Installation and operation manual

WATEX CMS-8/9/10/12/13/14 PLUS

WATER SOFTENER



Watch CMS water softener start-up video:

Read the instructions carefully before use!

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INTRODUCTION

WATEX CMS series water softeners are precision-built, high-quality systems for reducing water hardness, iron, ammonium and turbidity.
When installed and operated correctly, the unit will provide conditioned water for many years. Read this manual carefully before installation and follow all cautions and notes. Keep the manual for future reference. If you have questions about the water softener, contact your local dealer or WATEX.

REQUIREMENTS

The water softener is heavy and fragile. Protect its FRP pressure vessel from mechanical impact.
Mechanical impact may impair operation. Do not roll the unit or turn it upside down. Move it on a wheeled platform or have two people lift it.
When two people lift the unit, hold the upper end behind the control-valve housing where it joins the pressure vessel and support the bottom of the blue FRP pressure vessel.

- The water softener must stand on a firm, level surface.
- Install a mechanical prefilter rated at 50 µm or finer to extend the system's service life.
- For CMS PLUS units, the maximum permitted dissolved iron concentration in raw water is 15 mg/l. A raw-water analysis determines whether a separate iron-removal filter is needed.
- **DO NOT use a** pipe wrench to tighten nuts or caps.
- **DO NOT insert a** screwdriver into cap slots or strike the caps with a hammer.
- **DO NOT install the** unit backwards. Follow the flow-direction arrows at the inlet and outlet.
- **DO NOT join the** regeneration drain and the gravity overflow line.
- **ALWAYS provide** a bypass line around the water softener.
- Install pressure gauges upstream and downstream of the water softener.
- Install the water softener downstream of the pressure tank.

SPECIFICATIONS

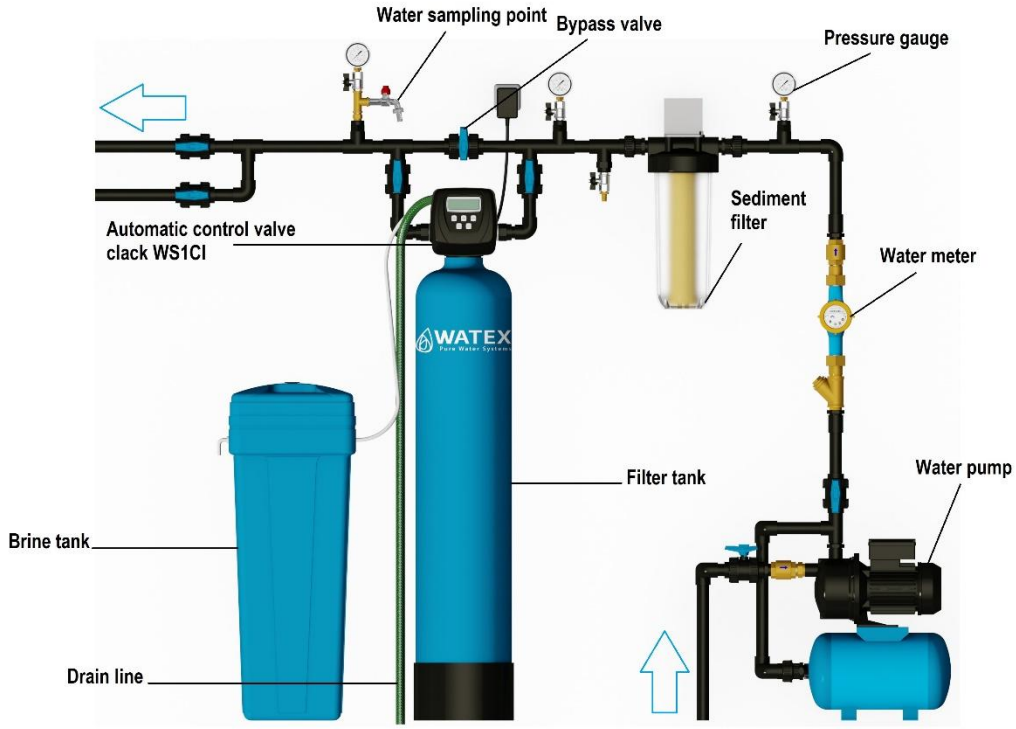
Equipment technical data	Unit	Model CMS8 PLUS	Model CMS9 PLUS	Model CMS10 PLUS	Model CMS12 PLUS	Model CMS13 PLUS	Model CMS14 PLUS
Flow rate* Q_{max}	m^3/h	0.6	1	1.6	2.2	2.8	3.6
Regeneration-water volume	liters	100	130	156	200	250	300
Minimum flow rate for rinsing	m^3/h	0.6	0.8	1	1.5	1.7	2
Tank size (diameter)	inches	8	9	10	12	13	14
	m	0.2	0.24	0.25	0.3	0.33	0.37
Tank volume	liters	25	32	64	85	110	145
Filter-media volume	liters	15	25	40	55	70	100
Dimensions							
Length	m	0.53	0.56	0.59	0.64	0.84	0.87
Width	m	0.2	0.24	0.25	0.3	0.33	0.37
Height	m	1.08	1.41	1.57	1.52	1.57	1.87
Water and drain connections	inches	1”/1”/¾”	1”/1”/¾”	1”/1”/¾”	1”-3/4”	Cl 1”	1 ¼”
Clack control valve		Cl 1”	Cl 1”	Cl 1”	Cl 1”	Cl 1”	Cl 1,25"
Treatment capabilities		Hardness, iron					
Tank material		FRP (fiberglass)					
Filtration media		Ion-exchange resin; silica sand, 1–3 mm and 3–5 mm					
Operating pressure	bar	2–6					
Power supply		220 V, 50 Hz, single phase					
Power input	W	3 W					

