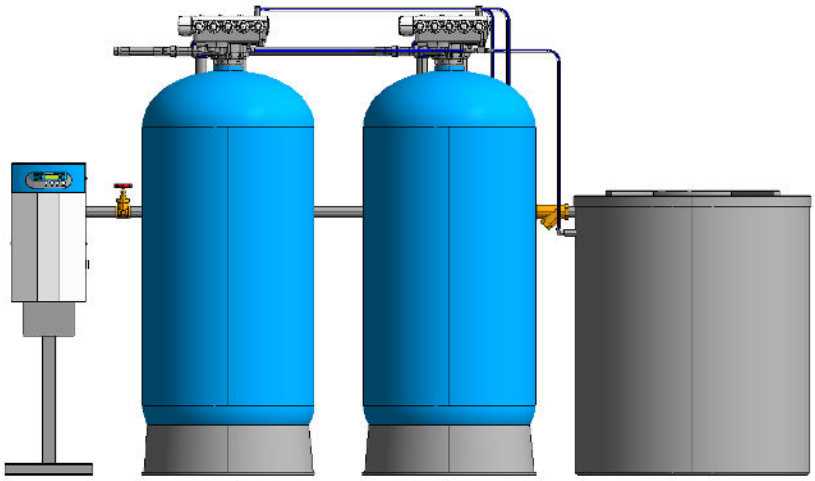
The Best Partner of
Energy, Water and Environment

MIURA

OPERATION MANUAL

System Integrated Water Softener

MW-35U
MW-65U
MW-65U
MW-100U
MW-150U
MW-250U
MW-400U
MW-600U
MW-1000U
(America Product)



This document was formulated in Japan.
Comply with the regulations and standards of the country of use regarding installation and usage.
The specifications of products and components may vary with country of use and the site situation.
INFORMATION IN THIS MANUAL MAY BE CHANGED WITHOUT NOTICE.

Manual Code No.	S827-089-020B

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Important Safety Information

Before using the MW model system integrated water softener, ensure that this operation manual has been read and fully understood; furthermore, the instructions given herein should be strictly observed during operation.

The MW model system integrated water softener contains moving parts that may become entangled (with a part of the human body) and high voltage sections that could cause electric shock. Failure to use this system integrated water softener in the appropriate manner can, therefore, result in death, injury, the outbreak of fire, and other serious accidents.

In order to ensure that tasks undertaken during operation and maintenance of the MW model system integrated water softener can be completed safely, it is critical that the locations of all dangerous and hazardous parts of this equipment be confirmed in advance. Here at MIURA, it is practically impossible to anticipate all potentially dangerous situations, and therefore, this Operation Manual deals only with known hazards. A higher level of safety can be achieved by careful observation of the warnings and instructions set forth herein.
Safety-related warnings are classified into the following three levels, and notification of these warnings is provided both within this Operation Manual and by the use of warning labels on the MW model system integrated water softener itself.

Indicates an imminently dangerous situation which leads to serious injury or death to the user, if the product is mishandled.

Indicates a situation which might cause serious injury or death to the user, if the product is mishandled.

Indicates a situation which might cause minor injury to the user or the occurrence of physical damage only, if the product is mishandled.

If any part used in the product fails, contact your dealer or MIURA sales office to replace it with its genuine part. Using parts of different models might reduce safety.
It should be noted that unauthorized alteration of the MW model system integrated water softener or repair procedures other than those described herein can pose a serious safety risk. Never make any modifications or repairs without MIURA’s permission.

Introduction

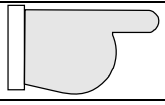
This document describes the methods of handling the MW model system integrated water softener (hereinafter, the “water softener”) to ensure its proper use.

Not only those who use the boiler for the first time but also those who know the handling methods should read this document carefully and understand the proper handling methods before use of the water softener.

Furthermore, we also recommend that this Operation Manual be stored in close proximity to the water softener so that it can be referred to at any time to confirm the correct usage.

[Explanation of Notation]

The meanings of the symbols used in this manual are as shown below.

	Indicates a prohibited action (what you must not do).
	Indicates a possibility of injuries when the specified position is touched.
	Indicates a possibility of electric shock when the product is handled with wet hands.
	Indicates an action to be taken according to an instruction (what to be executed).
	Indicates an action connecting a grounding wire.
	Indicates a caution.
	Indicates a possibility of injury due to high temperatures under specific conditions.
NOTE	Describes the precautions to prevent failures of the water softener, points to perform effective operation, and useful information to know.
	Indicates the page of related information.

Definition of Terms

Special terms used in this document are summarized below. Learn the terms and their meanings. Terms are indicated with an asterisk (*) in the text.

Term	Explanation
Hardness	The amount of calcium and magnesium dissolved in water. These substances are the main cause of scale buildup after they enter the boiler.
Raw water	Water supplied to the water softener.
Soft water	Water from which the hardness components are removed.
Ion exchange resin	Resin particles which can chemically absorb and remove the hardness components in the raw water. Brine is used periodically to regenerate the resin during operation.
Service (Water flow)	Normal state in which the water softener is operating to obtain softened water or a state in which water is passed through the water softener and either soft water or raw water is supplied to the secondary side.
Regeneration	Processes to recover the ion exchange resin saturated with hardness components to reuse it. (MW-35U to 400U include the five processes of Backwash, Brine, Slow Rinse, Fast Rinse, and Refill. MW-600U and MW-1000U include the seven processes of Backwash, Brine, Slow Rinse, Brine 2, Slow Rinse 2, Fast Rinse, and Refill.)
Regenerating salt	Salt used for regeneration. If you use rock salt, it may result in failures like clogging of the brine line. We recommend that you use pure regenerating salt for water softeners.
Scale	Substance formed by impurities contained in the water, such as calcium and magnesium, which adhere to the water tube of the boiler.
No. 1 unit	The primary unit for MW-35U to 400U, and the unit with a pressure gauge for MW-600U and MW-1000U of two units constituting the water softener.
No. 2 unit	The secondary unit for MW-35U to 400U, and the unit without a pressure gauge for MW-600U and MW-1000U of two units constituting the water softener.
Hardness removal capacity	A number to indicate the performance of the water softener, referring to how many hardness components can be removed in a regeneration cycle.
Softened water supply capacity	A number to indicate the performance of the water softener, referring to how much water can be treated in a regeneration cycle. The water softening volume may vary depending on the hardness of the raw water.
Soft water check	A method that uses a hardness indicator to check whether the water is softened.

Table of Contents

SECTION 1: SAFETY

1. Safety Regulations

Handling of the water softener is comprised of operations associated with running of the equipment and operations regarding maintenance.
Only those who have received a handling explanation with this document should operate the water softener.

Applicable to All Water Treatment Equipment (Related Laws and Regulations)	Document No.: 98-002-05-01

<Precautions for equipment installation and use> — Related laws and regulations

1) The table below shows part of the laws and regulations on the installation and use of water treatment equipment. Refer to the separate document for more information on other relevant laws and regulations.
   (There are also prefectural and municipal ordinances; therefore, contact the supervisory authority or competent authority for more information.)
2) The information listed in the table was created based on the laws and regulations in effect when the information was published.
3) The documents to be submitted and their destination vary depending on your equipment and facilities.
   If you have any questions, contact your nearest dealer, MIURA sales office, or the competent supervisory authority.
4) The laws and regulations listed below may not apply to all water treatment equipment. Refer only to those laws and regulations that apply to your equipment and facilities.

Related laws and regulations	Form(s) to be submitted	Destination	Submission timing	Remarks
Water Quality Pollution Control Act, River Act, Sewerage Service Act, etc.	Verification required from local towns and cities in which the water treatment equipment or other equipment is installed. (The laws and regulations in some areas may be defined even more specifically in accordance with regional regulations.)			Drain water may be produced depending on the type of water treatment equipment and equipment operation. Drain water must be treated in other ways to prevent it from damaging waterways and the like. In cases where the total amount of drain water exceeds the legal amount on a per-plant basis or where the equipment is used at specified facilities, an application is necessary. However, the conditions may vary from region to region. Accordingly, you should contact your local authorities for more information.
Regional Pollution Prevention Ordinance	Notification as required by the applicable ordinance	As set forth by the relevant regional authorities	As set forth by the relevant regional authorities	Applicability is defined independently by regional pollution prevention ordinances based; accordingly, you should contact your local authorities for more information. (Certain regional ordinances concerning air pollution, noise, vibration, drain water, and the like may supersede the corresponding national regulations.)
Water Supply Act	—	—	—	(Prohibition of direct waterworks contact) Water treatment equipment (excluding certified equipment) cannot be connected directly to waterworks. Instead, it is necessary to either set up a feed water tank or to isolate the systems using, for example, a float valve. Details may vary from region to region; accordingly, you should contact your local authorities for more information.
	Design specifications for dedicated waterworks, Notification of the start of feeding water	As set forth by the relevant regional authorities	—	Business operators are to submit notification to local governments for drinking water wells for industrial use in facilities where the volume of water intake exceeds the allowed quantity as prescribed by law which require the use of dedicated waterworks systems regardless of the form of usage. Contact your local authorities for details.
Act on Maintenance of Sanitation in Buildings	—	—	—	Buildings are to be preserved and maintained (through cleaning, water quality analysis, and other activities) in accordance with Hygiene Control Standards.
Food Sanitation Act	No notification made for equipment and related matters	—	—	Measures are to be implemented to maintain hygiene and safety and prevent sanitation hazards in accordance with applicable laws.
Industrial Safety and Health Act	Notification of plans	Chief of the Labor Standards Inspection Office	30 days before the start of installation work	When installing a facility where substances specified in applicable laws (such as specified chemical substances) are handled, it is necessary to submit a notification of facility planning. (Dilute sulfuric acid and hydrochloric acid are specified chemical substances.)
	—	—	—	When using substances specified in applicable laws (such as specified chemical substances), a qualified operator must be selected, all such substances are to be handled and managed in accordance with applicable laws, and the operator's healthcare is necessary.
Poisonous and Deleterious Substances Control Act	—	—	—	All such substances are to be stored and managed in accordance with applicable laws. Chemical substances are to be handled properly in accordance with the guidance and information listed on the SDS for the relevant material.
Fire Service Act	Notification as set forth by local fire departments	The nearest fire department	Prior to the start of work	Local fire chiefs or fire department chiefs must be notified in advance of any plans for any party to use or store certain substances (chemical substances and other materials) of a designated quantity as specified by applicable laws and regulations.

Applicable to All Water Treatment Equipment (Related Laws and Regulations)	Document No.: 98-002-05-02

<Precautions for chemical management and handling> — Related laws and regulations

1) The table below shows part of the laws and regulations on chemical management and handling. There are also prefectural and municipal ordinances; therefore, contact the competent administrative authority for more information.
2) This table shows the laws and regulations as of the end of September 2017. For the most up-to-date information, contact the competent administrative authority.
3) The management and handling differ depending on the chemicals you handle. If you have any questions, contact your nearest dealer, MIURA sales office, or the competent administrative authority.

Related laws and regulations	Destination	Submission timing	Remarks	Common precautions for management and handling
Poisonous and Deleterious Substances Control Act	—	—	If the chemical product is a deleterious substance, it is necessary to perform appropriate storage management, etc. as a person handling it in businesses.	The laws and regulations applicable to each chemical product are described in the SDS (Safety Data Sheet). Manage the chemical products in accordance with the laws and regulations. Refer to the SDS for details about proper handling of each chemical product.
Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (Law concerning Pollutant Release and Transfer Register (PRTR))	Authority in the prefecture to which the location of each office belongs	Yearly (April to June)	When handling one ton or more of a Class I designated chemical substance (0.5 ton or more of a specific Class I designated substance), as mentioned in the act, it is necessary to submit a notification depending on the target industry type and the number of permanent employees.	
Industrial Safety and Health Act	—	—	According to the act, if a chemical product containing chemical substances that require risk assessment in an amount equal to or more than the cut-off value is newly adopted, or the work procedures to handle it are changed, the business operator is required to perform risk assessment. * The risk assessment refers to the identification of the dangers and hazards of a chemical substance or its manufacture, estimation of the extent of possible harm or health hazard to the worker, and examination of the risk reduction measures.	

2. Safety-related Knowledge and Expertise

Usage of the water softener requires knowledge and experience of the operation and maintenance of mechanical equipment.

In addition, only the following persons should be permitted to perform work on the water softener.

- Operators who have read and fully understood this Operation Manual.

3. Protective Equipment

Remember to wear a helmet, protective glasses, protective mask, safety shoes, safety gloves, and other protective equipment depending on the work.

4. Prohibition of Unapproved Modification

It should be noted that unauthorized alteration of the water softener or repair procedures other than those described herein can pose a serious safety risk. Never make any modifications or repairs without MIURA's permission.

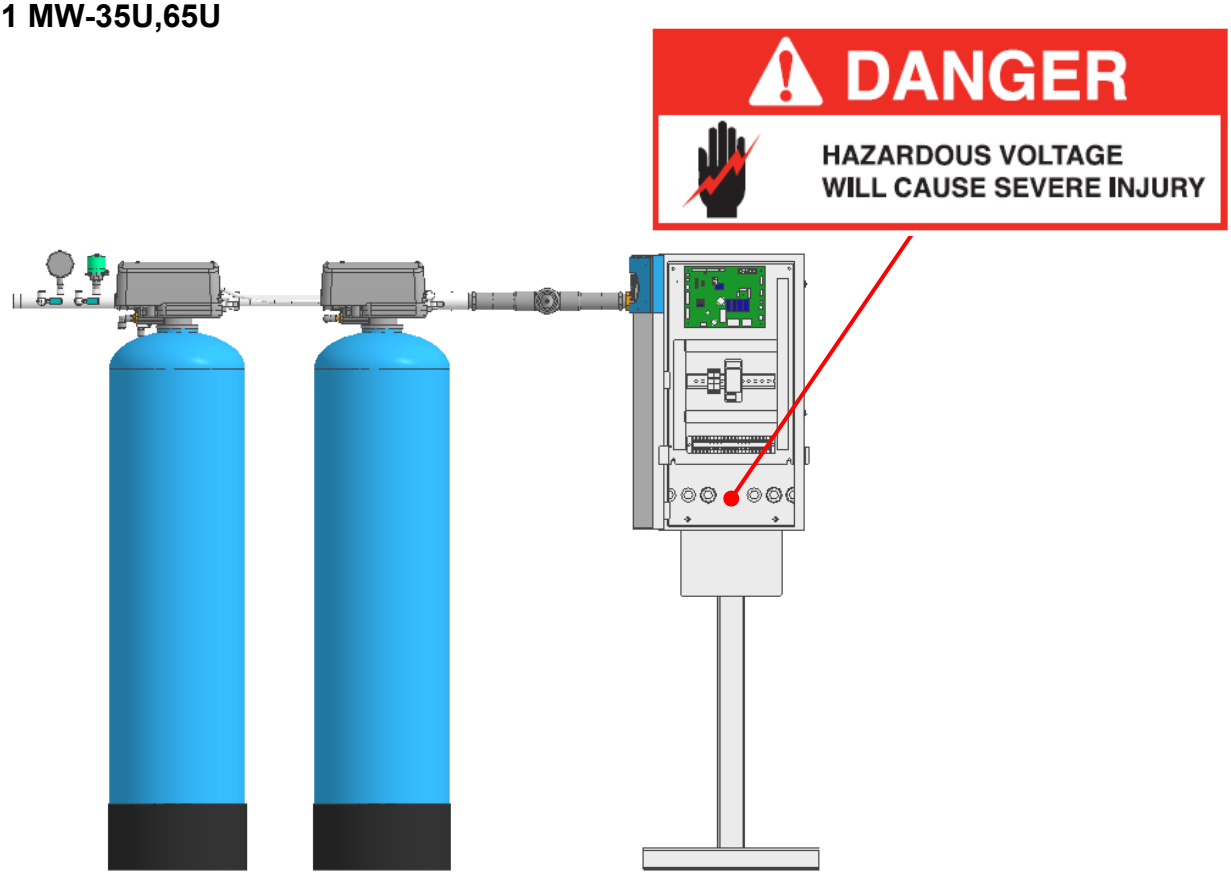
5. Warning Labels on the Water Softener

Warning labels are pasted at all locations that require attention to be paid during operation.

