

Installation and operation manual

WATEX CMS DUPLEX 12/13/14 **CONTINUOUS-OPERATION WATER SOFTENING SYSTEM**



Read these instructions carefully before use.

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GENERAL INFORMATION

Thank you for choosing WATEX water-treatment technology. It provides the comfort of clean water, helps reduce operating costs and limits problems caused by untreated water.

The WATEX CMS DUPLEX series combines modern technology with continuous operation. It reduces water hardness, iron, ammonium and turbidity. The system is easy to operate and will perform as intended when the requirements in this manual are followed.

WATEX CMS12/13/14 DUPLEX TECHNICAL DATA

Technical parameter	Unit	CMS12 DUPLEX	CMS13 DUPLEX	CMS14 DUPLEX
Nominal flow Q _{nom}	m³/h	2.8	3.5	5.0
Maximum flow Q _{max}	m³/h	4.4	5.6	8.0
Regeneration-water volume	L	302	335	417
Minimum rinse flow	m³/h	1.5	1.7	2.0
Vessel diameter	in	12	13	14
Vessel diameter	m	0.31	0.33	0.37
Vessel volume	L	85	110	145
Filter-media volume	L	55	70	100
Overall length (L)	m	1.40	1.60	1.190
Overall width (W)	m	0.33	0.39	0.52
Overall height (H)	m	1.77	1.82	1.57
Water connection	in	1"	1"	1¼"
Clack control valve		CI 1"	CI 1"	CI 1"
Treatment capability		Hardness; iron; ammonium; turbidity	Hardness; iron; ammonium; turbidity	Hardness; iron; ammonium; turbidity
Vessel material		FRP (fibreglass)	FRP (fibreglass)	FRP (fibreglass)
Filter media		Resinex KW-8 ion- exchange resin; quartz sand 1 × 3 mm, 3 × 5 mm	Resinex KW-8 ion- exchange resin; quartz sand 1 × 3 mm, 3 × 5 mm	Resinex KW-8 ion- exchange resin; quartz sand 1 × 3 mm, 3 × 5 mm
Working pressure	bar	2–6	2–6	2–6
Electrical supply		220 V, 50 Hz, 1 phase	220 V, 50 Hz, 1 phase	220 V, 50 Hz, 1 phase
Power consumption	W	3 W	3 W	3 W

* Source filtration-rate note: 25 L/h. ** Source filtration-rate note: 40 L/h.

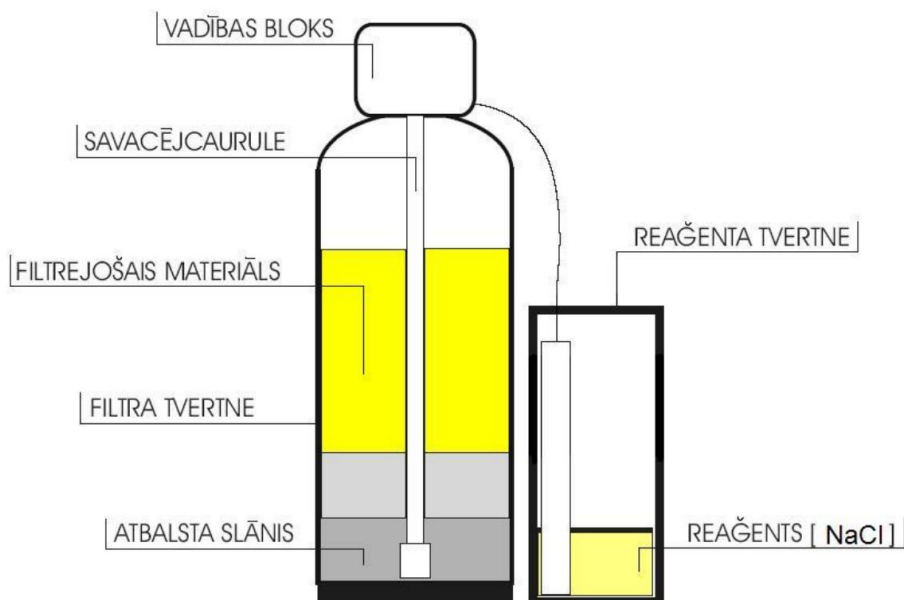
1. RELOCATION

The water-treatment system is heavy and fragile. The fibreglass pressure vessel and the electronic control valve can be damaged by impact; any mechanical shock may affect operation.

Move the system with a trolley and keep it upright. If it must be carried, use two people: support it at the control-valve housing and at the blue vessel. Never lift it by the loose black base tray.

