

**MOUNTING
AND MAINTENANCE GUIDE
FOR
FT/FTV 40-300
SOFTENING PLANT**

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2. DESCRIPTION

2.1 Application

HOH's automatic softening filter type FT/FTV is primarily designed for installation at industries, municipal waterworks, and residential areas etc. that make high demands on effective, reliable and economical softening.

2.2 Generally

HOH's automatic softening filter type FT/FTV is used in systems where, for various reasons, there is a requirement for demineralised, softened water.

HOH's automatic softening filters type FT/FTV are either time-controlled or waterquantity-controlled.

FT is a time-controlled softening system where regeneration takes place at night.

FTV is a water quantity-controlled softening system where regeneration takes place when a preset amount of water has passed the filter.

The plant consists of an individually mounted filter tank produced of fibreglass-reinforced polyester for a maximum work pressure of 1.0 MPa (10 bar).

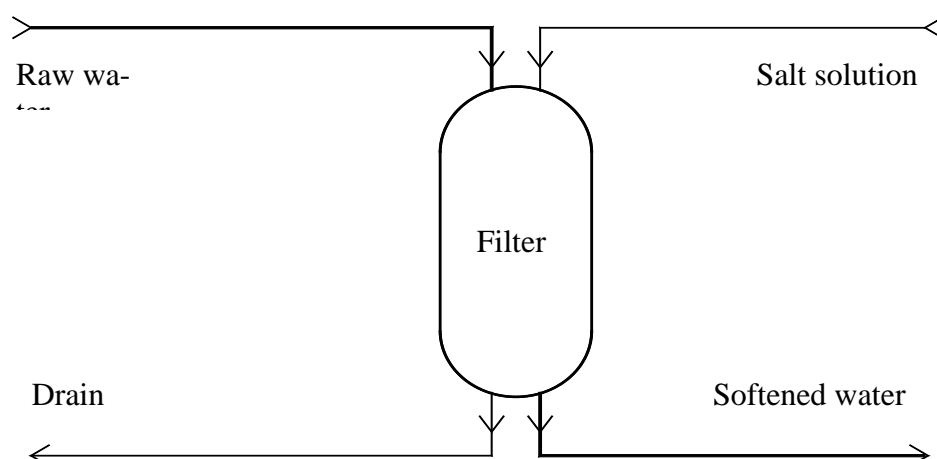
The multiport valve is made of cast bronze and has built-in backwash control, ejector and rinsing equipment. System FT supplies hard water during regeneration. On system FTV an external bypass valve, which opens up if you need water during regeneration, will have to be installed.

The regeneration intervals depend on the raw-water quality, consumption and the size of the filter, and adjustment is done individually on each plant. All automatics are placed in the control unit which is fitted on the filter tank.

Since refilling of water on the salt tank is time-controlled, the entire tank can – in principle – be used as salt stockpile.

The plant needs no continuous attendance apart from refilling of salt into the salt tank.

Basic flow is shown by figure 1.



3. INSTALLATION GUIDE

3.1 Conditions

If the regeneration automatics of the plant are to function within the working area of the filter, an incoming water pressure of minimum 0.2 MPa (2 bar) is required.

The pressure of the inlet water must not exceed 1.0 MPa (10 bar). Should this be the case, then a pressure reducing valve must be installed in the inlet pipe.

The temperature of the incoming water must not exceed + 35°C. Furthermore, the plant naturally must be installed in non-freezing surroundings.

In case of a too high iron content, the softening plant may become damaged, which implies that the resin inside the filter tank becomes ineffective and finally ceases to function. Manganiferous water causes like problems.

You should always consult your filter supplier about such problems.

Always place the softening filter near a floor drain.

3.2 Included components

Prior to installation – check that following components have been supplied:

FT 40-300

See figure FT40-120 page 6.

- **1 no. filter tank (A).**
- **1 no. multiport valve (B)**
- **1 no. salt tank with suction hose/filling hose**
- **1 no. transformer**
- **1 no. instruction**
- **1 no. outlet hose (not for FT 200-300)**
- **1 no. testing equipment for residual hardness in outflowing clean water.**
- **Ion exchange resin**

FTV 40-300

See also figures 3a and 3b respectively, page 6.

