



Household Softener  
DENVER PLUS PLUS  
**Owner's Manual, Installation  
and Maintenance**



## MAIN SPECIFICATIONS



### Electronic Timer.

Allows to control all parameters



### Regenerations

Delayed or immediate/ programming.



### Mixing Valve

Allows to regulate the residual hardness



### Integrated by-pass

Allows to isolate the system from installation



### Transformer

Outside.



### Easy tank salt filling

Special for Softeners



### Multilingual Timmer:

English / French / Spanish



### Certified

Official product



KEEP THIS MANUAL THAT INCLUDES THE SERVICE BOOK AND THE GUARANTEE SECTION.  
IT WILL PROVIDE YOU A BETTER POST-SALE SERVICE.

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### 1. PRESENTATION



The water treatment equipment that you have bought is a softener of last generation with one of the most advanced control heads in the market.

Denver Water Softeners have quickly positioned themselves as an international model in terms of household water softening systems, both for its proven quality and smart design as for its easy and intuitive operation.

By closely anticipating to the market's requirements, PURI-COM EUROPE launches the evolution of the Denver range: Denver Plus.

This is a system which combines the properties and advantages of the classic Denver with a more efficient water and salt consumption, thus contributing both to the protection of our environment and the household economy.

Your softener DENVER PLUS PLUS range will provide you and your family the following advantages.

#### BENEFITS AND ADVANTAGES:

Reduce the hardness present in the water, causing the incrustations.

**ENERGETIC SAVING:** Avoid the future incrustations in the pipes and connections.

Great wellness sensation in the shower.

Soft and smooth skin.

Increases the life time of the electronic devices and heating systems.

**ECONOMIC SAVING:** Reduces the consumption of the soaps, softeners and chemical products.

Low cost of maintenance.

Automatic function, your only concern is to add salt to the tank storage from time to time.

**!** It is important that you keep and read this manual carefully before the installation and starting up of this equipment. If you have any doubt about the installation, use or maintenance of this equipment, please contact with the technical assistance service (T.A.S.) of your distributor.

### 1.1 Softener safety



Your safety and other's safety are very important. We have included safety messages in this manual and on your appliance. This is the safety alert symbol.



This symbol alerts you to the potential hazards that can be risky for you and for others.

All safety messages will follow the safety alert symbol or either the word "DANGER" or "WARNING".

#### APPLICATION IN THIS MANUAL



##### "DANGER"

You can be killed or seriously injured if you do not immediately follow instructions.



##### "WARNING"

All safety messages will inform you about the potential hazard, how to reduce the chance of injury and what can happen if the instructions are not followed.

### 1.2 Before starting



See 'Section 5' before installing the water softener. Carefully follow the instructions for the installation. (Warranty may be considered void, should the installation be faulty).

Before starting the installation, read this entire manual. Afterwards, obtain all the necessary materials and tools for the installation.

Check the local plumbing installation and the electrical legislation.

All installations must be done according to the law in force in each region or country.

Be careful when handling the softener. Do not turn it upside down, drop it, or or set it on sharp/cutting objects.

Do not install it outdoors, keep it away from direct sunlight and from other adverse weather conditions.

## 2. INTRODUCTION



The DENVER PLUS PLUS softeners equipments will avoid you all kind of problems caused by the hardness of the water and will reduce a lot the maintenance requested by your electro-nical devices. They will have a longer life.

These systems come with a residual hardness regulator as standard, which allows selecting the appropriate hardness for your home.

Its user-friendly electronic programmer will allow you to put the system into operation in an easy and fast manner.

### 2.1 What is hardness?



By hardness we understand the quantity of the encrusted salts present in the water, formed mainly by sales of low solubility in calcium and magnesium. Salts causing the hardness are mainly:

Calcium bicarbonate:	$\text{Ca}(\text{CO}_3\text{H})^2$
Calcium chloride:	$\text{CaCl}^2$
Calcium sulfate:	$\text{CaSO}^4$
Magnesium bicarbonate:	$\text{Mg}(\text{CO}_3\text{H})^2$
Magnesium chloride:	$\text{MgCl}^2$
Magnesium sulfate:	$\text{MgSO}^4$

These sales, because of their chemical features, tend to precipitate getting hard in pipes and blocking them because of accumulation. At the same time the hardness has a high tendency to be encrusted in the electrical resistance of heaters and to precipitate inside the heaters because the temperature rises. The combination of tough minerals and soap produces a soap curd or cutted soap. This curd soap reduces the cleaning action of the soap.

#### MAINLY PROBLEMS PROBLEMÁTICAS

Precipitation in pipes, accessories and equipments.

Precipitation in electrical resistances, increase of energetic consumption because of isolation.

More use of soap and chemical products.

Reduction of life time of the electro-nical devices and  
More need of maintenance.

All these problems are solved when using a softener DENVER PLUS PLUS range, because the water obtained after being treated with the system is absolutely free of encrusted salts.

In the most part of Europe the hardness is being expressed in hydrometric French grades, but there are other measurement units depending on the zone where we are located. Please see above the equivalents more usual

UNITS	ppm of $\text{CaCO}_3$	° French
1 ppm of Calcium	2,5	0,25
1 ppm of Magnesium	4,13	0,413
1 ppm de $\text{CaCO}_3$	1	0,1
1° French (°HF)	10	1
1° German (°d)	17,8	1,78
1° English (°e)	14,3	1,43
1 mmol/L	100	10
1 mval/L=eq/L	50	5

### 2.2 How is your system working



The water softening in your system is being done with an ionic exchange process. To do this we use ionic exchange resins that have the chemical capacity to capture the Calcium ions (Ca) and Magnesium (Mg), removing them from the water.

At the same time that the ions of calcium and magnesium are captured by the resin they liberate Sodium ions (Na), that with their chemical features create sales with a much higher solubility, avoiding the problems related to hardness.

Moreover when we soften the water we increase the sodium level of the same. You can find a wider explanation of this aspect in point 2.8.

#### IONIC EXCHANGE RESINS:

They are synthetic components, normally spheric and they have the capacity to capture the chemical particles present in the water, exchanging them by others. In the case of the softening we use hard cationic resins, made of styrene copolymers and divinylbenzene in sulfonated basis.

The exchange resin charge is located inside the vessel of the softener, attending an important part of volume of the same (between 60 and 75% depending on the model). It is compulsory that one part of the vessel remains free to allow a correct regeneration of the resin bed.

## 2. Introduction

During the treatment process the water gets through the multiway valve by the entrance connection, flows to the upper part of the softener through the distributor producing this way an ionic exchange inside the resin bed.

The treated water is collected by the distributor and driven through the inner tube through the vessel till the multiway valve. It is sent with the out connection till the main water pipe for consumption. In this point the system has a counter for treated water to be contabilized.

### 2.3 Regeneration of the system



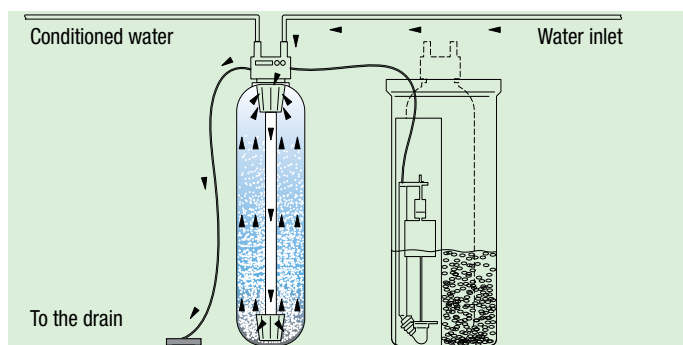
The quantity of calcium and magnesium ions that the resin may retain is limited; therefore, the water volume a water softener can treat is limited as well. The system must periodically carry out a process known as regeneration, which allows the resin to recharge with sodium ions, so it can continue softening water.

