



Sistemas de purificación de agua

*Water Purification Systems*

## **User manual**

**Micromatic**

**Rev.2**  
**23.10.19**

## 0. Introduction

### 0.1 Use of the user manual

The user manual provides information about the installation, start-up and maintenance tasks of the Micromatic system. Additionally, it provides information about the system operation and the care required.

Before start-up, read carefully the instructions regarding the safety of the system, as well as the information related to its electrical and hydraulic connections.

If in doubt, please contact your local distributor or the Wasserlab Technical Assistance Service (Section 0.3).

### 0.2 Models

This user manual is applicable for model:

- Micromatic

### 0.3 Contact information

<p><b>Wasserlab Technical Assistance Service:</b></p> <p>Tel: + 34 948 186 141 e-mail: <a href="mailto:sat@wasserlab.com">sat@wasserlab.com</a></p>	<p><b>Manufacturer:</b></p> <p>Navarra de Tratamiento del Agua S.L. Pol. Comarca II, calle E, nº 3 31191 – Barbatain, Navarra, Spain. Tel: +34 948 186 141 CIF:ES B31637580</p>
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**Management System**  
**ISO 9001:2015**

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## 2. Safety information

The safety information is related to both the user protection and the system protection. The user should carefully read the safety information included in this chapter to ensure the safe use of the system. If in doubt, contact the Technical Assistance Service (contact information in Section 0.3).

The following symbols are located along the manual to indicate:

	Attention: Danger or important information.
	Attention: Risk of electric shock.



Access to the equipment interior: Only the authorized technical service can access the interior of the equipment to carry out maintenance and repair tasks other than the usual installation and consumable replacement tasks described in this manual. The warranty does not cover activities other than those related to the intended use of the equipment; neither does it cover activities related to an improper handling of the equipment or incidents caused by personnel unrelated to the manufacturer's technical service.



Electrical connections: Check the compliance of the *Electrical requirements* described in Section 4.1 of this manual.



Feed water and hydraulic connections: Check the compliance of the *Feed water requirements* and the *Hydraulic connections* described respectively in Sections 4.2 and 4.8 of this manual. Deviations from the feed water requirements can result in a deterioration of the system components and/or a lower performance of the equipment.



Environmental conditions: Check the compliance of the *Environmental conditions* described in Section 4.3 of this manual.



Consumables: Follow the equipment warnings and the guidelines in this manual to replace the consumables of the system. Use original consumables. The use of consumables from another source may result in damage to the equipment and the loss of the warranty. If the consumables are not installed immediately, check the consumable storage instructions in the equipment documentation delivered with the equipment.



The equipment warranty is 12 months.

### 3. Equipment use and applications


The Micromatic water purification system combines different processes (pre-filtration, reverse osmosis, deionization) to provide Type II purified water (ASTM) from **tap drinkable water**.

Once the installation and the start-up of the equipment have been performed, the system performance is automatic.

In case of any anomaly, contact the Technical Assistance Service (contact information in Section 0.3). Do not perform interventions on the equipment other than the usual installation and consumable replacement tasks described in this manual. Do not allow any unauthorized technical service to manipulate or intervene in the equipment.

The water supplied by the system is suitable for numerous laboratory techniques, for preparation of culture media and for other applications that require Type II purified water. **The water supplied is not drinkable.**

## 4. Equipment specifications

<b>4.1 Electrical requirements</b>	
Input	<ul style="list-style-type: none"> <li>• 110-230 VAC/50-60 Hz. Single-phase.</li> <li>• Socket Type C, Europlug.</li> <li>• Use only the transformer supplied with the equipment.</li> <li>•  The connection plug to the electrical network must NOT be located below the equipment. Maintenance tasks may cause water splashes with the consequent risk of electrical shock if the plug is misplaced.</li> <li>• The connection plug to the electrical network must be accessible in case a quick disconnection is needed.</li> <li>• Avoid tight electrical cables.</li> <li>• Locate the equipment so that the electrical connections are not compromised.</li> <li>• Voltage fluctuations of the electrical network must NOT exceed 10% of the rated voltage.</li> <li>• Transitional overvoltage allowed: Those typically present in the electrical network (Category II of standard IEC 60364-4-443).</li> </ul>
Output of the transformer	24 VDC, type plug-in with connection from the back of the equipment.
Power	36VA

<b>4.2 Feed water requirements</b>	
Source <sup>a</sup>	Drinking water (according to European or USA standards)
Maximum inlet pressure <sup>b</sup>	6 bar
Minimum inlet pressure <sup>c</sup>	3 bar
Temperature	5°C – 35°C
Hardness <sup>d</sup>	< 300 ppm (CaCO <sub>3</sub> )
SDI (Silt Density Index)	< 5
Conductivity	< 2000 µS/cm
Free chlorine	< 1 ppm
Turbidity <sup>e</sup>	< 1 NTU
<p><sup>a</sup> In case of supplying non-drinking water: The presence of high microbial contamination in the feed water compromises the quality of the final water. A purification treatment (chlorination) of the feed water is therefore recommended. Purification treatments with peroxides are strongly discouraged. If the water is pretreated with peroxides, the user must verify the absence of peroxides in the pretreated water. This aspect is not controlled by the equipment.</p> <p><sup>b</sup> An excessive inlet pressure can damage the hydraulic system. Inlet pressures above 6 bar require the use of a pressure regulator</p> <p><sup>c</sup> Inlet pressures below 3 bar will result in a lower performance of the equipment and/or an improper performance of some system components. Inlet pressures below 3 bar require the use of a system that raises the pressure of the feed water.</p> <p><sup>d</sup> Hardness: The hardness of the feed water has a negative effect on the performance of the equipment. The use of an agent or decalcification system is recommended for feed water with hardness above 300 ppm.</p> <p><sup>e</sup> Turbidity: The presence of suspended solids in the feed water can clog the pretreatment filters reducing the performance of the equipment. In this case, an effective filtration system that properly treats the feed water is recommended</p>	

<b>4.3 Environmental conditions and location of the equipment</b>	
Temperature	Working: 5°C – 35°C. Ideally, the working temperature lies in a 20-25°C range. Storage: 5°C – 35°C.
Relative humidity	No condensation: < 80% for temperatures up to 31°C (linear decrease to 50% at 40°C).
Altitude	<3000 m
Pollution level	1 (No pollution or only dry, nonconductive pollution).
Other environmental conditions	Avoid direct sunlight. Avoid aggressive environments (chemical agents, dust, dirt). The equipment is not intended for use in explosive atmospheres.
Equipment and tank location	Indoors. On a flat surface. Ensure the flat surface is able to support the weight of the equipment or tank (See Section 4.6 <i>Dimensions and weight</i> ) Always keep the equipment upright. In case of transportation or in case of moving the equipment, disconnect the cartridges to avoid damaging the connectors during transportation. To move the equipment, hold it by the base. The equipment needs a drainage point for the rejection water. The drainage point must be located at a maximum distance of 3 m. The feed water connection point should be located at a maximum distance of 3 m. The connection point to the electrical network should be located at a maximum distance of 2 m. Locate the tank considering that it is the point of use of Type II water. The tank must be preferably opaque and with a lid. The tank should not receive direct sunlight. It is recommended to have a safety overflow line directed to a drainage point and to have enough space above it in order to be able to easily clean the tank.