- **1 no. filter tank (A).**
- **1 no. multiport valve (B).**
- **1 no. pipe with water meter (C).**

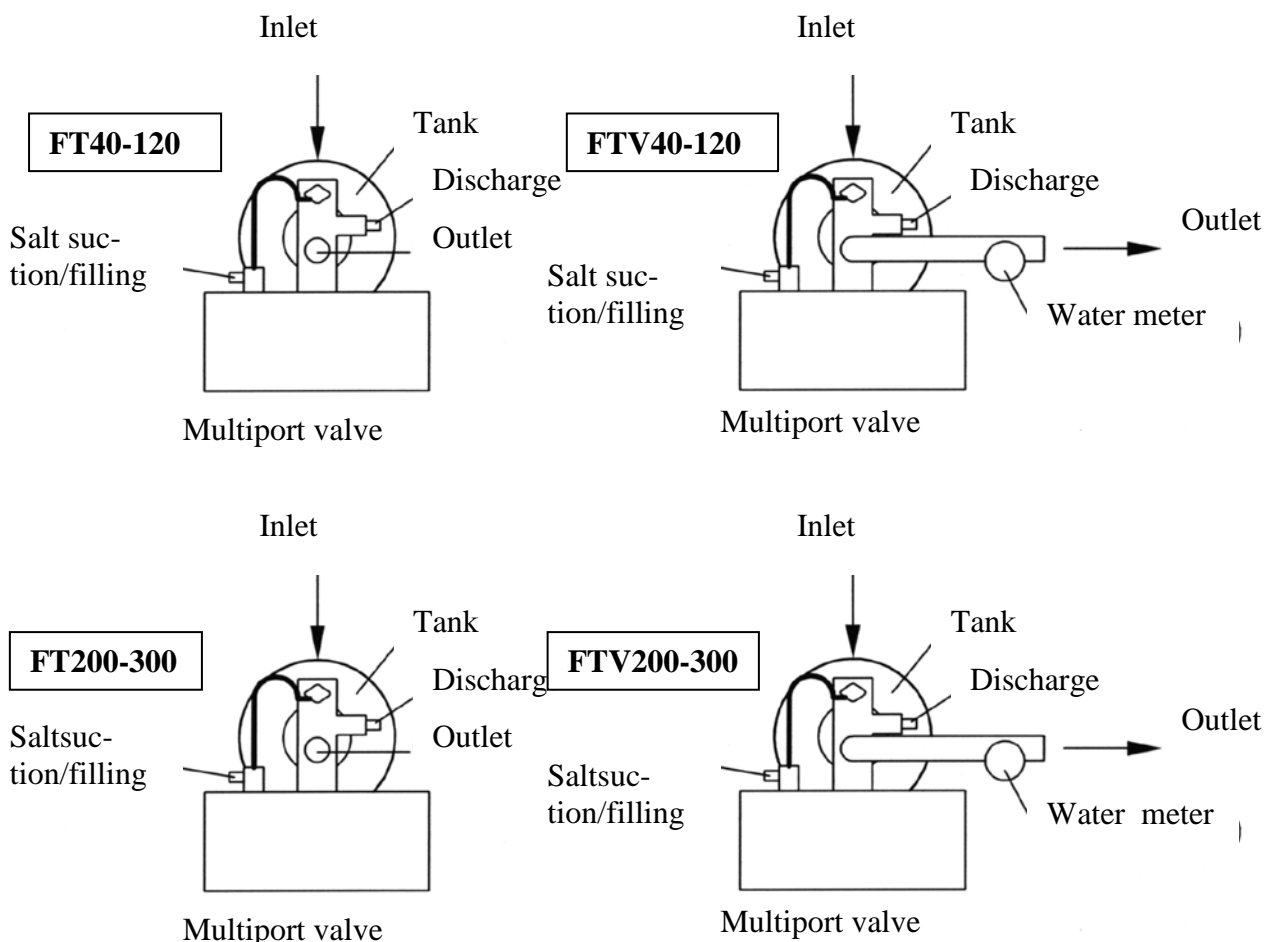
- **1 no. salt tank with suction hose/filling hose.**
- **1 no. transformer.**
- **1 no. instruction manual.**
- **1 no. outlet hose (not for FTV 200-300)**
- **1 no. testing equipment for check-up of residual hardness in outgoing clean water.**
- **Ion exchange resin**

Filter FT/FTV 40 is filled with resin prior to delivery.

Filter FT/FTV 75-300 has not been filled with resin prior to delivery. Check that the respective resin amounts have been supplied, see Technical specifications.

