Installation and Maintenance Handbook

Water Treatment System

W-Care
INDEX

1. GENERAL SAFETY RULES AND MACHINERY DESCRIPTION 1
   1.1 Precautions for use 1
   1.2 General description 1
   1.3 Structure 1

2. HANDLING AND DELIVERY 2
   2.1 Delivery methods 2
   2.1.1 Weight and dimensions skid ADVANCED 2
   2.1.2 Weight and dimensions skid BASIC 3

3. INSTALLATION 4
   3.1 Positioning and anchoring 4
   3.2 Positioning conditions 4
   3.3 Skid Advanced & Basic assembling 4
   3.3.3 Piping connection 5
   3.4 Electrical connections 6

4. HOW TO START W-CARE ADVANCED UP 7
   4.1 Time switch setup 7
   4.1.1 Reset 7
   4.1.2 Language setup 7
   4.1.3 Time and date setup 7
   4.1.4 Extra setup cancellation 7
   4.1.5 Main setup 7
   4.2 Biocide dosage system regulation 7
   4.2.1 Main parameters reset 7
   4.2.2 Dosage settings 8
   4.3 Antiscal system dosage regulation 8
   4.3.1 Main parameters reset 8
   4.3.2 Dosage settings 8
   4.3.3 Connecting the pulse generator counter 9
   4.3.4 Value of division calculation 9
   4.4 Conductivity control system regulation 9
   4.4.1 Main parameters reset 9
   4.4.2 Conductivity meter configuration setup 10
   4.4.2.1 Set-point setup 10
   4.4.2.2 Exit setup 10
   4.4.2.3 Hour setting 10
   4.4.2.4 Print settings 10
   4.4.2.5 Password settings 11
   4.4.3 Conductivity probe configuration 11
   4.4.3.1 Probe calibration 11
   4.4.3.2 Probe cleaning 11
   4.4.3.3 Password settings 12
   4.4.4 Electrical connections of conductivity meter 12
   4.5 Automatic purge valve connection (optional) 12

5. HOW TO START W-CARE BASIC UP 13
   5.1 Bivalent dosage system regulation 13
   5.1.1 Main parameters reset 13
   5.1.2 Dosage settings 13
   5.1.3 Connecting the pulse generator counter 13

6. GENERAL MAINTENANCE INSTRUCTIONS 13

7. CHEMICAL PROPERTIES OF THE WATER RECYCLING 14
   7.1 Recommended water characteristics 14
   7.2 PH-temporary water hardness diagram 15

8. W-CARE SPARE PARTS 16
   8.1 Skid Basic spare parts 16
   8.2 Skid Advanced spare parts 17
1. GENERAL SAFETY RULES AND MACHINERY DESCRIPTION

1.1 General Safety use
The content of this manual is to be considered as an integration to the general safety rules applied in your country, in the environment you are working in and also to the rules to be followed by law. In case of conflict with any of the previously mentioned rules in place, please contact our technical office for alternative procedures that will not create conflict. Always remember that any operation with mechanical machinery could be dangerous and make sure all possible precautions are followed before and during assembling & maintenance. SAFETY FIRST!

1.2 General description
The use of evaporative systems for cooling leads to an important reduction of energy consumption, but introduces the need for water management. A correct water treatment for the tower extends the life of the plant and the tower itself, by reducing the consumption to a minimum. W-Tech, in addition to producing evaporative cooling equipment, also proposes two solutions able to satisfy the needs from small to large plants.

The "Advanced" system automatically manages the draining of water inside the evaporative system (Tower, Closed Circuit cooled or evaporative condenser) through the use of a digital conductivity. It also manages the dosing of antiscale/anticorrosive proportionally to the water consumption and, in addition, the dosing of biocide by shock with programmable intervals. This type of system optimizes consumption of water and chemicals, to prolong the life of the entire system. The system is delivered pre-assembled skid mounted, fully wired (IP65) and includes a first supply of chemical products. It is recommended for a close circuit systems or for large plants.