2. SYSTEM COMPONENTS AND OPERATION

2.1. Main components



The system has three principal components: a filter-media vessel, a control valve and a brine tank. A DUPLEX installation contains two parallel filter trains.

Each polyethylene vessel is reinforced with a fibreglass winding and is designed for pressure up to 6 atm; working pressure should not exceed 4 bar. Graded quartz gravel (3 × 5 mm and 1 × 3 mm) forms the support layer and distributes the backwash flow evenly.

Ion-exchange resin (cation resin) is the softening medium. A collector tube with a screened basket prevents media from entering the water system and carries treated water upward to the control valve and consumers.

2.1.1. Control valve

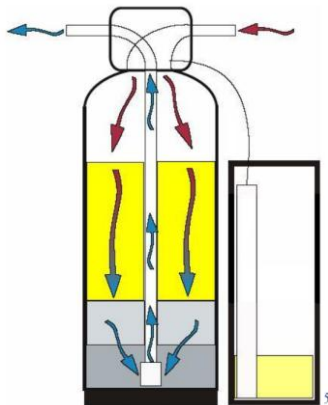
The control valve is mounted on the vessel and controls automatic regeneration. Its electronic board stores all cycle parameters and drives the internal motor to each programmed position. It operates from a 220 V supply. Regeneration is governed by measured water consumption and the programmed settings.

2.1.2. Brine tank

The brine tank stores sodium chloride (NaCl) tablets. It contains a float in a protective tube and an overflow outlet. The float regulates the regeneration-water volume. Under normal operation, the water level is approximately one-third to two-thirds of the tank height; adjustment is normally unnecessary.

2.2. System operation

Service cycle



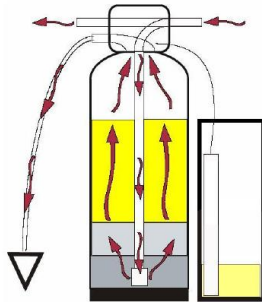
During service, raw water enters the control valve, flows downward through the filter media and is treated. It then rises through the collector tube and leaves through the treated-water outlet. Cycle duration depends on raw-water quality, media volume and water use. When water flows, SOFTENING appears on the display.

Each DUPLEX outlet has a meter that counts water use. When the programmed capacity in m³ is exhausted, regeneration starts. While one filter regenerates, the other stays in service and supplies treated water. HOLD prevents the second unit from regenerating until the first has returned to service, even if its remaining capacity shows 0.00 m³.

2.3. Regeneration-cycle diagrams

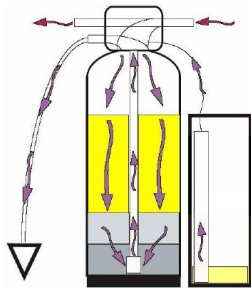
Regeneration removes accumulated substances and restores ion-exchange capacity. A complete cycle lasts about 1.5 hours and uses four main stages: backwash, brine draw, rinse and brine-tank fill. Keep the factory sequence unless an authorised technician specifies otherwise. During regeneration, treated water is supplied by the other DUPLEX filter. The regenerating filter's outlet solenoid closes to prevent rinse water reaching consumers and opens again before Fill.

2.3.1. Backwash



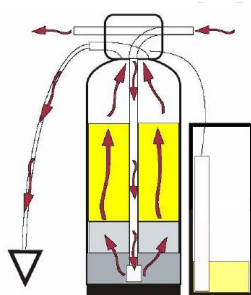
Flow reverses and travels upward through the vessel to the drain, loosening and removing accumulated material. Insufficient backwash reduces capacity and increases pressure loss. Factory duration: approximately 6–8 minutes. Flow is limited by the DLFC washer in the drain elbow.

2.3.2. Brine draw



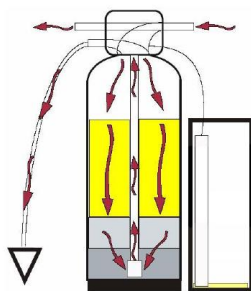
The injector draws brine from the brine tank. Brine flows from top to bottom through the media and restores the ion-exchange resin. Duration: approximately 60 minutes.

2.3.3. Second backwash



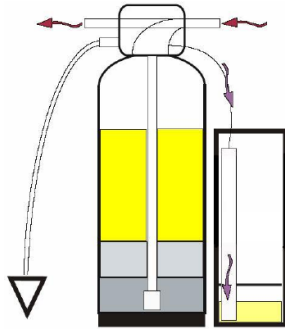
Water again flows upward through the vessel to remove separated deposits and residual reagent. Duration: 1–4 minutes.