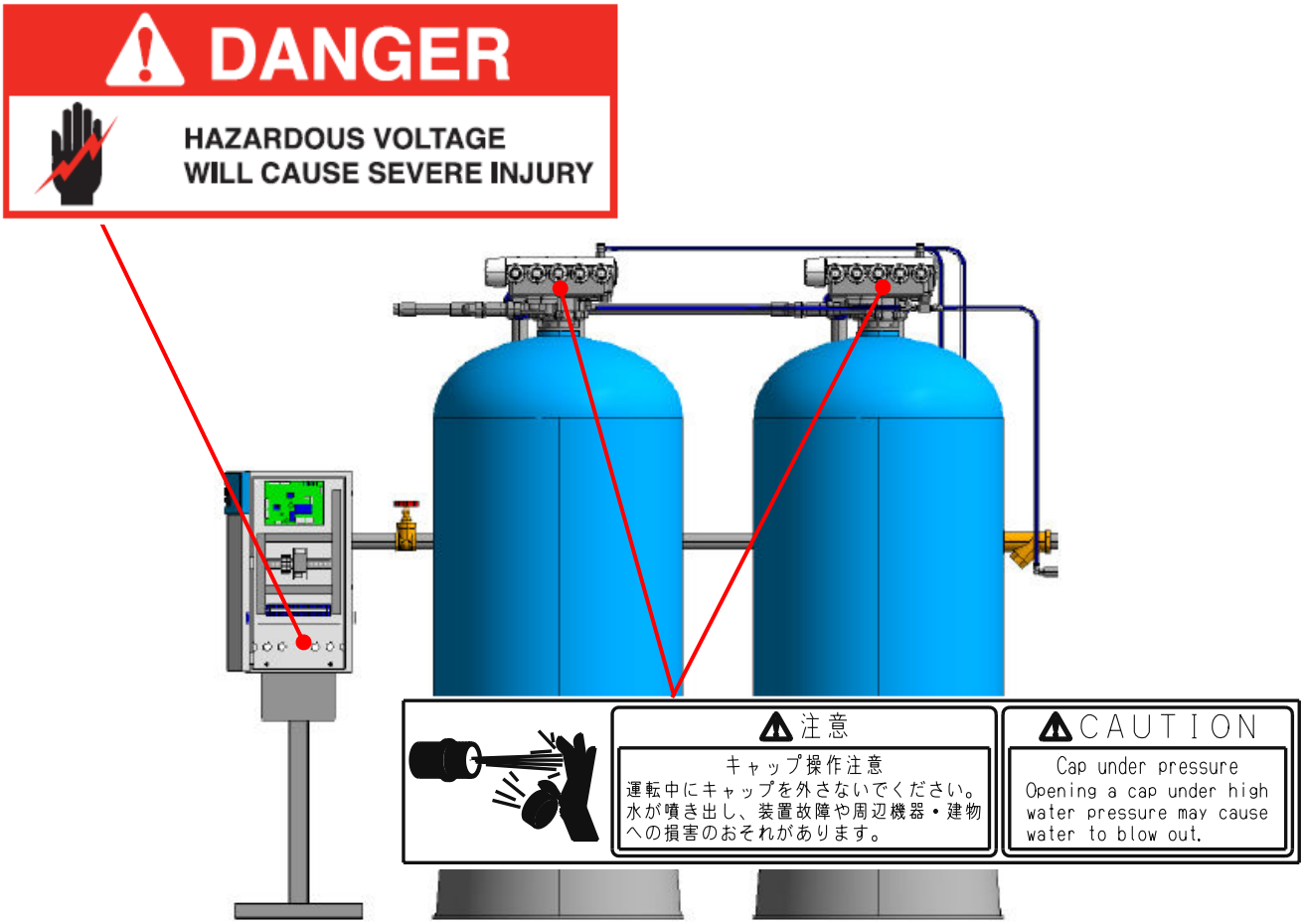
If any warning label is peeled off or torn, replace it with a new one.

For further details on warning labels contact your dealer or MIURA sales office

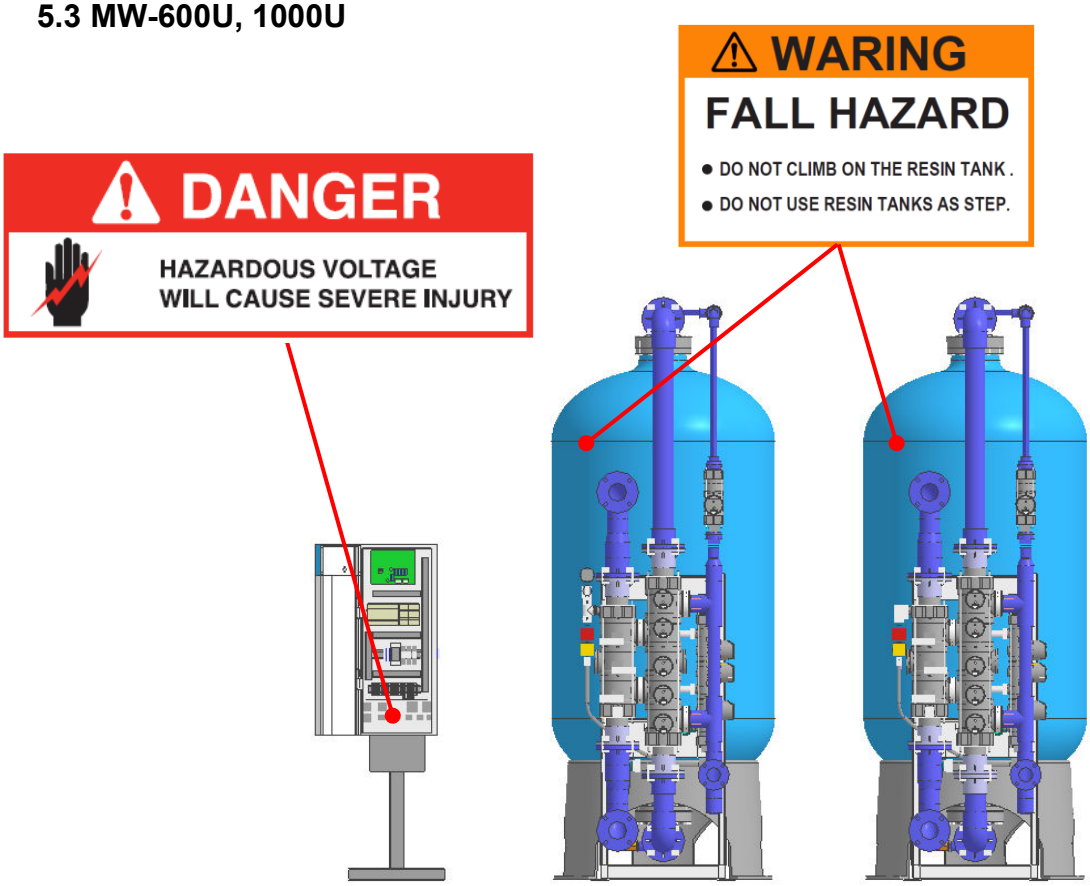
5.1 MW-35U,65U



5.2 MW-100U, 150U, 250U, 400U



5.3 MW-600U, 1000U



6. Safety Precautions

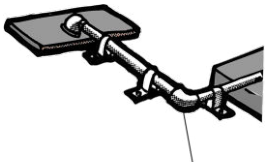
6.1 Safety during Installation

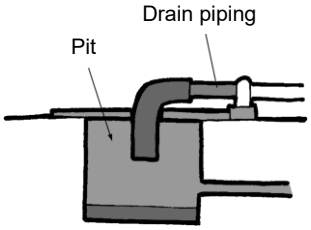
During installation, observe the following safety information.

WARNING

Instruction

Ensure that drain piping is fixed securely in place to prevent it moving in reaction to water discharge and that the end of the piping opens in a safe location such as a pit. Splashed water can cause electric shocks, burns, or other injuries.

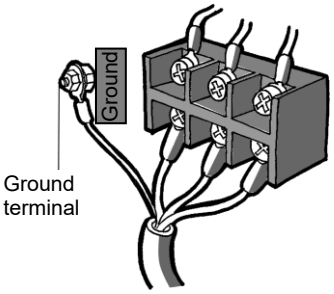


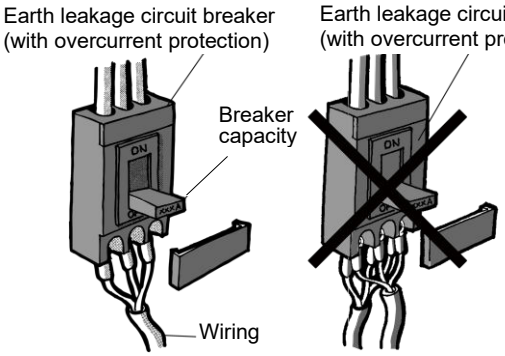


WARNING

Ground Connection

During power source installation work, use a specified wire diameter for connection and ensure that a ground is established.
(Japanese D-type grounding or better)
Furthermore, a dedicated power supply should be used and an earth leakage circuit breaker (with overcurrent protection) should be set up. If this precaution is not observed, serious accidents such as electric shock and outbreak of fire may result.





WARNING

Instruction

The AC/DC adaptor and surge protector are not waterproof.
Do not place them on the floor but install them in a position not subject to water.
If this precaution is not observed, serious accidents such as electric shock and outbreak of fire may result.

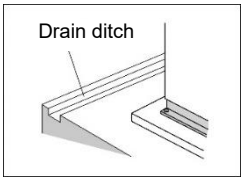
CAUTION

Dew drops may occur depending on environment conditions including the raw water temperature and the atmosphere in the installation location. If necessary, take measures to prevent dew condensation on this device and external piping, such as installing heat insulation.

Caution

Also, factors such as loose connectors and aging of pipe materials can lead to water leakage. In order to prevent water from leaking outside the room or downstairs, take appropriate measures against drain water on the installation surface of water treatment equipment and peripheral equipment.

- Setting up a drain ditch that completely encloses the whole equipment
- Applying a waterproof treatment to the floor, and making the floor slope downward to the drain ditch



6.2 Safety during Inspection and Preparation (Excerpt from Page 27 Onward)

During Inspection and Preparation, observe the following safety information.

WARNING

Prohibited

Do not place combustible materials inside the control box.
Failure to observe this precaution can lead to the outbreak of fire, which can result in injury or even death.

WARNING

Instruction

Make sure no water is leaking from the water softener or from around the piping. Turning the switches ON or OFF during a water leak may result in electric shock or fire from a short circuit.

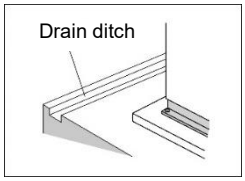
CAUTION

Dew drops may occur depending on environment conditions including the raw water temperature and the atmosphere in the installation location. If necessary, take measures to prevent dew condensation on this device and external piping, such as installing heat insulation.

Caution

Also, factors such as loose connectors and aging of pipe materials can lead to water leakage. In order to prevent water from leaking outside the room or downstairs, take appropriate measures against drain water on the installation surface of water treatment equipment and peripheral equipment.

- Setting up a drain ditch that completely encloses the whole equipment
- Applying a waterproof treatment to the floor, and making the floor slope downward to the drain ditch



6.3 Safety during Operation (Excerpt from Page 28 Onward)

During operation, observe the following safety precautions.

WARNING

Do not operate the main power supply breaker with wet hands. Failure to observe this precaution may result in electric shock, injury, or death due to contact with high voltage.

CAUTION

When cutting off water flow(*), make sure the “OPERATION” switch of the boiler is OFF. If the water flow(*) stops during operation of the boiler, it may result in abnormal stop and boil-dry due to low water level.

CAUTION

If the Caution [C210-01]/[C210-02] (Control valve defect) or [C210-03]/[C210-04] (Controller defect) occurs in the water softener, do not perform manual regeneration(*) during boiler operation. If manual regeneration(*) is performed, the normal unit enters the regeneration(*) process, and the following situations occur.

- In the case of the MW-35U to 400U

  Water bypass occurs in the control valve during regeneration(*). Hard water is supplied and scale(*) buildup may occur in the boiler during regeneration(*).

- In the case of the MW-600U and MW-1000U

  Water bypass does not occur in the control valve during regeneration(*). Water flow(*) may stop completely during regeneration(*).

  If manual regeneration(*) is performed by mistake and the water flow(*) stops, confirm that the unit in which the Caution has occurred can be bypassed, and then bypass the unit to avoid stopping of water flow(*).

  Refer to the following section for details on the bypass method.

“4.2 Stop” in SECTION 3 on page 32

6.4 Safety during Inspection and Maintenance (Excerpt from Page 35 Onward)

During inspection and maintenance, observe the following safety precaution.

WARNING

Make sure that the power plug is not dusty or the plug is not loose.
There is a risk of serious accident such as fire.

WARNING

The AC/DC adaptor and surge protector are not waterproof.
Do not place them on the floor but install them in a position not subject to water.
If this precaution is not observed, serious accidents such as electric shock and outbreak of fire may result.

CAUTION

Caution

Check the water quality once every four months.
Failure to complete the check of water quality may result in decreased boiler efficiency and water tube damage due to hardness(*) leakage.

CAUTION

Caution

Since the AC/DC adaptor is a consumable part, replace it every five years.
If the AC/DC adaptor has not been replaced, scale(*) may buildup in the boiler because power supply to the water softener stops and raw water(*) is supplied due to the AC/DC adaptor malfunction.

6.5 Safety during Troubleshooting (Excerpt from Page 41 Onward)

During the troubleshooting, observe the following safety precaution.

CAUTION

Caution

When the Alarm [A210-01] (Both units failure at same time) occurs, in the case of the MW-35U to 400U, hard water is supplied and scale(*) buildup may occur in the boiler. In the case of the MW-600U and MW-1000U, water flow(*) may stop completely. (The water flow(*) stops when both units fail during regeneration(*).)
If the Alarm occurs, immediately check the water flow(*). If the water flow(*) has stopped, bypass the both units.
Refer to the following section for details on the bypass method.

“4.2 Stop” in SECTION 3 on page 32

CAUTION

If the Caution [C210-01]/[C210-02] (Control valve defect) or [C210-03]/[C210-04] (Controller defect) occurs and the normal unit enters the regeneration(*) process, the following situations occur.

- In the case of the MW-35U to 400U

  Water bypass occurs in the control valve during regeneration(*). Hard water is supplied and scale(*) buildup may occur in the boiler during regeneration(*).

- In the case of the MW-600U and MW-1000U

  Water bypass does not occur in the control valve during regeneration(*), and the water flow(*) may be stopped in the unit in which an error has occurred. If the normal unit enters the regeneration(*) process in such a state, the water flow(*) may stop completely.

  If the normal unit enters the regeneration(*) process and water flow(*) stops when the Caution above occurs, confirm that the unit in which the Caution has occurred can be bypassed, and then bypass the unit to avoid stopping of water flow(*).

