifecycle, amperage (A) or voltage (V), or an error code. Keep on pushing the Set Button.
4) Check that the Display Window reads “Nor.”, which means the unit is in the normal mode.



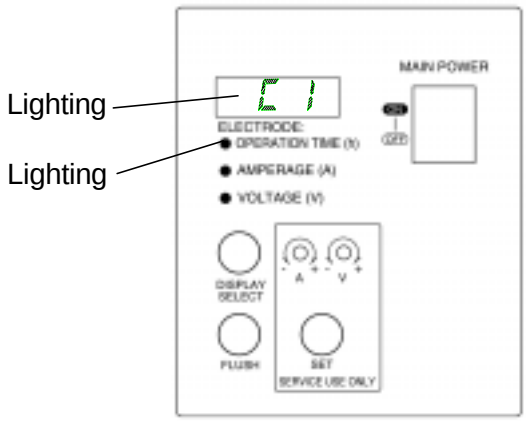
5) Keep on pushing the Set Button, and press the Display Button one time.
6) Check that the Display Window reads “AdJ.”, which means the unit is in the adjust mode.



7) Keep on pushing the Set Button, and press the Display Button one more time.
8) Check that the Display Window reads “CHE.”, which means the device is in the check mode.



9) Release the Set Button.
10) Check that the Display Window reads “C 1”, which means the device is in the check mode No. 1.

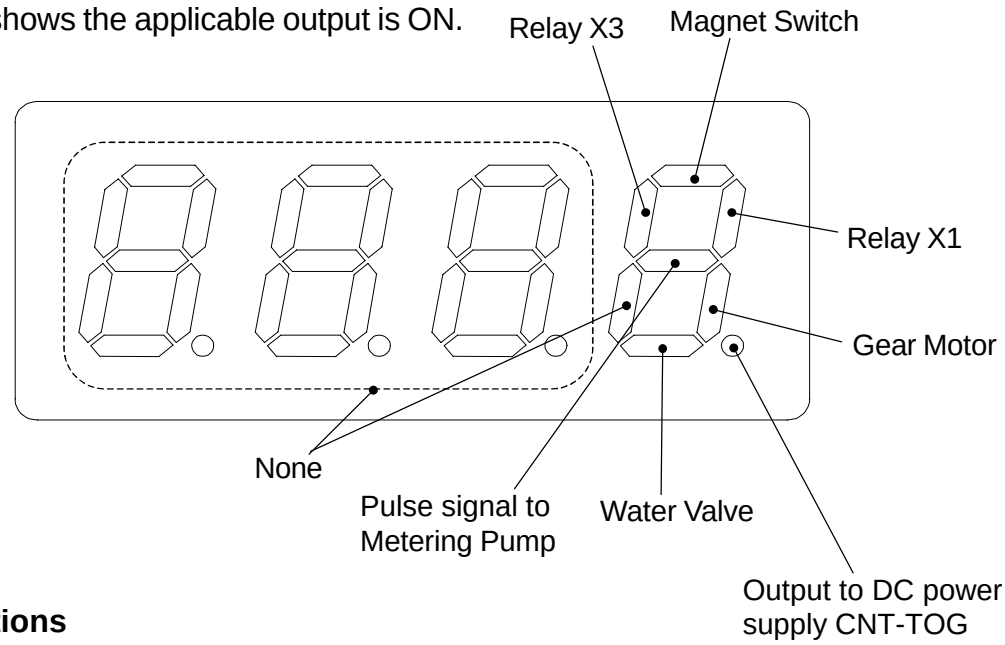


11) Push the Display Button. The Display Window will change from “C 1” to “C 2”. Another push will change “C 2” to “C 3”.

12) When the desired check item code is displayed, push the Flush Button one time. The Display Window will show the present check item information.
13) To finish checking, press the Display Button and Flush Button together to show “C 1”, “C 2”... in the Display Window.
14) When the Display Window shows one of those check item codes, keep on pushing the Set Button. Check that the Display Window reads “CHE.”
15) While pushing the Set Button, press the Display Button one time.
16) Check that the Display Window reads “Nor.”, which means the device is in the normal mode.
17) Release the Set Button.
18) This is the end of checking.