*Regeneration-water consumption depends on hardness and on the iron, ammonium and turbidity levels in the raw water.
** Water-softener capacity depends on hardness, iron, turbidity and ammonium levels. Calculate the capacity separately for each raw-water source to optimize treatment and reduce salt and regeneration-water consumption.

Contact your local dealer or WATEX to program the correct treatment capacity.
Important notes:
The water softener does not remove odors, organic matter, bacteria or viruses.

SYSTEM MAIN COMPONENTS

RECOMMENDED ASSEMBLY DIAGRAM FOR THE CMS KIT



The water softener has three main components: a resin tank, a Clack control valve and a brine tank.

Control valve

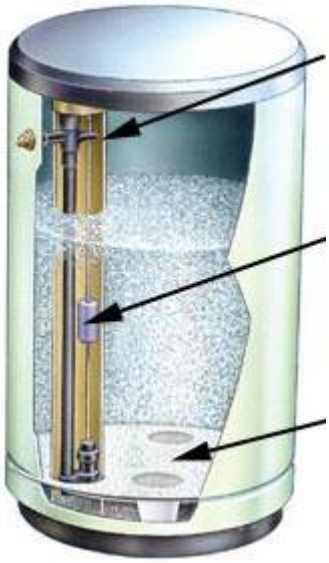




A Clack WS1CI control valve is installed on the resin tank and controls automatic regeneration of the water softener.
The control-valve housing is made from an engineered polymer. The control panel is at the front; the water and drain connections are at the rear.
The control valve operates at 220 V. Its control board stores and manages all rinse parameters. During rinsing, the board powers the built-in motor, which moves the internal piston to the required position.
A built-in flow meter beside the outlet manifold measures water consumption, which the rinse algorithm uses to schedule regeneration. The locking clip for the drain and brine connections is easy to remove for service. The standard 90° drain elbow has a ¾-inch male NPT thread and swivels through 180° for convenient orientation.
The 3/8-inch Parker Liquifit brine elbow swivels through 270° for convenient orientation. The built-in flow meter beside the outlet port is readily accessible for service.

Brine tank

The brine tank stores sodium chloride (NaCl salt tablets). It contains a safety float, brine well and grid plate. Normally, the water level should be about one third of the tank height, which is sufficient to dissolve the NaCl required for regeneration.



Brine well: this cylindrical guard keeps salt or potassium chloride away from the safety float and air-check valve so that both can operate freely.

Brine-tank safety float: the safety float prevents brine from overflowing onto the floor if the control-valve injector becomes blocked. Its level is adjustable, but adjustment is not normally required.

Grid plate (salt platform): the plate supports the salt above the water space at the bottom of the brine tank, maintaining sufficient brine volume for regeneration.