The "Basic" system is a solution, with a good quality / price ratio, designed for units of modest size and is capable of ensuring a bivalent protection thanks to the use of a single antiscale / anticorrosive & biocide product. The pump will dose into the water of the evaporative system (Tower, Closed Circuit cooled or evaporative condenser) the correct amount of product through the use of a metering pump connected to a pulse meter. This type of system optimizes the consumption of water and chemical product prolonging the life of the entire system. The system is supplied pre-assembled, complete with tank and metering pump (IP65) and comprises a first supply of chemical product.

1.3 Structure
The unit is built with galvanized steel panels ‘Sendzimir’ type with a superficial protection of 300g/m$^2$ of zinc. According to standard procedure a 70μm epoxy-polyester powder layer is applied on each side of the panels. The application occurs through electrostatic coating process, then the paint is polymerized in oven at 180° in order to guarantee a perfect application. This process grants a remarkable corrosion resistance and protection against UV light.

The painting procedure is called W-COAT® and is being applied on each of our products.
2. HANDLING AND DELIVERY

2.1 Delivery methods
This series models are supplied on wooden pallets. The connecting elements, pipes and other objects are provided in a separate box or inside the tank.

THE WOODEN SUPPORT AND THE PLASTIC SHEETS ARE TO BE REMOVED BEFORE INSTALLING THE SKID IN ITS FINAL POSITION. PAY ATTENTION TO THE PIPES AND THE PUMPING SYSTEM AND MAKE SURE THEY ARE FREE OF OBJECTS THAT COULD CAUSE PROBLEMS OR DAMAGE THE NORMAL FUNCTION OF THE WATER TREATMENT.

2.1.1 Weight and dimensions of the skid ADVANCED

- **Modality: Installation**
  - Chemical products: excluded
  - Weight: 60kg

- **Modality: Shipment**
  - Chemical products: included
  - Weight: 130kg

- **Modality: Shipment**
  - Chemical products: excluded
  - Weight: 70kg

- **Modality: Shipment**
  - Chemical products: included
  - Weight: 110kg
2.1.2 Weight and dimensions of the skid BASIC

**Modality: Installation**
Chemical products: excluded
Weight: 20kg

Chemical products: included
Weight: 45kg

**Modality: Shipment**
Chemical products: excluded
Weight: 25kg

Chemical products: included
Weight: 35kg
3. INSTALLATION

3.1 Positioning and anchoring
These units do not need a special base. They can be situated on a cemented base or on a concrete ground. Make sure you anchor the skid advanced.

3.2 Positioning conditions
The skid can be placed both in a free area and in a closed one.
It is required to maintain a distance between the chemical products pump and the unit, below the maximum distance allowed by the prevalence indicated on the pump.

3.3 Skid Advanced assembling
Before the installment, make sure that all the elements given within the basin have been removed. Inside the tank there are two square rods, fit them inside the rods with greater width that are placed vertically to the structure. Block the rods through the given bolts.
Place the instrument panel at the top by sliding the rods inside the rails. If possible, secure with screw and fix the tool panel on the wall.

Once the unit is set, connect the pipes to the pump through the specific pipe holder and tighten the locking nuts. Connect the BNC level probe connector of the two tanks to the space dedicated to the respective pumps. On the skid advanced connect the pulse generator counter cable to the INPUT present on the antiscale product pump. On the skid basic, connect the BNC to the only pump available.
The pipes must be placed in the following order:
1. From the biocide container to the suction tube joint of the biocide pump;
2. From the drain line joint of the biocide pump to the biocide container;
3. From the outlet pipe connection of the biocide pump to the cooling tower basin;
4. From the antiscale basin to the suction tube joint of the antiscale pump;
5. From the drain line joint of the antiscale pump to the antiscale basin;
6. From the outlet pipe connection of the antiscale pump to the cooling tower basin;
7. From the cooling tower’s basin to the conductivity probe-holder joint;
8. From the conductivity probe-holder joint to the cooling tower’s basin;
9. From the bivalent container to the suction-pipe joint of the bivalent pump;
10. From the drain line joint of the bivalent pump to the bivalent container;
11. From the outlet pipe connection of the bivalent pump to the cooling tower basin.