  Refer to the following section for details on the bypass method.

“4.2 Stop” in SECTION 3 on page 32

6.6 Safety during Storage (Excerpt from Page 46 Onward)

During transfer or resale, observe the following safety precaution.

WARNING

Ensure that the water softener is installed only in the specified condition and connected to the specified peripheral equipment.

Failure to observe this precaution may result in injury.

SECTION 2: OVERVIEW

1. Usage and Functions

1.1 Usage

This product is a device that supplies soft water(*) by using ion exchange resin(*) to remove hardness(*) (calcium and magnesium ions) from water.

NOTE

This product is not suitable for beverage and food processing, so make sure the treated water is not to be directly used for human consumption.

1.2 Functions

Various kinds of impurities are dissolved in the mains water and well water widely used for boilers. In particular, the hardness(*) in water are the main cause of the scale(*) buildup in the boiler pressure vessels that results in a considerable decrease in the operating efficiency and service life of the boiler. In order to maintain boiler operating efficiency for long-term operation, it is necessary to prevent scale(*) buildup.

The water softener utilizes ion exchange resin(*) to remove the hardness(*) from the raw water(*) that are the main contributors of scale(*) buildup in the boiler.

This product is also a water softener with efficient regeneration(*), a high level of reliability with regard to hardness(*) leakage, and labor saving in regenerating salt(*) management.

2. Work Mechanism

2.1 Removal of Hardness(*)

As shown in Figure 2-1, raw water(*) (hard water) is introduced from the raw water(*) inlet at the top. When the raw water(*) flows through the ion exchange resin(*) layer, the resin absorbs hardness(*) in the raw water(*), such as calcium and magnesium ions.
In this way, the hardness(*) is removed from the raw water(*), and the soft water(*) is collected from the treated water outlet.
Moreover, there is a limit on the amount of hardness(*) that can be absorbed by the ion exchange resin(*), so the amount of hardness(*) that can be removed depends on the volume of resin.

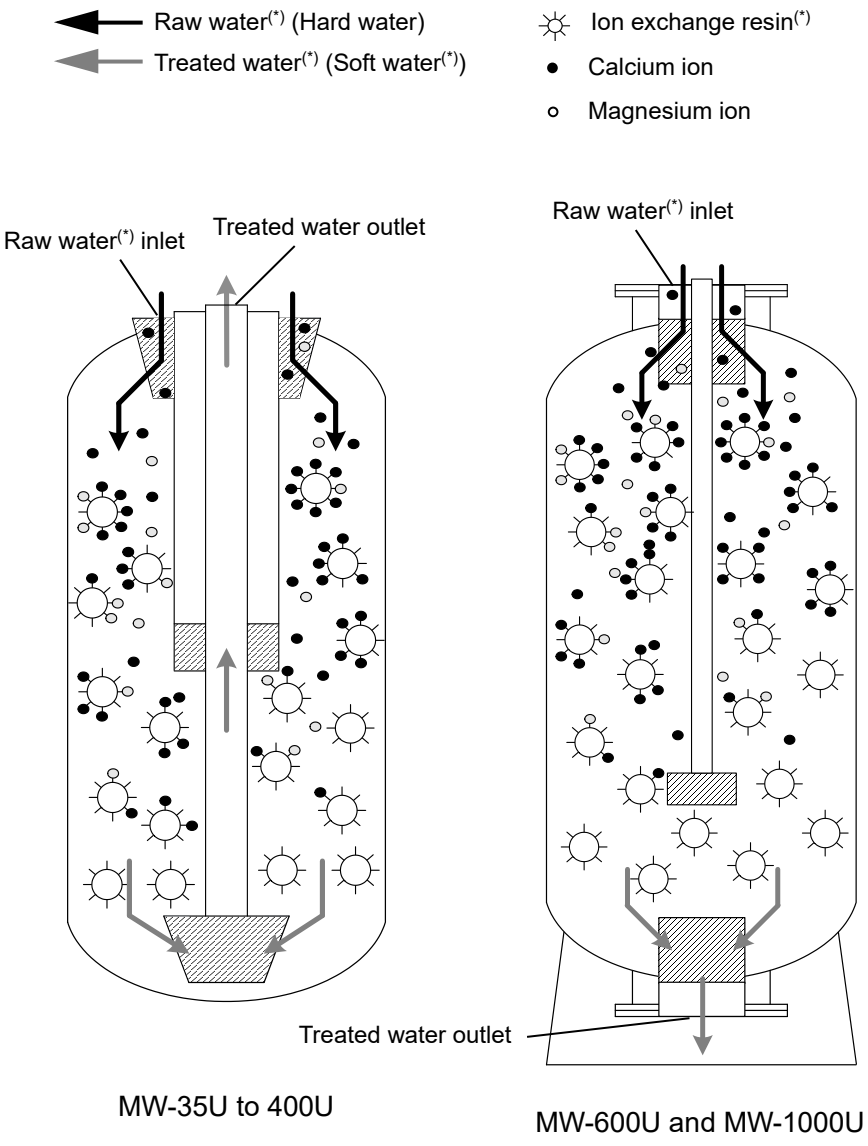


Figure 2-1: Mechanism of hardness(*)-components removal

2.2 Regeneration(*) of Ion Exchange Resin(*)

As shown in Figure 2-2, the regeneration(*) brine is introduced from the raw water(*) inlet and treated water outlet. When the regeneration(*) brine passes through the ion exchange resin(*) layer, it separates the hardness(*) such as calcium and magnesium ions that are absorbed by the resin. Regeneration(*) brine and calcium and magnesium ions are discharged from the regeneration(*) drain outlet in the center of the ion exchange resin(*) layer.

Once regenerated, the ion exchange resin(*) returns to its original state before adsorbing hardness(*) components and can then be reused.

To produce the regeneration(*) brine needed for regeneration(*), a sufficient amount of regenerating salt(*) is needed. If the regenerating salt(*) supply is insufficient, the regeneration(*) cannot be completed. If water is introduced under such conditions, hardness(*) components cannot be removed during operation, which in turn causes hardness(*) leakage.

Therefore, it is important to maintain a sufficient amount of regenerating salt(*) in the brine tank.

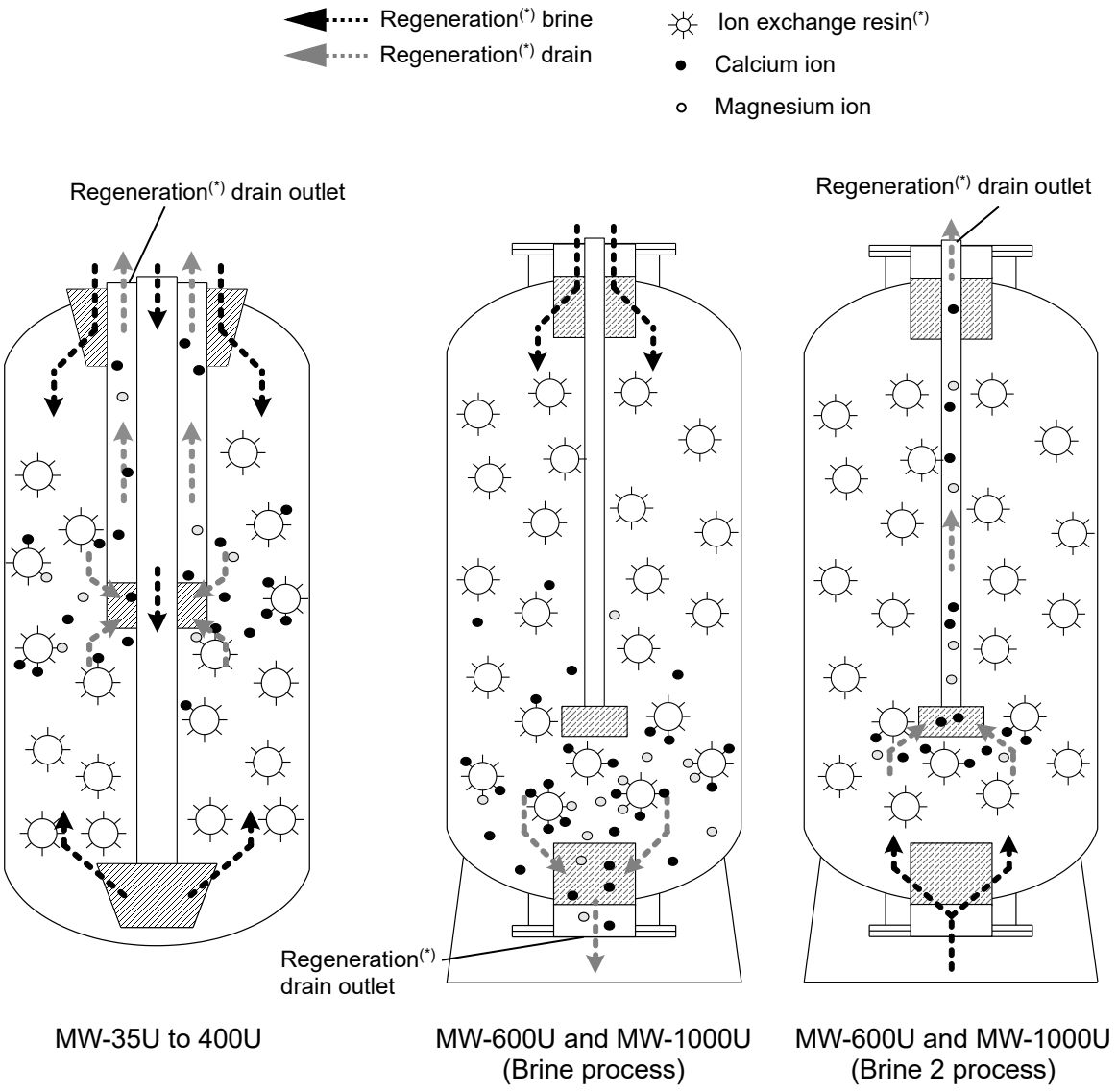


Figure 2-2: Regeneration mechanism of ion exchange resin(*)

2.3 Water Softener Processes

Eight processes are available with this water softener and their functions are as follows.

Table 2-1: Water softener processes

No.	Process	Process functions	Required time
1	Service (Water Flow)(*)	This process supplies raw water(*) to the resin layer and obtains soft water(*) by ion exchange.	—
2	Backwash	A large amount of water is supplied in the direction opposite that of normal water flow(*) to loosen the compressed ion exchange resins(*). Further, dirt deposited on top of the ion exchange resin layer(*) is discharged.	Approx. 10 to 20 min. Note 1
3	Regeneration(*) Standby	This process places the unit on standby if conditions for performing regeneration(*) are not met.	—
4	Brine (Brine 2) Note 3	Regeneration(*) brine is sucked from the brine tank. Regeneration(*) brine separates and drains calcium and magnesium ions absorbed by the ion exchange resin(*).	Approx. 5 to 115 min. Notes 1 and 2
5	Slow Rinse (Slow Rinse 2) Note 3	Regeneration(*) brine flow to the resin layer is stopped, and only a small amount of water flows. Regeneration(*) brine in the resin layer is slowly rinsed out.	Approx. 15 to 90 min. Note 1
6	Fast Rinse	A large amount of water is supplied to the resin layer, and the residual brine is completely discharged.	Approx. 10 to 30 min. Note 1
7	Refill	Water is added to the brine tank to produce the brine required for the next regeneration(*) cycle.	Approx. 5 to 130 min. Notes 1 and 2
8	Service(*) Standby	This process places the unit on standby after regeneration(*) is completed. The unit will proceed to the service(*) process once the other unit is taken out of service.	—

Note 1: The required time for the process depends on the model and the raw water(*) pressure.

Note 2: The amount of regenerating salt(*) per regeneration can be changed for this water softener.
The required time for Brine and Refill processes depends on the setting of the regenerating salt(*) amount.

Note 3: The Brine 2 and Slow Rinse 2 processes are performed only in MW-600U and MW-1000U.

3. Features

Conservation of Regenerating Salt(*) through Split-flow Regeneration(*)

In an ordinary water softener, the purity of soft water(*) will deteriorate if the amount of regenerating salt(*) per regeneration(*) is decreased. This is especially noticeable in raw water(*) with high concentrations of calcium and magnesium. The newly adopted split-flow regeneration(*) is a regeneration(*) method in which the purity of the soft water(*) does not easily deteriorate even with low amounts of regenerating salt(*), which allows regenerating salt(*) to be conserved.

Optimization of Regeneration(*) Frequency by Treated Water Volume Monitoring

The water softener is equipped with a flowmeter, and the volume of treated water is monitored. Regeneration(*) is activated in accordance with the degradation level of the ion exchange resin(*), and regeneration(*) is not performed unnecessarily. Hardness(*) leakage due to the amount of water flow(*) exceeding the ion exchange capability is prevented.

Prevention of Hardness(*) Leakage by Treated Water Hardness(*) Monitoring

The hardness(*) of the treated water can be monitored by installation of an optional Colormetry for hardness. In case there is hardness(*) leakage, the water softener switches the water flow(*) to the unit on standby and can continue to supply soft water(*). The unit in which hardness(*) leakage occurred then regenerates.

24-hour Continuous Water Service

The water softener is equipped with two water service(*) units so that water can be supplied even while one unit is regenerating.

Function for Evaluating Regenerating Salt(*) Concentration

The brine tank is equipped with a built-in salt concentration monitoring switch. A system notice is generated if the concentration of salt in the tank falls below a certain level after the Brine and Refill processes to prevent regeneration(*) defects due to failure to remember to add regenerating salt(*) or other issues.

Function for Adjusting Amount of Regenerating Salt(*)

The amount of regenerating salt(*) per regeneration(*) is set in accordance with raw water(*) quality, load conditions, and other factors. The softened water supply capacity(*) is adjusted automatically in accordance with the set amount of regenerating salt(*).

Online Maintenance Support

The status of the water softener can be monitored by a MIURA representative office or the online center at MIURA headquarters using the communications function. The office or online center is also notified of alarms and different types of errors by the water softener automatically.

Note: Communication equipment must be provided to enable communications.

Conservation of Space

In case of MW-35U to 400U, the two water service(*) units, the control panel, and the different kinds of piping including the bypass piping are integrated together into one system to realize conservation of space.

In case of MW-600U and MW-1000U, a bypass valve is provided inside the unit. Therefore, it is not necessary to set up a bypass line for the unit.

4. Specifications

Place a check mark inside the relevant model boxes (☐).