<b>4.4 Consumable storage requirements</b>	
Use original consumables. The use of consumables from another source may result in damage to the equipment and the loss of the warranty. Check the consumable storage indications in the documentation delivered with the equipment.	

<b>4.5 Quality of the final water and equipment performance</b>	
Conductivity (compensated at 25°C)	< 1 µS/cm
Production <sup>a</sup>	2.5 L/h
Maximum recommended production	25 L/day
Silica removal	>99,9%
Reverse osmosis performance	90– 98%
<sup>a</sup> The production values depend on the model. 15% fluctuation. The production values are based on standard operating conditions [25°C / pH 5 - 7/4 bar / 250 ppm NaCl] and can vary according to the quality of the feed water and the typical variations of the reverse osmosis membranes	

<b>4.6 Dimensions and weight</b>	
Weight in operation of the equipment	9 kg
Equipment dimensions (Height/Width/Depth) [cm]	45 x 25 x 40



<b>4.7 Components</b>	
Components of the system in operation	<ul style="list-style-type: none"> <li>• Equipment (Figure 4.1)</li> <li>• Tank (Figure 4.2). <b>The tank is not delivered with the equipment unless requested by the customer.</b></li> </ul>
Components in installation kit	<ul style="list-style-type: none"> <li>• One complete set of pretreatment cartridges (One sediment filter [1] + one filter of granular activated carbon (GAC) [2])</li> <li>• One complete set of ion exchange resin cartridges (One cartridge [3] and one cartridge [4])</li> <li>• Installation kit of hydraulic connections (components described in the equipment documentation)</li> </ul>
Description of the components of the system in operation	<ul style="list-style-type: none"> <li>• Equipment with the following elements:               <ul style="list-style-type: none"> <li>- Front (Figure 4.1): Screen and operation keys.</li> <li>- Back (Figure 4.3): Hydraulic connectors and transformer plug-in</li> <li>- Right (interior) (Figure 4.4):                   <ul style="list-style-type: none"> <li>- Two pretreatment cartridges (One sediment filter [1] + one filter of granular activated carbon (GAC) [2])</li> <li>- Two ion exchange resin cartridges (One cartridge [3] and one cartridge [4])</li> </ul> </li> <li>- Left (interior): reverse osmosis membrane (ROM), other components.</li> </ul> </li> <li>• Tank (Figure 4.2) at atmospheric pressure with dispensation point.</li> </ul>

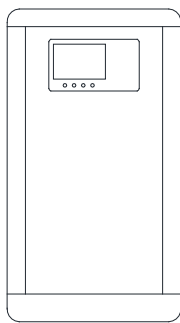


Figure 4.1. Equipment (Front view)

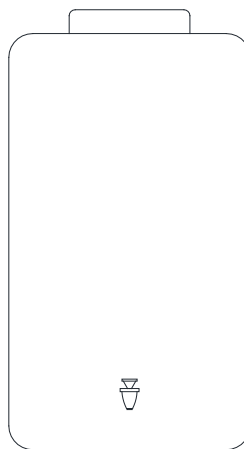


Figure 4.2. Tank

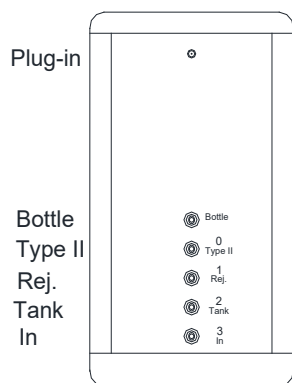


Figure 4.3. Equipment (Back view)

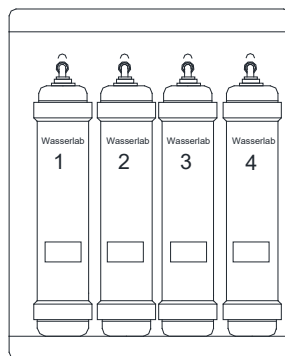


Figure 4.4. Equipment (Right interior)

<b>4.8 Hydraulic connections and switch level connection</b>	
Locate the equipment so that the hydraulic connections are not compromised. Avoid tight tubes.	
Hydraulic connections	Figure 8.1
Connection to water supply <b>(Requirement)</b>	Shut-off valve with a 3/8" male threaded gas terminal An easy accessible shut-off valve should be located before the water inlet into the equipment in case the water supply needs to be interrupted.
Connection [IN] of the equipment	From water supply to equipment Connector QC <sup>a</sup> Tube 1/4" (Outer diameter)
Connection [TANK] of the equipment	From equipment to atmospheric tank. Connector QC <sup>a</sup> Tube 1/4" (Outer diameter)
Connection [Rej] of the equipment	From equipment to drainage Connector QC <sup>a</sup> Tube 1/4" (Outer diameter)
Connection [Type II] of the equipment	Electrical connection to switch level.
Connection [Bot] of the equipment	Not used
<sup>a</sup> QC: Quick Connect	

## 5. Description of the water purification process.

**Pretreatment:** The feed water flows through the pretreatment cartridges, which protect the reverse osmosis membrane from the presence of suspended particles, colloids, organic matter and free chlorine present in the water.