2.3.4. Rinse



Water flows downward through the media and upward through the collector to the drain, removing excess reagent. Flow is controlled by the DLFC washer. Factory duration: 4 minutes.

2.3.5. Brine-tank fill



Treated water fills the brine tank to dissolve salt for the next regeneration. The stage lasts approximately 10–60 minutes and stops when the programmed time elapses or the float closes at the set level. The duration can be changed at the control valve. Because rinsing is already complete, the outlet valve opens at the start of this stage and the filter returns to service.

3. INSTALLATION

3.1. General conditions

- Place both vessels on a flat, level surface in a suitable technical room.
- Do not let the control valves or fittings carry the weight of the pipework.
- Complete all plumbing and electrical work in accordance with applicable local regulations.
- Provide uninterrupted water at 2.0–4.0 bar. Inlet water must not exceed +30 °C; room temperature must remain between +5 °C and +40 °C.
- Install a mechanical prefilter upstream of the system.
- Do not use petroleum jelly, oil, hydrocarbon grease or aerosol silicone on connections. Silicone grease may be used sparingly on black O-rings.
- Tighten nuts and sleeves by hand or with the specified plastic tool. Use suitable tools carefully only for releasing tight parts; never use a pipe wrench, insert a screwdriver into sleeve slots or strike parts with a hammer.
- Do not apply PTFE tape to the drain or brine fittings. Keep the route to the drain as short as practicable.
- Arrange preventive maintenance at least twice per year.

3.2. Water-supply connection

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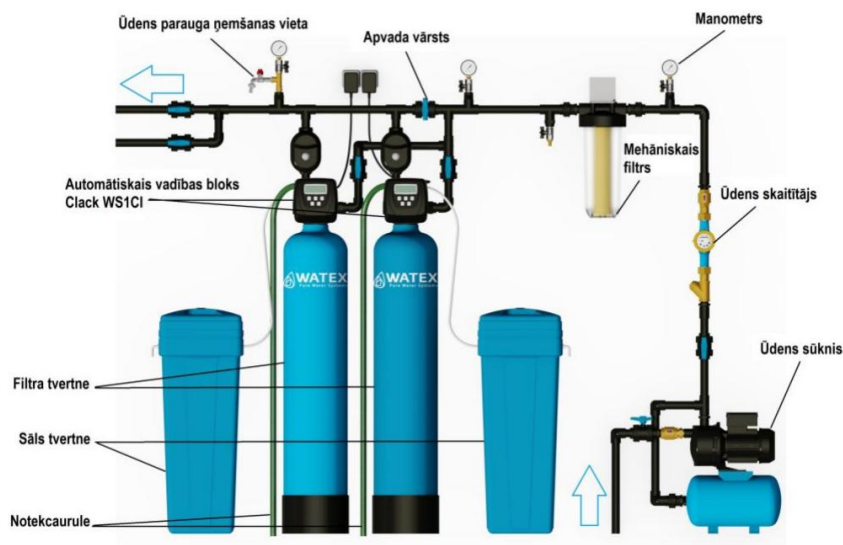
3.2. Water-supply connection

The inlet and outlet ports are on the rear side of each control valve and are identified by arrows. Viewed from the front, the outlet is on the right and the inlet on the left. The source specifies an internal water-connection thread of 1.5" or 2" for both inlet and outlet.

Use suitable fusion-welded, solvent-welded or threaded plastic pipe, flexible metal hose, or soldered brass pipe. Pipe material is secondary to proper support: the system must not carry the pipework.

For soldered pipe, complete and cool all soldering before connecting to plastic fittings. Prevent flux from contacting any part of the fitting.

CMS DUPLEX ÜDENS FILTRA IETEICAMĀ MONTĀŽAS SHĒMA



Install the equipment downstream of the pump, pressure vessel and pressure sensor. Provide a bypass valve as shown. During normal operation the bypass is closed and the inlet/outlet valves are open. For service, the bypass can supply untreated water directly.

Install sample taps and pressure gauges before and after the system to verify raw/treated water quality and pressure loss.

3.3. Drain connection

A drain connection is required for every regeneration. The drain carries away accumulated contaminants and the reagent used to restore the media. Use DN32–DN40 pressure pipe from the connection at the top of the control valve; the valve-side fitting is 3/4"–1 1/2" depending on valve and vessel size.