4. INSTALLATION

1. Place the filter tank on the intended location and on a level foundation.
2. Unscrew the multiport valve. The branch pipe follows along and can be loosened by pulling it apart (retighten with an O-ring). Reinstall the pipe in the tank. Protect the opening e.g. with insulating tape or similar. Fill in resin – a funnel facilitates the filling. Clean the thread of the tank and the branch pipe and remove the pipe sealing (insulating tape or similar). Fill in water with an external pipe in order to eliminate air hammering at commissioning. Refit the multiport valve on the branch pipe. Check that the branch pipe is centered in the tank and screw on the multiport valve on the tank.
3. Mount the brine suction/filling hose between valve and salt tank.
4. Lead the outlet hose to drain.
5. Then connect the filter to the required valves and possible bypass valve to in- and outlet pipe from the water meter.



Connections	FT/FTV 40 -120	FT/FTV 200-300
Inlet	1"	1¹/₂"
Outlet	1"	1¹/₂"
Discharge	1/2"	3/4"

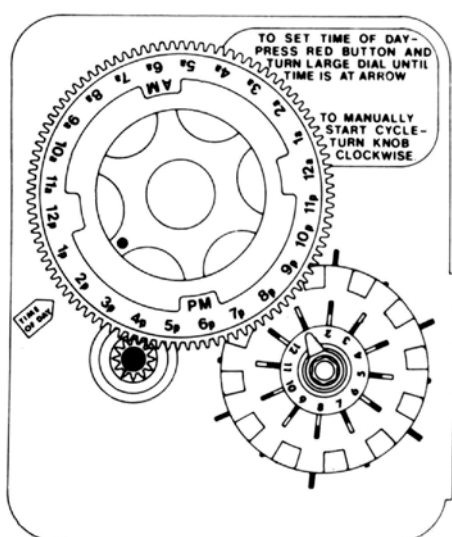
5. COMMISSIONING OF PLANT

5.1 Description of the multiport valve

Under the cover of the multiport valve the control unit is found, i.e. all the equipment which makes it possible to set and adjust the values which apply to the softening plant in question.

For softening filter type FT/FTV there are two types of program work, dependent on how the regeneration shall take place. Regardless which program work is used, it is placed to the right under the cover of the control unit.

5.2 Program work 3200



Program work 3200 (See figure 4) sits on model **FT** and initiates regeneration in accordance with a preset time interval. Regeneration takes place at night.

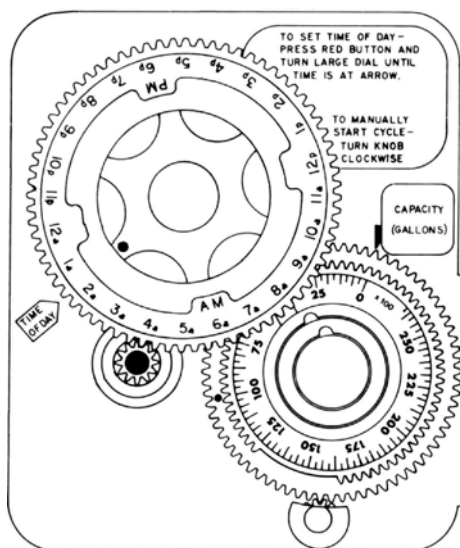
On the week dial you set regeneration interval, i.e. which days during the week you wish the filter to regenerate.

Turn the dial clockwise until current day of the week is centered in front of the red indicator. The different pins shall be pulled out for the days of the week you wish regeneration.

On the day dial you adjust current time of day. The dial is released by pressing in the red drive. Turn

the dial so that the correct time of day appears right in front of the arrow "time of day".

With the dial for manual regeneration you can start a regeneration sequence manually. Turn clockwise until a click is heard. The sequence starts and the dial automatically returns to starting position after approx. three hours.



5.3 Program work 3210

Program work 3210 (See figure 5) sits on model **FTV** and initiates regeneration after a preset amount of water has passed the filter 02.00 a.m.

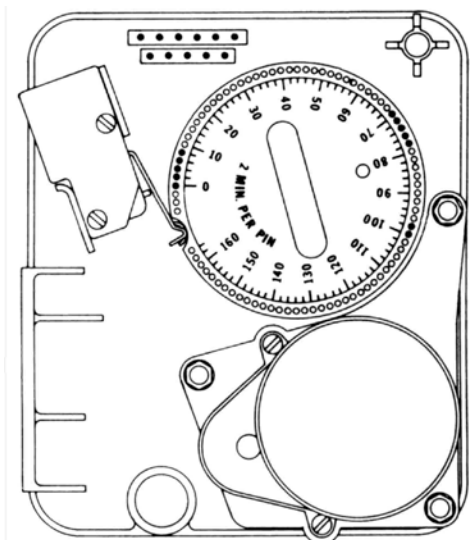
On the volume dial the capacity is adjusted, i.e. m³ water between regenerations. Lift the outside dial and turn until number of m³ appears right in front of the white point on the inner dial. The dial is reset when the white point is centered in front of the white arrow.