3.3.3 Piping connection

Verify that the furnished unit is equipped with pump for the basin water recircle (in case of an evaporative condenser or evaporative cooler) or without pump (in case of cooling tower). Identify your model with at least one of the below represented and follow the indications as they come in the chart in the legend.
Legend:
1 Pulse emitting water meter;
2 Antiscale dosage pump, controlled from pulse emitting water meter 1;
3 Biocide dosage pump, controlled from a time switch;
4 Biocide and antiscale injection;
5 Antiscale storage for the Advanced (Acquastar 2104), bivalent for the Basic (Acquastar 2105);
6 Biocide storage (Bio 416);
7 Probe holder;
8 Conductivity control system;
9 Conductivity probe;
10 Purge valve (Optional W-tech);
11 Pipe basin water replenishing.

### 3.4 Electrical connections
Our skids are generally supplied already wired and all the electric cables are available outside the unit in order to minimize the work on site.

It is therefore necessary to connect the power supply to start the instrumentation. **Before making the electrical connection make sure the power source corresponds to the electrical data on the nameplate.** Use cables of suitable section to avoid overheating and/or excessive voltage drop at the motor terminals.

Installation and maintenance, including operation on the electric motor, must be performed by EN 60204-1 trained personnel.
4. STARTING W-CARE ADVANCED UP

The skid advanced consists of:
1. Biocide pump time switch;
2. Biocide dosage system;
3. Antiscale dosage system;
4. Water conductivity reading system

4.1 TIME SWITCH SETTINGS

4.1.1 Reset

This operation will erase all the setting data and will bring the instrument back to the factory default settings.

- Press and hold simultaneously the four buttons for more than 3 seconds in order to erase all the records.
- The display will show the time switch identification code for a few seconds and then you will see the confirmation of the change that took place appear.

4.1.2 Language

Select the language you prefer by the "ץ" buttons and then confirm it pressing the OK button.

4.1.3 Time and Date settings

Insert the correct date (Year/Month/Day) by pressing the "ץ" buttons, confirm your choice and press OK. The time setting is next. Digit the correct time (hour/minutes/seconds) the same way you did with the date setting. Press OK and confirm.

4.1.4 Erase extra functions

Press “OK” (MENU) e choose MENU EXTRA from the many by the “ץ" buttons and press “OK”.

MENU EXTRA SEASON DO NOT USE OK
MENU EXTRA HOLIDAY REMOVE OK

Press “C” in order to exit the EXTRA MENU and return to the PROGRAM MENU

4.1.5 Main settings

Press “OK” (Menu) and choose PROGRAM MENU, confirm with “OK”. Select with the “ץ” buttons PROG 01 e press “OK”, once you are into PROG 01 select Program and scroll down with the “ץ” buttons until you get to C1 option CICLO and press “OK”.

Now set up the working days (INI DAYS) put ‘YES’ for a working day and ‘NO’ for the non-working days.
Set up the turn-on time for the working days you selected.
Set the instrument’s switching-off time (Please note that the switching-off time must be different from the turn-on time set up before).

In the end, set up the instrument’s turn-on time (TIME ON) e the switch-off time (TIME OFF).

(For example: time on 1 hour 5 min, time off 24-time on = 22 hours 55 min). Press “OK” to complete PROG 01, later double press “C” to exit the setting.

4.2 BIOCIDE DOSAGE SYSTEM Regulation

Additive to be used: Bio 416 (Biostatic Biocide or other)
Dosage: 500 gr a shock
Dosing frequency: 3 shock per week (summer season)
Functions to be used: CC ST; CONSTANT
Value to be set: CC ST (Per VMSA MF 4 l/h = 0.37 cc/imp)
Value to be set: CONSTANT = 23 SPM

4.2.1 Main parameters reset

This operation will erase all the setting data and will bring the instrument back to the factory default settings.