Add salt to the brine tank periodically; install the tank where it remains easy to access.

Add salt tablets when the water level rises above the salt level. Do not mix different salt types. If the water contains iron, use salt with an iron-removal additive or add a resin cleaner once a month. If the water contains no iron, use clean pellet, solar or cube salt.
Rock salt is not recommended because its impurities may block the injector assembly.

Resin tank

The resin tank contains cation-exchange resin, which reduces water hardness and iron concentration. Treatment capacity is calculated from the amount of resin and the raw-water quality. When the capacity is exhausted, the resin is regenerated with brine.

OPERATION MODES

WATEX CMS water softeners have two operating modes: Service and Regeneration.
In Service mode, water flows through the system **and** hardness-forming minerals are removed.

Regeneration consists of 5 stages:

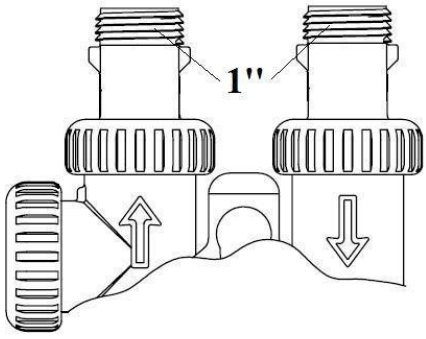
1. **First backwash: a rapid** upward flow loosens the resin bed and carries accumulated iron particles, dirt and sediment to the drain.
2. **Brine** draw: brine flows from the brine tank downward through the resin. Sodium ions displace hardness ions accumulated during service and regenerate the ion-exchange resin.
3. **Second backwash: after the** brine has been drawn from the brine tank into the resin tank, the brine float valve closes. Water displaces the remaining brine and carries the released hardness ions to the drain.
4. **Rinse: a** rapid downward flow follows the second backwash, removes the remaining brine and settles the resin bed for efficient softening.
5. **Fill:** after regeneration, water enters the brine tank **and** dissolves sodium chloride for the next cycle. During regeneration, sodium ions from the brine replace hardness ions on the resin beads.

INSTALLATION

General conditions

Install the water softener on a firm, level surface.
Install the water softener in a sound-insulated plant room where possible, because water flowing to the drain may be audible during regeneration, which normally occurs at night.
The control valve and its fittings are not designed to support the weight of the pipework.
Complete all plumbing and electrical work in accordance with local regulations.
Provide a continuous water supply at 2.0–3.5 bar. Raw-water parameters should not fluctuate by more than 30%.
Keep the distance between the drain and the water softener as short as possible. The room temperature must remain between +5 °C and 45 °C.
Do not use petroleum jelly, oil, hydrocarbon-based lubricant or silicone spray on the connections. Food-grade silicone grease may be used on the black O-rings, although lubrication is normally unnecessary.
The nuts and caps are designed for hand tightening or for use with the dedicated plastic service wrench. Pliers may be used carefully to loosen a tight nut or coupling. Do not damage the plastic components, and do not use an open-ended or socket wrench.
Do not insert a screwdriver into sleeve or cap openings, and do not strike the parts with a hammer. PTFE thread-seal tape is not required on the drain or brine fittings.
Position the water softener as close as practical to the drain connection. Have preventive maintenance performed at least once a year.

Water pipe connection



The water connections at the rear of the unit are marked with flow-direction arrows. Viewed from the front, the inlet is on the right and the outlet on the left. Both connections have 1-inch male threads. The swivelling plastic connectors remain sealed while being oriented; tighten the control-valve fittings by hand only.
Use PTFE thread-seal tape on plastic pipe threads.
The pipe material used to connect the water softener is not critical. The unit must not support the weight of the water-supply pipework.
The unit may be connected to cast-iron, solvent-welded or threaded PVC pipework. It may also be connected to flexible metal hoses or soldered copper/brass pipework.

Note: *complete all soldering before connecting the pipework to the control valve's plastic fittings. Heat can damage the fittings internally and cause leakage.*
Allow soldered fittings to cool before connection. Keep soldering flux away from all sealing surfaces and connector parts.