On the dial for manual regeneration you can start a regeneration sequence manually. Turn the dial clockwise until a click is heard.

Now the sequence starts and the dial automatically returns to service position when the sequence is finished.

5.4 Program Dial

Independent of which program is used, on the inside there is a program dial (See figur 6) which regulates the time during the regeneration sequence.



For model FTV:

Before the program work is opened, disconnect the driving wire from the water meter (leave the wire sitting on the program work).

By reprogramming of the times, loosen the program dial by pressing the dowels towards the middle and lift out the dial. Be careful with the arms of the change-over switches.

NOTE! The pin is stuck.

Use a gripper and instrument hammer.

5.5 Commissioning

Clean and rinse the connection branch pipes with clean water. Close the valves for inlet and outlet branch pipes. Maybe set the by-pass valve in by-pass position.

Tighten the control valve. Check that the program work is in service (operating position), i.e. the white dot on cogwheel for "manual regeneration" is centred on the arrow "Time of day".

If this is not the case, turn the cogwheel for "manual regeneration" slowly clockwise until the valve motor starts. Let the valve motor finish working until the next turn is made.

Continue in the same way until the cylinder units are in their correct positions.

Turn the cogwheel "manual regeneration" slowly until the valve motor starts and stops in next position which is "backwash". Cut the power to the control unit. Slowly open the valve for incoming water. Now the filter tanks begins to get filled with water. Continue with this until the outlet flow is clear and without air bubbles. Then close the connecting valve.

Turn on the power to the control valve and turn the cogwheel "manual regeneration" in stages until the culinder units are in position "brinefill". Immediately open the valve for inlet water and leave the power on.

The salt tank is now being filled with water. Let the automatics finish the filling. Measure the amount of water. Dependent on type of filter, the salt tank must be filled with approx. same amount of water as calculated in accordance with "salt solution/regeneration" see technical

data. Adjust the setting in acc. with paragraph "Adjustment of program work" if the amount is fundamentally different.

Fill in additional 10 cm of water with a hose or similar.

Now fill up the salt tank with salt (as tablets) intended for softening filters. In order to maintain a saturated brine solution there must always be visible, undissolved salt tablets in the tank. At a suitable interval, salt must be refilled when the water surface begins to become visible, 10 cm min/salt level.

Check the adjustments in the program work. Adjust day and week dial in accordance with actual time. **For FTV: Re-connect the driving wire to the water meter.** Fit the cover on the control unit. (Now the unit must have continuous voltage.) Open the connecting valve for outlet water. Close possible by-pass valve.

Now the plant is operating.

System FT supplies softened water until a pulled out pin (week day) on the week dial gives a signal, by which regeneration is started. System FT has an internal by-pass valve which opens during regeneration and supplies unsoftened water.

In system FTV softened water is supplied until an amount as preset on the volume dial is obtained, by which regeneration is started. System FTV has no internal by-pass valve. If water is required during regeneration, then an external by-pass valve can be ordered as accessory equipment.

6. ADJUSTMENT OF PROGRAM WORK

Softening filter type FT/FTV is standard-programmed prior to delivery and equipped for commonly occurring conditions. Local conditions, however, may deviate considerably from standard-qualifications, and that is why it may be necessary to carry out an adjustment of the program work on site.

6.1 Capacity

The capacity of the softening plant (regeneration interval) mainly depends on the total hardness ($^{\circ}\text{dH}$) of the raw water.

As standard the filters are pre-adjusted at a salt consumption of approx. 120 gram NaCl per litre ion exchange resin. This amount gives the most economical index capacity. If the salt amount is doubled, the capacity will only increase by approx. 25%.

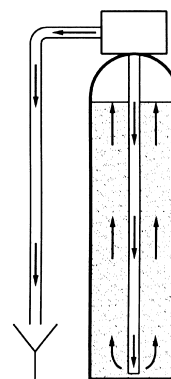
6.2 Regeneration program

When a preset interval on the week dial or a preset amount on the volume dial has passed, the regeneration of the filter starts. System FT leads the raw water to outlet line. With FTV it is necessary to purchase an external by-pass valve in case you need water during regeneration.