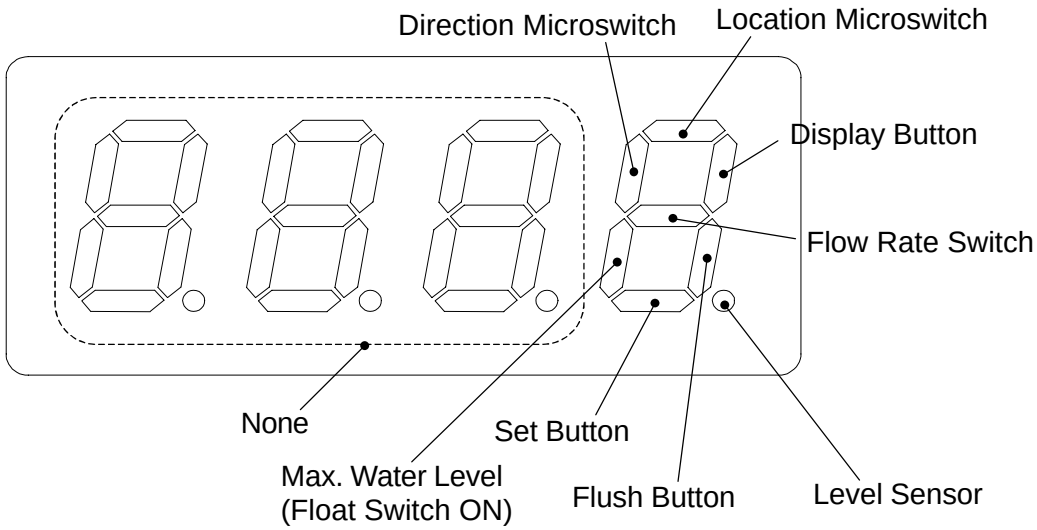
C1: Output Conditions

The lighting LED shows the applicable output is ON.