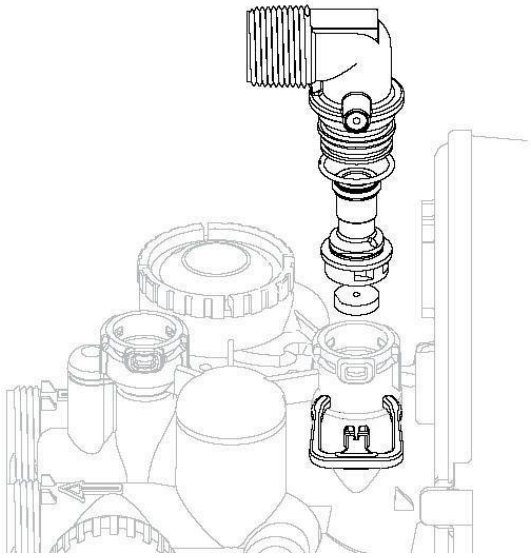
Install the bypass arrangement shown in the figure and provide sampling valves upstream and downstream of the unit.
During normal operation, the bypass valve is closed and the inlet and outlet valves are open.

During maintenance or repair, the bypass line can supply untreated water to the points of use.
Install sampling valves upstream and downstream to compare raw-water and treated-water quality. Pressure gauges at the same locations are recommended for monitoring pressure loss across the unit.
To extend the unit's service life, install a mechanical prefilter upstream to retain sand carried from the well and prevent internal blockages.

Drainage connection

Connect the water softener to a drain for regeneration. Regeneration discharges spent brine, rinse water and accumulated solids such as iron, sand, clay and other sediment.
The drain connection is located at the top of the control valve. Use a suitably sized hose to carry rinse water from the filter to the wastewater system.

Note: the drain elbow has an O-ring seal and can be rotated through 270° to the required orientation.



Important: *secure the drain hose so that it cannot pull free during rinsing.*

Important: *ensure that the drain hose is not kinked or crushed. A restriction reduces rinse flow and may prevent complete regeneration.*

The drain line may rise up to approximately 0.5 metres above the control valve. During the first cycles, confirm that the unit completes a full rinse.
If rinsing is incomplete, contact WATEX technical support.

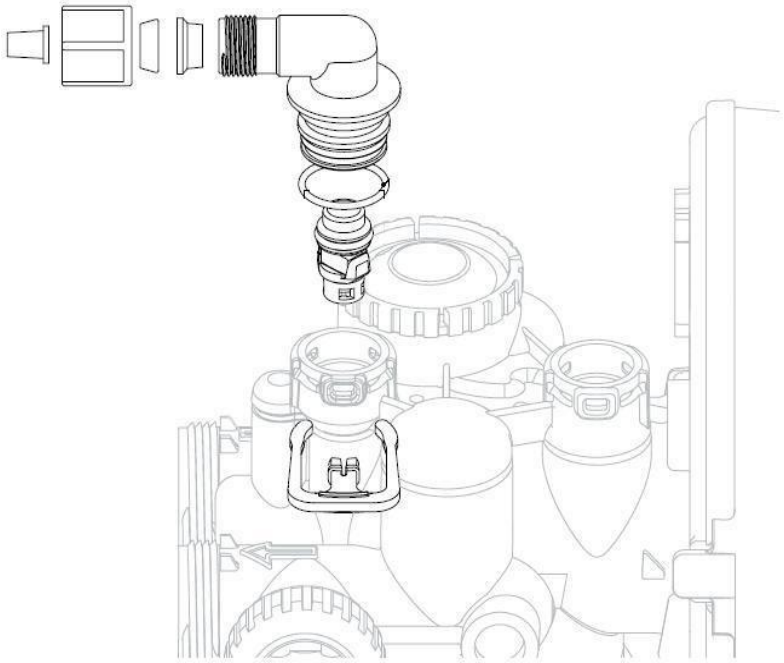
Important: the gravity drain pipe must have a minimum nominal diameter of DN 40.
Important: *never seal the drain hose into a waste pipe or receiving vessel. Maintain an air gap between the hose and the receptor to prevent backflow.*

Important: install a water trap (siphon) before the wastewater connection to prevent sewer odours and bacteriological contamination from entering the unit.