- Remove the power
- Press and hold simultaneously the “ץ" buttons to reconnect.
- You will see on the display the message LOAD DEFAULT together with the instrument identification code which means the operation went through.
4.2.2 Dosage settings

Setting mode CC ST set during the programming phase (quantity of the product to be dosed in relation to the pulses to be supplied to the magnet)

- Confirm the password E - E
- Enter the full menu ↑ E
- Select Prog 2 “SET UP” ↑ E
- Select set 1 “CC ST” E
- Set the “CC ST” value according to the pump used 00,xx cc/imp
- Save E
- Exit the menu ESC – ESC – ESC

Setting mode CONSTANT (The pump doses the product at a constant frequency as a function to the “SPM” values (rounds per minute) set during the programming phase.

- Confirm the password E - E
- Enter the full menu ↑ E
- Select Prog 1 “MODE” E
- Select Mode 1 “COSTANT” E
- Set the “COSTANT” value 23 SPM
- Save E
- Exit the menu ESC – ESC – ESC

For other functions (such pump priming, various alarms, etc.) and troubleshooting refer to the operating manual of the pump supplied with the skid.

4.3 ANTISCALE DOSAGE SYSTEM Regulation

Additive to be used: Acquastar 2104 (Antiscale)
Concentration in the circuit: 200 ppm
Restored concentration: 140 ppm
Functions to be used: CC ST, DIVIDE
Values to be set: CC ST (Per VMSA MF 4 l/h = 0.37 cc/imp)
Values to be set: DIVIDE = “N”
Pulse generator counter: Turbine threaded flow meter 4 imp/l

4.3.1 Main parameters reset

This operation will erase all the setting data and will bring the instrument back to the factory default settings.

- Remove the power.
- Press and hold simultaneously “↑ e →” buttons to reconnect.
- You will see on the display the message LOAD DEFAULT together with the instrument’s identification code which means the operation went through.

4.3.2 Dosage settings

CC ST set during the programming phase (quantity of the product to be dosed in relation to the pulses to be supplied to the magnet)

- Confirm the password E - E
- Enter the full menu ↑ E
- Select Prog 2 “SET UP” ↑ E
- Select set 1 “CC ST” E
- Set the “CC ST” value according to the pump used 00,xx cc/imp
- Save E
- Exit the menu ESC – ESC – ESC

Setting mode DIVIDE (The pulses supplied by the counter that’s connected to the pump, are divided by the value set during the programming phase and they determine the frequency of dosage).

- Confirm the password E - E
- Enter the full menu ↑ E
- Select Prog 1 “MODE” E
- Select Mode 2 “DIVIDE” ↑ E
- Set the “N” value XX
- Save E
- Exit the menu ESC – ESC – ESC

For other functions (such pump priming, various alarms, etc.) and troubleshooting refer to the operating manual of the pump supplied with the skid.
4.3.3 Connecting the pulse generator counter
Install the threaded cold water meter on the line of reinstatement of the tower in order to quantify the “clean” water fed into the tower. Connect the BNC connector to the antiscale INPUT set up.

4.3.4 How to calculate the value of division
The calculation of the number of division that the pump must accomplish is to be done as following:

\[
\frac{\text{imp}[\text{l}]}{\text{ppm}[\text{cc}] \times \text{K}} \times 1000 = N
\]

N – value of division to be set; [imp/l] - litre pulses supplied by the pulse generator counter; [cc] – the quantity of product dosed for single injection (in cc) of the metering pump you want to use; [ppm] – amount of product to dose in parts per million (gr/m3) in order to guarantee the product’s concentration in the tower not less than 200 ppm; [K] – coefficient of product to be dosed. Pure product K=1.