Table 2-2: Specifications (MW-35U, MW-65U, and MW-100U)

ITEM		UNITS	SYSTEM WATER SOFTENER									
Model		—	MW-35U			MW-65U			MW-100U			
Resin volume		L	35 × 2			65 × 2			100 × 2			
Standard flow rate		GPH	95～260			170～520			265～870			Note1
Pressure loss (Maximum)		psi	5.8			20.3			14.5			Note 2
Required salt per regeneration		lb	Min.	Initial	Max.	Min.	Initial	Max.	Min.	Initial	Max.	
			6.9	9.3	18.5	12.9	17.2	34.4	19.8	26.5	52.9	Note 3
Hardness removal capacity per regeneration		x1000 grain $CaCO_3$	17.7	20.4	26.5	30.2	36.4	51.7	55.4	63.4	82.4	Note 4
Max. hardness removable capacity per day		x1000 grain $CaCO_3$	35.5	40.7	53.1	60.5	72.8	103	111	127	165	Note 5
Max. salt storage weight		lb	143						353			
Raw water temperature range		°F	39–104 (no freezing)									
Raw water pressure range		psi	22–71									Note 6
Regeneration drain	Drain per regeneration	Gal	65–95			130–240			185–345			Note 7
	Peak flow	GPM	1.4–2.1			2.5–5.1			2.8–5.5			Note 8
Power supply (Power supply at the primary side of the AC/DC adaptor)		—	100–125 VAC, 50/60 Hz, single-phase									
Rated power consumption		W	22									
Electric capacity		VA	22									
Connection diameter	Inlet, Outlet port	thread:inch hose:mm	1" (Internal thread: accessory piping)						1-1/4" (Internal thread: accessory piping)			Note 9
	Drain port		ϕ 19× ϕ 15(Hose: control valve)						1" (External thread: control valve)			
Overall dimensions	Water softener unit	inch	ϕ 10 1/2" × 50 5/16"			ϕ 13 9/16" × 61"			14 3/8" × 76 11/16"			Note 10
	Brine tank		ϕ 18 1/2" × 40 15/16"						ϕ 25 5/8" × 51 3/4"			
	Control box		15 3/4" × 10 1/4" × 55 1/8"									
Dry mass	Water softener unit	lb	110			177			287			Note 10, 11
	Brine tank		15.4						33			
	Control box		46.3									
Operating mass	Water softener unit	lb	165			309			463			Note 10
	Brine tank		375						882			

Note 1: If the electric conductivity of raw water is less than 60mS/m, it may be possible to increase the flow rate. Please contact your dealer or MIURA sales office

Note 2: This is the maximum pressure loss during operation.
(This is the value for when the primary unit is in Service(*) process and the secondary unit is in Backwash or Fast Rinse process. At standard flow volume, with a water temperature of 68°F.)

Note 3: This is the amount of regenerating salt(*) per regeneration(*); settings are changeable.

Note 4: This value expresses hardness removal capacity(*) per unit, which increases and decreases depending on the set amount of regenerating salt(*).

Note 5: A total of two regenerations(*), one for each unit, can be made with the water softener per day.
However, if two regenerations(*) are made in a day when the regeneration(*) level is set to 240 g/L-R and regenerating salt(*) other than salt pellets is used, the ion exchange capacity may not recover due to the lack of time for dissolution of salt.

Note 6: Minimum pressure is the water pressure required for regeneration(*); maximum pressure is the maximum allowable water pressure of the unit.

Note 7: This is the value for the raw water(*) pressure range when the amount of regenerating salt(*) is set to default.

Note 8: This is the value for the raw water(*) pressure range.

Note 9: When installing multiple MW units, the diameter of collective pipe section must be determined separately according to the flow rate and the amount of regeneration drain.

Note 10: This is the value per unit.

Note 11: The dry mass includes the ion exchange resin(*) and gravel.

Table 2-3: Specifications (MW-150U, MW-250U, and MW-400U)

ITEM		UNITS	SYSTEM WATER SOFTENER									
Model		—	MW-150U			MW-250U			MW-400U			
Resin volume		L	150 × 2			250 × 2			400 × 2			
Standard flow rate		GPH	400～1300			660～2000			1060～2600			Note 1
Pressure loss (Maximum)		psi	17			32			49			Note 2
Required salt per regeneration		lb	Min.	Initial	Max.	Min.	Initial	Max.	Min.	Initial	Max.	
			29.8	39.7	79.4	49.6	66.1	132.3	79.4	105.8	211.6	Note 3
Hardness removal capacity per regeneration		x1000 grain $CaCO_3$	82	92	120	136	153	199	214	244	315	Note 4
Max. hardness removable capacity per day		x1000 grain $CaCO_3$	164	186	241	272	306	398	429	488	629	Note 5
Max. salt storage weight		lb	353			529			860			
Raw water temperature range		°F	39–104 (no freezing)									
Raw water pressure range		psi	22–71									Note 6
Regeneration drain	Drain per regeneration	Gal	260–480			480–565			770–1000			Note 7
	Peak flow	GPM	4.6–8.7			12.8–14.5			17. 8–23.6			Note 8
Power supply (Power supply at the primary side of the AC/DC adaptor)		—	100–125 VAC, 50/60 Hz, single-phase									
Rated power consumption		W	22									
Electric capacity		VA	22									
Connection diameter	Inlet, Outlet port	inch	1-1/2" (Internal thread: accessory piping)									Note 9
	Drain port		1" (External thread: control valve)									
Overall dimensions	Water softener unit	inch	ϕ 19 3/8" × 78 5/8"			ϕ 24 3/4" × 90 3/4"			ϕ 30 3/4" × 87 7/8"			Note 10
	Brine tank		ϕ 25 5/8" × 51 3/4"			ϕ 30 7/8" × 52 1/2"			ϕ 42 1/8" × 50 3/4"			
	Control box		15 3/4" × 10 1/4" × 55 1/8"									
Dry mass	Water softener unit	lb	474			860			1378			Note 10, 11
	Brine tank		33			44			77			
	Control box		46.3									
Operating mass	Water softener unit	lb	827			1521			2238			Note 10
	Brine tank		882			1213			2205			

Note 1: If the electric conductivity of raw water is less than 60mS/m, it may be possible to increase the flow rate. Please contact your dealer or MIURA sales office

Note 2: This is the maximum pressure loss during operation.
(This is the value for when the primary unit is in Service(*) process and the secondary unit is in Backwash or Fast Rinse process. At standard flow volume, with a water temperature of 68°F.)

Note 3: This is the amount of regenerating salt(*) per regeneration(*); settings are changeable.

Note 4: This value expresses hardness removal capacity(*) per unit, which increases and decreases depending on the set amount of regenerating salt(*).

Note 5: A total of two regenerations(*), one for each unit, can be made with the water softener per day.
However, if two regenerations(*) are made in a day when the regeneration(*) level is set to 240 g/L-R and regenerating salt(*) other than salt pellets is used, the ion exchange capacity may not recover due to the lack of time for dissolution of salt.

Note 6: Minimum pressure is the water pressure required for regeneration(*); maximum pressure is the maximum allowable water pressure of the unit.

Note 7: This is the value for the raw water(*) pressure range when the amount of regenerating salt(*) is set to default.

Note 8: This is the value for the raw water(*) pressure range.

Note 9: When installing multiple MW units, the diameter of collective pipe section must be determined separately according to the flow rate and the amount of regeneration drain.

Note10: This is the value per unit.

Note11: The dry mass includes the ion exchange resin(*) and gravel.

Table 2-4: Specifications (MW-600U and MW-1000U)

Item		Unit	System integrated water softener						
Model		—	☐ MW-600U			☐ MW-1000U			
Resin volume		L	600 × 2			1000 × 2			
Standard flow rate		GPH	1590～4750			2600～7920			Note 1
Pressure loss		psi	10.2			17.4			Note 2,
Required regenerating salt(*) per regeneration		lb	Min.	Initial	Max.	Min.	Initial	Max.	
			120	159	318	199	265	530	Note 3
Hardness removal capacity(*) per regeneration(*)		x1000 grain $CaCO_3$	335	404	548	519	631	854	Note 4
Max. hardness removable capacity(*) per day		x1000 grain $CaCO_3$	670	809	1,096	1,038	1,262	1,641	Note 5
Max. salt storage weight		lb	1,100			1,830			
Raw water(*) temperature range		°F	39–104 (no freezing)						
Raw water(*) pressure range		psi	26–71						Note 6
Regeneration(*) drain	Drain per regeneration(*)	Gal	1,290–1,695			2,165–3,015			Note 7
	Peak flow	GPM	40–55			54–87			Note 8
Power supply		—	100–125 VAC, 50/60 Hz, single-phase						
Rated power consumption		W	42						
Electric capacity		VA	42						
Connection diameter	Inlet, Outlet port	inch	2-1/2" CLASS150 PVC flange			3" CLASS150 PVC flange			Note9
	Regeneration(*) drain port		2" CLASS150 PVC flange						
	Brine line connecting port		3/4" SCH80 PVC pipe connection						
	Drain outlet port		1" NPT internal thread						
Overall dimensions	Water softener unit	inch	37 1/8" × 57 5/8" × 95 2/3"			48 2/3" × 66 1/3 " × 103"			Note 10
	Brine tank		ϕ 41 3/4" × 63"			ϕ 53" × 63"			
	Control box		15 2/3" × 10 1/3" × 55"						
Dry mass	Water softener unit	lb	1,875			3,021			Notes 10 and 11
	Brine tank		155			199			
	Control box		67						
Operating mass	Water softener unit	lb	3,264			5,800			Note 10
	Brine tank		2,757			4,477			

Note 1: If the electric conductivity of raw water is less than 60mS/m, it may be possible to increase the flow rate. Please contact your dealer or MIURA sales office

Note 2: This is the pressure loss during normal operation. (With a water temperature of 68°F)
In MW-35U to MW-400U, the two units are connected in series. Therefore, the water flow(*) pressure loss fluctuates depending on the condition of the other unit. However, since the two units are connected in parallel in MW-600U and MW-1000U, one unit is not affected by the condition of the other.

Note 3: This is the amount of regenerating salt(*) per regeneration(*); settings are changeable.

Note 4: This value expresses hardness removal capacity(*) per unit, which increases and decreases depending on the set amount of regenerating salt(*).

Note 5: With MW-1000U, regeneration(*) is performed every 12.5 hours at the earliest, only when the amount of regenerating salt(*) is set to the maximum value. (The water softener can perform 1.92 regenerations(*) in total each day.)
In other cases, the water softener can perform one regeneration(*) every 12 hours at the earliest for each unit (a total of two regenerations(*) each day). However, if two regenerations(*) are made in a day when the regeneration(*) level is set to 240 g/L-R and regenerating salt(*) other than salt pellets is used, the ion exchange capacity may not recover due to the lack of time for dissolution of salt.

Note 6: Minimum pressure is the water pressure required for regeneration(*); maximum pressure is the maximum allowable water pressure of the unit.

Note 7: This is the value for the raw water(*) pressure range when the amount of regenerating salt(*) is set to default.
Note 8: This is the value for the raw water(*) pressure range.

Note 9: In the primary piping of MW-600U, 1000U, the flow rate in the collecting pipe section before branching to each unit increases when service process and regeneration process overlap, so the pipe diameter is recommended that MW-600U:3” or more, MW-1000U: 4 or more per one MW unit. When installing multiple MW units, the diameter of collective pipe section must be determined separately according to the flow rate and the amount of regeneration drain.
Note 10: This is the value per unit.
Note 11: The dry mass includes the ion exchange resin(*) and gravel.

5. Component Names

5.1 Component Names (MW-35U, 65U)

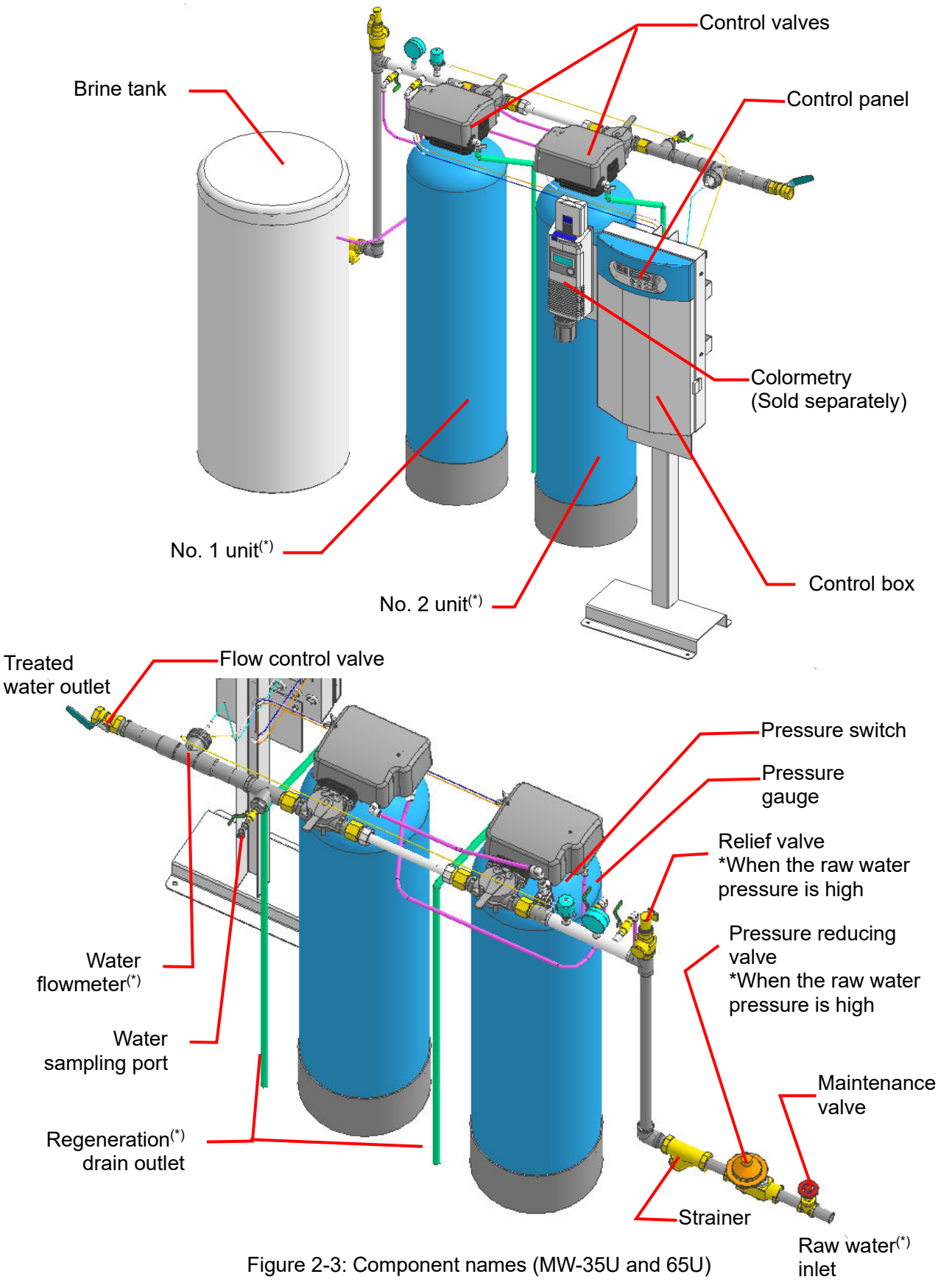


Figure 2-3: Component names (MW-35U and 65U)