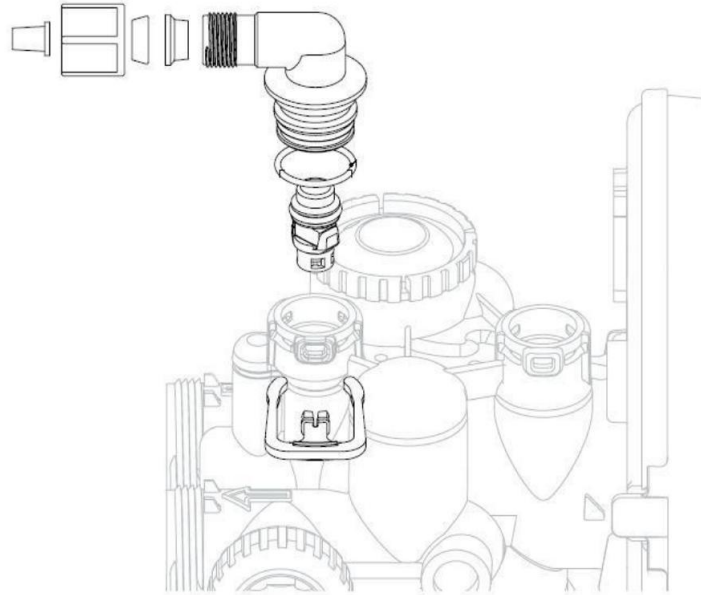
1. Pull out the retaining clip and remove the drain elbow.
2. Connect the pressure pipe to the external thread and route it to a gravity drain. The pressure-pipe length should not exceed 10 m.
3. Reinsert the drain elbow and return the clip to its locked position. The O-ring-sealed elbow can rotate through 270°.



IMPORTANT: the gravity drain must be at least DN63.

3.4. Brine-tank connection

The kit includes the brine tank and $\frac{3}{8}$ "– $\frac{1}{2}$ " connection tubing. Place the tank beside either filter column where it remains easy to reach for salt replenishment. The tank contains a shut-off float in a plastic well. Do not use packing material on these threads.



1. At the control valve, pull out the clip and remove the brine elbow.
2. Pass the tube through the nut.
3. Insert the cylindrical support into the tube end, followed by both rings in the specified order.
4. Push the tube fully into the elbow and tighten the nut by hand.
5. Insert the elbow and reinstall the clip. Its O-ring seal permits 270° rotation.
6. Pass the other tube end through the tank-side opening and connect it as in steps 2–4.

After connecting the water supply, drain and both brine tanks, add NaCl salt tablets to the brine tanks.

3.5. Electrical connection

Each filter is supplied with its own transformer for a 220 V supply. Power must be continuous and the transformers are for dry locations only. All work must comply with applicable local regulations. Provide a permanent outlet within 2 m of the filters. Each control valve also requires its own outlet solenoid connection.

1. Remove the front button panel from the control valve.
2. Release the centre retaining tab at the top of the electronic-board frame.
3. Route the transformer plug through the opening in the right side of the housing.
4. Connect it to the power socket at the lower-right of the board.
5. Route the cable behind the designated clips along the board frame.
6. Return the board frame to its retaining tab and lock it in place.
7. Refit the front button panel.

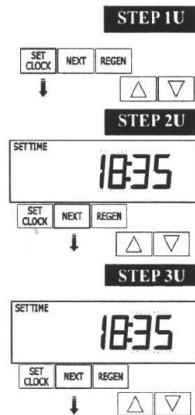


4. FIRST START-UP

The principal operating parameters of WATEX CMS DUPLEX systems are normally programmed at the service centre. At first start-up, set the current time, confirm that each brine tank contains salt, and follow the commissioning settings specified for the site.

4.1. Setting the clock

Reset the correct hours and minutes after a power interruption. All other programmed information remains in memory.



1. Press SET CLOCK.
2. Set the current hour with UP and DOWN.
3. Press NEXT and set the current minutes with UP and DOWN.
4. Press NEXT to save and return to normal operation. The displayed time stops flashing.

4.2. Setting cycle durations and capacity

Press and hold NEXT and DOWN together for 3 seconds, then step through the settings with NEXT.

1. SOFTENING flashes in the upper-left corner.
2. BACKWASH appears; adjust its duration with UP/DOWN.
3. BRINE appears; adjust its duration with UP/DOWN.
4. RINSE appears; adjust its duration with UP/DOWN.
5. FILL appears; adjust its duration with UP/DOWN.
6. The capacity in m³ appears; adjust it with UP/DOWN. Continue pressing NEXT until the current time is displayed. Settings are saved automatically.

4.3. Setting regeneration interval and time

Press and hold NEXT and UP together for 3 seconds.

