User's guide for the water treatment cabinet system

aquina

Water treatment systems with the Fleck 5600 Contro

Cabinet: **SMK**

WMK

WK Standard

WK De Luxe

WK Euro

Simple: **WG**

Dear customer,

you have just become an Aquina water treatment system user. In order for the system to work to your full satisfaction it is necessary to meet some basic requirements for installation and the initial activation according to this user's manual.

The equipment function description

These water treatment systems we are offering use the most common and proven method of water softening through ion exchange based on regeneration of salts.

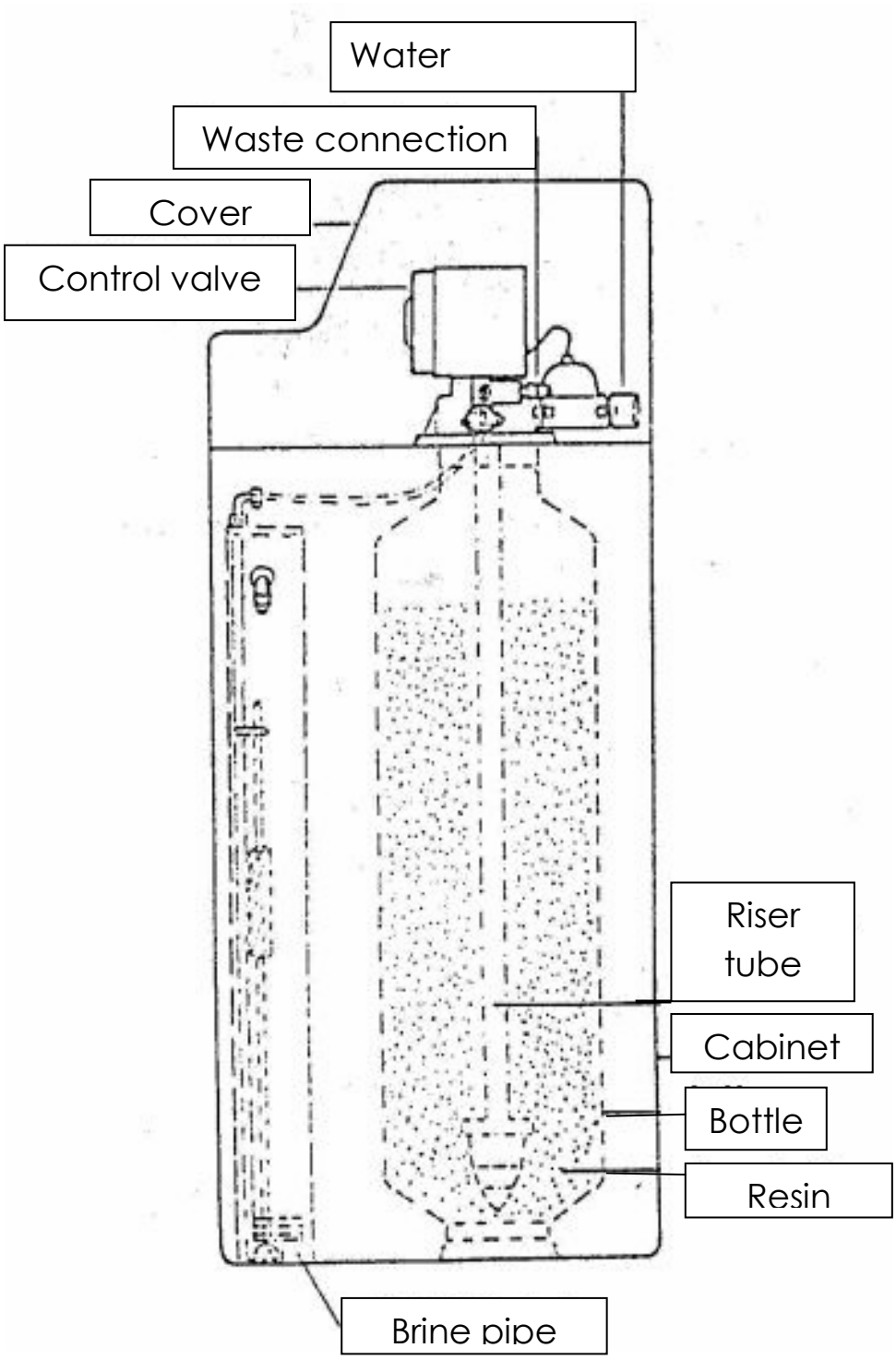
Ion Exchange Water Softening Plant works on this principle: The Ion-exchange resin contains a macro molecular organic polymer called cat-ion exchange resin. When hard water is passed through this resin, the Na ion replaces Ca++/Mg++ ion in the water and thus the water becomes soft. The exhausted resin can be regenerated using a concentrated solution of common salt. During this process all the unwanted Mg++ and Ca++ ions are replaced by Na+ ions and thus the resin becomes ready for the next cycle of operation.