5.2 Component Names (MW-100U, 150U, MW-250U, and MW-400U)

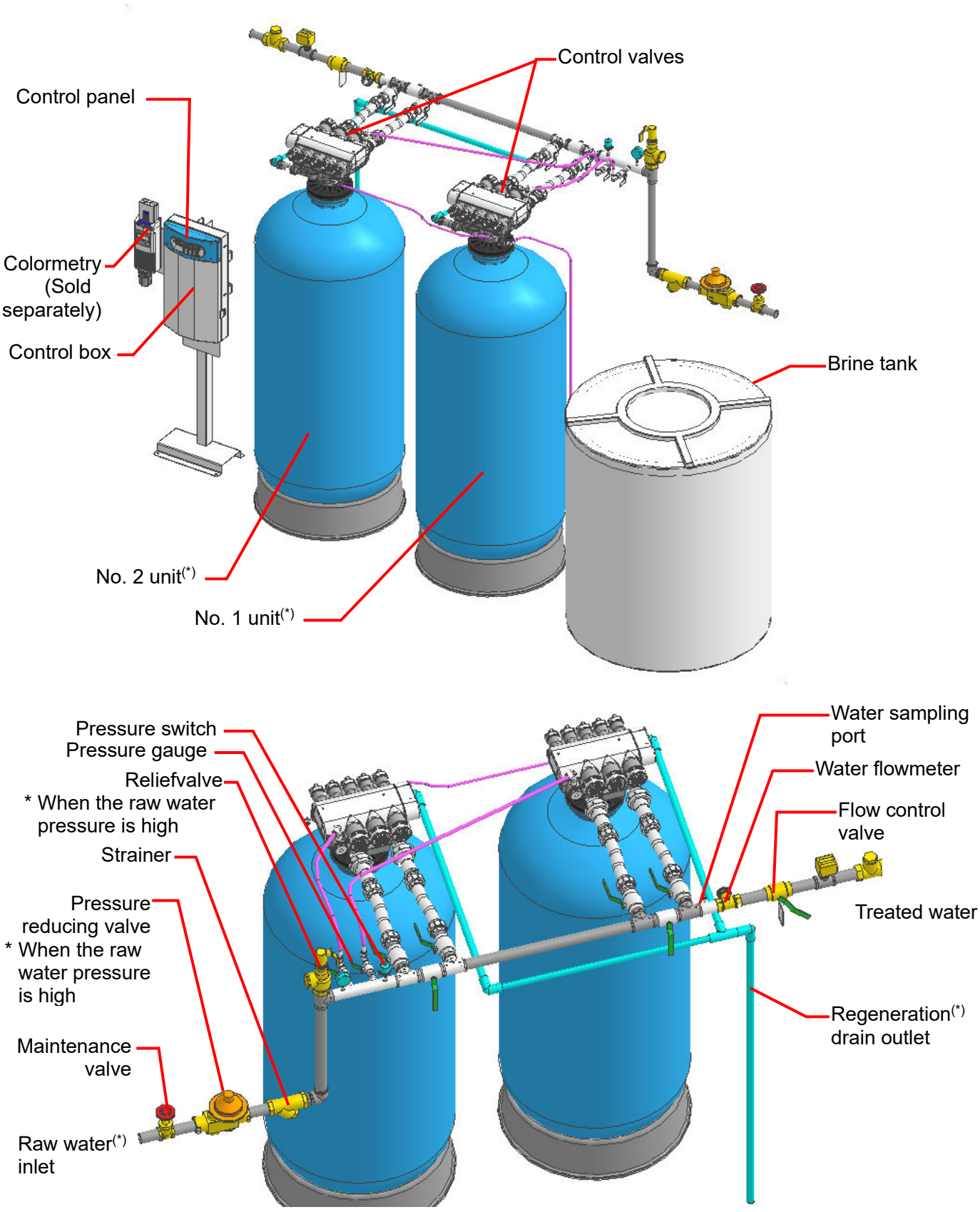


Figure 2-4: Component names (MW-100U, 150U, MW-250U, and MW-

5.3 Component Names (MW-600U and MW-1000U)

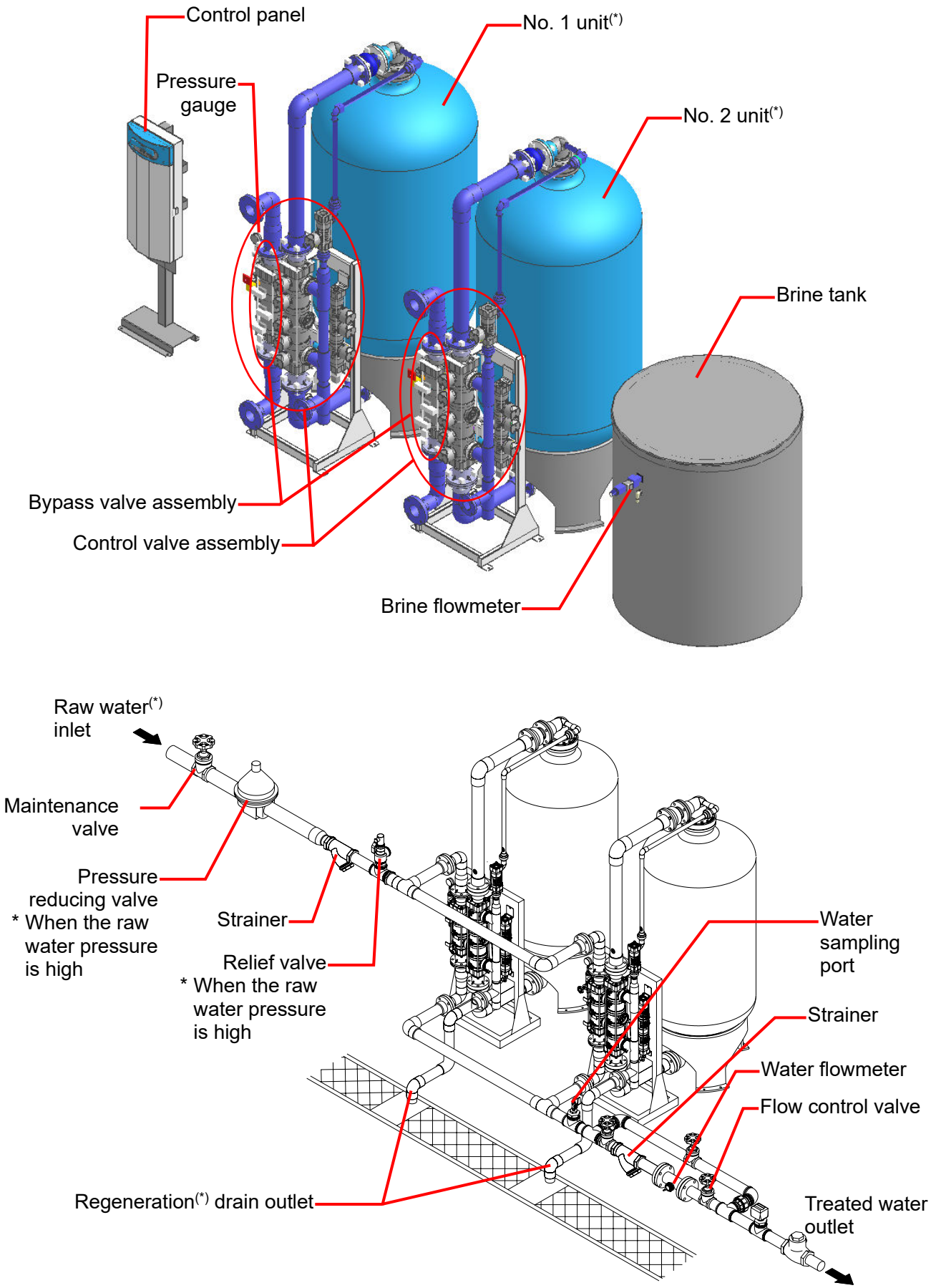


Figure 2-5: Component names (MW-600U and MW-1000U)

5.4 Names and Functions for the Control Panel

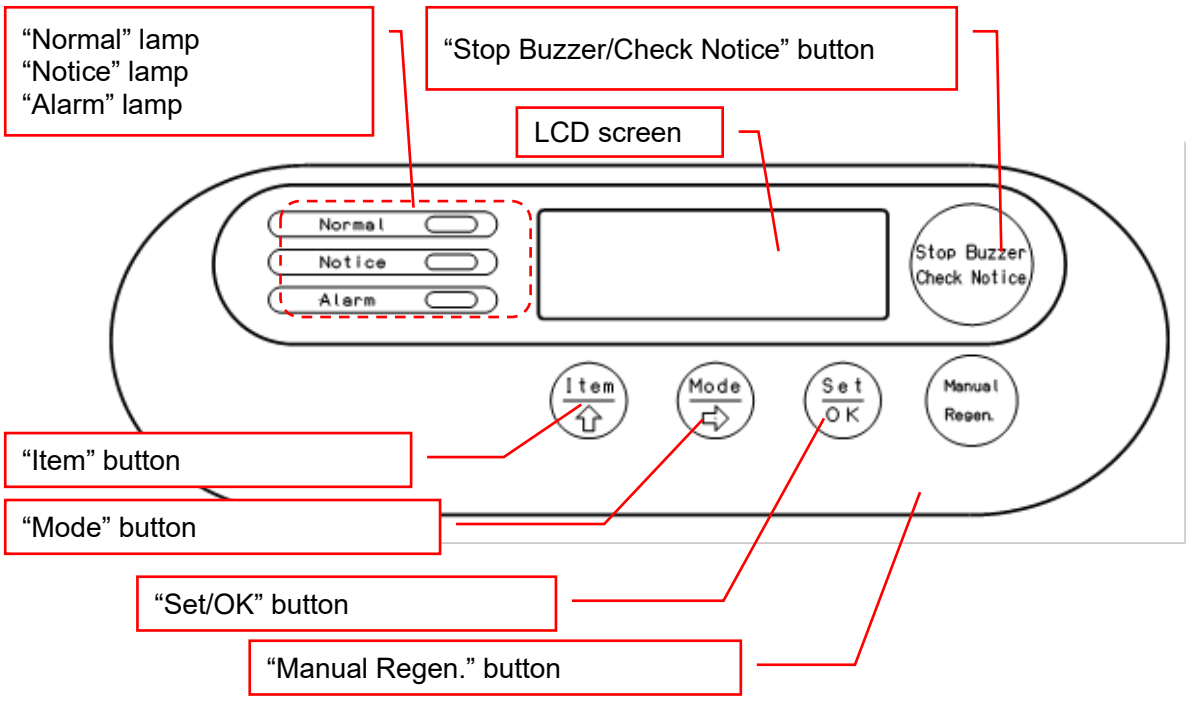


Figure 2-6: Names and functions for the control panel

LCD screen

- Displays operating status and settings information.

“Stop Buzzer/Check Notice” button

- Stops the buzzer if pressed while the buzzer sounds. Also displays an alarm while it is issued.

“Manual Regen.” button

- Used for manual regeneration(*) of a unit during the Service(*) process.

“5. Manual Regeneration(*)” in SECTION 3 on page 33

“Item” button

- Used to switch between items shown on the LCD. Also used when setting the current date and time.

“Mode” button

- Used to move the cursor when setting the current date and time.

“Set/OK” button

- Used when setting the current date and time.

“Normal” lamp (green LED)

- Lights while the power is ON if there are no anomalies in the water softener.

“Notice” lamp (yellow LED)

- Flashes when a caution or notice is generated.
- Switches from flashing to being lit when the “Stop Buzzer/Check Notice” button is pressed.
- Turns off when the cause of the problem is removed and the water softener returns to normal status.

“Alarm” lamp (red LED)

- Flashes when an alarm is generated.
- Switches from flashing to being lit when the “Stop Buzzer/Check Notice” button is pressed.
- Turns off when the cause of the alarm is removed and the water softener returns to normal status.

SECTION 3: OPERATION

1. Working with the LCD Screen

1.1 LCD Screen Display

The following information is displayed on the LCD screen.

“Item” button or “Stop Buzzer/Check Notice” button changes the item displayed.

Table 3-1: Display items on the LCD screen

	Item	Display content	Typical screen display
a	Water softener operation status	Displays operation status for each unit.	1:SRVC__2:S-STBY
b	Current date and time	Displays the current date and time set on the water softener.	_09/08/01_10:00_
c	Instantaneous flow rate	Displays the instantaneous flow rate of treated water.	SRVC_____1000GPH
d	Residual capacity	Displays the residual capacity (to eliminate hardness(*)) of the unit in service(*).	Residual___100%_
e	Alarms	Displays the content of generated alarms, cautions, and notices.	AL01:____C530-01

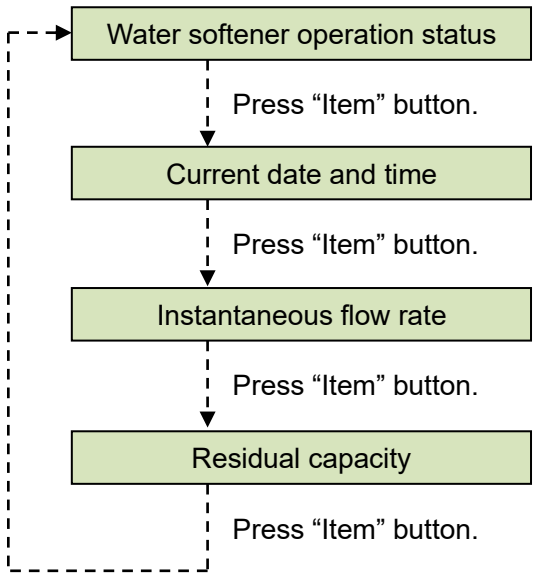


Figure 3-1: Changing display items

1.2 Details for Each Display Item

1.2.1 Water Softener Operation Status

Operation status for No. 1 unit(*) is displayed as 1: **** and for No. 2 unit(*) as 2: ****.

(Ex.: 1: SRVC 2: S-STBY)

Operation status for each display item is as given below.

Displayed text flashes while the water softener is proceeding to the next process.

Table 3-2: LCD screen display and operation status

LCD screen display	Operation status	
S-STBY	On Service(*) standby	
SRVC	In Service(*) process	
BKWASH	Regenerating / Backwash process	
R-STBY	On regeneration(*) standby	
BRINE	Regenerating / Brine process	
SL-RNS	Regenerating / Slow Rinse process	
BRINE＊	Regenerating / Brine 2 process	Only for MW-600U and MW-1000U
S-RNS＊	Regenerating / Slow Rinse 2 process	
FS-RNS	Regenerating / Fast Rinse process	
REFILL	Refilling brine tank	
FAIL	Unit failure occurred	

1.2.2 Current Date and Time

The current date and time set on the system are shown in order of YY/MM/DD and hh:mm.

Changing the current date and time

1) Press the “Set/OK” button.
   • A flashing cursor appears.
2) Press the “Item” button.
   •The numeral on the flashing cursor increases by one.
3) Press the “Mode” button.
   •The flashing cursor moves one character right.
4) Press the “Set/OK” button.
   • The flashing cursor disappears, and the current date and time are set.

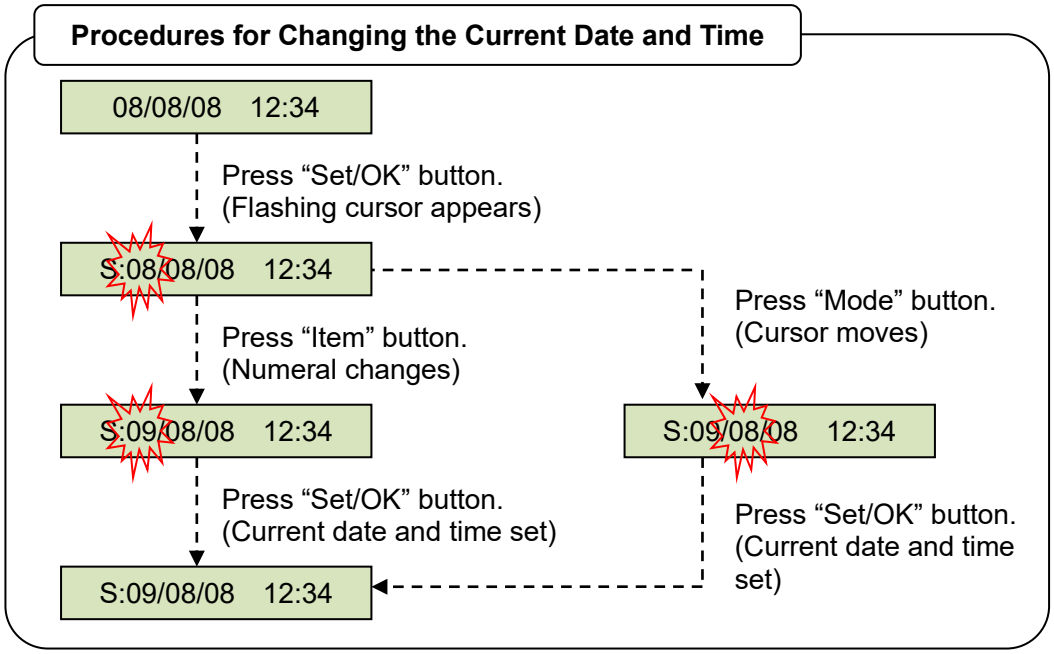


Figure 3-2: Changing current date and time

1.2.3 Instantaneous Flow Rate

Displays the instantaneous flow rate to the outlet side of the water softener.
Ex.: SRVC 1000GPH

- The flow rate does not display if the water flowmeter has failed; ---- displays instead.