In DENVER PLUS PLUS systems the regeneration process starts automatically when the systems detects that the exchange capacity is going to finish, the timer incorporated in the system allows to configure in a different way the starting of the regeneration, please see section 6.3 in order to get more information about how the programme works.

The regeneration of a softener system is made of different parts, each with a concrete finality

#### BACKWASHING:

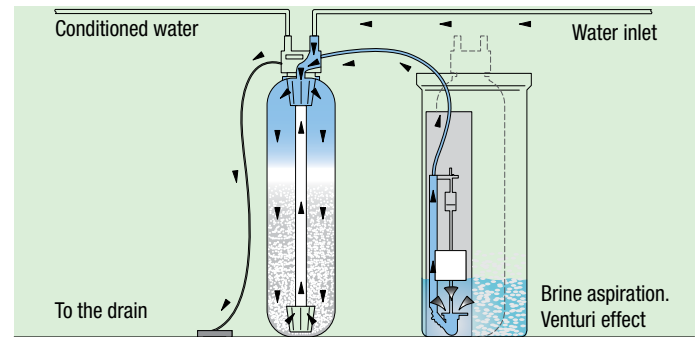
The water gets into the vessel through an inferior collector, making a washing and a flopping of the resin bed and allowing, this way, the following regeneration process.



#### BRINE ASPIRATION:

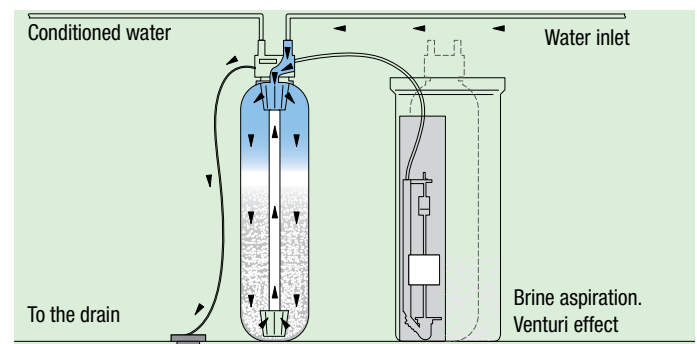
Through an aspiration process for venturi effect the system suctions the brine liquid solution previously prepared for the regenerating tank. This salt solution is introduced into the softening vessel getting in contact with the ionic exchange resin

and starting the regeneration.



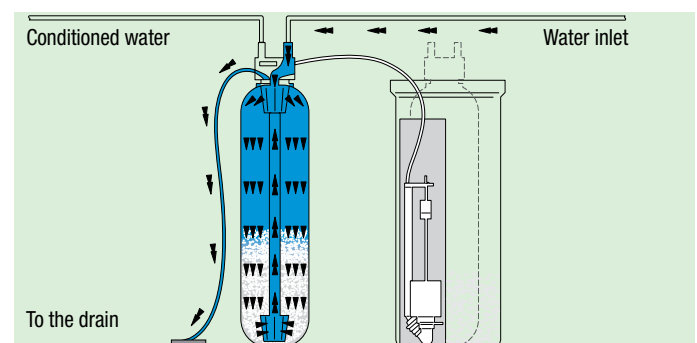
#### SLOW RINSE:

It refers to the movement in the resin bed of the salt solution previously aspirated, this way the contact of the salt with the resin is higher and the regeneration of the same is optimized.



#### FAST RINSE:

The water flows through the resin bed making a final wash of the same and ensuring the total removing of the salt that can be inside the vessel.



#### REFILLING THE BRINE TANK:

The volume of water goes automatically to the brine tank in order to prepare the necessary brine to be consumed in the next regeneration. This process is automatic, so normally it is not necessary to put more water in the brine tank (except during the starting up as shown in section 7).



**NOTE:** During the regeneration process the systems allows the passage of the non treated water in order to ensure the disponibilty of the water to be consumed.

## 2.4 Regeneration grade and capacity

The exchange capacity is the quantity of hardness that a particular resin volume can keep before getting useless. This value can be expressed like °HFxm<sup>3</sup>/liter of resin.

The higher the resin volume is the higher hardness can be kept by this resin before getting useless. This way it will be able to treat a higher quantity of water before starting regeneration. It is important to choose the system that better suits the concrete needs of each installation.

Depending on the quantity of sodium chloride used to regenerate each liter of resin the capacity of exchange can differ. Normally the DENVER PLUS PLUS systems are provided with a programmation with a regenerating grade of , 250grNaCl/ resin liter and an exchange capacity of 6,5°HFxm<sup>3</sup>/resin liter.

DENVER PLUS systems have three different regeneration degrees, depending on the conditions under which the system must operate, which are shown below:

Capacity	Salt/Regen.	Capacity	Max. Hardness
Small	1,8 Kg	115°HFxm <sup>3</sup>	35°HF
Medium	3,6 Kg	170°HFxm <sup>3</sup>	70°HF
Large	7,5 Kg	210°HFxm <sup>3</sup>	100°HF

## 2.5 Work volume



The softeners with ionic exchange should respect the suitable contact times between the water to be treated and the resin in order to ensure that the softening process is correctly carried out. For DENVER PLUS systems you should respect following work process:

Minimum volume (liters/hour): Resin volume x 4

Maximum volume (liters/hour): Resin volume x 40

In case of work volumes are out of the recommended ranges this can affect the correct work of the system (too high charge loss, harness leak...)

You can find more information about the minimum and maximum volumes for each type in the general characteristic board

## 2.6 Hardness leak

The ionic exchange process in which the softening water is based can be affected by different parameters that can reduce its efficacy creating a kind of hardness leak.

### HIGHER SODIUM CONCENTRATION IN THE TREATED WATER

The ionic exchange process in which the softening water is based can be affected by different parameters that can reduce its efficacy creating a kind of hardness leak.

### EXCESSIVE VOLUME

It can affect the exchange process

### REGENERATION GRADE

If there is no enough time, part of the hardness cannot be kept by the resin

## 2.7 Residual hardness

Depending on the application of the treated water it is necessary to have it completely softened or on the contrary it is better to have a certain amount of residual hardness. These systems have been designed to supply fully softened water, but the control valve integrates a residual hardness mixer, which allows for the regulation of the desired hardness degree in treated water (see 'Section 7').

## 2.8 Sodium increase

The majority of the sodium that we are daily consuming comes with the food and also with the preserved/canned food because the salt is an excellent preservative and it is used like additive for the prepared products.

### 3. Technical specifications

However, it is important to bear in mind, as we have said before, that the softeners equipments increase the sodium coccentration existing in the treated water (compared to the concentration of the same at the initial moment of water treatment).