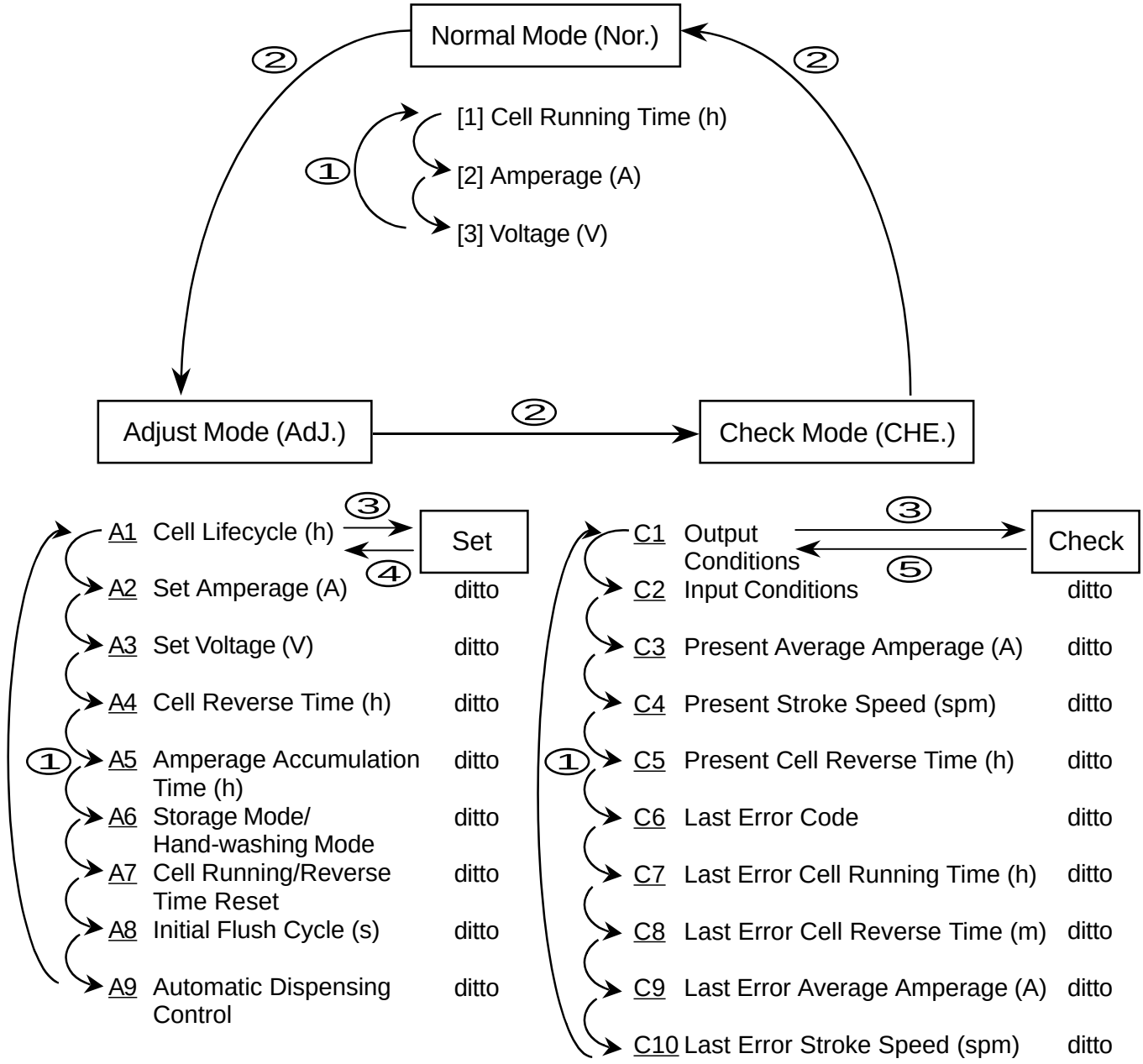


C2: Input Conditions

The lighting LED shows the applicable input is ON.



3. OPERATION FLOW CHART



Operation

① Press Display Button.

② Keep on pushing Set Button, and press Display Button.

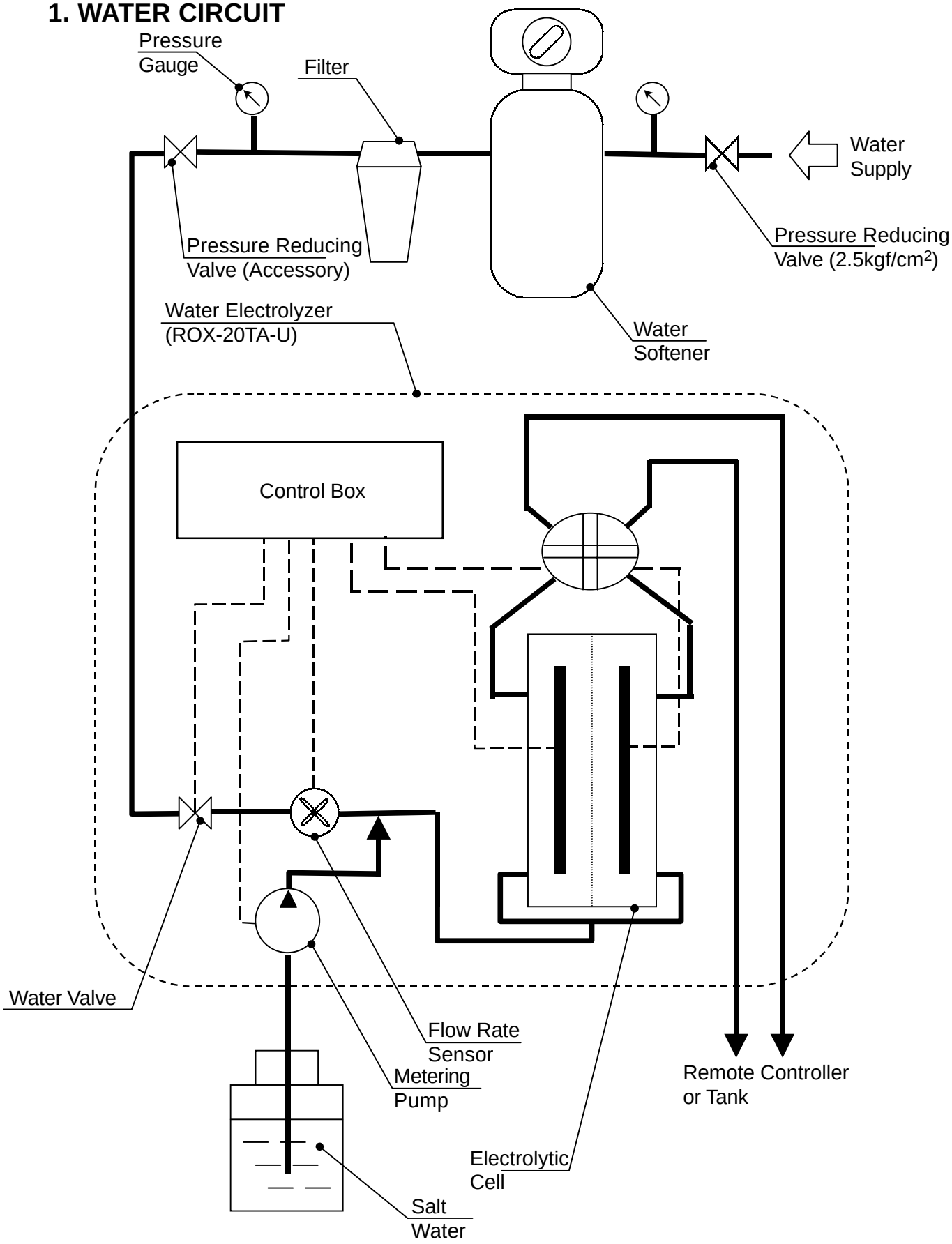
③ Press Flush Button.