The regeneration sequence is divided into various phases, which have been adapted in duration so that the most efficient and economical recharging of the filter is obtained.

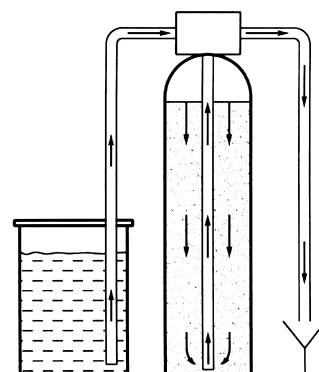
6.2.1 Backwash

Means that the water flow inside the filter tank is reversed and streams from the bottom through the resin and out through the tank top to drain. The purpose of this is to loosen the resin and rinse out possible smudge deposits. The flow is adapted by means of a flow control in the outlet line, so that the flow velocity is adequate to lift (expand) the resin mass by approx. 50 %.



6.2.2 Brine & Rinse

Means that the brine solution is led in from the top, through the resin and out through the bottom diffuser to drain. The brine solution is sucked in by means of an ejector which is adapted to let the calculated amount be fed in less than approx. 20 minutes. After that the displacement sequence is started. During this sequence, the resin is carefully flowed through by a water amount corresponding to approx. one resin bed. This is done to give the resin longer contact time with the salt and consequently better output.



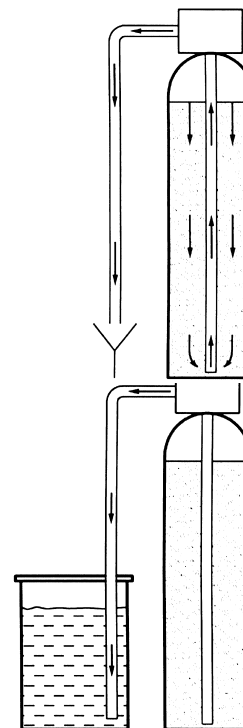
6.2.3 Rapid rinse

Includes rinsing of the resin for surplus salt. The water is led in from the top, through the resin and out through the distribution pipe to drain. The rapid-rinse time is adjusted to let water corresponding to 2 resin beds pass the resin after finished rinse. Should the water still contain residual salt after the rapid rinse, then the rinsing time will be prolonged.

6.2.4 Brinefill

Is done by filling up the salt tank with an amount of water corresponding to the amount of brine solution that the filter in question requires. A flow control in the line means that the water is relatively insusceptible towards changes of pressure, and consequently the water amount can easily be determined by adjusting the filling time

On delivery the filters are equipped with regeneration program in accordance with below diagram.



Regeneration phase	Type	FT/FTV	FT/FTV	FT/FTV	FT/FTV	FT/FTV
		40	75	120	200	300
Backwash						
Number of pins/minutes		3/6	3/6	3/6	3/6	3/6
Brine & Rinse						
Number of holes/minutes		26/52	26/52	26/52	32/64	48/96
Rapid rinse						
Number of pins/minutes		6/12	6/12	8/16	8/16	10/20
Brine fill						
Number of holes/minutes		4/8	5/10	6/12	10/20	14/28
Termination						
Number of pins/minutes		2/4	2/4	2/4	2/4	2/4

Adjustment is made on the program dial (see figure 6). If required by local regulations, the regeneration sequences can be extended or reduced as needed.

Each pin or hole corresponds to 2 minutes.

The program dial for e.g. FTV-40 looks as follows:

Rapid rinse starts at 0 minutes with 3 pins = 6 minutes

Then follows Brine & Rinse with 26 holes = 52 minutes

Then comes Rapid rinse with 6 pins = 12 minutes
 Finally there is Brine Fill with 4 holes = 8 minutes
 Always finish with 2 pins

NOTE! It is very important to always end final sequence with two pins.

The program dial continues to rotate until the contact lever of the inner micro switch falls into the groove on the dial.

Adjustment of program after commissioning (to be completed)

Backwash min.
 Brine fill min.
 Rapid rinse min.
 Filling of brine tank..... min.

6.3 Regeneration frequency

Dependent on the hardness of the raw water, the regeneration frequency must be adjusted in accordance with below example:

Example:

Type of filter: FTV-40
 Hardness of the raw water: 12.4 °dH

Under "Technical specifications" it appears that FTV-40 has an index capacity of 124 m³ at 1°dH. This means that the index capacity in this example will be:

$$\frac{124}{12.4} = 10 [m^3]$$

If the regeneration is to take place at the correct time of day, then the program dial must be adjusted at 10 m³ in accordance with the result in above-mentioned example.