The following board gives you an orientation about the increase of the sodium concentration in the treated water as per feed hardness:

FEED WATER Hardness (°HF)	ADDED SODIUM by SOFTENER (mgNa/liter)
10	43
15	65
25	108
30	130
35	152
40	173
45	195
50	217
60	260

### 3. TECHNICAL SPECIFICATIONS

Model	DENVER PLUS 12,5	DENVER PLUS 30
Code	762916	762917
Resin volume	12,50 Litros	30 Litros
Bottle	10x17	10x35
Working flow	0,50	1,20
Maximum flow	0,70	1,80
<b>Low capacity configuration</b>		
Salt/regeneration	0,80 Kg	1,80 Kg
Exchange capacity	31 °HFxm <sup>3</sup>	115 °HFxm <sup>3</sup>
<b>Medium capacity configuration</b>		
Salt/regeneration	1,50 Kg	3,60 Kg
Exchange capacity	48 °HFxm <sup>3</sup>	170 °HFxm <sup>3</sup>
<b>High capacity configuration</b>		
Salt/regeneration	1,92 Kg	7,50 Kg
Exchange capacity	55 °HFxm <sup>3</sup>	210 °HFxm <sup>3</sup>
<b>Dimensions</b>		
Height <b>A</b>	575	1034
Width <b>B</b>	333	333
Depth <b>C</b>	505	505

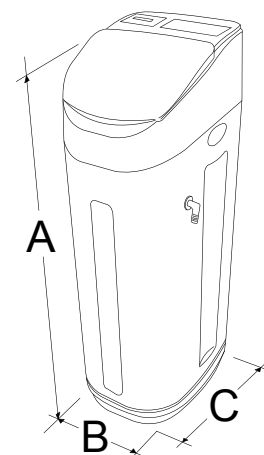
#### VOLUME OF TREATED WATER ACCORDING TO INLET HARDNESS

##### DENVER PLUS 12,5 LITROS · 762916

Hardness	Capacity <b>LOW</b> (31°HFxm <sup>3</sup> )	Capacity <b>MEDIUM</b> (48°HFxm <sup>3</sup> )	Capacity <b>HIGH</b> (55°HFxm <sup>3</sup> )
35°HF	0,90 m <sup>3</sup>	1,40 m <sup>3</sup>	1,60 m <sup>3</sup>
40°HF	0,75 m <sup>3</sup>	1,20 m <sup>3</sup>	1,40 m <sup>3</sup>
45°HF	0,68 m <sup>3</sup>	1,05 m <sup>3</sup>	1,20 m <sup>3</sup>
50°HF	0,62 m <sup>3</sup>	0,96 m <sup>3</sup>	1,10 m <sup>3</sup>
60°HF	0,51 m <sup>3</sup>	0,80 m <sup>3</sup>	0,90 m <sup>3</sup>

##### DENVER PLUS 30 LITROS · 762917

Hardness	Capacity <b>LOW</b> (115°HFxm <sup>3</sup> )	Capacity <b>MEDIUM</b> (170°HFxm <sup>3</sup> )	Capacity <b>HIGH</b> (210°HFxm <sup>3</sup> )
35°HF	3,30 m <sup>3</sup>	4,80 m <sup>3</sup>	6,00 m <sup>3</sup>
40°HF	2,90 m <sup>3</sup>	4,30 m <sup>3</sup>	5,30 m <sup>3</sup>
45°HF	2,50 m <sup>3</sup>	3,80 m <sup>3</sup>	4,70 m <sup>3</sup>
50°HF	2,30 m <sup>3</sup>	3,40 m <sup>3</sup>	4,20 m <sup>3</sup>
60°HF	1,90 m <sup>3</sup>	2,80 m <sup>3</sup>	3,50 m <sup>3</sup>





## 4. UNPACKAGING AND CONTENTS VERIFICATION

It is important that before installing and starting the system you check the box and conditions of the material received in order to ensure that the system has not been damaged during the transport

***Any claim for damages during the transport must be detailed together with the delivery note or invoice to the distributor, mentioning the name of the carrier within a maximum period of 24 hours after the goods reception.***

The DENVER PLUS softeners are provided completely assembled and have the following parts:

- Volumetric DENVER PLUS valve 850 : Automatic and made of Noryl. With isolating by-pass and mixing screw of residual hardness.
- Vessel containing the resins, made of polyester reinforced with glass fibre.
- Resin for the ionic exchange, cationic type, special for softening, provided inside the vessel.
- System DENVER PLUS, made of plastic, with salt capacity for multiple regenerations.
- Brine system aspiration protected with plastic funnel.
- Packaging and protection, including a pressurized air balloon to avoid the vessel movements.

Please read carefully this manual before starting installation.

how to dispose of your electrical and electronic systems once they have fulfilled their use, contact the local authorities for the management of urban waste or the shop where you bought the system.

The proper collection and treatment of the machines that can no longer be used contributes to the preservation of natural resources and also avoids the potential public health risks.



**The air balloon has to be removed before proceeding the system installation.**

The packaging material can be recycled and must be thrown away in the suitable recycling bins or to be delivered to the specific centre for the collection of waste material.

The system that you have bought has been designed and manufactured with high quality materials and components that can be recycled and re-used. This product cannot be thrown away into the usual urban rubbish. In case of wanting to throw away the system, it must be taken to a specific local centre for the recycling of materials, indicating that it has circuits, electrical and electronic components and also resin of ionic exchange. In order to obtain more information about

### 5. WARNINGS



**!** The water treatment equipments serie DENVER PLUS are not intended to be used to produce POTABLE WATER. Their function is to eliminate the hardness of the water obtaining a treated softened water that will avoid all problems related to hard water.

**!** If the treated water does not come from a public net or it is from an unknown source it will be necessary to carry out a physical-chemical and bacteriological test in order to ensure the correct potabilization as per techniques and systems needed (BEFORE the system is INSTALLED). Please contact your distributor and he will recommend you the most suitable treatment according to your needs.

### 5.1 Requirements for the proper working of the system



- Do not supply hot water ( $T > 36^{\circ}\text{C}$ ) to the system.
- The temperature must be between  $4^{\circ}\text{C}$  and  $45^{\circ}\text{C}$ .
- If possible the system must be installed in a dry environment, free of acid vapors. At the same time a proper ventilation must be insured.
- The minimum pressure should be of 2,5 bars, and if this is not possible you should install a pressurization system that allows to get a proper pressure.
- If the inlet pressure is higher than 5,5 bars you should install a pressure regulator
- Water to be treated must be properly filtered, therefore, it is recommended to install a pre-filter to guarantee the removal of suspended particles, which may be swept along by inlet water. It is recommended to use the self-cleaning filters of the FILTERMAX series, which include all necessary components.

**!** If a suitable filtered is not installed these suspended particles could block the holes and the inner injectors of the system and could affect the proper working of the same.

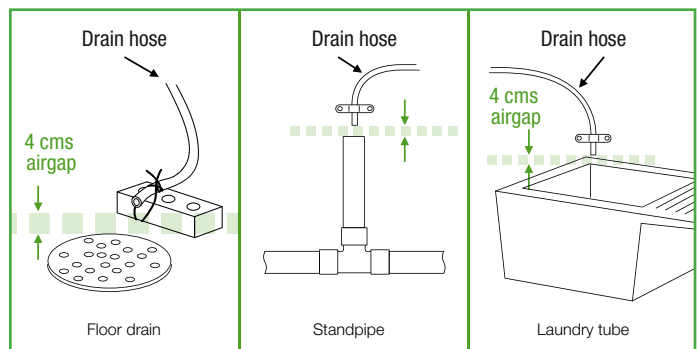
### 5.2 Installation



- To condition all water at home, install the water softener close to the water supply inlet, and before all other plumbing connections. Outside faucets should remain on hard water to avoid wasting conditioned water and salt. In any case and

considering the sodium increase in softened water, it is not recommended its use for watering because it can damage the growing of plants and vegetables.

- In case of having to prepare the place for the installation of the system you should follow the national laws in force regarding electric and hydraulic installations.
- A drain is needed for regeneration discharge water. The drain connection should be of free exit. The diameter of this connection should be of minimum 1". The maximum distance between the softener and the floor drain should be no more than 6 meters. A nearby drain is needed to carry away the regeneration discharge water. A floor drain, close to the water softener, is preferred. A laundry tub or a standpipe are other drain options.