④ Press Set Button. For A7, keep on pushing it for 10 sec.

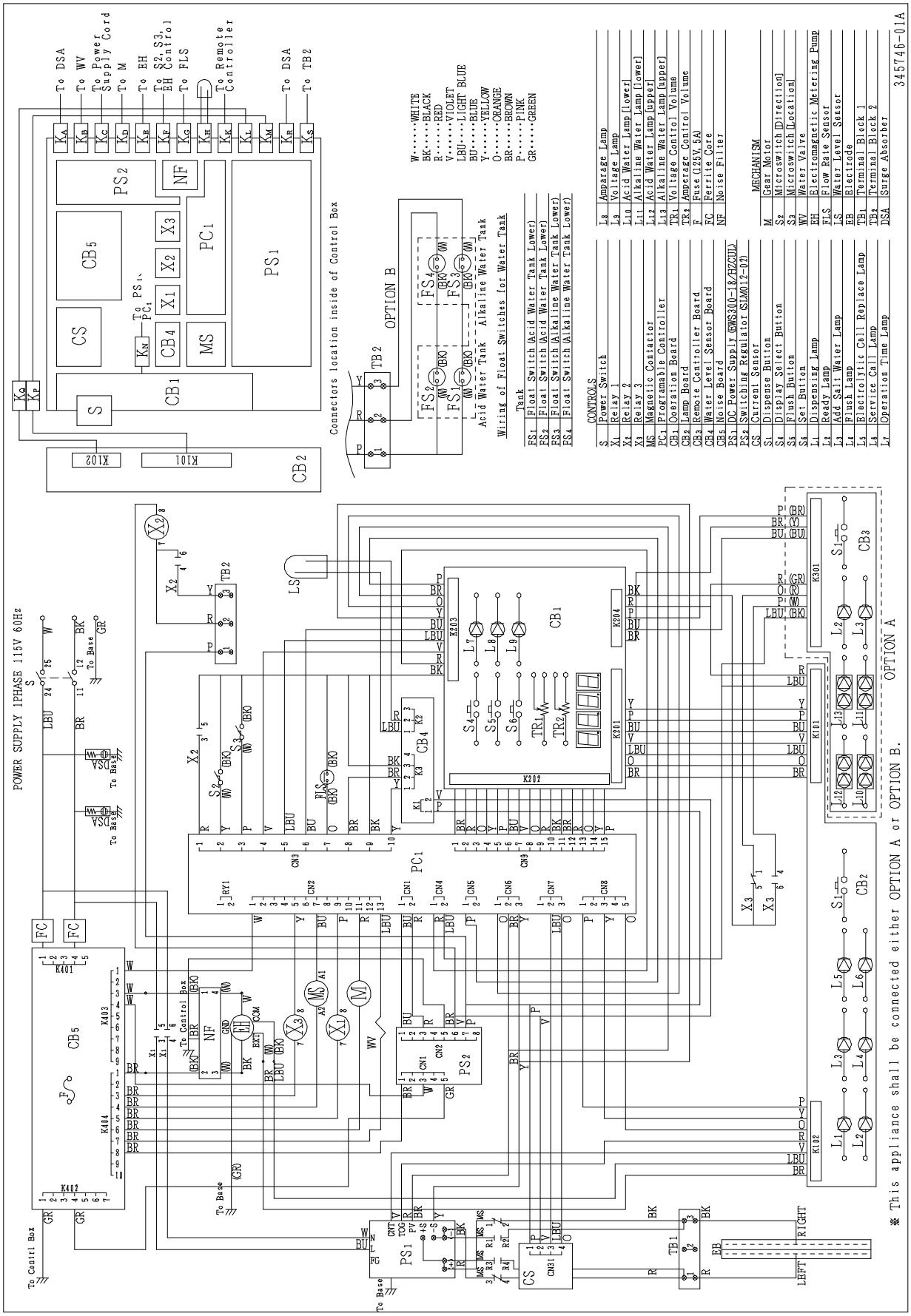
⑤ Press Display Button and Flush Button together.