The water softening process consists of these phases:

The water softening cycle:
Raw water flows through the control valve and the resin tank, where the ion exchange takes place as described above and then exits through the control valve as soft water back to the system.
The regeneration cycle:
The resin compound is flushed and recharged with brine solution. The individual (separate) equipment delivers raw untreated water during the regeneration; double (combined) equipment delivers treated water.
The regeneration cycle consists of the following phases:
Backwash
The resin compound is properly flushed with water. The resin is lifted and rinsed of all the material, which accumulated in it during the operation.
Salting
During this cycle brine solution is pumped into the resin tank from the brine tank. The ion exchange is taking place.
Rinsing
The Fleck control valve performs multiple brine flushes, which discharges all the excess salts. The resin tank is fully rinsed.
Brine flow
Raw water is pumped again into the brine tank in order to form a new brine solution for the next regeneration. After pumping is finished, the regeneration process is terminated as well. Since regeneration is a chemical process, we must allow at least 160 minutes for full regeneration of the resin compound. After this time period, the resin is back at 100% of its capacity.

The treatment system consists of these parts:

Fiberglass pressure tank (bottle)
The tank is filled with resin through which water constantly flows under pressure. This is a pressurized vessel, which discharges corrosion, or oxidation. Depending on its size, it has an upper, middle or lower opening with threading or a flange for attachment of a pipe or a control valve.
Control valve
This valve connects the treatment system to the water main. It is usually housed in a fiberglass pressurized tank. The valve controls the whole process including the regeneration or flushes. It can be set for a particular cycle. The valve has a jet system, which ensures optimal flow of water through the resin in the tank. The Fleck system discharges corrosion or oxidation. It is highly resistant against damage from mechanical dirt.
Resin
is the chemical substance through which the raw water is filtered and depending on the treatment method changes the chemical properties or composition of the outflowing water.
The brine tank
is a cylindrical plastic vessel, in which the regeneration solution is created. In this case it is a saline solution, which will serve as a resin regenerator after all the resin is used up. The brine tank is connected through the control valve to the water treatment system. It is placed separately (the WG type) or it is combined with the


Water
Waste connection
Cover
Control valve
Riser tube
Cabinet
Bottle
Resin
Brine pipe

Operating Conditions

In order for the water treatment system to function properly, it is necessary to follow these conditions:

- Temperature of the inflowing water may not exceed 40°C, unless otherwise noted.
- The inflowing water must be filtered through a functional mechanical filter.
- The filtered water must be under constant pressure ranging from 0.2 MPa to 0.6 MPa.
- Electrical current must be 220V/50Hz, unless otherwise noted.
- The system must have an unobstructed connection to the waste water system.
- Correct function is assured only under the condition that the brine tank is properly and regularly filled with salt (NaCl).
- The system must be installed on an even and solid surface.
- The treatment system may not be exposed to the impact of negative water pressure or hydraulic or hydro-pneumatic effects.
- The system must be installed in an area without presence of open fire or radiant heat.
- The system must be installed in area where no risk of the system‘s freezing exists.
- The system may be used solely for purposes defined by the supplier.
- All and any system alterations must be consulted with the supplier.
- It is prohibited to interfere with the control valve, including both the electrical and the mechanical parts.

Equipment installation

1. Place the system in the installation area. If you have a system WG 5600 with capacity above 120, the system is not assembled and you will need to follow subsequent instructions. If you have a smaller system, your equipment is fully assembled and you can go directly to point 7 - Installation.
2. Fill the fiberglass tank with resin. Make sure that you keep the workplace clean during filling, because the gel resin beads can make the floor very slippery. Remove all potential debris immediately.
3. Fill the tank with water all the way just below the rim.
4. Now push the riser tube with the lower distributor basket all the way to the bottom with slight pressure while simultaneously rotating the tube. Make sure the upper end of the tube is correctly centered towards the tank’s head.
5. Prepare the control valve for assembly. Place the upper brinewell cover and then the plastic basket onto the lower part of the valve where you see threading for attachment to the tank on the valve’s bronze body. Insert the basket into the well and drill through the side guiding openings holes into the basket’s body for plastic holding pins. Then affix the basket with these plastic pins. If the tops of the pins are sticking out, cut them off.