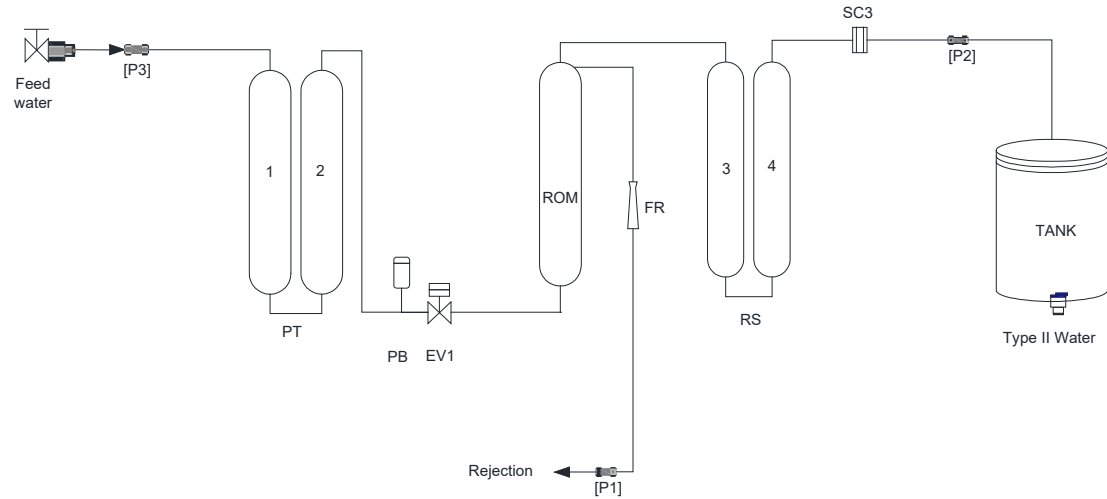
**Reverse osmosis:** The pretreated water flows through a reverse osmosis module. The water is divided into two streams: rejection and permeate. The rejection is directed to a drainage point with most of the inorganic salts, organic matter, microorganisms and particles present in the water coming from the pretreatment. The permeate continues to the next stage (Deionization) with a flow rate of 2.5 L/h.

**Deionization:** The osmotized water flows through a module of ion exchange resins that retains the anions and cations still present in the water and that have not been eliminated in the reverse osmosis process. The result is the reduction of the conductivity of the outlet water below  $1\mu\text{S} / \text{cm}$ . The purified water continues to an atmospheric deposit.

**Type II water storage:** Type II water is stored in an atmospheric tank. A level detector (switch level) must be installed in the tank for the system to work automatically.

## 6. Hydraulic scheme

### 6.1 Micromatic model



PT	Pretreatment filters [1] y [2]
PB	Low pressure switch
EV1	Solenoid valve
ROM	Reverse Osmosis Membrane
FR	Flow restrictor
RS	Deionization resin [3] and [4]
SC3	Conductivity probe for Type II water
[P1, P2,P3]	Back connectors

Figure 6.1. Hydraulic scheme of the Micromatic model

## 7. Installation and start-up of the equipment

### 7.1 Unpacking

Verify the packaging is not damaged.

Unpack the equipment and its components carefully. Verify none of the components is damaged.

Verify that none of the components described in *Components of the system in operation* and *Components in installation kit* described in Section 4.7 is missing.

### 7.2 Location of the equipment

The equipment is self-supporting. To lift or move the equipment, hold it by the base. Always keep the equipment upright. Do not overturn the equipment.



**IMPORTANT!** Before the installation, take into account the *Environmental conditions and location of the equipment*, *Electrical requirements*, *Feed water requirements* and the *Dimensions and weight* described in Chapter 4.

### 7.3 Installation of the equipment

#### 7.3.1 Hydraulic connections and installation of switch level

A flexible tube and a tube cutter are provided with the equipment to make the hydraulic connections.

QC (Quick Connect) connectors are installed in the equipment. To connect and disconnect this type of connectors, follow these steps:

- To connect the tube, simply insert the tube into the QC connector (Figure 7.1) until limit stop.
- To disconnect the tube, first press the central washer of the QC connector while pulling the tube in the opposite direction.



Figure 7.1



**Important!** Before disconnecting a QC connection, make sure that the connector is not under pressure. If the hydraulic circuit of the equipment is pressurized, the QC connectors will offer resistance to being disconnected.



**Important!** The tubes inserted in QC connectors have to be cleanly cut. The cut must be perpendicular to the length of the tube. The section of the tube inserted in the connection will be smooth, without scratches. Any bevel or irregular cut will make the connection imperfect and can present risks of water leakage.

The hydraulic connections of the equipment are illustrated in Chapter 8. Take the following steps to perform the hydraulic connections:

- **Water supply:**

The water supply shall be provided with a shut-off valve with a 3/8" male threaded gas terminal. The shut-off valve must be easily accessible in case the water supply needs to be interrupted.

The connecting piece supplied (Figure 7.2) is screwed into the male 3/8" terminal. Do not use Teflon for this connection (the connection piece is provided with a rubber gasket).

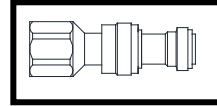


Figure 7.2



**IMPORTANT!** The shut-off valve must be closed during installation.

- **Connection [IN] of the equipment:**

Tube from water supply to connection [In] on the back of equipment.

- **Connection [TANK] of the equipment:**

Tube from connection [TANK] on the back of equipment to tank

- **Connection [Rej] of the equipment:**

Tube from connection [Rej] on the back of equipment to a drainage point to collect the rejected water. The drainage point must be located at a maximum distance of 3 m. Make sure the tube stays in place by means of a drain flange (provided by the manufacturer) or by inserting the tube about 30 cm into the drain pipe.

*Installation of the drain flange:*

- Drill a 6.5 mm hole on the drain pipe where the rejection tube needs to be inserted (Figure 7.2).
- Place the pad and the drain flange over the hole, gripping the pipe. Secure it by tightening the screws on both sides of the flange (Figure 7.3).
- Insert the rejection tube 5 cm. Secure the rejection tube with the drain flange nut (Figure 7.4).



Figure 7.2



Figure 7.3



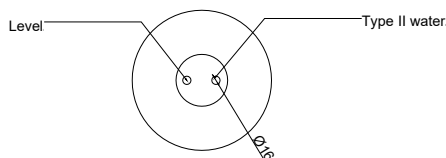
Figure 7.4

- **Connection [Type II] of the equipment:**

The switch level must be installed in the tank. The switch level is electrically connected to the level cable from the [Type II] connection on the back of the equipment. The type of switch level will depend on the installed tank.

If the water storage tank is not supplied, a switch level is supplied to be installed in the user's deposit of choice.

To place it, drill two holes of 16 mm outer diameter to place the switch level fitting and the Type II water inlet tube. The switch level must be positioned upright.