NOTE: THE MINIMUM CONCENTRATION VALUE OF THE PRODUCT TO BE HELD IN THE TOWER DEPENDS ON THE CHEMICAL CHARACTERISTICS OF THE WATER, IN CASE OF ABSENCE OF THE SPECIFIC CHEMICAL ANALYSIS IT IS POSSIBLE TO ADOPT THE PARAMETERS RECOMMENDED BY US AND IN ANY CASE VERIFY THAT THERE IS NO SCALE FORMATION NEITHER WHITE-RUST ON THE GALVANIZED SURFACES.

Example of calculation:
- Pulse generator counter of 4 l/h, VMS MF 4 l/h = 0.37 cc/imp – Pure product K=1
- amount of product to dose in parts per million (gr/m3) = 140 ppm

\[
\frac{4}{0.37} \times 140 \times 1 = 10.5 = N
\]

4.4 CONDUCTIVITY CONTROL SYSTEM REGULATION
Conductivity meter: 90÷240VAC-50/60Hz
Power: 10 Watt
Degree of protection: IP 65
Measuring scale: 0÷20 mS
Factor K conductivity probe: 1
Measuring scale: 0÷5 mS
Electrode type: stainless steel
Purge valve (optional): ball solenoid

4.4.1 Main Parameters reset
Do this in case you have forgotten your password or when it is necessary. Erasing all the data will bring the instrument back to the factory default settings.

- Remove the power
- Press and hold the ESC button until the message “PRESS ENTER FOR DEFAULT OR ESCAPE TO CONTINUE” appears.
- Wait the recovery screen to show up and confirm pressing “Enter” if you want to proceed.
4.4.2 Conductivity meter configuration setup

From the main screen double press the “>” button in order to underline the “SETUP” function. Press “Enter” to confirm. Then you will see the insert password screen appear (0000 is the password set up from W-tech). Press “Enter” to confirm and access the menu setup. With the “ESC” button you will be able to turn back to the main setup.

4.4.2.1 “Set point” settings

- Access the menu pressing “Enter”
- On the screen below enter the data as following

D1 is the instrument’s digital output setpoint 1 and it is not editable. “Off” indicates that the setpoint is disabled. It should be changed in “On” to activate the D1.

- D1: Off (If not installed automatic purge valve) - D1: On (If installed automatic purge valve)
- D1: On (Automatic purge valve closure) Set the value < 02.40* mS (* Inductive value with use of galvanized sheet. Either way, consult the Recommended Water Characteristics chart) - Γ: 00.00

D2 is the instrument’s digital output setpoint 2 and it is not editable. “Off” indicates that the setpoint is disabled. It should be changed in “On” to activate the D2.

- D2: Off (If not installed automatic purge valve) - D2: On (If installed automatic purge valve)
- D2: On (Automatic purge valve opening) Set the value > 02.42* mS - Γ: 00.01

Γ: is the ignition point/ turning off the relay, it turns on when the solution reaches 02,43 mS and it turns down when it passes 02,41 mS

P1 is the proportional output for an eventual pump. P1: Off
P2 is the proportional output for an eventual pump P2: Off
A1 is the alarm, entering 1 it is enabled. “Off” means the alarm is disabled. It must be “On” in order to activate it.
A1: On > 02,80* mS it indicates the intervention of the alarm shall be activated with a higher value than the one of the solution. The water conductivity may cause problems to the structure and its components.
A2: Off

- Double press “Enter” to save and turn back to the Setup menu

4.4.2.2 “OPTION” settings

- Access the menu pressing “Enter”
- On the screen below enter the data as following
- Double press “Enter” to save and turn back to the Setup menu

4.4.2.3 “CLOCK” settings

Underline “Clock” and press “Enter” to confirm. See the screen as below. Using the pointer keys set date and clock as following:

- Date: Day of the week DD/MM/YY – Time: HH.MM.SS. (24h)
- Double press “Enter” to save and turn back to the Setup menu.

4.4.2.4 “PRINT, COMM.” setup

Use this set up only if there is a printer, computer or LDCOM installed. Highlight “PRINT, COMM” and press “Enter” to confirm.