- The location foreseen for its installation must have enough space for the system itself, its accessories, connections, and to carry out a proper maintenance.
- The system should not be installed next to a heat source or where it receives a direct flow of hot air.
- In no case you will install the systems in the open air.
- Do not locate the water softener where hot temperatures occur or near to a warm supply.
- Environment where the system is installed should have all the proper hygienic and sanitary conditions.
- All outside leakings over the system should be avoided: plumbings, drain...
- In case of softened water supplying a hot water or steam device, it will be necessary to install a checking valve between the softener and the water heater in order to avoid hot water returns that could damage the system.
- It is recommended to foresee the installation of the simple valves for the water to be treated and for the softened water near the softener.
- If there are quick closing valves in your installation it is recommended to use a non ram device.
- The softener works only on 12 volt- 50 hz electrical power supplied by a direct plug-in transformer included. Please use the transformer and connect it to a floor of 220 – 240 V, 50Hz.

At the same time you should be sure that the home installation is properly protected with a device like a switch or or a fuse.

- If the daily pressure is over 5.5 bars, nighttime pressure may exceed the maximum. Please install a reducing valve if needed. (A pressure reducing valve may reduce the flow). If your home is equipped with a back flow preventer, you should install an expansion tank in accordance with local legislation.
- It is also recommended to install a silicophosphate filter at the outside of the system, this way you will protect the installation from the corrosive tendency of the softened water.

### 5.3 Setting up and maintenance



- The system must be periodically sanitized. For more information see section 8.
- The system maintenance has to be carried out by qualified technical people and following the suitable hygienic conditions. (For more information please contact the technical service of your distributor).

## 6. INSTALLING PROCESS



DENVER PLUS installation process must be carried out by qualified technical people. Please follow the advises of section 5 and warnings of this manual.

*Taking into account that the system that you are going to install will improve the quality of the water that it is going to be consumed and that this is considered a food, all tools used for the assembling and installation should be clean and in no case can be contaminated nor impregnated of grease, oils or oxides. The job should be carried out with the proper attitude and hygienic conditions considering all necessary precautions with everything related to the materials that are going to be in contact with the treated/ to be consumed water (Please contact your distributor for more information).*

### 6.1 Tools and parts needed

Before starting the installation, please make sure you have all necessary tools. Read and follow the instructions included in 'Section 6.2'.

Screwdriver

Pliers

Tape measure

Flexible hose of ½".

#### If using soldered copper pipe

Tubbing cutter

Propane torch

Misc.copper pipe fittings

Lead-free solder and flux

Emery cloth

Sandpaper or steel wool

#### If using threaded pipe

Pipe cutter or hacksaw

Threading tool

Pipe joint compound

Misc.threaded pipe fittings

#### If using CPVC plastic

Pipe cutter

Hacksaw

Adjustable wrench

Glue for CPVC

Misc.CPVC pipe fittings

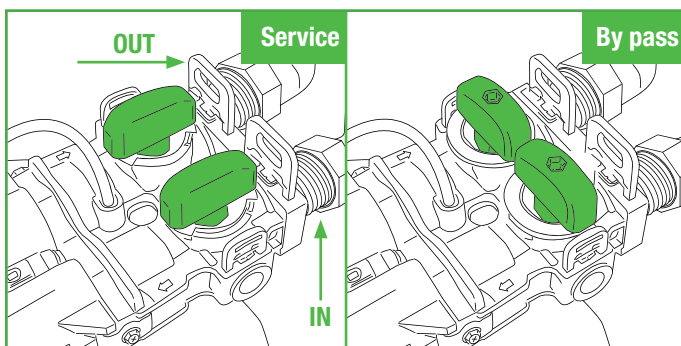
## 6. Installation

### If using other

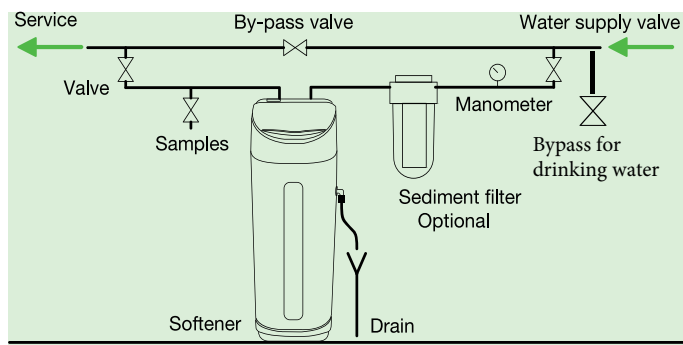
Other pipes and fittings suitable for potable water supply as required by manufacturer or local legislation.

### 6.2 Installation step by step

1. The system should be always installed with the by-pass valve supplied. If desired it can be installed a by-pass with 3 valves. The bypass of DENVER PLUS systems has several positions.



### RECOMMENDED INSTALLATION



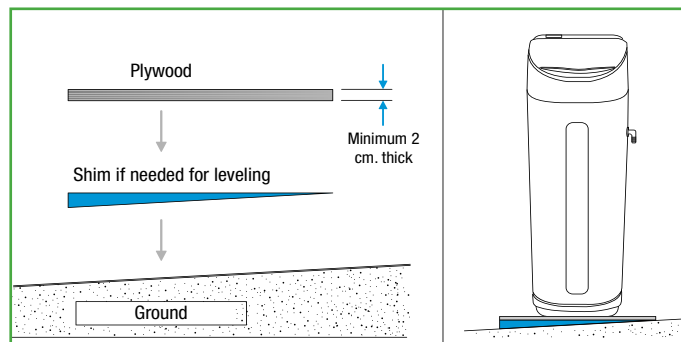
2. Close the main water supply valve, near the well pump or water meter.

3. Open all faucets to drain all water from the house pipes.

**NOTE:** Be sure not to drain water from the water heater because it can be damaged

**! "DANGER"** Excessive weight hazard. At least two people are required to move and lift salt bags. Failure to do so can result in back or other body parts injury.

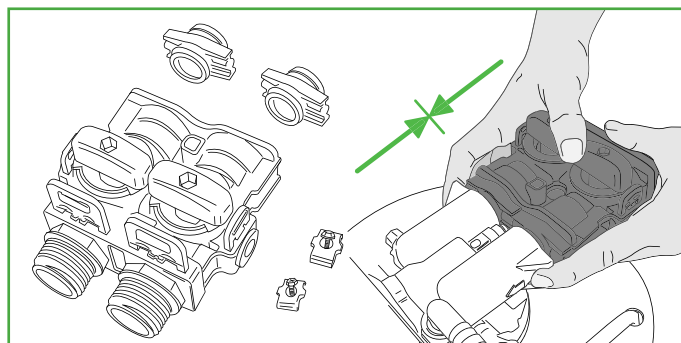
4. Move the water softener into installation position. Set it on a level surface. If needed, place the water softener on a section of plywood, a minimum of 2 cm thick. Then, shim under the plywood to level the water softener. Please see picture below:



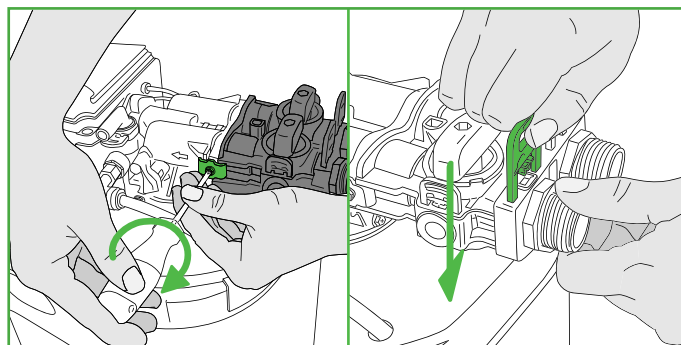
**IMPORTANT:** Do not place shims directly under the salt storage tank. The weight of the tank, when full of water and salt, may cause the tank to fracture at the shim.

5. Visually check and remove any debris from the water softener valve inlet and outlet ports

6. Set up the bypass into the softener valve and before put a light coating of silicone grease on the bypass valve o-rings.