Brine-tank connection

The kit includes a brine tank and 3/8-inch connection tube. The flexible plastic tube is stored under the brine-tank lid. Place the brine tank beside the resin tank on either side.
Remove the cap from the brine well, take out the safety-float assembly and remove the transit rubber fitted to the bottom of the float. No thread sealant is required on this connection.

Remember!
The brine tank must be refilled with salt tablets regularly, so install it where it remains easy to access.
The drawing identifies the brine-line connection on the control valve. Connect the tube as follows:



1. Remove the retaining clip and pull the brine elbow out of the control valve.
2. Pass the tube through the compression nut.
3. Insert the cylindrical tube support, then fit the two compression rings in sequence.
4. Push the tube fully into the elbow and tighten the nut by hand.
5. Insert the brine elbow into the valve port and secure it with the retaining clip.
Note: the brine elbow has an O-ring seal and can be rotated to the required orientation. The elbow can be rotated through 27^{0}°.
6. Pass the other end of the tube through the side opening in the brine tank and connect it as described in steps 2–4.

After completing the water, drain and brine connections, fill the brine tank with NaCl salt tablets.

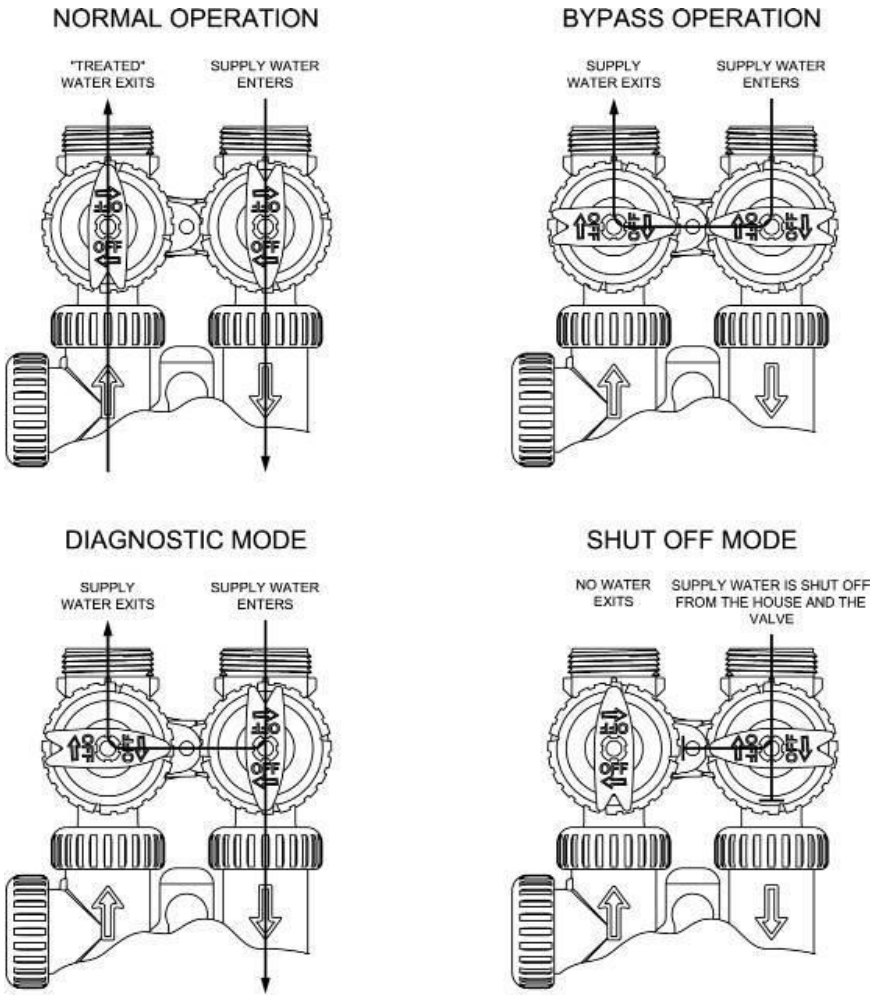
Bypass (option)





- The arrows show the four flow positions: normal service, bypass, diagnostic and shut-off.
- Radial seals accommodate minor horizontal and vertical pipe misalignment; hand-tighten the connections only.
- A single internally lubricated rotor O-ring reduces friction.