6. Now place the control valve on the tank. Clean the contact surface and the threading of the plastic bottle. Grab the control valve with one hand and with the other hand pull the riser tube from the fiberglass tank and connect them together while rotating both parts until the upper end of the pipe passes through the rubber O-ring in the neck of the valve. You will feel when these two parts are firmly connected. Now screw this assembled piece to the fiberglass tank and tighten it by hand. Do not use any tools. During the tightening one person should hold the tank to keep it in a fixed position and another person tightens the valve making sure not to damage the watermeter on the control valve.
7. The system is assembled.
8. Now connect the treatment system to the water main through the bronze connection. Please pay attention to the arrows on the casting. The arrow pointing down towards the control valve designates the raw water connection; the arrow pointing away from the valve is intended for the treated water outflow. Do not allow water inside the system.
9. The treatment system of the WG type, which has a separately positioned brine tank, has the connection done as follows. The connection is done with the PE tube included in the delivery to the point on the valve where a screw fitting is located on its side. Unscrew the fitting, guide the tube through it, attach the sealing ring with the cone and tighten the whole set. Apply the same steps for the outlet to the brine tank.
10. The next step in all the systems is the waste connection. This connection is in the rear part of the valve and has a plastic connector for a hose attachment and its fixation with a tape. The hose is not part of the supplied package.
11. Now built up pressure in the system by slowly turning the water faucet. After building up the pressure, check tightness of all connections. Tighten all loose connections you may find.
12. The last installation step is to connect the treatment system to the electric current by plugging it into a 220V/50Hz outlet. Make sure the cable is placed securely in the surrounding environment with no chance of being damaged or coming into contact with conductive elements. All electrical work must be performed in adherence to valid Czech government norms.
13. The system is now in a state of being under pressure and connected to electricity and the green control light on the panel should be on. If the light is red, disconnect the system from electrical grid and turn the main panel wheel clockwise to the basic position according to the picture. Then plug the system back to the electric grid.
14. Now you can adjust the installed system for operation.

Setting the treatment system control valve

In order for the water treatment system to work properly and to provide maximum output at minimum operational cost it is necessary to set the basic values in the control valve panel.

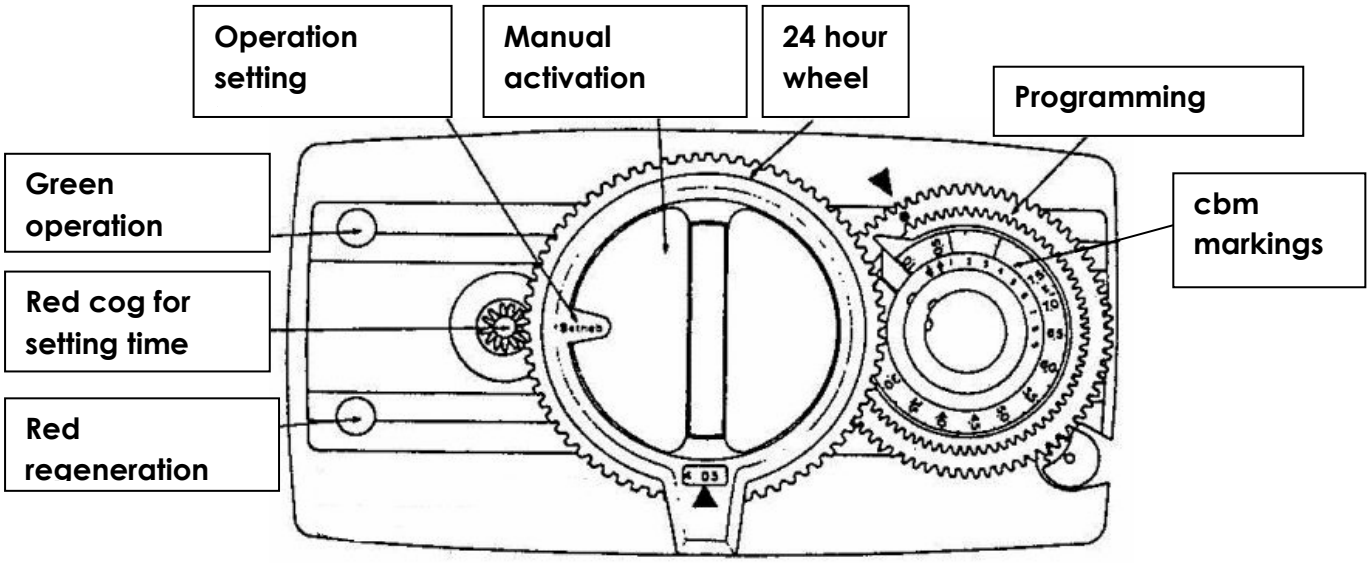
There are two basic types of settings depending on the particular control valve type. The setting can be done according to time or volume.