7. You will be supplied with a in and out noryl set of connections male 1". Be sure that the clips snap firmly into place so the bypass will not pull out.



8. You should measure, cut, and loosely assemble pipe and fittings from the main water pipe to the inlet and outlet ports of the water softener valve. Be sure to keep fittings fully together, and pipes squared and straight. Check that hard water supply goes to the water softener valve inlet side.

**NOTA:** Inlet and outlet are marked on the valve. Trace the water flow direction to be sure.

**IMPORTANTE:** Be sure to fit, align and support all plumbing to prevent putting stress on the softener valve inlet and outlet. Undue stress from misaligned or unsupported plumbing may cause damage to the valve.

### SOLDERED COPPER

1. Thoroughly clean and apply solder flux to all joints.
2. Make all solder connections.

**NOTE:** Do not solder with installation tubes attached to single valve bypass. Soldering heat will damage the valve.

**IMPORTANT:** When installing the copper tubes and ground clamp assembly to the single valve bypass, the ground clamp must be secured in place. If necessary tighten the screw.

### THREADED PIPE

1. Apply pipe joint compound or Teflon tape to all male pipe threads.
2. Tighten all threaded joints and make all solder connections.

### CPVC PLASTIC PIPE

1. Clean, prime and cement all joints, following the manufacturer's instructions.

**NOTE:** Do not solder with installation tubes attached to single valve bypass. Soldering heat will damage the valve.

### OTHER

Follow the piping system manufacturer's instructions when using other pipe approved for potable water.

### INSTALLING DRAIN HOSE

Measure, cut to needed length and connect the ½" drain line to the water softener valve drain fitting. Use a hose clamp to hold the hose in place.

**NOTA:** Run the green drain hose or copper tubing to the floor drain. Secure drain hose. This will prevent "whipping" during regenerations.

### INSTALLATION OF SALT STORAGE TANK OVERFLOW ELBOW

Connect the storage tank overflow elbow installed in the system to a near floor drain point. This point should be no higher than the drain fitting on the salt storage tank.

**NOTA:** Drain hose should be installed in a proper way just

to avoid that the water overflows and returns from the drain hose.

## 6.3 DENVER PLUS TIMER



### TIMER DESCRIPTION

DENVER PLUS softeners are equipped with an advanced electronic timer that can easily control the working of the system. This timer is equipped in the upper part of the cabinet. DENVER PLUS timers supply a lot of information about the operation of the system. Moreover it allows to adjust all the internal parameters of the system.

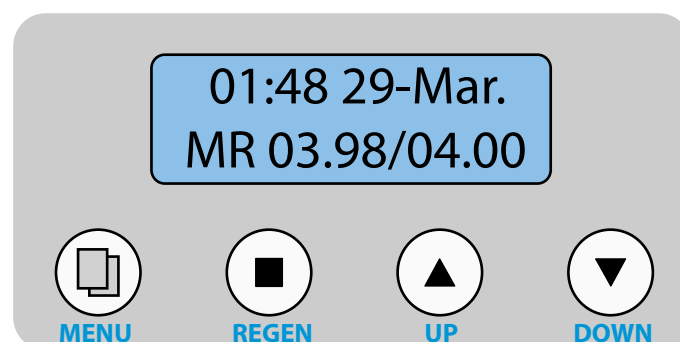
#### PRESTACIONES MÁS DESTACADAS:

Digital display.

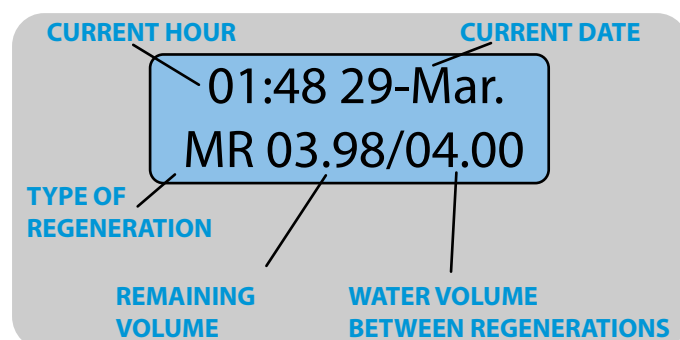
You can set up a maximum period of time without regenerations in order to avoid the water being blocked

You can chose between different types of regeneration: immediate, automatic, delayed or mixed

### FRONT PART OF THE TIMER:



**LCD DISPLAY:** It supplies information about the softener. Depending on the stage in which the system is the timer will supply different types of information: **Service:** Information about softener working



**Regeneration:** Current stage is showed in the lcd display

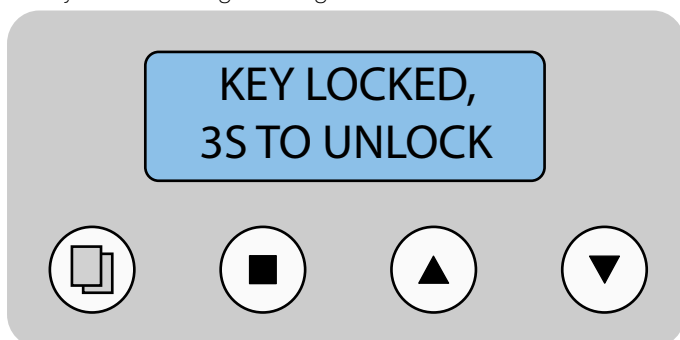
**Programming:** The display shows all the internal parameters and allows to modify them.

**"MENU" KEY:** Allows entering inside the internal programming and confirms the amended parameters in any stage of programming .

**"UP" Y "DOWN" KEYS:** Allow to navigate among the different parameters. In programming allow to modify the selected parameters.

**"REGEN" KEY:** It is used to start automatic regenerations.

**PROGRAMMING BLOCKAGE:** After some seconds without pressing any key the timer will be blocked automatically for safety. The following message will be showed:



To unlock the timer, please press "MENU" key for 3 seconds.

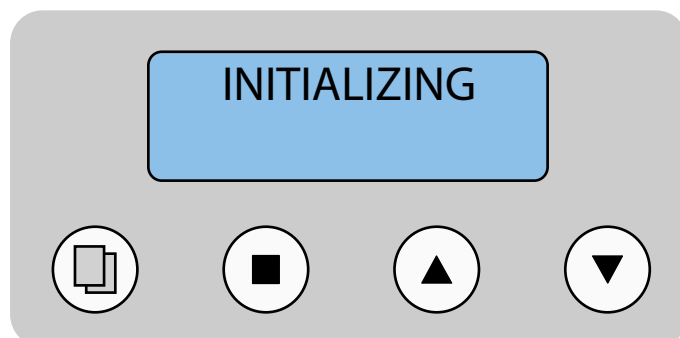
### 6.4 Start-up programming

DENVER PLUS softeners are configured to work with delayed regenerations (02.00 am).

#### PROGRAMMING:

**1.** Connect the provided transformer to the electrical connector at the back of the system. The timer will show service position.

**IMPORTANT:** After connecting the system can show following message:



*This message indicates that the system is placing itself in service position. If after two minutes this message is still in the display please contact your distributor.*

**2.** Press "MENU" key for three seconds to enter into the internal programming. By pressing "UP" y "DOWN" keys the different parameters can be selected, and pressing REGEN key we can access to modify it (selected parameter flashes). With "UP" y "DOWN" keys we can modify the selected parameter and pressing REGEN key one final time the parameter will be confirmed. Parameters that you can modify are as follows:

**HOUR OF DAY:** Format 0:00-24:00.

**LANGUAGE:** Spanish or English

**UNITS :** Metric system or US units

**TYPE OF REGENERATION:** There are several as follows:

**Time initiated (--)** Delayed regenerations according to selected frequency (Ex: Regenerates every 3 days at 02:00 am ).