Bypass Valve Operation



External in-line blending valve (optional)

Use the optional in-line blending valve to set the desired outlet-water hardness or, with a carbon filter, to retain a controlled chlorine residual in the outlet water.



Electrical connections

The water softener is supplied with a 220 V AC adapter. The power supply must be continuous, and the adapter may be used only in a dry location.

Note: All electrical connections must comply with local regulations.
Provide continuous power from an outlet no more than 2 metres from the water softener. Connect the

adapter cable inside the control valve.

1. Remove the front cover of the control valve.
2. Release the upper centre retaining tab that secures the control-board frame to the valve body.
3. Pass the AC-adapter plug through the opening on the right-hand side of the control-valve housing.
4. Connect the plug to the socket at the lower-right corner of the control board.
5. Route the remaining cable beside the control-board frame and behind the retaining clips.
6. Return the control-board frame to the retaining tab and secure it in its original position.
7. Refit the control-valve front cover.

Button operation and functions

SET CLOCK	Sets the time of day, or exits programming and saves the changes.
NEXT	Scrolls through available user-display screens, or advances to the next screen in programming mode.
△ ▽	Changes the displayed value in programming mode.
REGEN	Enables or cancels a scheduled regeneration. Hold REGEN for more than 3 seconds to start immediate regeneration. In programming mode, REGEN moves back one step.

Press the buttons in the illustrated sequence to lock (LoC) or unlock (UnLoC) access to the OEM setup screens.

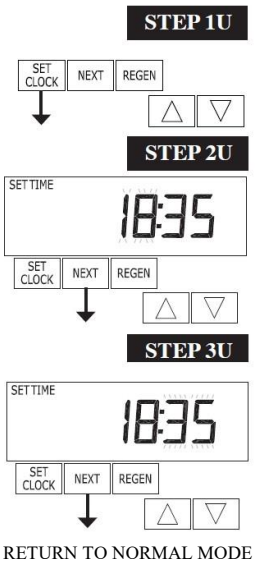






Setting Time of Day

The time of day normally needs to be reset only after a power outage longer than 24 hours, a depleted battery, or a daylight-saving time change. After an outage longer than 24 hours, the time flashes and must be reset. If an outage lasted less than 24 hours but the time flashes, reset the time and replace the non-rechargeable battery.

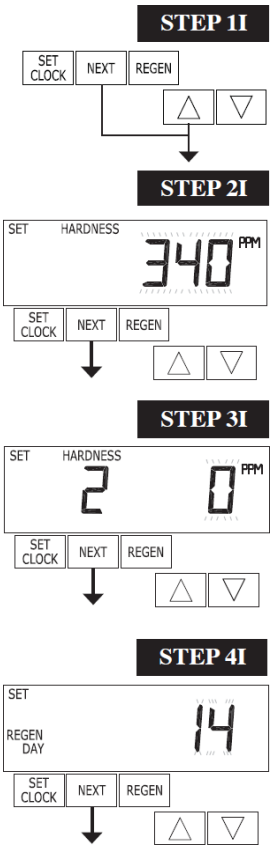


STEP 1U - Press SET CLOCK.

STEP 2U - Current time (hour): set the hour with the arrow buttons. Press NEXT to continue to step 3U.

STEP 3U - Current time (minutes): set the minutes with the arrow buttons. Press NEXT to exit the time setting. Press REGEN to return to the previous step.

Installer display settings



STEP 1I - Hold NEXT and ▲ simultaneously for 3 seconds.

STEP 2I - Influent hardness: set the value with ▼ or ▲. If FILTER was selected in step 2F, or if '-nA-' was selected in step 5CS / 'oFF' in step 8S, '-nA-' is displayed. Press NEXT to continue to step 3I; press REGEN to exit the installer display.

Units available
PPM
FH
dH

STEP 3I - Effluent hardness: when a mixing valve is used, set the effluent hardness with ▼ or ▲. The available range depends on system capacity and the hardness entered in step 2I. '-nA-' is displayed if FILTER was selected in step 2F, '-nA-' in step 5CS, or 'oFF' in step 8S. Press NEXT to continue to step 4I; press REGEN to return to the previous step.

STEP 4I - Day override: if capacity is set to 'oFF', set the number of days between regenerations. With AUTO or a numeric capacity, set the maximum interval between regenerations (1-28 days). Select 'oFF' for volume-based initiation only. Set the value with ▼ or ▲. See the setting-options table for details. Press NEXT to continue to step 5I; press REGEN to return to the previous step.