IV. TECHNICAL INFORMATION

1. WATER CIRCUIT

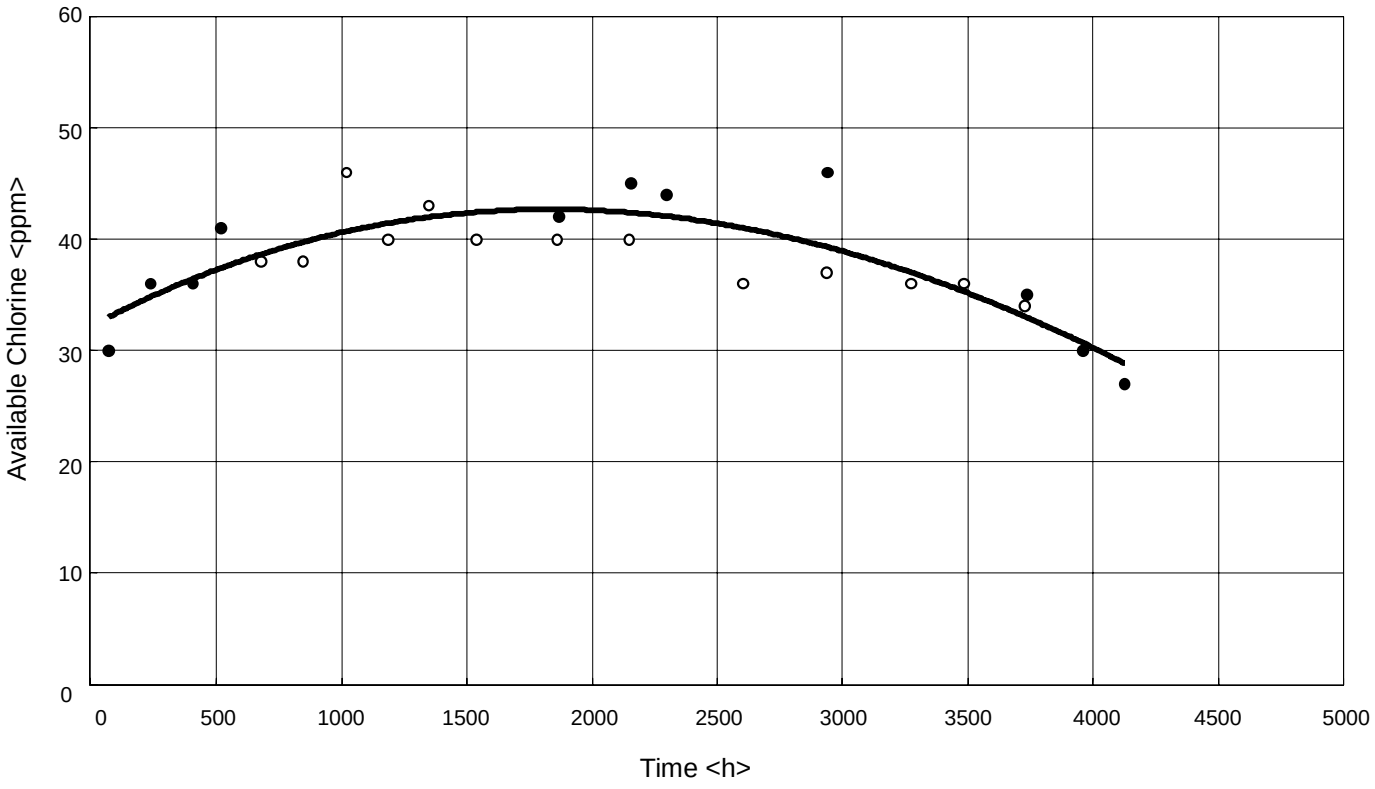


2. WIRING DIAGRAM

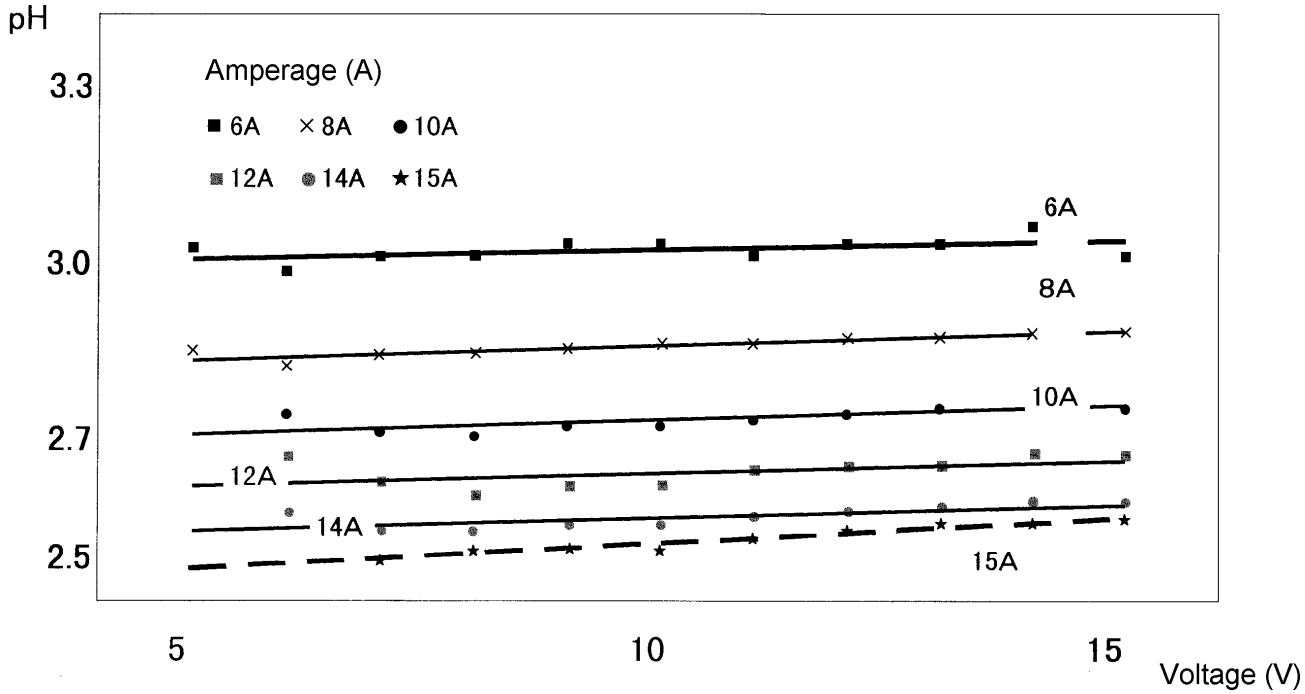


3. PERFORMANCE DATA

The following graph shows the electrode performance curve. The electrode life cycle depends on the free chlorine concentration as well