1. Setting the control valve for **volume control**

Daytime setting: Push the red pin and turn the time wheel until the time of day hits the arrow.

Setting the regeneration by hand: Turn the button clockwise until you reach the regeneration position.

Notice: This process is the same for the control valve in the immediate regeneration version. In that instance the current time setting, as described in point 1 and in the note for calculation in point 2, do not apply. All other steps in this process are as follows:



1. Push the red cog for setting the current time. This will release the time setting wheel. Turn this wheel until the little window at the bottom shows the current time at the arrow. Now release the red cog.

2. Set the cbm volume of water for regeneration. The programming wheel has a pronounced white dot. Grab the inner ring of the water cbm counter and pull it towards yourself. Now turn the counter until the desired cbm water volume for regeneration appears against the white dot on the programming wheel. Now release the ring, which will settle back to its original position. The volume of water for regeneration is determined in the following manner: We know the treatment system capacity (for instance 40) or we know the number of resin liters (number of liters times 4 = capacity, for example 10 l x 4 = capacity 40). We divide the capacity by water

hardness in °dH (e.g. 25). If we know the water hardness value in mmol/l, we use the conversion formula mmol x 5.6 = °dH. Round the result up to the nearest whole number upwards. Now you know the capacity and the water hardness in °dH. Now divide the capacity by the water hardness in °dH and round the result downward to an increment of 0.5. (Our result in our example is 40/ 25 = 1.5). Now lower this result (1.5) by 25% in order to compensate for regeneration output reserve at night. That means that in our example the value set against the white dot on the program wheel will be approximately 1.

Note: In case of the control valve with immediate regeneration the setting is done without the percentage lowering.

3. The valve is now set. Pour regeneration salt into the brine tank. Use the tablet type salt, which will prevent salt hardening and consequently prevent formation of the saline solution. In such case the treatment system would appear constantly fully exhausted even after regeneration had been performed.

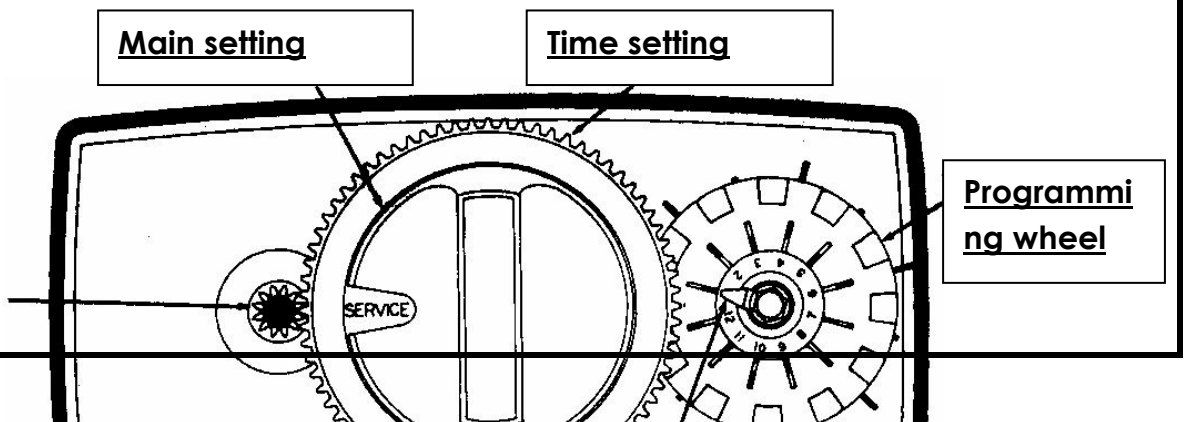
The minimum volume of salt in the brine tank is calculated as follows:

Divide capacity by 4 – this is the resin volume in liters. Multiply the resin volume in liters by 0.2 – this is the volume of salt in kg for one regeneration. In our example: Capacity 40/ 4 = 10 l of resin x 0.2 = 2 kg of salt for one regeneration. You can add more salt, so you don't have to add salt after each regeneration, but make sure that the volume of salt never exceeds one half of the tank's volume.