COMMISSIONING

The WATEX service centre normally presets all main operating parameters. At first start-up, only the time of day needs to be set.

Regeneration cycles and capacity programming

Press and hold **NEXT** and the down-arrow button simultaneously for 3 seconds.

1) The word "**SOFTENING**" flashes in the upper left corner.
2) Press **NEXT**. The first backwash stage and its duration in minutes are displayed. Change the duration with the arrow buttons.
3) Press **NEXT**. The second stage, brine draw, and its duration in minutes are displayed. Change the duration with the arrow buttons.
4) Press **NEXT**. The second backwash stage and its duration in minutes are displayed. Change the duration with the arrow buttons.
5) Press **NEXT**. The rinse stage and its duration in minutes are displayed. Change the duration with the arrow buttons.
6) Press **NEXT**. The fill stage (brine-tank refill) and its duration in minutes are displayed. Change the duration with the arrow buttons.
7) Press **NEXT** to display the unit capacity in cubic metres. Change the capacity with the arrow buttons. Pressing **NEXT** saves the value and advances to the **next** setting. Continue pressing **NEXT** until the current day of the week is displayed.

This closes the setup cycle and saves all settings.

Regeneration stage-duration settings

To change regeneration-stage durations, hold **NEXT** and the down-arrow button simultaneously for 3 seconds.

1) The word "**SOFTENING**" flashes in the upper-left corner.
2) Press **NEXT**. Set the first backwash duration with the arrow buttons.
   Press **NEXT**. Set the brine-draw duration with the arrow buttons.
3) Press **NEXT** successively to set the second backwash, rapid-rinse and brine-tank refill durations with the arrow buttons.

Press **NEXT** once more.

This closes the setting mode and saves all settings.

Manual regeneration

Manual regeneration may be needed before the control valve schedules it, for example after unusually high water consumption caused by guests or extra laundry.

To schedule manual regeneration for the next preset regeneration time, briefly press REGEN. REGEN TODAY flashes on the display. If REGEN was pressed accidentally, press it again to cancel the request.

To start manual regeneration immediately, press and hold REGEN for 3 seconds. Regeneration begins immediately and cannot be canceled.
During regeneration, the display shows the current stage and the time remaining. The system completes all stages automatically and returns to water-treatment mode when regeneration is finished.

Monitoring operation

During normal operation, the user display shows:

- time of day;
- current flow rate in litres per minute;
- remaining treatment capacity in cubic metres.

Press NEXT to scroll through these displays. If no button is pressed for 5 minutes **during** programming, the normal user display returns. Changes made before the timeout are saved.

To exit programming or Installer Settings quickly, press SET CLOCK. Changes made before exiting are saved. To regenerate at the next preset time (default 02:00), press REGEN; REGEN TODAY appears. For immediate regeneration, **hold** REGEN for 3 seconds.