- **Connection [Bot] of the equipment:**

Not used

### 7.3.2 Install the pretreatment cartridges [1] and [2]

Follow the instructions in Section 11.1 *Installation or replacement of the pretreatment cartridges [1] and [2]*

### 7.3.3 Install the resin cartridges [3] and [4]

Follow the instructions in Section 11.2 *Installation or replacement of the resin cartridges [3] and [4]*

#### **7.3.4 Equipment start-up**

After making the hydraulic connections and installing the switch level (Section 7.3.1), installing the pretreatment (Section 7.3.2), and installing the deionization resin cartridges (Section 7.3.3), start-up the equipment taking the following steps:

- Open the feed water shut-off valve and check that there are no water leaks at the connections made or from the inside of the equipment.
- Connect the equipment to the electrical network.
  - o First connect the transformer to the equipment.
  - o Then connect the transformer to the electrical network. The equipment will start automatically.
- Leave the equipment in operation. The equipment will go into Production mode until the tank gets full (See *Production* in Chapter 9).
- Once the tank is full, the equipment will switch to stand-by mode (See *Stand-by* in Chapter 9).
- Check that the water dispensation is done properly (see *Water Dispensation* in Chapter 9).

## 8. Hydraulic connections

### 8.1 Micromatic model

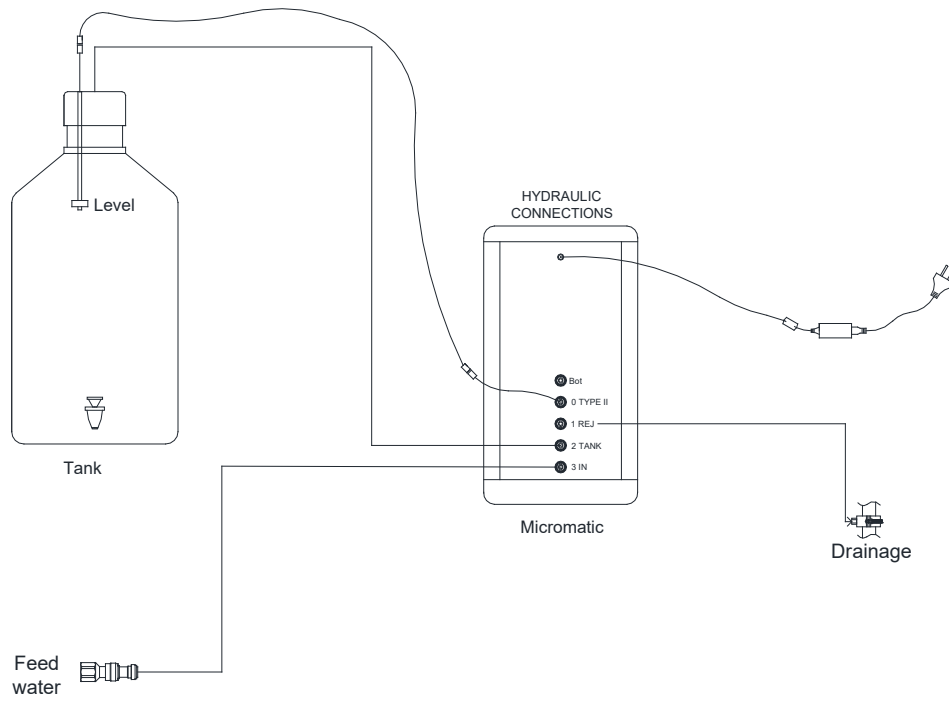


Figure 8.1. Hydraulic connections of Micromatic.



## 9. Automatic operation of the equipment

Status of the equipment	Operation mode and Screen
Stand-by	<p>The equipment is in stand-by mode because the tank is full. The inlet solenoid valve is closed. The symbol <i>Full tank</i> is activated on the main menu of the screen (See symbols ar Section 10.2). The screen shows the conductivity value of the last water produced. If the equipment is new, it will show 00.0 <math>\mu\text{S}/\text{cm}</math>.</p>
Production	<p>The equipment produces Type II water that is sent to the atmospheric deposit. The symbols, of production, solenoid valve, tank filling are activated on the main menu of the screen (see symbols and meaning in Section 10.2). The screen shows the conductivity value of the water produced. When the tank is full, the equipment stops automatically and switches to stand-by mode. When the water level in the tank decreases, the equipment goes back to production mode automatically.</p>
Water dispensation	<p>The user can obtain purified water from the tank point of use.</p>
Warnings	<p>Several operation parameters of the equipment are constantly monitored. When the equipment detects a warning situation, it emits warning signs through an acoustic signal and a warning symbol (see symbols and meaning in Section 10.2). Pressing any key deactivates the acoustic signal. The different possible warnings are described in Section 14.1.</p>

## 10. Monitoring

Figure 10.1 shows the screen with all its possible symbols and the keyboard. The symbols and their meaning are tabulated in Section 10.2. The user sees the main menu on the screen and can access the configuration menu. Pressing the MODE / ESC key switches between the main menu and the configuration menu. Section 10.1 shows the possible symbols that are activated in each menu.

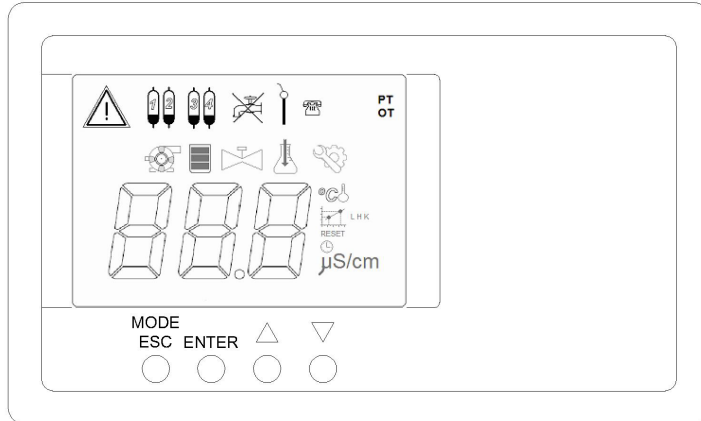








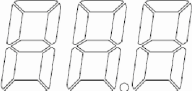











Figure 10.1

### 10.1 Screen

<b>Screen</b>	
<p>On the screen, the main menu shows simultaneously:</p>	<ul style="list-style-type: none"> <li>○ The conductivity of the water produced (compensated at the specified temperature), or the conductivity value of the last water that has been produced (If the equipment is new, it will show 00.0 <math>\mu\text{S}/\text{cm}</math>). Symbols : </li></ul>
<p>The configuration menu (indicated by the symbol ) shows sequentially - by pressing the keys <math>\Delta</math> y <math>\nabla</math>— the four screens described here.</p> <p>To modify the settings of the configuration menu, see Section 10.4:</p>	<ul style="list-style-type: none"> <li>○ Screen with the conductivity set point in <math>\mu\text{S}/\text{cm}</math> for replacing the deionization resin cartridges [3] and [4]. Symbols:  <math>\mu\text{S}/\text{cm}</math></li> <li>○ Screen with the hours set point for changing the pre-treatment cartridges. Symbols: </li> <li>○ Screen with pre-treatment counter in hours (Working hours of the equipment and RESET of hours). Symbols:  RESET</li> <li>○ Screen with the water compensation temperature in <math>^{\circ}\text{C}</math>. Symbols: </li> </ul>