Inst. ID: is the instrument ID number. It must be modified only if there and more than one instruments connected to the same network.

“Tx at 00.00 ev. 00.00”: allows the status dispatch at a time on a chosen time(At) every hour/minute (ev.). You can vary the time and the interval by the pointer keys.
"or if: Off": is set on "Off" the dispatch is disabled. If set on "alarm" the dispatch is enabled even when there is a
general alarm condition. Besides the general alarm it is possible to select the alarm for lack of flow "flow" and/or
alarm for tank level "level".

Modern": yes "SMS": no PSTN modem configuration (es.: 56K/V90). It can be controlled remotely: Configuration
and status.

"Modem": yes "SMS": yes Configuration for modem GSM. It sends short text messages (SMS) in case of alarm or
on set time intervals. Text Messages can be sent on a maximum 9 numbers memorized on the SIM CARD.

• Double press "Enter" to save and turn back to the Setup menu

4.4.2.5 “PASSWORD” Settings
If you modify the password, you will deny unauthorized persons access the “Setup” menu. Using the pointer keys
you can enter a new numeric password from 0000 to 9999. In case you forget it, you should reset the instrument.

4.4.3 Conductivity probe configuration
From the main screen, press “>” three time until you highlight the “PROBE” function. Press “Enter” to confirm. Then you will
see the insert password screen appear (0000 is the password set up from W-tech). Enter “Enter” to confirm and access the
probe menu. With the “ESC” button you will be able to turn back to the main setup.

4.4.3.1 Probe calibration
Choosing “1.Calibrate” from the menu you access the probe setting (see below). For this setup it is necessary a
buffer solution (next to the work valve) to perform the calibration of the probe.

A

B

C

The screen is divided in 3 main sections A, B, C.
In section "A" you visualize the current conductivity reading, the temperature and the date of the last calibration.
This elements are not editable.

Section “B” contains the conductivity probe data. This is a list of the editable elements:
• “K”: Coefficient of the probe. The probe that we supply has a K value equal to 1.
• “Temp”: temperature of the buffer solution. Measure with a thermometer the temperature of the buffer
solution and insert the value.
• “P1”: calibration of the "zero". To calibrate the probe, remove it from the probe holder and leave it to dry
out. Move the pointer to “Set-P1", read the conductivity value present in the section “A” and wait until it
stabilizes. The value present in sector “A” may not correspond with the value of the buffer solution. You just
need to wait until it stabilizes. Press “Enter”. Next to “P1: 0.000mS", “OK” button will appear.
To save the values, move the pointer to “SAVE” and confirm with “Enter”. In case you want to proceed to the
next calibration (“P2"), move the pointer to the concerning field.
• “P2": probe calibration with the buffer solution. Insert the probe in the buffer solution, move the pointer to
“P2", select ‘mS” o “μS”. Read the value if the buffer solution and insert it on the corresponding field. Move
the pointer to "Set-P2" and press “Enter”. Next to “P2: 141.3 μS” (explanatory value) “OK” button will
appear.
• In order to save all the data, move the pointer to “SAVE”, press “Enter”, wait until the message “SAVE?”
appears and confirm pressing “Enter”.
• Section “C” contains the configuration data of the temperature probe. The instrument we supply is already
tared. In case you need to re calibrate it ( for example: probe’s tolerance recovery, compensation between
the installation temperature and the probe holder), move the cursor to the numerical value and set the value
detected by the thermometer. Move until you highlight “Set-T” and press “Enter”. Beneath “Set-T” “OK”
button will appear.

4.4.3.2 Probe cleaning
From the main screen select “Self-Clean” (automatic cleaning) and press “Enter”. You will see the following screen
appear. NOTE: Before choosing the self-cleaning please consult the manual.
4.4.3.3 Password setup
Select the 3. Password” voice and press “Enter” to confirm. If you modify the password, then you would prohibit unauthorized persons access the “Probe” menu.