**Meter immediate: (MI)** Regenerations are stated as per treated volume of treated water. When remaining volume is 0 starts a regeneration.

**Delayed regenerations: (MD)** Regenerations are delayed according to volume. When the remaining volume is finished the system starts the regeneration the same day at the programmed hour.

**Mixed regeneration (MR)** Similar to delayed regeneration but it allows to program a maximum period of time between regenerations.

**NOTE:** Mixed regenerations are recommended. If you want to select another type of regeneration, please contact your distributor.

**SYSTEM CAPACITY:** It is necessary to program the volume of the water that can be treated by the system. To calculate it please follow the indications as stated below:

$$\text{Volume(m3)} = \frac{\text{Exchange capacity (° HFxm3)}}{\text{Hardness (° HF)}}$$

Where:

#### EXCHANGE CAPACITY:

It is the amount of hardness that can be retained by the system. See the table below.

#### HARDNESS:

Hardness of inlet water in French degrees °HF.



**VOLUME:**

Amount of water that can be treated by the system.

THIS IS THE PARAMETER THAT SHOULD BE PROGRAMMED INTO THE SYSTEM.

**Example:** A softener of 30 liters of resin with a hardness of 30°HF.

$$\text{Volume (m}^3\text{)} = \frac{115 (^\circ \text{HFxm}^3)}{30 (^\circ \text{HF})} = 3,8 \text{ m}^3$$

3,8 m<sup>3</sup> must be programmed inside capacity parameter.

In case of adjusting the residual hardness of treated water with a mixing screw the initial hardness should be compensated with the residual value.

**Example:**

**Initial hardness:**

30°HF

**Residual hardness:**

5°HF

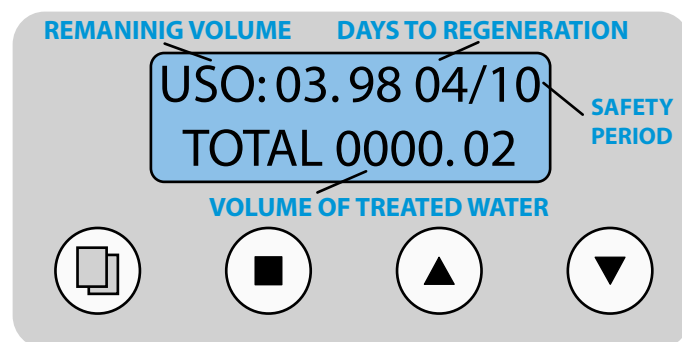
**Volume:**

$(\text{m}^3) = 115 / (30-5) = 4,6\text{m}^3$

Capacity to be compensated/programmed: 4,6m<sup>3</sup>

**CHECKING MENU:**

By pressing “UP” y “DOWN” keys simultaneously when the system is working the display shows additional information of the softener.

**REGENERATIONS:**

To start an immediate regeneration you only need to press REGEN key for three seconds.

**REGENERATION STAGE:**

Once the regeneration is started, it can be cancelled by pressing any key. However the stage can only be cancelled when the motor of the valve stops (the display will be flashing).

## 7. START UP

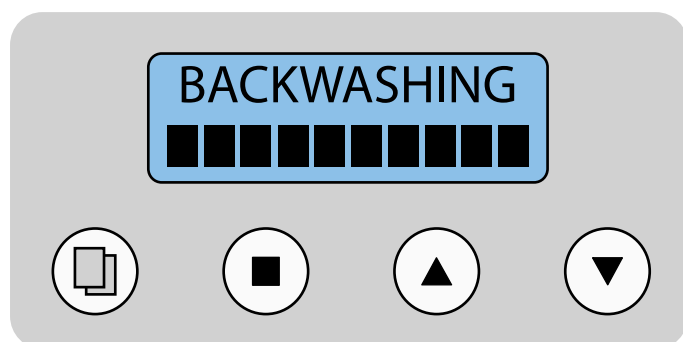


### 7.1 Hydraulic start-up

Prior to initiate the start-up of the system make sure that all previous steps regarding installation. Ensambling and programming have been correctly effected and according to the instructions of this manual and according to local regulations. To start up follow the following steps:

**!** Do not put salt inside the system till the end of the start-up process. In order to avoid air pressure upon the softener and the plumbing system, follow the instructions in order.

1. Put the bypass valve in "bypass" position.
2. Fully open two or more cold and treated water faucets located near the water softener.
3. Open completely the inlet valve. Leave the water flow till you get a continuous flow from the faucets, without air bubbles.
4. Plug the programmer to the power supply using the transformer included in the system.
5. The program must be in service, otherwise please check 'Section 6.3'.
6. Press the 'REGEN' button for 3 seconds to start a regeneration. After some minutes, the system will move to the Backwash stage.



7. Slowly open the water inlet valve to allow the entrance of water inside the system. At this point, the inlet flow must be rather low, since in this position water will come in from the bottom of the bottle and flow upwards to the drain.

8. When water starts flowing continuously through the drain, fully open the water inlet of the system. At this point, the bottle will be full of water and so a higher flow will not produce any damage. Water going out to the drain may be a bit yellowish or brown. This is completely normal, since it is due to the pre-servatives of the resin.

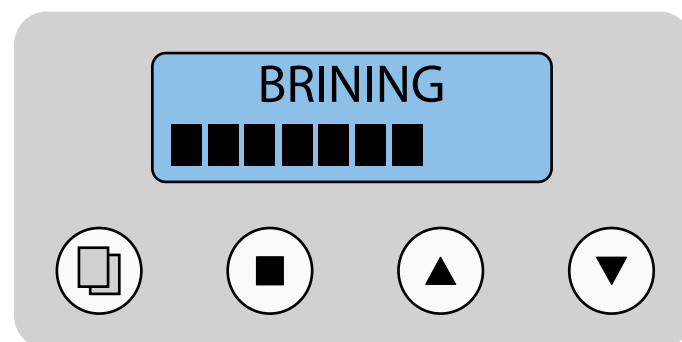
9. Please maintain this position (water flowing through the drain) until coloration disappears.

10. Close inlet valve for five minutes and all the air trapped with the resin will float to the upper part of the vessel.

11. Open inlet valve one more time for some minutes to ensure that all the air inside the vessel has been removed.

12. Cancel the current stage of the regeneration until refill stage. The brining tank will start refilling by itself. In this moment the system will end the regeneration started in point 6.

13. Start another regeneration. Wait until the system is placed in backwashing position nbr.6 and cancel this stage by pressing any key.



14. The softener will start to suction water from the tank (brining position). Check that the softener suctions water from the tank.

15. Cancel the remaining stages of the regeneration.

16. Put the by-pass in service position and check that the treated water has been correctly softened (see Section 7.3).

17. Fill the tank with salt.

18. The system is ready to work. Start-up process is finished.

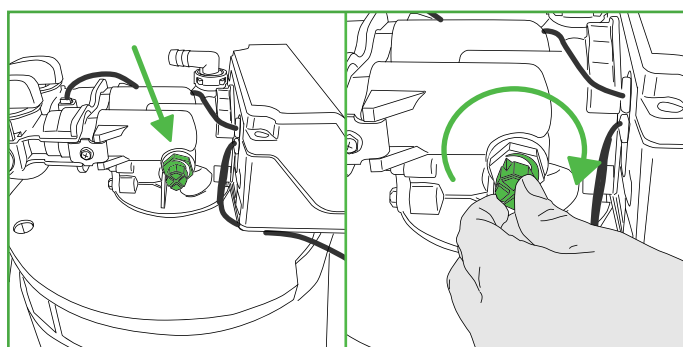
**!** **"WARNING"** Excessive weight hazard at least two people are required to move and lift salt bags. Failure to do so can result in back or other body parts injury.