4. Now we will perform a manual check whether the treatment system works correctly. Grab the main setting wheel and turn it clockwise to the first stop position. (Turning the wheel in the wrong direction will damage the valve's mechanical properties.) The red control light on the panel will come on, which means the system is in the regeneration cycle. This first regeneration also serves as a check of correct filling of the brine tank with water. The regeneration duration is 3 hours. After the process is over, the green light on the panel comes on and the system is ready for water treatment.

5. If there is water in the brine tank and the green light is on, the control valve works properly and you can receive your first treated water.

2. Setting the control valve for **time control**



1. Push the red cog for setting the current time. This will release the time setting wheel. Turn this wheel until the little window at the bottom shows the current time at the arrow. Now release the red cog.

2. Set number of days until regeneration. The setting wheel has preset positions, which determine number of days till regenerations. The number of days is set in the following manner: We know the treatment system's capacity (for instance 40) or we know the number of resin liters (number of liters times 4 = capacity, for example 10 l x 4 = capacity 40). We divide the capacity by water hardness in °dH (e.g. 25). If we know the water hardness value in the mmol/l units, we use the conversion formula mmol x 5.6 = °dH. Round the result to the nearest whole number upwards. Now we know the daily consumption (e.g. 0.5 l per day). We also know the capacity and water hardness in °dH. Now divide the capacity by the water hardness in °dH and round the result downward to an increment of 0.5. (Our result in our example is 40/ 25 = 1.5). Now lower this result (1.5) by 25% in order to compensate for regeneration output reserve at night. This value is about 1.1. Since the daily consumption is 0.5 cbm, we divide 1.1 by 0.5 = 2.2. After rounding downwards, the number on the programming wheel should be 2 – this is the number of days until regeneration. The programming wheel is set as follows: Push all the pins towards the wheel's center. Then pull out pins number 2, 4, 6, 8, 10 and 12 outwards. This sets every other day for the regeneration. If you want the system to regenerate every day, pull out all the pins. If you want the system to regenerate every third day, pull out multiples of three and so forth.

3. The valve is now set. Pour regeneration salt into the brine tank. Use the tablet type salt, which will prevent salt hardening and consequently prevent formation of the saline solution. In such case the treatment system would appear constantly fully exhausted even after regeneration was performed.

The minimum volume of salt in the brine tank is calculated as follows:

Divide capacity by 4 – this is the resin volume in liters. Multiply the resin volume in liters by 0.2 – this is the volume of salt in kg for a single regeneration. In our example:

Capacity 40/ 4 = 10 l of resin x 0.2 = 2 kg of salt for a single regeneration. You can add more salt, so you don't have to add salt after each regeneration, but make sure that the volume of salt never exceed one half of the tank's volume.

4. Now we will perform a manual check whether the treatment system works correctly. Grab the main setting wheel and turn it clockwise to the first stop position. (Turning in the wrong direction will damage the valve's mechanical properties.) The red control light on the panel will come on, which means the system is in the regeneration cycle. This first regeneration serves as a check of correct filling of the brine tank with water. The regeneration duration is 3 hours. After the process is over, the green light on the panel comes on and the system is ready for water treatment.

5. If there is water in the brine tank and the green light is on, the control valve works properly and you can receive your first treated water.

The Warranty Certificate for the Aquina water treatment system

Type of the installed system:

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Control valve serial number:

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System capacity measured in °dH:

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Hardness of inflow water in °dH:

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Regeneration set to: a) cbm to reg.: …… b) days to reg.: ……

Location of installation: Firm's Name:

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Address:

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Activation date and user's training:

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Installation and setting done by: Firm's Name:

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Address:

……

Signed, stamped:

……

Person trained: Name:

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Signature:

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This Warranty Certificate must be fully and legibly completed. Failure to do so voids the Warranty.

This merchandize is under warranty for 12 months from the date of purchase. Other conditions are governed by the Civil and Commercial Codes.

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