## 10.2 Symbols on the screen and meaning

Symbol	Meaning
	Tank: When the three lines flash consecutively, the equipment is in production mode. When all three lines are lit simultaneously, the tank is full and the equipment is in stand-by mode.
	Inlet solenoid valve open
	Numerical value of the measurement.
	Equipment in production mode
OT	Equipment configuration <b>OT</b> : Equipment with atmospheric deposit
	Pretreatment warning: Pretreatment cartridges [1] and [2] must be replaced. See Section 14.1.
	Resin warning: Deionization resin cartridges [3] and [4] must be replaced. See Section 14.1.
	Water cut: The water inlet to the equipment has been interrupted. See Section 14.1.
	The conductivity probe does not measure correctly. See Section 14.1.
	Configuration menu.
μS/cm	Unit of conductivity.
	Unit of temperature.
	Calibration menu (only accessible by the technical assistance service).
RESET	Setting the pretreatment counter (in hours) to 0 in the configuration menu.
	Pre-treatment counter (in hours) in the configuration menu.


## 10.3 Keyboard symbols and meaning

MODE/ESC	Cancellation of actions / Access from the main menu to the configuration menu or vice versa.
ENTER	Acceptance of actions / Start the modification of values in configuration menu.
▽	Scroll into the different screens of the configuration menu / Decrement of values.
△	Scroll into the different screens of the configuration menu / Increment of values.

## 10.4 Configuration of parameters

### 10.4.1 Modification of the parameters in the configuration menu

Follow the procedure below to modify the parameters in the configuration menu (except the pre-treatment counter, in this case, go to Section 10.4.4):

From the main menu, press MODE / ESC (until the symbol  appears on the screen). The entire configuration menu is accessed with the  $\Delta$ / $\nabla$  keys, which is sequential. The following values are shown:

Conductivity set point in $\mu\text{S}/\text{cm}$ for replacing the deionization resin cartridges [3] and [4] <sup>a</sup>	X.X $\mu\text{S}/\text{cm}$
Set point in hours for replacing the pretreatment cartridges [1] and [2] <sup>b</sup>	XXX $\oplus$
Screen with pre-treatment counter in hours (Working hours of the equipment and RESET of hours) <sup>c</sup>	XXX RESET
Water compensation temperature in $^{\circ}\text{C}$ <sup>d</sup>	25.0
<sup>a</sup> See details in Section 10.4.2. <sup>b</sup> See details in Section 10.4.3. <sup>c</sup> See details in Section 10.4.4. <sup>d</sup> See details in Section 10.4.5.	

- Use the  $\Delta$ / $\nabla$  keys to access the screen that shows the parameter to be modified (for example: the *Conductivity set point in  $\mu\text{S}/\text{cm}$  for replacing the deionization resin cartridges [3] and [4]*)
- Press ENTER, the first digit flashes. To modify it, press  $\Delta$  or  $\nabla$  until the desired number appears. To accept, press ENTER
- The second digit will flash. Perform the same operation
- The third digit will flash. Perform the same operation and the value will be set
- To exit the configuration menu and return to the main menu, press MODE / ESC.

### 10.4.2 Conductivity set point in $\mu\text{S}/\text{cm}$ for replacing the deionization resin cartridges [3] and [4]

The equipment is delivered with a factory setpoint value within a range of values between 1 and 20  $\mu\text{S}/\text{cm}$ . The user can modify this set point value within this range following the steps described in Section 10.4.1.

During standard operation, the conductivity of the produced water is maintained below the set point. When the produced water reaches or exceeds this conductivity set point, the warning to replace the deionization resin cartridges [3] and [4] is activated. See Section 14.1.

### 10.4.3 Set point in hours for replacing the pretreatment cartridges [1] and [2]


The equipment is delivered with a factory set point value within a range of values between 1 and 999 hours.. For safety reasons, the user should not change the factory setting.

During standard operation, the working hours are maintained below the set point. When the working hours reaches or exceeds this set point, the warning to replace the pretreatment cartridges [1] and [2] is activated. See Section 14.1.

### 10.4.4 Pre-treatment counter (Hours of operation of the equipment and RESET of hours)

When the equipment is installed, the pre-treatment counter shows 000 RESET. As soon as the equipment starts operating, the pre-treatment counter will be updated showing the working hours of the equipment. When the working hours reach or exceed the set point in hours for replacing the pretreatment cartridges [1] and [2], the warning to replace the pretreatment cartridges [1] and [2] is activated. See Section 14.1.

When the pretreatment is replaced, the user needs to restart the pretreatment counter. To modify this value, take the following steps:

- Press MODE / ESC (until the symbol  appears on the screen). The entire configuration menu is accessed with the  $\Delta$ / $\nabla$  keys, which is sequential. The values will be those shown in the Table of Section 10.4.1.
- Use the  $\Delta$ / $\nabla$  keys to access the screen that shows the pre-treatment counter. The screen shows the working hours of the equipment in format: XXX RESET.
  - Press ENTER, the value of the screen will flash.
  - Press ENTER, the counter has been reset to 0 hours. The screen will show 000 RESET.
  - To exit the configuration menu and return to the main menu, press MODE / ESC.

### 10.4.5. Water compensation temperature in $^{\circ}\text{C}$

As the water temperature greatly affects the conductivity value, there is a need to "compensate" it to be able to compare measurements at different temperatures. Typically, the conductivity value is usually expressed by normalizing the conductivity reading to 25  $^{\circ}\text{C}$ .

To calculate the conductivity compensated at 25  $^{\circ}\text{C}$ , the user must know the temperature of the water at which the measurement is being carried out and must apply a correction factor of 2% for each temperature degree that deviates from the reference temperature, as shown in the following equation :

$$C_{25} = \frac{C_t}{\{1 + 0.02 \times (t - 25)\}}$$

where  $C_{25}$  is the water conductivity in  $\mu\text{S/cm}$  compensated at  $25^\circ\text{C}$ ,  $C_t$  is the water conductivity in  $\mu\text{S/cm}$  at a temperature  $t$  and  $t$  the temperature of the water in  $^\circ\text{C}$  at which the measurement is being carried out.