## 7.2 Regulation of residual hardness

As stated out in section 2.7. it is recommended not to supply completely softened water to household installations.

DENVER PLUS systems have a residual hardness regulator that allows to adjust the hardness quantity in the treated water. This works making a small test of non treated water with a completely softened water.

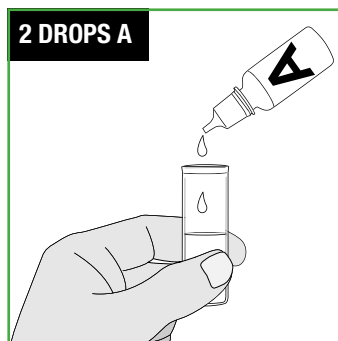
In order to modify the residual hardness, lightly open the regulating valve, as indicated in the images below.



Now you can test the hardness of the outlet water and check that it is according to the desired values. If it is not like this adjust the regulator and check it again.

**ATTENTION:** The hardness regulator is supplied completely closed, so if you do not regulate it the softener will provide a totally softened water.

2. Add two drops of indicator reactive A



3. Shake it.
4. If the water becomes blue it means that it is completely softened, if it has a reddish means that presents some kind of hardness.
5. Add some drops of B reactive till the water gets blue. The

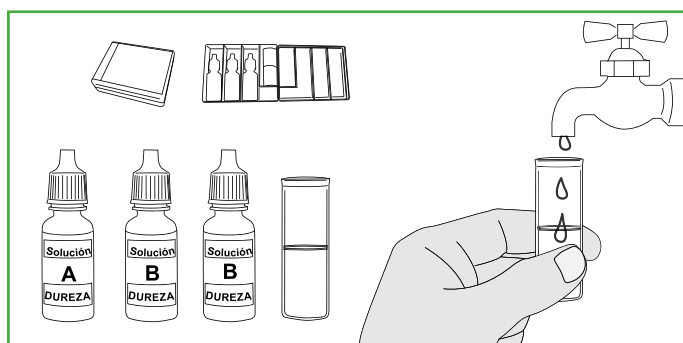


## 7.3 Hardness checking



In order to check the hardness of the water with the tester (code 271800), you should follow following steps:

1. Prepare the water to be analyzed



quantity of drops used will be the quantity of hardness in °HF found in the tested water.

### 8. MAINTENANCE/SANITIZING



The DENVER PLUS softeners, being automatic, do not require a complex maintenance.

In order to ensure a correct working of the system it is enough to make the following checking from time to time as showed in the table below:

TESTING	PERIOD
Check the quantity of salt inside the tank:	Monthly
Check the feed hardness:	Monthly.
Check the hardness of the treated water:	Monthly
Sanitizing:	Every 12 months.
Incrustation level:	Every 12 months
Salt tank cleaning :	Yearly.
Technical service revision:	Yearly

**!** It is important not to make the sanitizing and the descaling treatment at the same time, because the chemical products can react in a dangerous way. You should alternate both processes as per indicated frequency.

#### SALT FILLING

Please revise the level of the salt inside the tank.. It should be minimum: 1/3 of the tank. If the system runs out of salt before the refilling the softener will produce hard water. When finishing the checking please make sure that the cover is correctly closed.

**NOTE:** In humid areas it is best to keep the salt storage level lower and refill the tank more often.

**RECOMMENDED SALT:** Coarse salt tablets or balls with less than 1% of impurities.

**NOT RECOMMENDED SALT:** Rock salt, with impurities, block, granulated, table, ice melting, or for kitchen use.

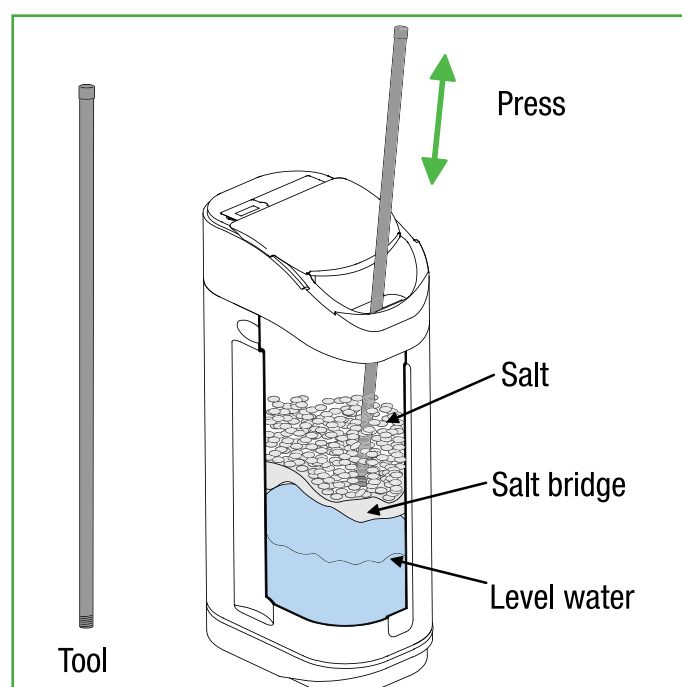
#### BREAKING A SALT BRIDGE

Sometimes, a hard crust or salt bridge is formed in the brine tank. It is usually caused by high humidity or the wrong kind of salt. When there is a salt bridge, and empty space forms between the water and the salt. Then the salt will not be dissolved in the water to make brine and without brine the resin bed does not regenerate and you will get hard water.

If the storage tank is full of salt, it is hard to tell if you have a salt bridge because salt is loose on top but the bridge is under it.

Take a tool or a broom handle, for instance, and hold it next to the water softener, measure the distance from the floor to the rim of the water softener. Then push the broom handle straight down into the salt. If you find a hard object, it is most likely a salt bridge. Carefully push into the bridge in several places to break it.

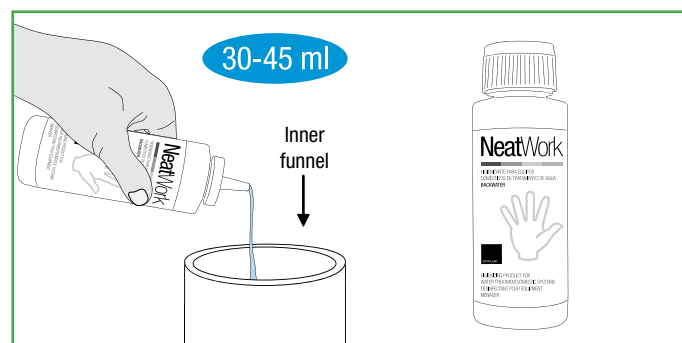
**!** **“WARNING”** Do not use any sharp or pointed objects as you may puncture the brine tank



#### SANITIZING:

Every year it is recommended to make an sanitizing process as follows:

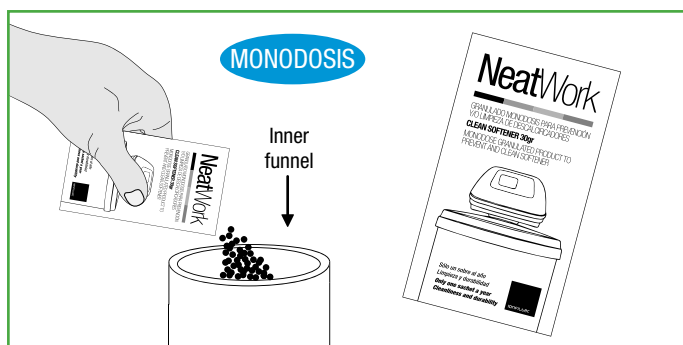
1. Open the covers of the salt tanks and put inside about 20 a 30 ml (2 or 3 caps) of Bacwater (652100.) inside the funnel. Close again.