7. PERIODIC INSPECTION

Every week:

- Check the salt tank. Fill in salt tablets when needed.
- Take out water samples of the outlet water. The samples shall be drawn with accompanying test equipment in accordance with separate instruction.
- Enter the values in the log book.

Every month:

- Monitor a regenerations sequence.
- Check times and flow in acc. with preset programming
- Taste the water at the end of the rapid-rinse sequence. The water must not taste salty. Check that the salt tank is filled with water to the correct level.

Every half year:

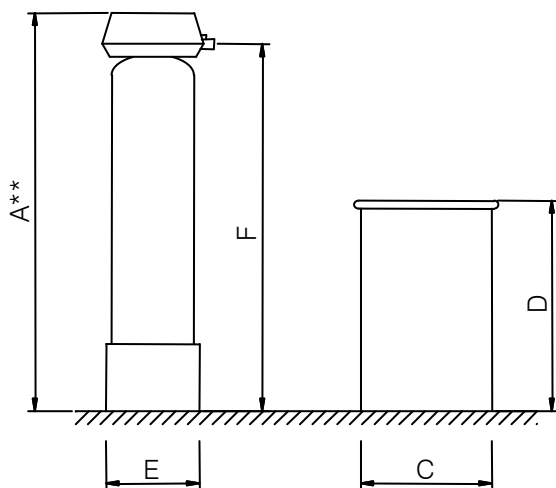
- Empty and clean the salt tank.
- Disassemble and clean the salt valve and overflow protection
- Clean strainer and flow control in the brine line (placed in salt cylinder in the multi-port valve).
- Clean ejector unit and strainer (placed in ejector housing of plastic).
- Clean and wipe off the filter tank and control unit
- Lubricate valve spindles with vaseline.

8. TROUBLE SHOOTING

PROBLEM		POSSIBLE CAUSE	POSSIBLE REMEDY
1	The filter does not re-generate	No power to control unit Counter out of order	Check fuses, cable connections, contact plug Check water meter and wire, and that the gear teeth of the work engage. If the volume dial has moved to final bearing, reset.
2	Hard water	Bypass valve open No/too little salt in brine tank Ejector clogged Too little brine Leak in the brine hose Internal leak in the multiport valve	Close the valve Fill in salt tables Disassemble and clean ejector and strainer Check the filling valve. Disassemble and clean the flow control Check and tighten hose connections Disassemble the valve. Clean and replace sealing and gaskets
3	Too high level in the brine tank	Filling time is incorrectly adjusted The brine line is clogged Flow control in drain pipe is clogged	Check program dial Disassemble and clean ejector, strainer, overflow protection or brine valve Disassemble and clean the flow control
4	Resin in the drain pipe	Top or bottom disperser is damaged and the backwash flow is too high or there is air in the system	Disassemble filter. Replace top disperser. Check flow control in the drain pipe. Check reason for air in the system
5	Regeneration does not terminate	Micro switch is broken	Replace faulty micro switch
6	Continuous flow to drain	Control unit is set wrongly Filth in the multiport valve Internal leak in multiport valve	Reset volume dial. Reset to operating position manually Let the valve run some periods manually and see if that helps. If not, disassemble the valve and clean it Disassemble multiport valve. Replace sealings and gaskets.

9. TECHNICAL DATA

Filter type FT/FTV Type	Unit	40	75	120	200	300
Capacity by pressure drop of 1.0-1.2 bar	[m ³ /h]	3.0	5.1	6.0	9.9	10.5
Index capacity/reg. at a hardness of 1°dH	[m ³]	124	232	387	620	930
Salt intake/-regeneration	[kg]	4.8	9	15	24	36
Brine/regeneration	[l]	25	45	75	120	180
Flow to drain during regeneration, approx.**	[l/min]	15	30	40	45	45
Resin amount	[l]	40	75	125	200	300
Height of filter, total (A)***	[mm]	1350	1550	1850	1800	2030
Diameter brine tank (C)	[mm]	550	550	760	760	900
Height brine tank (D)	[mm]	1030	1030	1030	1130	1130
Diameter filter (E)	[mm]	260	330	410	550	620
Connection height (F)	[mm]	1160	1410	1730	1670	1910



Min. operating pressure during regeneration 0.2 MPa (2 bar).

NB Necessary headway over the filter min. 500 mm.

We reserve the right to make constructional changes.