The Micromatic does not measure the water temperature and, by default, it assumes a water temperature of  $25^\circ\text{C}$ .

If the user knows the water temperature, the user can modify the *water compensation temperature* value by another value within a range between  $5$  and  $35^\circ\text{C}$  following the steps described in Section 10.4.1. In the main menu, the water conductivity value will be compensated at  $25^\circ\text{C}$ .

## 11. Maintenance

### 11.1 Installation or replacement of the pretreatment cartridges [1] and [2]

The duration of the pretreatment depends on the working hours of the equipment. Replace the pretreatment when the warning- *Replace the pretreatment* is activated. That is, when the following symbols are activated:




**IMPORTANT!** Before installing or replacing the pretreatment, verify the compliance of the *Consumable storage requirements* described in Section 4.4 in the pretreatment to be installed or call your supplier for the acquisition of a new pretreatment module.



**IMPORTANT!** To install or replace the pretreatment, ensure no water is being fed into the equipment and the equipment is depressurized (follow instructions below). The QC connectors cannot be disconnected under pressure.

Follow the instructions below to install or replace the pretreatment:

- Close the feed water shut-off valve.
- The warning *Water cut* is activated. Pressing the MODE / ESC key deactivates the acoustic signal.
- Access the location of the pretreatment. (Cartridges [1] and [2]): The cartridges are installed inside the equipment, on the right side. Remove the right cover to access the pretreatment. See Figure 11.2.
- If installing the pretreatment for the first time, skip this step. If replacing the cartridges, disconnect the cartridges [1] and [2] from the QC connections. First the ones on top and then the ones on the bottom (See Figure 11.1, see QC connection/disconnection instructions at the beginning of Section 7.3.1).
- Connect the new cartridges from the QC connections. First the ones on the bottom and then the ones on top (see QC connection/disconnection instructions at the beginning of Section 7.3.1).
- Open the feed water shut-off valve.
-  **IMPORTANT!** Reset the pretreatment counter. Follow instructions of Section 10.4.4.

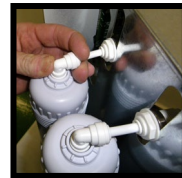


Figura 11.1

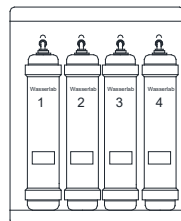




Figure 11.2

## 11.2 Installation or replacement of the resin cartridges [3] and [4]

The duration of the resin cartridges depends on the quality of the feed water and the consumption of purified water. Replace the cartridges when the warning-*Replace the deionization resin* is activated. That is, when the following symbols are activated:



 **IMPORTANT!** Before replacing the cartridges, verify the compliance of the *Consumable storage requirements* described in Section 4.4 in the cartridges to be installed or call your supplier for the acquisition of new cartridges.

 **IMPORTANT!** To install or replace the cartridges, ensure no water is being fed into the equipment and the equipment is depressurized (follow instructions below). The QC connectors cannot be disconnected under pressure.

Follow the instructions below to install or replace the resin cartridges:

- Close the feed water shut-off valve.
- The warning *Water cut* is activated. Pressing the MODE / ESC key deactivates the acoustic signal.
- Access the location of the resin cartridges (Cartridges [3] and [4]): The cartridges are installed inside the equipment, on the right side. Remove the right cover to access the cartridges. See Figure 11.3.
- If installing the cartridges for the first time, skip this step. If replacing the cartridges, disconnect the cartridges [3] and [4] from the QC connections. First the ones on top and then the ones on the bottom (See Figure 11.1, see QC connection/disconnection instructions at the beginning of Section 7.3.1).
- Connect the new cartridges from the QC connections. First the ones on the bottom and then the ones on top (see QC connection/disconnection instructions at the beginning of Section 7.3.1).
- Open the feed water shut-off valve.
- Once the resin cartridges have been replaced, the equipment is put into operation and the conductivity of the produced water will be shown on the screen.

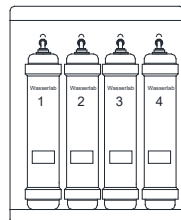


Figure 11.3

### 11.3 Replacement of the reverse osmosis membrane

The osmosis membrane should last at least 2 years. NO warning is activated when a change of the osmosis membrane is needed. The symptoms that indicate that the membrane must be replaced are:

- Decrease in production flow.
- Higher consumption of resin cartridges.



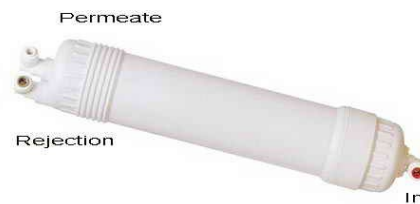
**IMPORTANT!** Before replacing the membrane, verify the compliance of the *Consumable storage requirements* described in Section 4.4 in the membrane to be installed or call your supplier for the acquisition of a new membrane.



**IMPORTANT!** To install or replace the membrane, ensure no water is being fed into the equipment and the equipment is depressurized (follow instructions below). The QC connectors cannot be disconnected under pressure.

Follow the instructions below to install or replace the osmosis membrane:

- Close the feed water shut-off valve.
- The warning *Water cut* is activated. Pressing the MODE / ESC key deactivates the acoustic signal.
- Access the location of the osmosis membrane. The membrane is installed inside the equipment, on the left side. Remove the top and left covers to access the membrane.
- Disconnect the membrane from the QC connections (See QC connection/disconnection instructions at the beginning of Section 7.3.1).
  - Lower connector (Water inlet = IN).
  - Upper connector: Middle connector ( Permeate) and side connector ( Rejection).
- Pull the membrane to release it from the anchor that holds it to the back wall of the equipment.
- Connect the new membrane from the QC connections. Make sure the connections are made properly.
- Open the feed water shut-off valve.



### 11.4 Tank cleaning and disinfection

The tank must be emptied, cleaned and disinfected:

- **At least once a year (recommended: at least 2 times a year)**
- **After prolonged stops.**

Cleaning the tank eliminates the contamination attached to the tank walls. It is recommended to clean the tank with a jet of water under pressure or by rubbing the tank walls.

A small dose of neutral detergent can be used during the cleaning. After cleaning, the detergent must be completely removed. To remove it, thoroughly rinse the tank with water.

After cleaning and disinfecting the tank, thoroughly rinse the tank with tap water, and use purified water for a final rinse.