1.2.4 Residual Capacity

Displays the residual capacity (to eliminate hardness(*)) of the unit in Service(*) process in %.
Ex.: Residual 50%
If the residual capacity reaches 0%, the unit automatically proceeds to regeneration(*) (in normal operation).

- If there is a possibility that regeneration(*) has not been performed correctly, or if power failure occurs during water flow(*), parentheses ( ) are displayed for the residual capacity.
  Ex.: Residual (50%)
- The display returns to normal when the next regeneration(*) is performed correctly.

1.2.5 Alarms

Enables you to check the content of generated errors, cautions, and notices.
Each time the “Stop Buzzer/Check Notice” button is pressed, the alarm codes for generated errors, cautions, and notices are displayed in order starting with the most recent.
Ex.: AL 01: C530-01
If no error, caution, or notice has been generated, the screen returns to the normal screen shortly after displaying the message No Alarm.
For details on alarms, refer to “SECTION 5: TROUBLESHOOTING”.

“SECTION 5: TROUBLESHOOTING” on page 41

2. Inspection and Preparation for Operation

Carry out the following checks before starting operation.

WARNING

Do not place combustible materials inside the control box.
Failure to observe this precaution can lead to the outbreak of fire, which can result in injury or even death.

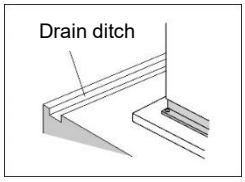
WARNING

Make sure no water is leaking from the water softener or from around the piping.
Turning the switches ON or OFF during a water leak may result in electric shock or fire from a short circuit.

CAUTION

Dew drops may occur depending on environment conditions including the raw water temperature and the atmosphere in the installation location. If necessary, take measures to prevent dew condensation on this device and external piping, such as installing heat insulation.
Also, factors such as loose connectors and aging of pipe materials can lead to water leakage. In order to prevent water from leaking outside the room or downstairs, take appropriate measures against drain water on the installation surface of water treatment equipment and peripheral equipment.

- Setting up a drain ditch that completely encloses the whole equipment
- Applying a waterproof treatment to the floor, and making the floor slope downward to the drain ditch



Ensure that no water is leaking from the water softener.

- Do not operate the water softener if water is leaking.
- Make sure the main power breaker of the water softener is OFF.
- If water is leaking, contact your dealer or MIURA sales office.

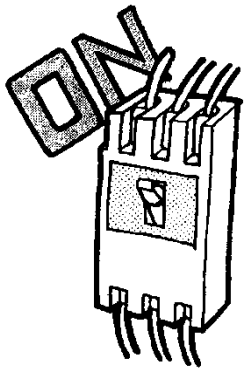
3. Preparation before Use

3.1 Connecting the Water Softener to a Power Supply

WARNING

Wet Hands Prohibited

Do not operate the main power supply breaker with wet hands. Failure to observe this precaution may result in electric shock, injury, or death due to contact with high voltage.



Main power

Turn the main power of the water softener to ON.

NOTE

Do not switch the main power OFF even when not using the water softener. Data may be erased if the power is turned OFF for long periods of time (10 days or longer). Be sure to check and set the data once again if the power is turned OFF for long periods of time.

3.2 Replenishing Regenerating Salt(*)

Regenerating salt(*) is essential for regenerating the water softener. Make sure that there is regenerating salt(*) in the brine tank at all times.

- The water softener needs regenerating salt(*) for regeneration(*).
  Ensure that the amount of regenerating salt(*) in the tank is about 1/3 of the tank capacity at all times.

NOTE

Do not use rock salt.
Always use refined salt.
If salt other than refined salt is replenished, the brine plate may get blocked, which results in poor regeneration(*).

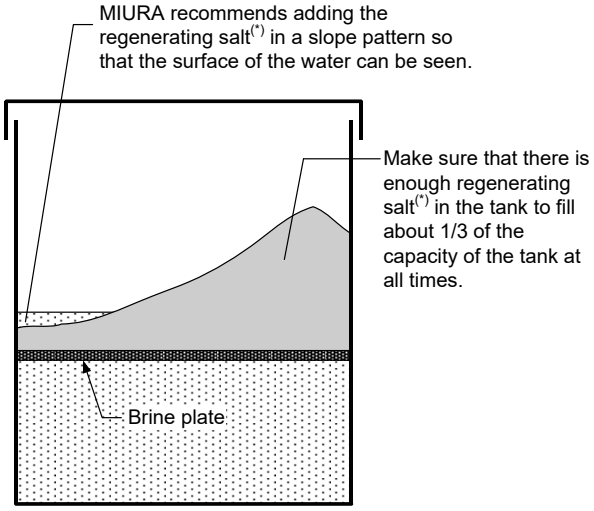


Figure 3-3: Replenishing regenerating salt(*)

- If too much salt is added, it may absorb water and harden to form a cavity in it as shown in Figure 3-4. Such a state of hardened regenerating salt(*) is called a salt bridge.
  If this kind of state forms, it will become impossible to produce the brine required for regeneration(*). To avoid this, MIURA recommends adding only enough so that the surface of the water can be seen as shown in Figure 3-3.
  Should a salt bridge happen to form, break it up with a stick or the like, taking care not to damage the brine plate.

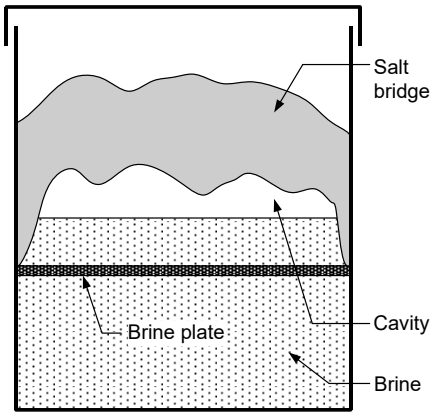


Figure 3-4: Formation of a salt bridge

3.3 Checking Raw Water(*) Pressure

Check the raw water(*) pressure with a pressure gauge.

- Confirm that the water softener inlet pressure is 71 psi or less at all times. If the pressure exceeds 71 psi, release pressure with the pressure reducing valve.
- During regeneration(*), a raw water pressure of 22 psi or higher is required for MW-35U to 400U, and a raw water(*) pressure of 26 psi or higher is required for MW-600U and MW-1000U. If the pressure does not reach the required value, install a pressure pump or similar device to raise it.
- If any other equipment or devices are installed in series, check the specified pressure range of the equipment or devices, and ensure the required pressure is achieved.

NOTE

If the inlet pressure exceeds 71 psi, it can lead to water leakage from the water softener or deformation of the water softener. In such a case, take measures such as installing a pressure reducing valve.

If the inlet pressure is less than 22 psi for MW-35U to 400U, or less than 26 psi for MW-600U and MW-1000U, it may cause poor regeneration(*).

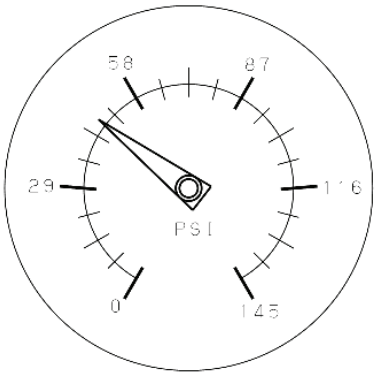


Figure 3-5: Display of the pressure gauge

4. Start and Stop

4.1 Start

4.1.1 Water Flow(*)

Confirm that each valve around the water softener opens and closes properly.
Open the valves installed in the inlet and outlet to/from the water softener.

• Water flow(*) starts.

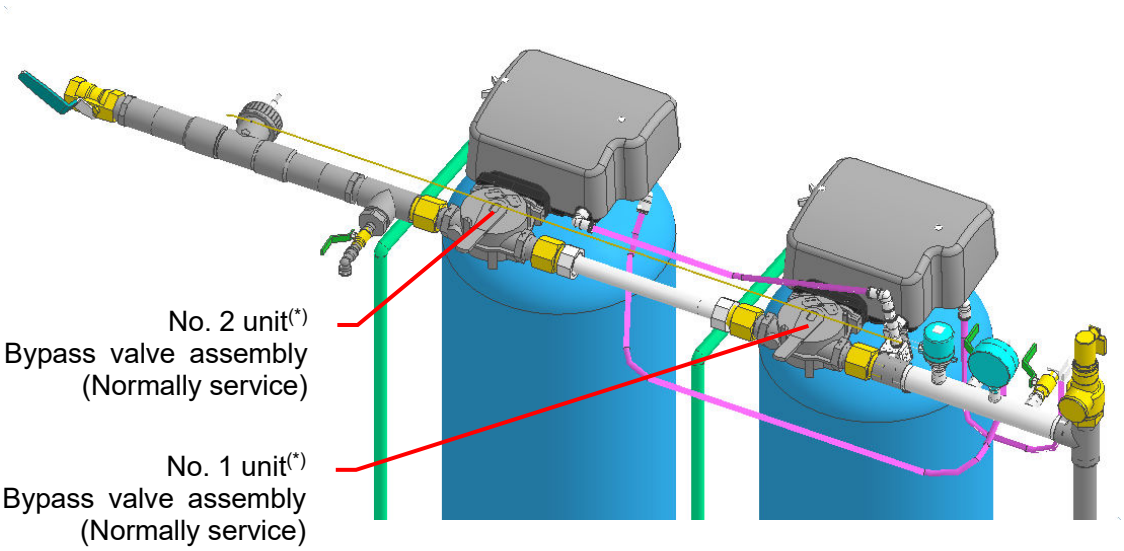


Figure 3-6: Locations of valves (MW-35U and 65U)

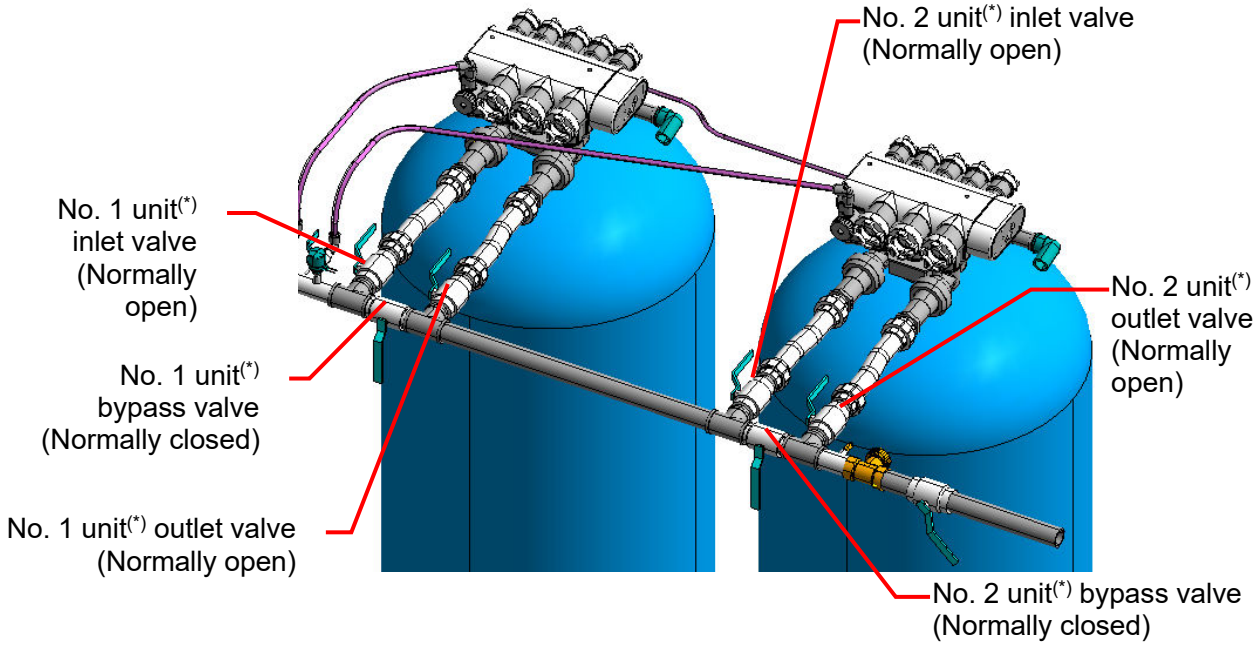
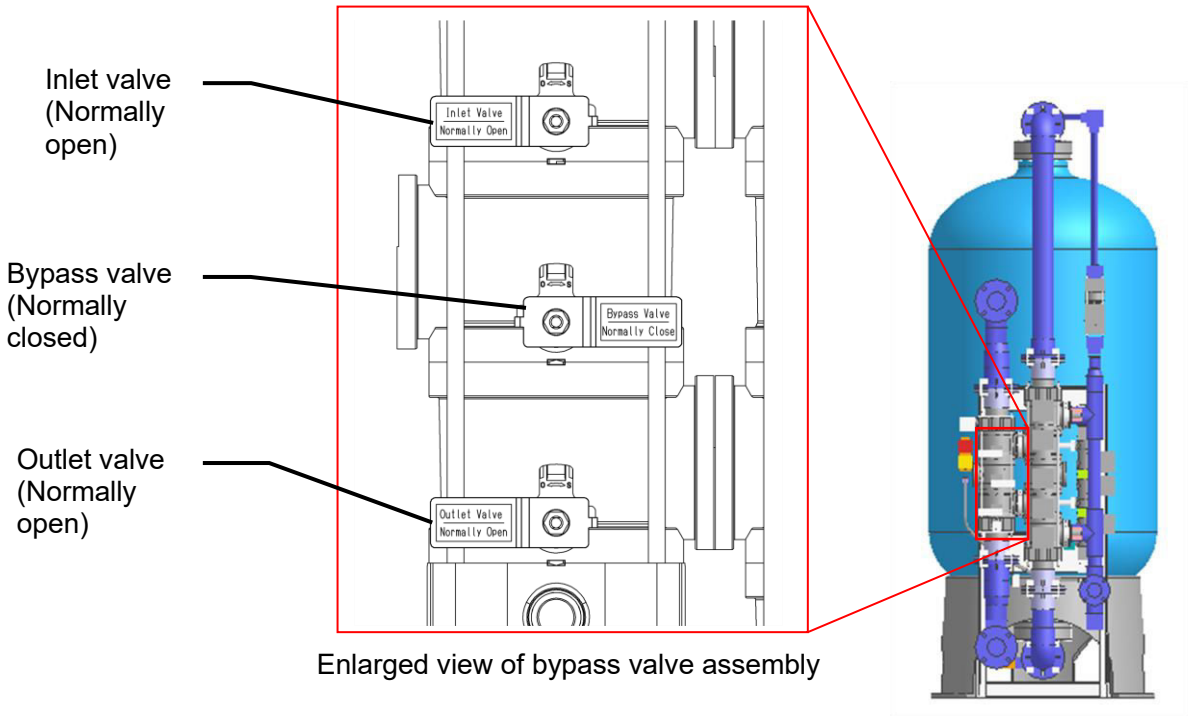


Figure 3-7: Locations of valves (MW-100U, 150U, MW-250U, and MW-400U)



Enlarged view of bypass valve assembly

* The state of the handles shown in the enlarged view above is the state during water flow(*).
  When all three handles are in horizontal state and the character display on them is not inverted, as seen in the enlarged view, water is flowing through the water softener.
* The location of valves is the same in both the No. 1 unit(*) and the No. 2 unit(*).