PROBLEMS AND SOLUTIONS

Problem	Possible cause	Solution
1. The timer does not display time	a. Transformer not connected	a. Reconnect the transformer.
	b. No voltage in electrical outlet	b. Repair the outlet or use a working outlet.
	c. Transformer failure	c. Replace the transformer.
	d. Electronic control board damaged	d. Replace the electronic control board.
2. The timer does not display the correct time	a. Control-board connector disconnected	a. Check the connector or use another control-board socket.
	b. Power failure	b. Reset the time of day.
	c. Electronic control board damaged	c. Replace the electronic control board.
3. The display does not show "SOFTENING" while water is flowing	a. Water flows through the bypass and not through the water softener.	a. Set the bypass valve to the service position.
	b. Flow meter disconnected	b. Reconnect the flow meter to the control board.
	c. Flow-meter turbine jammed or stopped	c. Remove the flow meter and check for foreign material.
	d. Flow meter damaged	d. Replace the flow meter.
	e. Electronic control board damaged	e. Replace control board.
4. Control valve starts regeneration at wrong time	a. There has been a power outage	a. Set the correct time on the control valve.
	b. Time of day set incorrectly	b. Set the time of day correctly.
	c. Incorrect regeneration time	c. Reset the regeneration time.
	d. The control valve is set for immediate regeneration	d. Check the control valve's regeneration-time setting.
5. An error code is displayed 1001 or E1 – the regeneration start position cannot be detected 1002 or E2 – unexpected stop. 1003 or E3 – the motor runs too long and cannot reach the next regeneration-cycle position 1004 – the motor runs too long and cannot reach the home position If any other code is displayed, contact the manufacturer.	a. The control valve has just been serviced	a. Hold NEXT and REGEN for 3 seconds, or disconnect the black power cable and reconnect it to reset the control valve.
	b. The control valve is jammed	b. Check whether the piston or spacer stack is jammed.
	c. Excessive drive force is required to move the piston	c. Replace the piston and seal/spacer stack.
	d. The control-valve piston is not in the *home* position	d. Hold NEXT and REGEN for 3 seconds, or disconnect and reconnect the black power cable to reset the control valve.
	e. The motor is not fully engaged with the drive gears, or its wires are damaged or disconnected, or the motor has failed	e. Check the motor and wiring; replace the motor if necessary.
	f. The drive position marker is damaged or dirty, or the drive mechanism is missing or damaged	f. Clean or replace the drive mechanism.
	g. The drive assembly is seated incorrectly on the control board	g. Check that the drive bracket is seated correctly.

	h. The electronic control board is damaged or defective	h. Replace the electronic control board.
	i. The electronic control board is connected incorrectly to the drive assembly	i. Make sure that the control board is correctly connected to the drive assembly.
6. The control valve stops during regeneration	a. Motor does not run	a. Replace the motor.
	b. No voltage at the electrical outlet	b. Repair the outlet or use a working outlet.
	c. AC adapter (transformer) damaged	c. Replace the transformer.
	d. Electronic control board damaged	d. Replace the electronic control board.
	e. The actuator or a drive-cover component is damaged.	e. Replace the actuator or the damaged drive-cover component.
	f. Piston retainer damaged	f. Replace the piston retainer.
	g. Main piston or regenerant piston damaged	g. Replace the main piston or regenerant piston.
7. The control valve does not start regeneration when REGEN is held	a. The transformer is disconnected	a. Reconnect the transformer.
	b. No voltage at the electrical outlet	b. Repair the outlet or use a working outlet.
	c. Faulty actuator or drive-cover component.	c. Replace the faulty actuator or drive-cover component.
	d. Electronic control board damaged	d. Replace the electronic control board.
8. The control valve does not regenerate automatically, but starts when REGEN is pressed	a. Water flowing through the bypass	a. Close the bypass.
	b. Flow meter disconnected	b. Connect the flow meter to the control board.
	c. Flow-meter turbine jammed or stopped	c. Remove the flow meter and check for foreign material.
	d. Flow meter damaged	d. Replace the flow meter.
	e. Electronic control board damaged	e. Replace the electronic control board.
	f. Configuration error	f. Check the control-valve settings.
9. The time display flashes on and off	The power has been off for more than 2 hours, the transformer or control-board plug has been disconnected and reconnected, or NEXT and REGEN have been pressed to reset the control valve.	a. Reset the time of day.

WARRANTY TERMS AND CONDITIONS

The manufacturer's warranty period for this equipment is 24 (twenty-four) months. The equipment must be serviced
at least once a year.
Warranty coverage is subject to the manufacturer's terms in the technical manual and the supplier's conditions below. A technical manual is provided with each product in the original language unless otherwise requested. The buyer must follow the technical
specifications and use the product correctly.
The warranty covers manufacturing defects only when the product has been used according to the technical manual. Watex Estonia OÜ remedies covered defects at the supplier's expense.

The warranty does not **apply** in the following cases:

1. The product is mechanically damaged or the manufacturer's labels have been altered;
2. The product has been stored under unsuitable conditions;
3. The product has been disassembled or repaired by the user;
4. The product has been damaged by force majeure, such as fire, flood, earthquake, war or monetary reform;
5. If the supplier did not install the product, the buyer must deliver a defective product to the Watex Estonia OÜ office during the warranty period. If an authorized Watex Estonia OÜ representative delivered, installed, adjusted and commissioned the product, warranty service is provided at the customer's site.

For warranty service, contact Watex Estonia OÜ.