## 12. Additional monitoring

The equipment monitors the conductivity of the produced water and the working hours of the equipment. Based on this data, the equipment warns the user of the need to replace the ion exchange resin and the pretreatment cartridges.

This chapter explains additional monitoring that the user can perform to have a better understanding of the equipment performance.

### 12.1 Monitor the inlet pressure

Check that the inlet pressure is at least 3 bar

### 12.2 Monitor the ionic rejection of reverse osmosis membrane.

The ionic rejection of the reverse osmosis membrane should be  $\geq 90\%$ .

Follow the instructions below to calculate the ionic rejection of the reverse osmosis membrane:

- Measure the inlet water conductivity in  $\mu\text{S/cm}$
- Measure the osmotized water conductivity in  $\mu\text{S/cm}$
- Calculate the ionic rejection percentage:  
Ionic rejection (%) =  $100 * (\text{Conduct. inlet water} - \text{Conduct. osmotized water}) / \text{Conduct. inlet water}$
- Verify the ionic rejection percentage is  $\geq 90\%$ .

*Example:*

- Inlet water conductivity =  $450 \mu\text{S/cm}$
- Osmotized water conductivity =  $6 \mu\text{S/cm}$
- Calculation: Ionic rejection (%) =  $100 * (450 - 6) / 450 = 98.7 \%$
- Ionic rejection  $98.7 \% \geq 90\% \rightarrow \text{OK}$

### 12.3 Monitor the production flow rate

Follow the instructions below to calculate the production flow rate:

- With the equipment in production mode, disconnect the tube that connects the equipment to the tank.
- When the flow rate stabilizes, measure the time in seconds (t) needed to fill 100 ml of a test tube
- Calculate the production flow rate in L/h: Production flow rate (L/h) =  $360/t$ .
- Measure the inlet water temperature and use Table 12.1 to calculate the normalized production flow rate at  $25^\circ \text{C}$ .
- Verify that the normalized production flow rate at  $25^\circ \text{C}$  is greater than or equal to the nominal flow rate.

*Example:*

- An equipment with a nominal flow rate of  $10 \text{ L/h}$  takes 30 seconds to fill 100 mL:  $t = 30 \text{ seconds}$
- Calculation: Production flow rate in  $\text{L/h} = 360/30 = 12 \text{ L/h}$
- Water temperature =  $18.8^\circ \text{C}$
- Factor in Table 12.1: Factor =  $1.251$
- Calculation: Normalized production flow rate at  $25^\circ \text{C}$  in  $\text{L/h} = 12 * 1.251 \text{ L/h} = 15.01 \text{ L/h}$ .
- Normalized production flow rate at  $25^\circ \text{C}$  ( $15.01 \text{ L/h}$ )  $\geq$  Nominal flow rate ( $10 \text{ L/h}$ )  $\rightarrow \text{OK}$

Table 12.1.

Temp	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
5	2.134	2.125	2.117	2.108	2.100	2.091	2.083	2.074	2.066	2.058
6	2.049	2.041	2.033	2.025	2.017	2.009	2.001	1.993	1.985	1.977
7	1.969	1.961	1.953	1.945	1.937	1.930	1.922	1.914	1.907	1.899
8	1.892	1.884	1.877	1.869	1.862	1.855	1.847	1.840	1.833	1.825
9	1.818	1.811	1.804	1.797	1.790	1.783	1.776	1.769	1.762	1.755
10	1.748	1.741	1.734	1.728	1.721	1.714	1.707	1.701	1.694	1.688
11	1.681	1.675	1.668	1.662	1.655	1.649	1.642	1.636	1.630	1.623
12	1.617	1.611	1.605	1.598	1.592	1.586	1.580	1.574	1.568	1.562
13	1.556	1.550	1.544	1.538	1.532	1.526	1.521	1.515	1.509	1.503
14	1.498	1.492	1.486	1.481	1.475	1.469	1.464	1.458	1.453	1.447
15	1.442	1.436	1.431	1.425	1.420	1.415	1.409	1.404	1.399	1.394
16	1.388	1.383	1.378	1.373	1.368	1.363	1.357	1.352	1.347	1.342
17	1.337	1.332	1.327	1.322	1.318	1.313	1.308	1.303	1.298	1.293
18	1.288	1.284	1.279	1.274	1.270	1.265	1.260	1.256	1.251	1.246
19	1.242	1.237	1.233	1.228	1.224	1.219	1.215	1.210	1.206	1.201
20	1.197	1.193	1.188	1.184	1.180	1.175	1.171	1.167	1.163	1.158
21	1.154	1.150	1.146	1.142	1.138	1.133	1.129	1.125	1.121	1.117
22	1.113	1.109	1.105	1.101	1.097	1.093	1.089	1.085	1.082	1.078
23	1.074	1.070	1.066	1.062	1.059	1.055	1.051	1.047	1.044	1.040
24	1.036	1.032	1.029	1.025	1.021	1.018	1.014	1.011	1.007	1.004
25	1.000	0.996	0.993	0.989	0.986	0.983	0.979	0.976	0.972	0.969
26	0.970	0.967	0.964	0.961	0.958	0.955	0.952	0.949	0.946	0.943
27	0.940	0.937	0.935	0.932	0.929	0.926	0.923	0.920	0.918	0.915
28	0.912	0.909	0.906	0.904	0.901	0.898	0.896	0.893	0.890	0.887
29	0.885	0.882	0.879	0.877	0.874	0.872	0.869	0.866	0.864	0.861
30	0.859	0.856	0.853	0.851	0.848	0.846	0.843	0.841	0.838	0.836
31	0.833	0.831	0.828	0.826	0.823	0.821	0.819	0.816	0.814	0.811
32	0.809	0.806	0.804	0.802	0.799	0.797	0.795	0.792	0.790	0.788
33	0.785	0.783	0.781	0.778	0.776	0.774	0.772	0.769	0.767	0.765
34	0.763	0.760	0.758	0.756	0.754	0.752	0.749	0.747	0.745	0.743
35	0.741	0.739	0.736	0.734	0.732	0.730	0.728	0.726	0.724	0.722
36	0.720	0.718	0.716	0.713	0.711	0.709	0.707	0.705	0.703	0.701
37	0.699	0.697	0.695	0.693	0.691	0.689	0.687	0.685	0.683	0.682
38	0.680	0.678	0.676	0.674	0.672	0.670	0.668	0.666	0.664	0.662
39	0.661	0.659	0.657	0.655	0.653	0.651	0.649	0.648	0.646	0.644
40	0.642	0.640	0.639	0.637	0.635	0.633	0.631	0.630	0.628	0.626

## 12.4 Monitor the rejection flow rate

Follow the instructions below to calculate the rejection flow rate:

- Disconnect the rejection tube (drainage tube) and measure the time in seconds (t) needed to fill 100 mL of a test tube.
- Calculate the rejection flow rate in L/h: Rejection flow rate (L/h)=360/t.
- The rejection flow rate should be 36 l/h.
- A rejection flow rate below 36 L/h with a correct inlet pressure indicates the flow restrictor is blocked.