Figure 3-8: Locations of valves (MW-600U and MW-1000U)

4.1.1 Water Leakage Check

- Make sure no water is leaking from the water softener.
- Make sure no water is leaking from the peripheral equipment of the water softener.
- Make sure no water is leaking from the piping and flanges.
- If a water leakage is detected, retighten the location of water leakage.
- If water is still leaking, it is required to replace seals or other parts. In such a case, contact your dealer or MIURA sales office.

4.2 Stop

CAUTION

Caution

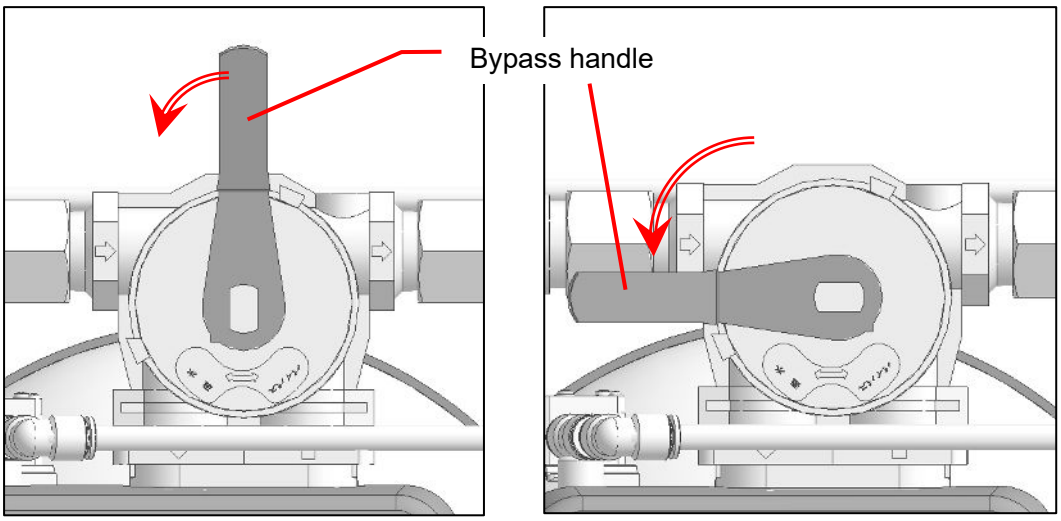
When cutting off water flow(*), make sure the “OPERATION” switch of the boiler is OFF. If the water flow(*) stops during operation of the boiler, it may result in abnormal stop and boil-dry due to low water level.

Close the inlet valve to the water softener.
• Water flow(*) stops.

NOTE

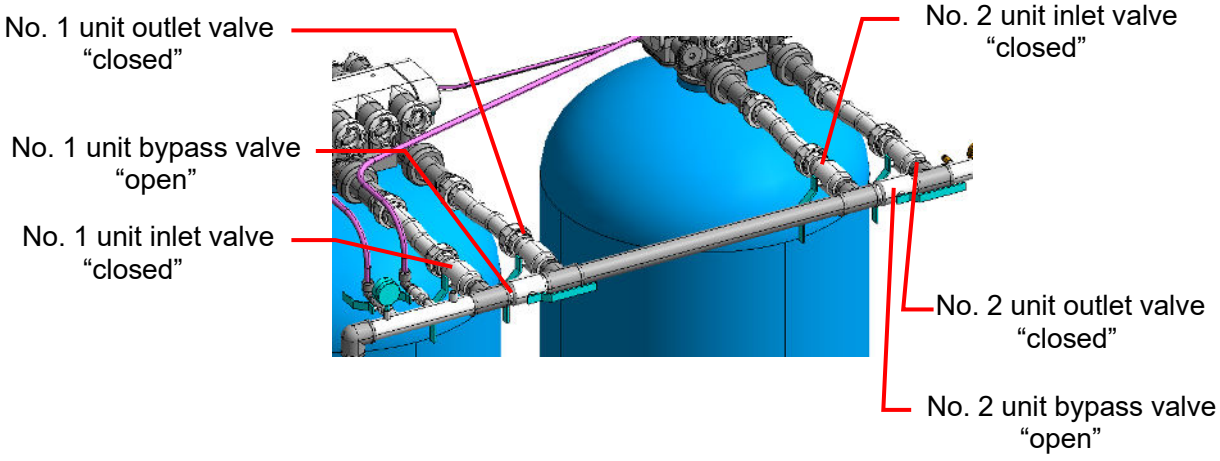
- If the water softener fails and cannot supply soft water(*), bypass the water softener. In this case, the water softener will supply hard water. Contact your dealer or MIURA sales office immediately.

◆How to bypass the water softener (MW-35U, 65U)



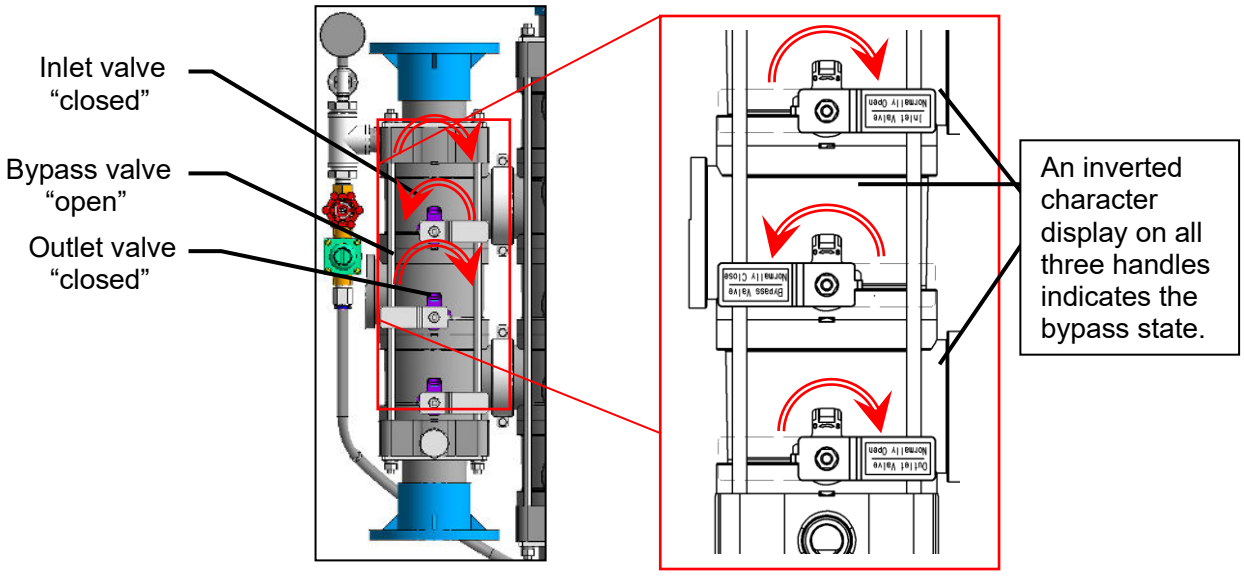
◆ How to bypass the water softener (MW-100U, 150U, MW-250U, and MW-400U)

Turn the bypass valve from “closed” to “open” and the inlet/outlet valves from “open” to “closed”.



◆ How to bypass the water softener (MW-600U and MW-1000U)

Turn the bypass valve from “closed” to “open” and the inlet/outlet valves from “open” to “closed” to bypass the water softener.



• If the water softener will not be used for a long period of time, contact your dealer or MIURA sales office for assistance as there is a need to leave the water softener in a suitable condition.

5. Manual Regeneration(*)

CAUTION

If the Caution [C210-01]/[C210-02] (Control valve defect) or [C210-03]/[C210-04] (Controller defect) occurs in the water softener, do not perform manual regeneration(*) during boiler operation. If manual regeneration(*) is performed, the normal unit enters the regeneration(*) process, and the following situations occur.

Caution

◆ In the case of the MW-35U to 400U

Water bypass occurs in the control valve during regeneration(*). Hard water is supplied and scale(*) buildup may occur in the boiler during regeneration(*).

◆ In the case of the MW-600U and MW-1000U

Water bypass does not occur in the control valve during regeneration(*). Water flow(*) may stop completely during regeneration(*).

If manual regeneration(*) is performed by mistake and the water flow(*) stops, confirm that the unit in which the Caution has occurred can be bypassed, and then bypass the unit to avoid stopping of water flow(*).

Refer to the following section for details on the bypass method.

“4.2 Stop” in SECTION 3 on page 32

To perform manual regeneration(*), press the “Manual Regen.” button on the control panel.
When the “Manual Regen.” button is pressed, one of the following messages will display.

- When manual regeneration(*) can be started.
  - P&H: Start RGN (Push & Hold: Start Regeneration) is displayed.

  Press and hold down the “Manual Regen.” button.
  - Regeneration(*) for the unit in Service(*) starts.
  - Regeneration(*) proceeds automatically. Regeneration(*) is complete in approx. 1 to 3 hours with MW-35U～400U, and in approx. 3 to 6 hours with MW-600U and MW-1000U.
  - The unit returns to Service(*) process (or to Service(*) standby) after regeneration(*) ends.

- When manual regeneration(*) can be scheduled.
  - RGN Interlock (Regeneration Interlock)
  - Other Unit : RGN (Other Unit Regeneration)
  - Inhibit RGN : ON (Inhibit Regeneration: ON)
  - Water Passing : ON (Water Passing: ON)

  One of the above messages is displayed, and then,
  the message P&H: Book RGN (Push & Hold: Book Regeneration) is displayed.

  Press and hold down the “Manual Regen.” button.
  - Regeneration(*) for the unit in Service(*) is scheduled.
  - Once preparation allowing regeneration(*) is completed, regeneration(*) starts automatically.
  - Regeneration(*) proceeds automatically. Regeneration(*) is complete in approx. 1 to 3 hours with MW-35U～400U, and in approx. 3 to 6 hours with MW-600U and MW-1000U.
  - The unit returns to Service(*) process (or to Service(*) standby) after regeneration(*) ends.

- When manual regeneration(*) cannot be performed
  - RGN Denied (Regeneration Denied) is displayed.

  Manual regeneration(*) cannot be performed in this case.
  Contact your dealer or MIURA sales office if continuously unable to perform manual regeneration(*).

SECTION 4: INSPECTION AND MAINTENANCE

1. Inspection and Maintenance Checklist

WARNING

Instruction

Make sure that the power plug is not dusty or the plug is not loose.
There is a risk of serious accident such as fire.

Periodically perform the inspection and maintenance as shown in Table 4-1 “Inspection and maintenance checklist”.

- The checklist records the standard inspection and maintenance cycle, but this cycle may change depending on water quality and operating conditions. Therefore, follow the instructions of your dealer or MIURA sales office.

Table 4-1: Inspection and maintenance checklist

Inspection and maintenance	Reference page	Timing		
		Daily	Once every 4 months	Once every 5 years
Soft water check(*)	This page	✓		
Check for regenerating salt(*)	Page 36	✓		
Raw water(*) quality check	Page 37		✓	
Strainer cleaning	Page 38		✓	
AC/DC adaptor replacement	Page 40			✓

2. Daily Inspection and Maintenance

2.1 Soft Water(*) Check

Check whether the water processed by the water softener is softened. Follow the procedures below to check the soft water(*) quality:

a) Discharge accumulated water.

Before checking for soft water(*), discharge about half a gallon of water from the water sampling port.

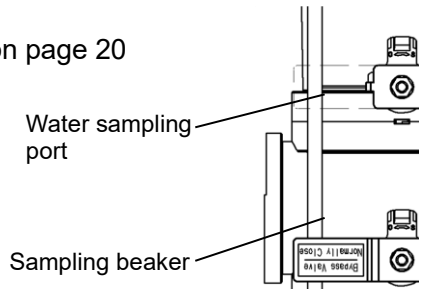
Refer to “5. Component Names” in SECTION 2 for the placement of the water sampling port.

In case of MW-600U and MW-1000U, the water sampling port is required to be installed on site.

“5. Component Names” in SECTION 2 on page 20

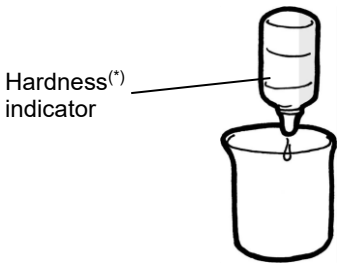
b) Wash the sampling beaker.

Use the water from the water sampling port to thoroughly clean the supplied sampling beaker.



c) Add hardness(*) indicator.

Hold the container of the hardness checker upside down, and slowly add 4 drops of the hardness(*) indicator to the sampling beaker.



d) Add the treated water.

Add about 0.7FL.OZ. of water from the water sampling port into the sampling beaker, and swirl the sample to mix thoroughly.

NOTE

- Do not stir the sample with a finger or any other object. Doing so will cause the hardness measurement to be inaccurate.

e) Check the color of the sample.

Add additional water from the sampling port to the sampling beaker until the total volume of water reaches 1.7FL.OZ, and immediately check the water color.

Table 4-2: Soft water(*) check by color

Color of water	Test result
Light blue – Blue	Water has been softened
Bluish purple – Red	Water has not been softened

- Be sure to check color immediately. If the sample sits for more than 10 minutes, the color may change giving an inaccurate result.
- Sometimes hard water will be detected immediately after regeneration(*) or after water flow(*) has stopped for a long period of time. This is usually fixed by allowing some water to flow(*) through the unit.
- If it is found that the water has not been softened after a few separate checks, complete manual regeneration(*).

“5. Manual Regeneration(*)” in SECTION 3 on page 33

2.2 Check for Regenerating Salt(*)

Regenerating salt(*) is needed for regenerating the ion exchange resin(*). Maintain the water softener to ensure that there is regenerating salt(*) in the brine tank at all times.

a) Check the amount of regenerating salt(*).

Check whether there is regenerating salt(*) in the brine tank.

- An amount equal to about 1/3 of the capacity of the brine tank is adequate.

b) Add regenerating salt(*).

If the amount of regenerating salt(*) has gotten low, refer to “0 3.2 Replenishing Regenerating Salt(*)” in SECTION 3 to replenish the regenerating salt(*).

“3.2 Replenishing Regenerating Salt(*)” in SECTION 3 page 28

3. Inspection and Maintenance to be Performed Every Four Months

3.1 Raw Water(*) Quality Check

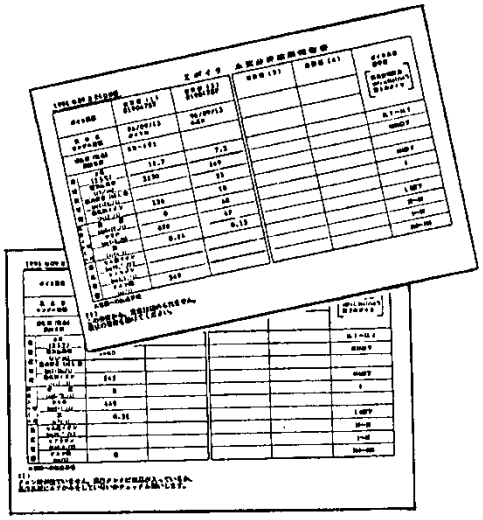
The water quality of tap water, ground water, and industrial water varies with the seasons. Therefore, water quality needs to be checked periodically.