2. Make sure that the bypass valves are working.
3. The disinfection process will be done when the regeneration finishes and the disinfection solution has been extruded from the softener to the drain.

### REMOVING INCRUSTATION:

Once a year it is recommended to make a cleaning with Clean Softener (611000), a product specially designed for the cleaning of your softening system. This product, because of its special formulation, will clean the resin eliminating all kind of iron and other remaining metals that represent a contamination and at the same time it will remove all possible incrustations in the inner passages of the valve.



**NOTE:** Follow carefully the instructions of the use of the product stated out on the label of the same.

The maintenance and sanitizing of the system should be carried out by a specialized technician qualified in hygienic conditions and following the specific indications of each product.

## 9. TROUBLESHOOTING GUIDE

PROBLEM	SOLUTION	
<b>1. The timer doesn't work</b>	1. The transformer is not connected.	1. Plug the transformer (power supply).
	2. Electric cable defective.	2. Replace the cable.
	3. No power.	3. Revise the installation.
	4. Defective transformer	4. Replace the transformer.
<b>2. The system regenerates at incorrect hours</b>	Power cuts cut damage the timer programming.	Please use the manual to adjust the clock of the system.
<b>3. Water leaks</b>	Bad connections.	Revise/tight all connections.
<b>4. Annoying noises / White water</b>	Air inside the system.	Make a backwashing to eliminate the air
<b>5. Excessive hardness of the water treated</b>	1. Increase of hardness in inlet water.	1. Check the hardness and revise timer.
	2. Incorrect regeneration.	2. Revise the timer.
	3. Damaged resin.	3. Substitute the resin.
	4. Lack of salt inside tank /salt bridge.	4. Fill the storage with salt /break the salt bridge
<b>6. There is no brine aspiration</b>	1. Not enough feed pressure.	1. The minimum feed pressure should be of 2,5bar.
	2. Brine line blocked.	2. Clean the brine line.
	3. Blocked injectors.	3. Clean or replace the injector and the filter.
	4. Water inner leaks.	4. Revise piston, threads and separators.
<b>7. The brine tank is overflowing</b>	1. Incorrect timing	1. Please contact the distributor.
	2. Incorrect aspiration.	2. Revise aspiration.
	3. Flow to high.	3. Revise back flow.
<b>8. The hardness of the water is not going away</b>	1. Fail of regeneration.	1. Check for loss of power and correct.
	2. Not enough brine.	2. Keep the brine tank full of salt.
	3. Incorrect aspiration.	3. Revise aspiration.
<b>9. Backwashing flow too high or too low.</b>	1. Incorrect backwashing regulator.	1. .Put a proper regulator
	2. Blocked backwashing regulator.	2. Wash the backwashing regulator.
<b>10. Non treated Water leakings during working</b>	1. Incorrect regeneration.	1. Make a regeneration checking that the salt amount is correct
	2. Leaks in by-pass valve .	2. Check the by-pass valve.
	3. Tube o-ring damaged.	3. Replace the o-ring.
	4. Incorrect regeneration cycle.	4. Reset the regeneration cycle
<b>11. Resin escape from the system</b>	1. Inner difusors damaged.	1. Substitute damaged difusors
	2. Damaged resin	2. Substitute resin and revise installation
<b>12. During working water is coming through the drain</b>	1. O-ring and separators damaged.	1. Replace o-rings and separators.
	2. Damaged piston.	2. Replace piston
	3. Bad located piston.	3. Start the system again, repeat the process and if it does not work please contact your distributor.



NAME, SIGNATURE AND STAMP OF AUTHORISED TECHNICIAN				
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/ /	<input type="checkbox"/> DESCALING			
/ /	<input type="checkbox"/> OTHERS			

## EC STATEMENT OF AGREEMENT

We declare, hereby assuming all responsibility, that:  
the softener system based in ionic exchange for the  
water treatment for human consumption, Denver brand  
with series nbr. according to manufacture, is adapted to  
norms or regulations: EN-12100-1, EN12100-2,  
EN-55014-1:2000/A1:2001, EN-61000-3,  
2:2000/A1:20001, EN-61000-3-3:1995/A1:2001,  
EN-61558-2-6 and fulfils the essential requirements of  
the directives: 98/37/CE, 73/23/CEE, 89/336/CEE.

Name and position of the authorised person

**Jose Antonio Fogued Franco**

Data: **01/07/2009**. Signature / Stamp:

**Puricom Europe, S.L.**  
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Pol. Ind. l'Ametlla Park  
T. 93 693 43 29 Fax. 93 693 43 29  
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PURICOM EUROPE- C. Aiguafreda 8 · Pol. Ind. l'Ametlla Park · 08480 Barcelona- Spain

## GUARANTEE CERTIFICATE FOR DENVER SERIES

### SYSTEMS GUARANTEE:

The distributor guarantees the systems for two years against any manufacturing defect, in accordance with Law RD 1/2007, 16 november (Guarantees in Consumer Goods Sales). The guarantee covers the repair and substitution of defective parts by authorized personnel by the distributor or the official technical service (TAS), in the place of installation or in their workshops. Including the labour and shipping cost should they arise.

**Puricom Europe** will not cover the guarantee regarding the substitution of parts that have suffered usual wear and tear, lack of maintenance, hits, etc. due to the improper use of the system outside specifications provided or in those cases where it has been modified or prepared by personnel that do not belong to the company or official TAS. The substituted parts remain the property of Puricom Europe.

**Puricom Europe** will cover any kind of disconformity related to the origin or suitability of the product according to its nature and end use. Taking into account the specifications of the system it is compulsory to comply with the installation and working process in order to be able to use the guarantee. Otherwise this guarantee will not be valid. The distributor guarantees that the system installed is appropriate for the improvement of the quality of your water in particular, according to technical specifications of the system, indications given by the manufacturer and legislation presently in force. The installer guarantees the proper installation and setting up of the system having followed the indications provided by the manufacturer and legislation in force.

### COMPANY and / or Authorised installer:

Company and/ or installer, date & signature

### The system is installed and in cooperation to the satisfaction of the client and for the record:

\*Previous treatment of the system:

\*Feed hardness of the system (°F):

\*Treated water hardness (°F):

\*Residual hardness (°F):

\*Pressure of the system feed (bar):

### \*Result of the installation sheet and putting into operation

☐ CORRECT ☐ OTHERS

The owner of the system has been properly and clearly informed of the use, manipulation and maintenance required by the system in order to guarantee that it works properly and the quality of the water produced. To such effect they were offered a maintenance contract.

\*Ref. Maintenance contract

☐ Accept the maintenance

☐ Do not accept the maintenance contract

Should you require information, to report a breakdown or that the system is not working properly, Maintenance application or technical assistance, first read the sections on working, detection and problems resolution in this manual and then contact the distributor or company that sold you.

### ! NOTE FOR COMPANY AND / OR AUTHORISED TECHNICIAN / INSTALLER

The information marked (\*) must be filled in by the Technician installer and transcribed by him from the INSTALLATION AND SETTING UP REGISTRATION SHEET OF THE SYSTEM



# PuricomEurope®

REVERSE OSMOSIS PURE WATER

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Pol. Ind. L'Ametlla Park  
08480 L'Ametlla del Vallès  
Barcelona · Spain

[www.puricom.eu](http://www.puricom.eu)



Miembro de la Water Quality Association



El sistema de calidad para la comercialización y montaje de equipos para tratamiento de aguas, está certificado y es conforme a la norma UNE-ISO-9001.



Miembro de Agua España, perteneciente esta asociación a Agua Europa (Federación de asociaciones nacionales europeas)