1. The value 14 flashes at lower right, meaning regeneration every 14 days. Set the required day interval with UP/DOWN and press NEXT.
2. The arrow and value 2 flash at lower left, meaning a 02:00 start. Set the desired hour with UP/DOWN, press NEXT, and set the minutes.
3. Press NEXT to save and return to normal operation.

4.4. Manual regeneration

To request regeneration at the programmed delayed time, press and release REGEN; REGEN TODAY flashes. Press REGEN again to cancel. To start immediately, hold REGEN for 3 seconds. Immediate regeneration cannot be cancelled. The display shows the current stage and the valve returns automatically to service when complete.

4.5. Operation monitoring

Press NEXT to alternate the normal displays: current time; days or volume remaining until regeneration; and current treated-water flow. On a DUPLEX pair, HOLD means that the other filter is regenerating and this valve is waiting while continuing to supply treated water.

5. MAINTENANCE SCOPE

The water softening system requires periodic maintenance. Maintenance is a paid service during and after the warranty period. The source specifies a standard interval of twice per year; depending on water quality, consumption and salt replenishment, the interval may vary from 6 to 24 months. Labour, parts and transport are quoted separately before service.

No.	Maintenance work
1.1.1	Check and adjust regeneration cycles
1.1.2	Check control-valve operation and sealing
1.1.3	Check pipe and fitting tightness; rectify leaks as required
1.1.4	Check and adjust brine draw and fill cycles
1.1.5	Replace the draw/fill injector if required
1.1.6	Clean and lubricate the control-valve drive
1.1.7	Clean the valve cylinder and piston with suitable softener-service chemicals, then lubricate
1.1.8	Check salt quantity and replenish if required
1.1.9	Clean the floats in both brine tanks
1.1.10	Top up filter media if required
1.2.1	Verify regeneration operation for both filters
1.3.2	Test treated-water hardness on site and other parameters when required
2	Transport and any replacement parts: quoted separately

6. PROBLEMS AND SOLUTIONS

Problem	Possible cause	Corrective action
1. Timer shows no time	a. Transformer disconnected b. No voltage at outlet c. Transformer faulty d. Electronic board faulty	a. Reconnect power b. Repair or use a live outlet c. Replace transformer d. Replace electronic board
2. Timer shows wrong time	a. Outlet was disconnected b. Power interruption c. Electronic board faulty	- a–b. Set the time again c. Replace electronic board
3. SOFTENING/FILTERING does not flash while water flows	a. Water bypasses the filter b. Meter disconnected c. Meter turbine jammed d. Meter faulty e. Electronic board faulty	a. Set bypass to service b. Connect meter to board c. Remove meter and clear obstruction d. Replace meter e. Replace board
4. Regeneration occurs at the wrong time	a. Power interruption b. Clock set incorrectly c. Regeneration time incorrect d. Immediate regeneration selected	- a–b. Set correct time c. Reset regeneration time d. Check regeneration-time option
5. Error 1001/E1, 1002/E2, 1003/E3 or 1004	E1: start position not detected. E2: unexpected stop. E3/1004: motor runs too long while seeking a cycle/start position. Other possible causes: recently serviced valve; jammed piston/spacer stack; excessive piston load; piston not at home; motor/wiring/drive fault; dirty or damaged drive label; drive bracket or board fitted incorrectly; defective board.	Hold NEXT and REGEN for 3 seconds, or disconnect/reconnect power to reset. Inspect piston, spacer stack, motor, wiring, drive and bracket. Clean or replace the defective part. Ensure the board is correctly seated. For any other code, contact Watex Estonia.

6. PROBLEMS AND SOLUTIONS

Problem	Possible cause	Corrective action
6. Valve stops during regeneration	a. Motor not running b. No outlet voltage c. Transformer faulty d. Electronic board faulty e. Drive/cover part faulty f. Piston retainer damaged g. Main or regeneration piston faulty	a. Replace motor b. Repair/use a live outlet c. Replace transformer d. Replace board e. Replace drive/cover part f. Replace retainer g. Replace affected piston
7. Valve will not regenerate automatically	a. Transformer disconnected b. No outlet voltage c. Drive/cover part faulty d. Electronic board faulty	a. Reconnect transformer b. Repair/use a live outlet c. Replace drive/cover part d. Replace board
8. Automatic regeneration fails, but REGEN works	a. Water bypasses filter b. Meter disconnected c. Turbine jammed d. Meter faulty e. Board faulty f. Setting error	a. Close bypass b. Connect meter c. Remove meter and clear obstruction d. Replace meter e. Replace board f. Check settings
9. Time flashes on and off	Power was absent for more than 2 hours; transformer or board plug was reconnected; or the valve was reset.	Set the clock again.