4.4.4 Electrical connections of conductivity meter

Our skids are generally supplied already wired and all the electric cables are available outside the unit in order to minimize the work on site.
It is therefore necessary to connect the power supply to start the instrument. **Before making the electrical connection make sure the power source corresponds to the electrical data on the nameplate.** Use cables of suitable section to avoid overheating and/or excessive voltage drop at the motor terminals.
Installation and maintenance, including operation on the electric motor, must be performed by EN 60204-1 trained personnel.

Referring to the above shown figure, a list of the available contacts:
F1: General-purpose fuse for protection (3.15A)
F2: Fuse for the instrument protection (2A)
F3: Fuse for alarm protection (2A)
1(Phase) 2(Earth) 3(Neutral): Power source (90÷240) VAC - 50/60Hz (Fig. 1)
4(Phase) 5(Earth) 6(Neutral): Output (90÷240) D1 - Setpoint1 – Automatic purge valve Output (closure)
7(Phase) 8(Earth) 9(Neutral): Output (90÷240) D2 - Setpoint2 – Automatic purge valve Output (opening)
20(Mass) ; 21: Contact level 2 (Fig. 2)
22 ; 23 ; 24: Flow sensor (Fig. 2)
40(Mass/yellow/white); 41(Entry signal/green); 42(Power source/brown): Temperature probe PT100 (Fig. 3)
43(Mass/blue); 44(Entry signal /red); 45(Entry signal /black): Conductivity probe (Fig. 3)
J1-J2 Serial communication ports (RS232-RS485); 25(-); 26 (+):exit RS485

**NOTE:** please consult the instrument’s manual about all the other connections.
If installed solenoid valve, see the connections below (fig. 4).

4.5 Automatic purge valve connection (optional)
Thanks to the water conductivity reading, the W-Care Advanced system will automatically open the purge valve, reducing the concentration of the water itself. Once the from the set-point requested value is reached, the system will send a signal to shut the valve. This mode of operation guarantees the restoration of ‘fresh’ water, therefore the reduction of the water concentration and the maintenance of the established value, and in the meantime eliminating waste. For further information and troubleshooting refer to the operating manual supplied with the skid.
5. STARTING W-CARE BASIC SYSTEM UP

The skid basic consists of:

1. Bivalent component dosage system (biocide + antiscale);
2. Pulse emitting water meter

5.1 BIVALENT DOSAGE SYSTEM Regulation

Additive to be used: **Acquastar 2105** (Antiscale)
Concentration in the circuit: 200 ppm
Restored concentration: 140 ppm
Functions to be used: CC ST; DIVIDE
Value to be set: CC ST (Per VMSA MF 4 l/h = 0.37 cc/imp)
Value to be set: DIVIDE = “N”
Pulse generator counter: Turbine threaded flow meter 4 imp/l

5.1.1 Main parameters reset

*This operation will erase all the setting data and will bring the instrument back to the factory default settings.*

- Remove the power
- Press and hold simultaneously the “ünde” buttons to reconnect.
- You will see on the display the message LOAD DEFAULT together with the instrument identification code which means the operation went through.

5.1.2 Dosage regulation

CC ST set during the programming phase (quantity of the product to be dosed in relation to the pulses to be supplied to the magnet)

- Confirm the password
- Enter the full menu
- Select Prog 2 “SET UP”
- Select set 1 “CC ST”
- Set the “CC ST” value according to the pump used 00,xx cc/imp
- Save
- Exit the menu

Setting mode DIVIDE (The pulses supplied by the counter that’s connected to the pump, are divided by the value set during the programming phase and they determine the frequency of dosage).

- Confirm the password
- Enter the full menu
- Select Prog 1 “MODE”
- Select Mode 2 “DIVIDE”
- Set the “N” value XX
- Save
- Exit the menu

To calculate the value of division “N”, refer to the paragraph 4.3.4

For other functions (such pump priming, various alarms, etc.) and troubleshooting refer to the operating manual of the pump supplied with the skid.