as the raw water quality. To optimize the electrolyzed water, we recommend the Electrolytic Cell should be replaced every 3,000 hours of operation.

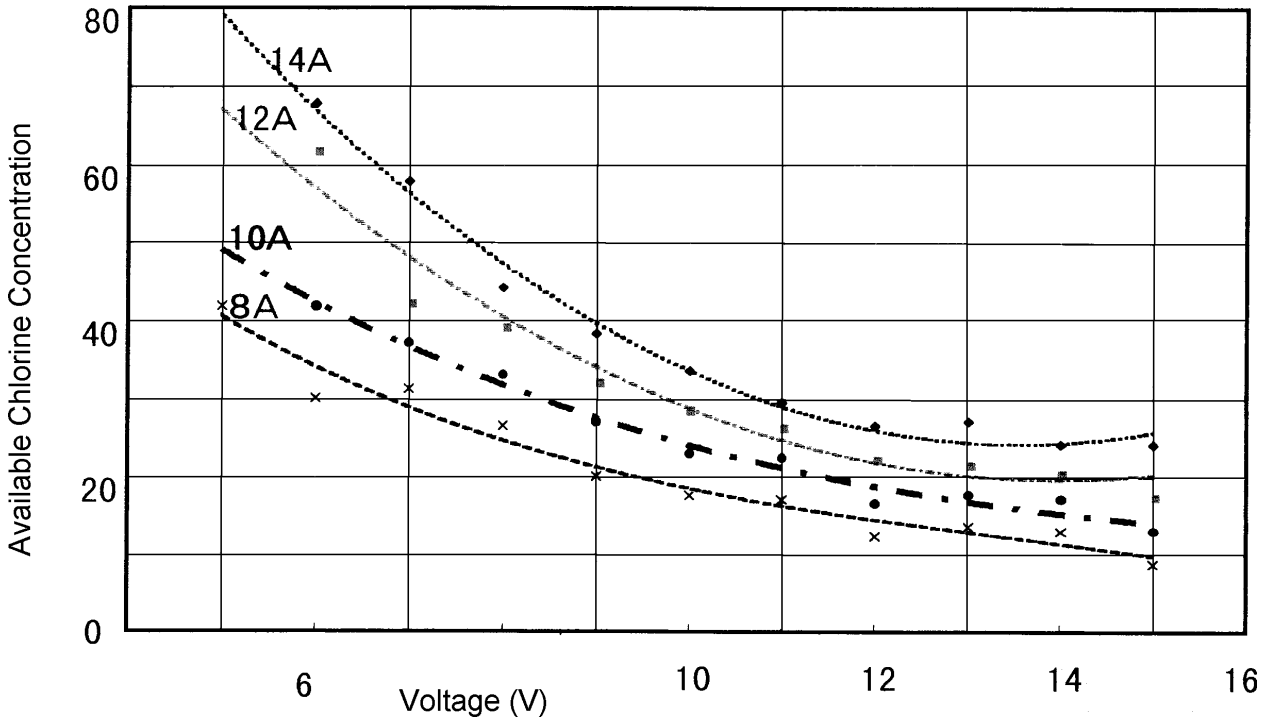


pH and Amperage



Water Temperature: 25°C
* The above data depends on the water temperature and water quality.