CAUTION

Caution

Check the water quality once every four months.
Failure to complete the check of water quality may result in decreased boiler efficiency and water tube damage due to hardness(*) leakage.

MIURA has the capability of providing water quality analysis. Consult your dealer or MIURA sales office for water quality testing.



3.2 Strainer Cleaning

In MW-35U to 400U, a strainer is installed at the primary side of the water softener, and in MW-600U and MW-1000U, a strainer is installed at both the primary side and the secondary side.

Follow the procedures below to clean the strainer periodically.

Water cannot flow when cleaning of strainers is in progress. Therefore, check the water level of the feed water tank and the equipment at the secondary side.

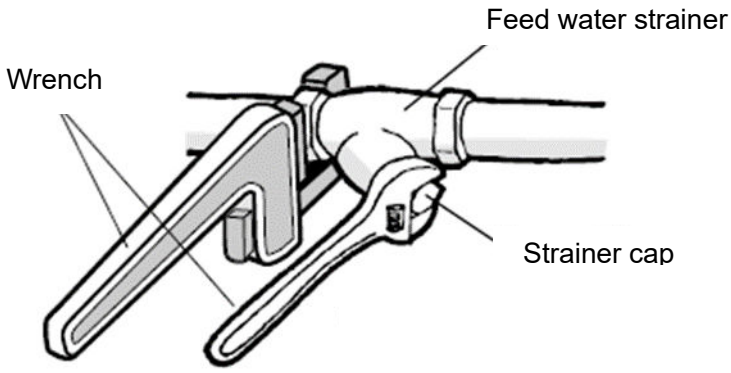
a) Close the valve.
   1) Close the valve upstream of the strainer.
   2) To release the residual pressure from the water softener, discharge water from the water sampling port and release pressure in the piping. Refer to “5. Component Names” in SECTION 2 for the placement of the water sampling port. In case of MW-600U and MW-1000U, the water sampling port is required to be installed on site.
   3) Close the valve downstream of the strainer. To minimize the amount of collected water discharged from the piping when the strainer cap is opened, close the valve located closer to the strainer.

“5. Component Names” in SECTION 2 on page 20

b) Open the strainer cap with wrenches.

NOTE

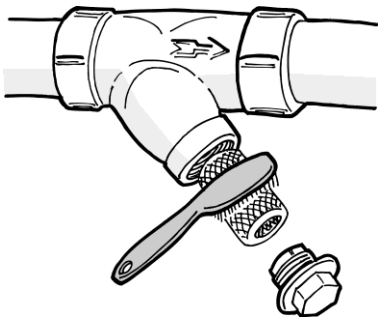
Once you remove the cap of the strainer, water is discharged of the piping. Use a bucket or other container to collect water. Sometimes, large volumes of water may be discharged depending on the condition of the piping.



c) Clean the strainer mesh.

Remove the strainer mesh and clean it with a brush.

• If the rust cannot be removed from the gaps in the mesh or significant deformation has occurred, the strainer must be replaced. In such a case, contact your dealer or MIURA sales office.



d) Return the strainer mesh.

Return the strainer mesh to its original position in the strainer.

e) Close the cap.

If the strainer is sealed with a gasket, wrap the sealing tape around the cap contact surface and tighten the cap using a wrench.

NOTE

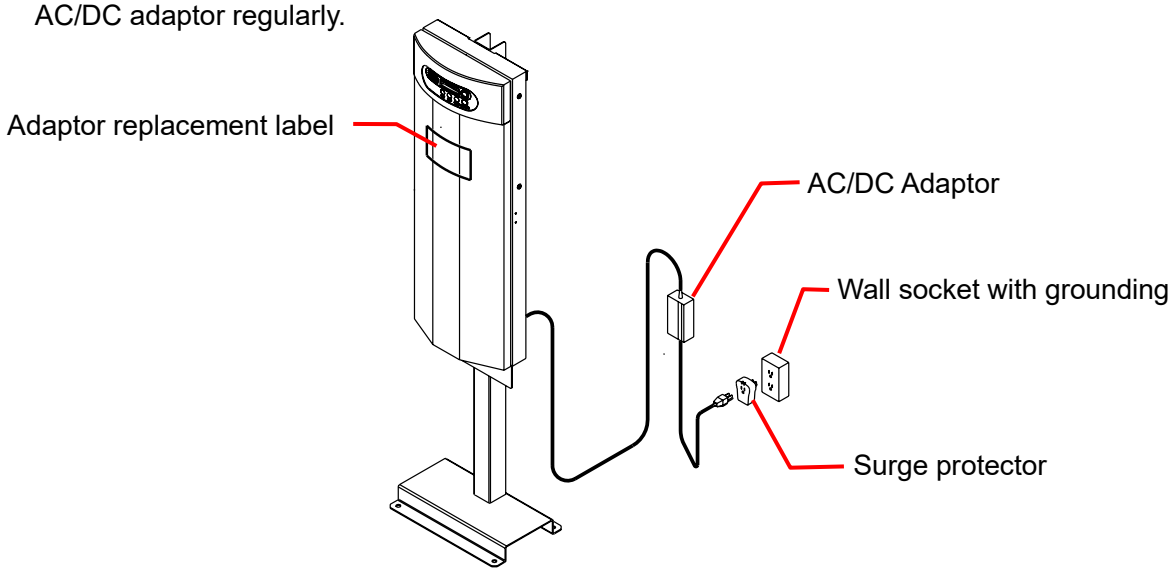
Tightly wrap the sealing tape around in the direction opposite that of the cap tightening. Failure to observe this instruction may result in water leakage.

f) Open the valve.

1) Open the upstream and downstream valves that were closed for cleaning the strainer.
2) Make sure there is no water leakage.

4. Inspection and Maintenance to be Performed Every Five years

Power of MW is supplied from the AC/DC adaptor. Following the procedures below, replace the AC/DC adaptor regularly.



CAUTION

Caution

Since the AC/DC adaptor is a consumable part, replace it every five years.
If the AC/DC adaptor has not been replaced, scale(*) may buildup in the boiler because power supply to the water softener stops and raw water(*) is supplied due to the AC/DC adaptor malfunction.

a) Prepare the replacement AC/DC adaptor nearby.
Please contact your dealer or MIURA sales office for the replacement AC/DC adaptor.

b) After confirming that the water softener is not regenerating, replace the AC/DC adaptor.
Do not replace the adapter during regeneration. It may cause poor regeneration.

c) Check the LCD display of the water softener to confirm that power is supplied.

d) Write down today's date in five years as the next replacement time on the adaptor replacement label attached to the front of the control box.

WARNING

Instruction

The AC/DC adaptor and surge protector are not waterproof.
Do not place them on the floor but install them in a position not subject to water.
If this precaution is not observed, serious accidents such as electric shock and outbreak of fire may result.

SECTION 5: TROUBLESHOOTING

1. Checks and Actions in Case of Failure

1.1 Types of Notice

If a failure or defect occurs, a notice is displayed on the LCD of the control panel. Notices are divided into the following three types depending on the severity of the problem.

Table 5-1: Types of alarm

Type of notice	Seriousness	Magnitude of effect
Error	High	Use as is may cause the entire boiler system to stop.
Caution	Medium	Use as is may result in soft water(*) not being supplied.
Notice	Low	Use as is may result in the occurrence of hardness(*) leakage.

1.2 Error

When an error is generated, in addition to display of the alarm code on the LCD screen of the control panel, the buzzer sounds, and the “Alarm” lamp flashes.

a) Stop the buzzer.

Press the “Stop Buzzer/Check Notice” button.

- The buzzer stops sounding.
- The “Alarm” lamp changes from flashing to being lit.
- The alarm code is displayed on the LCD screen.

b) Check the content of the errors.

- Check the content with the alarm code on the LCD screen.

Table 5-2: Content of errors

Category	LCD screen display	Symptom
Error	A200-09	Water level in feed water tank is low.
	A210-01	Both units failed.
	A500-01	Microcomputer circuit board failed.
	A510-65	Safety parts are not connected.

CAUTION

When the Error [A210-01] (Both units failure at same time) occurs, in the case of the MW-35U to 400U, hard water is supplied and scale(*) buildup may occur in the boiler. In the case of the MW-600U and MW-1000U, water flow(*) may stop completely. (The water flow(*) stops when both units fail during regeneration(*).)

Caution

If the Error occurs, immediately check the water flow(*). If the water flow(*) has stopped, bypass the both units.

Refer to the following section for details on the bypass method.

"4.2 Stop" in SECTION 3 on page 32

c) Eliminate the cause of the error.

Eliminate the cause of the error as described in "0 1.4 Actions to be Taken before Ordering Repairs" in SECTION 5.

"1.4 Actions to be Taken before Ordering Repairs" in SECTION 5 on page 45

- The "Alarm" lamp will turn off the moment the cause is eliminated.
- If the same error occurs again, there may be other factors. In this case, contact your dealer or MIURA sales office.

1.3 Caution and Notice

When a caution or notice is generated, in addition to display of the alarm code on the LCD screen of the control panel, the buzzer sounds, and the “Notice” lamp flashes.

* The buzzer does not sound for a notice.

a) Stop the buzzer.

Press the “Stop Buzzer/Check Notice” button.

- The buzzer stops sounding, and the “Notice” lamp changes from flashing to being lit.
- Pressing the button once more returns the LCD screen to operation status display.
- The water softener continues to supply water without stopping.

b) Check the content of the caution or notice.

- Check the content using the alarm code on the LCD screen.

Table 5-3: Content of cautions and notices

Category	LCD screen display	Symptom
Caution	C210-01	No. 1 unit(*) control valve is defective.
	C210-02	No. 2 unit(*) control valve is defective.
	C210-03	No. 1 unit(*) controller is defective.
	C210-04	No. 2 unit(*) controller is defective.
	C530-01	Raw water(*) pressure switch may have failed.
	C590-09	Communications data cannot be sent.
Notice	F520-10	Hardness(*) leakage regeneration(*) has occurred continuously in No. 1 unit(*).
	F520-11	Hardness(*) leakage regeneration(*) has occurred continuously in No. 2 unit(*).
	F520-27	Brine flow is insufficient.
	F520-28	Concentration of brine is insufficient.
	F530-17	Water flowmeter failed.
	F530-40	Brine flowmeter failed.
	F590-11	Linkage with Colormetry for hardness is incomplete.
	F700-08	Raw water(*) pressure was insufficient during regeneration(*).
	F700-18	Power failure occurred during regeneration(*).
	F800-06	Amount of salt in brine tank is insufficient.

CAUTION

If the Caution [C210-01]/[C210-02] (Control valve defect) or [C210-03]/[C210-04] (Controller defect occurs and the normal unit enters the regeneration(*) process, the following situations occur.

◆ In the case of the MW-35U to 400U

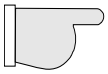
Water bypass occurs in the control valve during regeneration(*). Hard water is supplied and scale(*) buildup may occur in the boiler during regeneration(*).

◆ In the case of the MW-600U and MW-1000U

Water bypass does not occur in the control valve during regeneration(*), and the water flow(*) may be stopped in the unit in which an error has occurred. If the normal unit enters the regeneration(*) process in such a state, the water flow(*) may stop completely.

If the normal unit enters the regeneration(*) process and water flow(*) stops when the Caution above occurs, confirm that the unit in which the Caution has occurred can be bypassed, and then bypass the unit to avoid stopping of water flow(*).

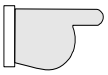
Refer to the following section for details on the bypass method.



“4.2 Stop” in SECTION 3 on page 32

c) Eliminate the cause of the caution or notice.

Eliminate the cause of the caution or notice as described in “0 1.4 Actions to be Taken before Ordering Repairs” in SECTION 5.



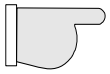
“1.4 Actions to be Taken before Ordering Repairs” in SECTION 5 on page 45

- The “Notice” lamp will turn off the moment the cause is eliminated.
- If the same caution or notice occurs again, there may be other factors. In this case, contact your dealer or MIURA sales office.

1.4 Actions to be Taken before Ordering Repairs

If any failures or other problems should arise, take the steps described in Table 5-4 below to eliminate the abnormality.

- If the problem persists even after countermeasures have been taken, stop operation of the water softener immediately, and contact your dealer or MIURA sales office.



"4.2 Stop" in SECTION 3 on page 32

Table 5-4: Troubleshooting overview

LCD screen display	Cause	Required action	Page
A200-09	Insufficient raw water(*) pressure	Check the water pressure.	29
	Clogged resin layer	Contact your dealer or MIURA sales office.	*
	Clogged strainer	Clean the strainer.	38
	Incorrectly opened/closed manual valves	Open/close the manual valves correctly.	30
A210-01	Both units failure	Contact your dealer or MIURA sales office.	*
A500-01	Microcomputer circuit board failure		
A510-65	Safety parts not connected		
C210-01	No. 1 unit(*) control valve defect		
C210-02	No. 2 unit(*) control valve defect		
C210-03	No. 1 unit(*) controller defect		
C210-04	No. 2 unit(*) controller defect		
C530-01	Raw water(*) pressure switch failure		
C590-09	Data transmission error		
F520-10	No. 1 unit(*) hardness(*) leakage		
F520-11	No. 2 unit(*) hardness(*) leakage		
F520-27	Brine suction defect		
F520-28	Salt concentration defect		
F530-17	Water flowmeter failure		
F530-40	Brine flowmeter failure		
F590-11	Incomplete linkage with Colormetry for hardness		
F700-08	Low raw water(*) pressure during regeneration(*)	Check the water pressure.	29
F700-18	Power failure during regeneration(*)	Check the power supply.	*
F800-06	Insufficient regenerating salt(*) in brine tank	Replenish regenerating salt(*).	28

SECTION 6: STORAGE

1. Inactivity of the Water Softener

If the water softener is to be inactive, contact your dealer or MIURA sales office.

NOTE

If the water softener is not be used for a long period of time (more than a week), it should be properly maintained during that time. When equipment is not used, it is often overlooked and not properly maintained.

If the equipment is not properly maintained while not in use, it may not operate correctly when it is used again.

2. Transfer or Resale

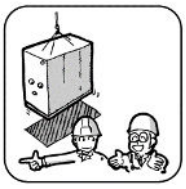
WARNING

Prohibited

Ensure that the water softener is installed only in the specified condition and connected to the specified peripheral equipment.

Failure to observe this precaution may result in injury.

In order to correctly install the water softener and set the proper peripheral equipment when transferring or reselling it, contact your dealer or MIURA sales office. When reselling our product, hand the Operation Manual and product-related materials together to the next customer.



3. Export

This product was manufactured for use in the country where MIURA judges that the export of the product is allowable.

Therefore, the full performance may be inhibited due to differences in operating environment if the product is used outside the current country of use.

Regarding export, you are to comply with the laws and regulations.

You will also come under control in many cases, with regard to export, on-site import, and on-site use according to the laws and regulations of the destination for the export.

When exporting the product, contact your dealer or MIURA sales office.

SECTION 7: DISPOSAL

1. Disposal

When disposing of the product, comply with the laws and regulations.

SECTION 8: WARRANTY

1. Questions regarding Warranty

For details on the warranty, contact your dealer or MIURA sales office.

2. Questions regarding the Product and Operation Manual

For any questions about your purchased product or the content of this Operation Manual, contact your dealer or MIURA sales office.

3. If the Operation Manual is Lost

The Operation Manual contains the information for the safe usage.

In the event of loss of the Operation Manual, contact your dealer or MIURA sales office.