## 12.5 Monitor the water hardness

The feed water hardness can vary throughout the year, so it is recommended to measure it several times a year.

A water softener to prevent the formation of lime precipitates in the system is needed when the feed water hardness exceeds 300 ppm of CaCO<sub>3</sub>.

## 12.6 Monitor the chlorine

It is recommended to measure the absence of chlorine in the rejection water several times a year (qualitative method). The presence of chlorine in the rejection water indicates the exhaustion of the pretreatment.

## **13. Calibration**










The equipment is adjusted and calibrated at the factory before delivery.

The equipment can be calibrated and adjusted at any time by the Technical Assistance Service according to international standards. It is recommended to recalibrate the equipment once a year.

## 14. Troubleshooting

This chapter shows two tables. The first one shows the warning messages that the equipment can emit, their causes and the corrective actions on them. As a general prevention measure, it is recommended to follow the corresponding actions once a warning is activated. The second table collects most of the unforeseen situations that may require intervention, their causes and the corrective actions on them.

### 14.1 Warnings

Warning	Cause	Corrective actions
<b>The equipment emits warnings through a symbol and an acoustic signal. Pressing any key deactivates the acoustic signal.</b>		
Warning-pretreatment. <i>Replace the</i>   	The working hours of the equipment reached the working hours set point.	Change the pretreatment cartridges [1] and [2]. Follow the instructions in Section 11.1.
Warning-deionization resin. <i>Replace the</i>   	The conductivity of the Type II water exceeded the conductivity set point.	Change the resin cartridges [3] and [4]. Follow the instructions in Section 11.2.
Warning-Water cut 	The feed water is interrupted	Check that water is being supplied to the equipment.  Change the pretreatment if it is blocked.
Warning- Conductivity probe  	Conductivity probe is not measuring correctly.	Contact the Technical Assistance Service (see contact information in Section 0.3).

### 14.2 Problems

Problem	Cause	Corrective actions
The screen light or the menu does not work.	The equipment does not receive electrical power.  Defective electrical component.	Disconnect the equipment. First disconnect the plug-in and then disconnect the transformer from the electrical network.  Check the electrical connections: Connection to the electrical network, to the transformer and to the electronic board.
The equipment produces no water or produces very little water.	Water is not being supplied to the equipment. Feed water pressure < 3 bar Erroneous hydraulic connections.	Check that water is being supplied to the equipment. See recommended actions described in Warning- <i>Water cut</i> .  Check the inlet pressure: The lower the pressure, the lower the performance of the equipment.  Check the hydraulic connections.  Check that the tube that connects the tank to the equipment is not blocked  Check that the rejection tube is not blocked  If no deviations are observed after checking all the above, the lower production may be due to the exhaustion of the reverse osmosis membrane. See recommended actions in problem <i>The resin lasts a short time</i> .  Check the switch level connection.
The conductivity of the final water is high.	The resin cartridges may be exhausted.	Check that water is coming out of the rejection tube.  Change the resin cartridges [3] and [4]. Follow the instructions in Section 11.2.

		See recommended actions in problem <i>The resin lasts a short time.</i>
The resin lasts a short time.	Reverse osmosis membrane may be exhausted.	Check the percentage of ionic rejection of the membrane (See Section 12.2): If the percentage is lower than 90% the membrane must be replaced by a new one. To replace the reverse osmosis membrane, follow the instructions in Section 11.3.
Water leaks.	Failure in an equipment connection.	Contact the Technical Assistance Service (Contact information in Section 0.3).
After changing the pretreatment, the warning does not deactivate.	The pretreatment counter has not been reset	Reset the pretreatment counter (See Section 10.4.4).

## 15. Liability

Navarra de Tratamiento del Agua, S. L. (Wasserlab) disclaims any liability for breach of the recommendations outlined in this document or the use of consumables or spare parts of equipment not supplied by the manufacturer.

## 16. Waste disposal

**Packaging:** When the packaging is no longer needed, it can be disposed of as household waste.

**Equipment:** The system is in conformity with Guideline 2012/19/UE. The pictogram means the equipment is not a household waste. The equipment must be properly disposed of. Contact the local authorities or pertinent waste disposal companies.



## 17. Declaration of conformity

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### Declaration of conformity

Navarra de Tratamiento del Agua S. L. declares that this

Water Purification Equipment:  
Model: Micromatic  
Brand: **Wasserlab**<sup>®</sup>

Manufactured and certified by Navarra de Tratamiento del Agua S.L., is in conformity with the relevant Union harmonisation legislation:

- Directive 2014/35/UE Low Voltage.  
Security requirements for electronic measuring, control and laboratory use equipments:
  - o UNE/EN 61010-1:2011/A1:2020 Safety requirements for electrical equipment for measurement, control and laboratory use. Part 1: General requirements
- Directive 2014/30/UE Electromagnetic compatibility.
  - o Electrical material for measurement, control and use in the laboratory. Electromagnetic compatibility requirements. UNE/EN 61326-1:2021 General requirements.
  - o UNE/EN 61000-3-2:2019 Electromagnetic compatibility (CEM). Limit
  - o UNE/EN 61000-3-3:2013 Electromagnetic compatibility (CEM). Limit
  - o UNE/EN 61000-4-2:2010 Electromagnetic compatibility (CEM). Part 4-2: Testing and measurement techniques. Electrostatic discharge immunity test
  - o UNE/EN 61000-4-8:2011 Compatibilidad electromagnética (CEM). Part 4-8: Testing and measurement techniques. Immunity tests to magnetic fields at industrial frequency
- Directive 2011/65/UE on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

The equipment complies with the directives and standards mentioned when installed according to manufacturer's specifications.

Signed for and on behalf of Navarra de Tratamiento del Agua, S. L.:

**Wasserlab**<sup>®</sup>  
Navarra de Tratamiento el Agua S.L.  
Tax Number ESB31637580

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This declaration of conformity is issued under the sole responsibility of the manufacturer