Amperage and Available Chlorine Concentration



Water Temperature: 25°C
* The above data depends on the water temperature and water quality.

V. SERVICE INFORMATION

1. MAINTENANCE/INSPECTION

Check the following items during maintenance or inspection in normal condition. If any of them is found abnormal or defective, repair, replace or adjust it properly.

No.	Inspection		Remedy
	Item	Check	
1	Acid Water pH	Within specified range?	Check by pH tester.
2	Alkaline Water pH	Within specified range?	Check by pH tester.
3	Available Chlorine Concentration (Acid)	Within specified range?	Check by accessory chlorine test paper or thiosulfuric acid titration.
4	Flow Rate (Acid/Alkaline)	Within specified range?	Check by beaker.
5	Ambient Temp.	Within specified range?	Check by thermometer.
6	Water Supply Temp.	Within specified range?	Check by thermometer.
7	Water Supply Pressure	Within specified range?	Check by water pressure gauge.
8	Cell Replace Lamp	Flashing or lighting?	Visually check.
9	Salt Water Tank	No dirt buildup? No salt deposit at bottom?	Visually check. Visually check.
10	Filter	Not clogged with dirt?	Visually check.
11	Water Circuit	No water leak?	Visually check.
12	Attachment Plug	Securely plugged in? Not hot?	Visually check. Check.
13	Exterior	Clean?	Visually check.
14	Float Switch	Free of scale? Working properly?	Visually check. Check for proper operation.
15	Water Softener	Water softened? Working properly? Set to regenerate water while unit is out of service? Proper amount of salt inside?	Check water sample. Check. Check. Check.
16	Cartridge Filter	Pressure difference within specified range?	Visually check.
17	Remote Controller	Water outlet not blocked? Working properly?	Visually check. Check for proper operation.
18	Labels	Attached firmly in place?	Visually check.

[a] Acid Water pH, Alkaline Water pH [No. 1, 2]

Always use the accessory pH test paper or a pH tester on the market to check pH.
Carefully read the instructions provided with the test paper or tester, and use it properly.

[b] Available Chlorine Concentration (Acid) [No. 3]

Always use the accessory test paper or the thiosulfuric acid titration specified below to check available chlorine concentration.
Carefully read the instructions provided with the test paper, and use it properly.
If the available chlorine concentration is below the specified level (it also depends on the original water quality), be sure to adjust the amperage and voltage to make the concentration reach the specified level.

Thiosulfuric Acid Titration

< Instruments >
Erlenmeyer flask (100mL - 200mL)
Measuring cylinder (50mL)
Measuring pipet or syringe (graduated by 0.1 or 0.5mL)
Reagents: Potassium iodide (KI)
Sodium thiosulfate (1/100N)

1) Wash the Erlenmeyer flask, measuring cylinder and measuring pipet with tap water.
2) Take 35.4mL of acid water in the cylinder, and pour it gently into the flask.
3) Put some potassium iodide (two or three grains) into the flask, and stir it lightly. The acid water will turn orange.
4) Take some sodium thiosulfate (1/100N) with the pipet, and read it.
5) Drop the sodium thiosulfate (1/100N) little by little into the flask while stirring it lightly. When the acid water starts losing its color, drop the reagent with special care.
6) When the acid water turns from orange into clear, stop dropping the reagent and read the pipet.
7) The dropping amount (mL) x 10 will be the available chlorine concentration (mg/L). For example, if the dropping amount is 4.5mL, the available chlorine concentration will be 45mg/L.

[c] Cell Replace Lamp [No. 8]

The flashing Cell Replace Lamp indicates that the Electrolytic Cell has run for 2900 - 3000 hours and should be replaced soon.
The lighting Cell Replace Lamp indicates that the Electrolytic Cell has run for 3000 hours or more and needs immediate replacement.

[d] Water Softener [No. 15]

Carefully read the instructions provided with the water softener, and use it properly.
Check that the water softener is set to start regeneration while electrolyzed water is not dispensed (ex. 2:00AM).

The water softener also needs salt for regeneration. Always add a proper amount of salt into the water softener. Give the user sufficient instructions to add salt periodically.

[e] Cartridge Filter [No. 16]

Replace the cartridge filter when the pressure gauge readings on the primary side of the water softener and on the secondary side of the cartridge filter differ by 0.1MPa (1.0kgf/cm^2) or more.