5.1.3 Connecting the pulse generator counter

Install the threaded flow meter for cold water on the tower’s restoration line so it can supply a continuous reading of the returning “fresh” water. Connect the BNC connector to the antiscale pump Input set up.

6. GENERAL MAINTENANCE INSTRUCTIONS

In order to get the maximum of this system performance, you must pay attention to the correct chemical product distribution and make sure that the pipe system is clean and not clogged.

If necessary replace the chemical product aspiration and the input pipes. Periodically clean the walls of the tray and the sensor, verify that the contacts of the probe are clean and free of scale.

Make sure that inside the container there is not water present, as this would deteriorate the characteristics of the chemical products contained inside. Make sure that the level of chemical product is always above the minimum to avoid the blocking of the pump because of minimum level alarm. See the chart on the next chapter to verify that the water conditions are compatible with the material and all the unit’s component.
### 7. CHEMICAL PROPERTIES OF THE WATER RECYCLING

#### 7.1 Recommended water characteristics

<table>
<thead>
<tr>
<th>Property</th>
<th>Galvanized steel Z-300</th>
<th>Stainless Steel AISI 304</th>
<th>Stainless steel AISI 316</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>7.0 – 9</td>
<td>6.0 – 9.5</td>
<td>6.0 – 9.5</td>
</tr>
<tr>
<td>Total suspended solids (ppm)</td>
<td>&lt; 25</td>
<td>&lt; 25</td>
<td>&lt; 25</td>
</tr>
<tr>
<td>Conductivity (micro-Siemens/cm)</td>
<td>&lt; 2.400</td>
<td>&lt; 4.000</td>
<td>&lt; 5.000</td>
</tr>
<tr>
<td>Alcalinity CaCO₃ (ppm)</td>
<td>75 – 600</td>
<td>&lt; 600</td>
<td>&lt; 600</td>
</tr>
<tr>
<td>Hardness CaCO₃ (ppm)</td>
<td>50 – 750</td>
<td>&lt; 600</td>
<td>&lt; 600</td>
</tr>
<tr>
<td>Silica SiO₂ (ppm)</td>
<td>&lt; 150</td>
<td>&lt; 150</td>
<td>&lt; 150</td>
</tr>
<tr>
<td>Chlorides Cl⁻ (ppm)</td>
<td>&lt; 400</td>
<td>&lt; 400</td>
<td>&lt; 2.000</td>
</tr>
<tr>
<td>Bacterial (cfu/ml)</td>
<td>&lt; 10.000</td>
<td>&lt; 10.000</td>
<td>&lt; 10.000</td>
</tr>
</tbody>
</table>
7.2 Ph-temporary water hardness diagram

TILLMANN DIAGRAM

HARD WATER THAT FORMS SCALE UNDER NORMAL CONDITIONS

BALANCED WATER THAT NEITHER CORRODES NOR FORMS SCALE

CORROSIVE/AGRESSIVE WATER UNDER NORMAL CONDITIONS
8. W-CARE SPARE PARTS

8.1 Skid Basic spare parts

1. Level probe with foot filter and injection valve;
2. Threaded pulse generator counter (3/4" – 1" – 2");
3. Graduated container for additive 50 l ;
4. Bivalent chemical product pump;
5. 20 m extension pulse generator counter;
6. Kit PE pipe for aspiration and input 20 m;
7. Bivalent chemical product Acquastar 2105 25 l .
8.2 Skid Advanced spare parts

1. Level probe with bottom filter and injection valve;
2. Turbine pulse generator counter (3/4" – 1" – 2");
3. Graduated container for additive 50 l;
4. Biocide product pump;
5. Antiscale product pump;
6. Pulse generator counter extension 20 m;
7. Kit PE aspiration and input pipe 20 m;
8. Antiscale product tank Acquastar 2104 25 l;
10. Digital tool for the conductivity reading;
11. Conductivity probe with stainless electrodes;
12. Conductivity probe holder;
13. Emergency button;
14. Timer;
15. Circuit break switch and release;
16. Metal structure;
17. Cleaning solution for conductivity probe;