2. SERVICE DIAGNOSIS

When the unit shuts down with the Service Call Lamp lighting:

Lamp	Code	Problem	Check	Possible Cause	Remedy
Service Call	E11	After water valve opens, flow rate sensor does not detect water flow for 3 sec.	Water Supply	Cut off.	Recover.
			Water Outlet	Blocked.	Unblock.
			Connecting Hose	Crushed or bent.	Release stress.
			Alkaline Water Line	Scaled up.	Clean.
			Flow Switching Valve	Clogged.	Unclog.
			Water Valve	Clogged.	Unclog.
				Connector in bad contact.	Improve contact.
				Defective.	Repair or replace.
			Flow Rate Sensor	Clogged.	Unclog.
				Connector in bad contact.	Improve contact.
				Defective.	Repair or replace.
			Programmable Controller	Water valve output contact defective.	Repair or replace.
				Flow rate sensor input defective.	Repair or replace.
	E14	After water valve closes, flow rate sensor detects water flow for 3 sec.	Water Valve	Clogged.	Unclog.
			Flow Rate Sensor	Defective.	Repair or replace.
Service Call	E42	Metering pump stroke speed exceeds 360spm for 60 sec.	Salt Water Tank	Salt water too thin.	Thicken.
			Set Voltage	Too low.	Raise.
			Set Amperage	Too high.	Reduce.

Lamp	Code	Problem	Check	Possible Cause	Remedy
Service Call	E42	Metering pump stroke speed exceeds 360spm for 60 sec.	Filter	Dirty.	Clean.
			Salt Water Hose	Clogged.	Unclog.
				Air inside.	Remove air.
			Water Supply	Too much.	Keep within specified range.
	E43	Metering pump stroke speed does not exceed 10spm for 60 sec.	Cell Salt Concentration	Too high.	Repeat dispensing to supply water and lower concentration.
			Set Voltage	Too high.	Reduce.
			Set Amperage	Too low.	Raise.
			Salt Water Tank	Salt water too thick.	Thin.
			Metering Pump Head Dial	Not positioned at “E”.	Turn into “E” position.
Service Call	E51	Stroke speed exceeds last stroke speed + 10spm for 20 sec.	Salt Water Hose	Air inside.	Remove air.
				Clogged.	Unclog.
			Filter	Dirty.	Clean.
			Salt Water Tank	Salt water too thin.	Thicken.
			Switching Power Supply	Defective.	Repair or replace.
				DC power supply line opened.	Repair.
			Control Panel Backside Board	Connector in bad contact.	Improve contact.
				Parts on board defective.	Repair or replace.
			Relay	Bad contact.	Repair or replace.
			Magnetic Contactor	Bad contact.	Repair or replace.
	E52	Abnormal input from current sensor	Current Sensor	Defective.	Repair or replace.
				Connector in bad contact or open circuit.	Improve contact or repair.
			Switching Power Supply	Defective.	Repair or replace.
				Connector in bad contact.	Improve contact.

Lamp	Code	Problem	Check	Possible Cause	Remedy
Service Call	E61	Flow switching valve direction microswitch turns ON and OFF 5 times in 2 min.	Gear Motor	Will not stop.	Repair or replace.
			Location Microswitch	Fails to detect.	Repair or replace.
	E62	Programmable controller outputs to flow switching valve gear motor for 20 sec.	Microswitch	Fails to detect.	Repair or replace.
	E65	After gear motor stops, location microswitch turns ON.	Gear Motor	Overrun.	Repair or replace.

* When restarting the electrolyzer after a shutdown for some error, check the amperage and voltage on the electrolytic cell with an ammeter and voltmeter (not those provided on the electrolyzer). If the voltage reading is normal but the amperage is still low, the salt water inlet can be clogged or the salt water may be too thin. If both amperage and voltage are too low, check for abnormal DC power supply or a bad contact of the relay or magnetic contactor.

* The electrolyzer may also shut down for some error when the flow rate varies for acid water and alkaline water because of different piping resistance (ex. connecting hose crushed or one of the water outlets under water). Even if the electrolyzer is in operation, varying flow rate may cause low pH and chlorine concentration. Keep a constant flow rate by balancing the piping resistance.

* The amperage varies with the salt water concentration and metering pump stroke speed. When restarting the electrolyzer after a shutdown for some error, check the change in amperage and the metering pump operation.

HOSHIZAKI

HOSHIZAKI ELECTRIC CO., LTD.

3-16 MINAMIYAKATA, SAKAE, TOYOAKE,
AICHI 470-1194 JAPAN
PHONE: 0562-97-2111

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP