Water purification system

Adrona Q-Front N

INSTALLATION & OPERATION MANUAL

Version 1.0 (2019)

ISO 9001
BUREAU VERITAS
Certification

No. LVRIG38118A

Table of Contents

INTRODUCTION 3
Using This Manual 3
Safety Information 3
Contact Adrona 3
PRODUCT OVERVIEW 4
Adrona Q-Front N Water System General Description 4
System Overview 4
Water Specifications 5
Technical Specifications 5
System Components in Flow Chart 6
Principle 6
PRE-INSTALLATION 7
Feedwater requirements 7
Feedwater connection 7
Site requirements 8
Environmental requirements 8
Water leakage safety 8
UNPACKING 9
INSTALLATION 9
Preparation of the System 9
Introduction to John Guest tubing system 9
Front and side panel 10
Pro tank 11
Installation procedure 12
Side mounted dispenser installation 14
Connection to tank cable 18
Connection to PC, validation port and power plug 19
Calibration 20
USING THE SYSTEM 20
Display 20
Sensor validation 21
TOC reduction and monitoring 22
TOC monitoring module (optional) operation principle 22
Diagnostic screen 22
Connection to PC 23
Rinsing the system 23
Introduction to Q-Front N operating modes 24
Operating Q-Front N tap water systems 32
MAINTENANCE 35
Maintenance schedule 35
Replacement of pre-filter module 36
Replacement of polishing module 38
Calibration 39
Empty the tank 40
Adrona Recirculation Sanitization 40
TROUBLESHOOTING 41
SPARE PARTS AND CONSUMABLES 42
WARRANTY AND CLAIMS 42

INTRODUCTION

Using This Manual

This is a user manual for Adrona Q-Front N water purification systems. We strongly advise you to read this manual before installing and using the water purification system.

Safety Information

WARNING! Read and understand all sections in this guide before installing or operating the system. The symbols used below are internationally accepted symbols that warn of potential hazards with electrical products.

This HAZARD symbol is used to refer to instructions in this manual that need to be done safely and carefully.

This ATTENTION symbol is used to refer to instructions in this manual that need to be done carefully.

This ELECTRICAL GROUND symbol is used to refer to a position where an electrical ground connection is made.

This ELECTRICAL DANGER symbol means that there are dangerous voltages present within the unit.

This DANGER symbol indicates that it is necessary for the user to refer to the owner's manual, read, understand and follow the instructions.

This UV RADIATION symbol indicates the ultraviolet radiation (UV) danger. Failure to comply with safety instructions may result in personal injury.

Ensure that anyone who operates the water purification system has received instructions in both general safety practices for laboratories and specific safety practices for the unit.

Contact Adrona

Adrona SIA
Kalnciema st. 209
Riga, LV-1046
LATVIA

Phone: +371 67551894
Mob: +371 26112517
info@adrona.lv
www.adrona.lv

PRODUCT OVERVIEW

Adrona Q-Front N Water System General Description

Adrona Q-Front N is Ultrapure water purification systems which requires external water tank that use tap water as feed water (tap water system).
There are 4 sub-variations available for each system: Trace, HPLC, Bio and Bio UF.

Water purification system Adrona Q-Front N produces pure water that complies with ISO 3696 Grade II and Grade I water requirements.

Pure (ISO 3696 Grade II) water applications include, but are not limited to:

- Feed for laboratory equipment (washing machines, clinical analyzers, humidifiers, autoclaves, hydrogen gas generators);
- Manufacturing of chemical and biochemical reagents;
- Buffer preparation;
- Microbiological media preparation;
- In some cases - sensitive analytical techniques (e. g. atomic absorption, ICP-OES);
- Wet chemistry;
- Spectrophotometry.

Ultrapure (ISO 3696 Grade I) water applications include but are not limited to:

- High sensitivity analytical techniques (ICP-MS);
- High performance liquid chromatography;
- TOC analysis
- Molecular biology;
- Cell culture.

System Overview

Water Specifications

Purified water specification	**Q-Front N Trace**	**Q-Front N HPLC**	**Q-Front N Bio**	**Q-Front N Bio UF**
Grade I water resistivity	18.2 MΩ x cm	18.2 MΩ x cm	18.2 MΩ x cm	18.2 MΩ x cm
Grade I water conductivity	0.055 µS/ cm	0.055 µS/ cm	0.055 µS/ cm	0.055 µS/ cm
Grade II water resistivity	>10 MΩ x cm	>10 MΩ x cm	>10 MΩ x cm	>10 MΩ x cm
Grade II water conductivity	<0.1 µS/cm	<0.1 µS/cm	<0.1 µS/cm	<0.1 µS/cm
TOC	<10 ppb	<2 ppb	<2 ppb	<2 ppb
RNase	-	-	<0.01 ng/mL	-
DNase	-	-	<4 pg/µL	-
Bacteria	<0.01 CFU/mL	<0.01 CFU/mL	<0.01 CFU/mL	<0.01 CFU/mL
Endotoxins	<0.15 EU/mL	<0.15 EU/mL	< 0.001 EU/mL	-
Particles >0.22 µm	<1/ per mL	<1/ per mL	-	-
Nominal flow, pure water (to storage tank)	10 L/h	10 L/h	10 L/h	10 L/h
Dispense rate, ultrapure water	Up to 2 L/min	Up to 2 L/min	Up to 2 L/min	Up to 2 L/min

Technical Specifications

Dimensions and weight

	Trace	**HPLC**	**Bio / Bio UF**
Dimensions (W*D*H)	35*39*54 cm		
System weight	27 kg	28 kg	29 kg
Operating weight	30 kg	31 kg	32 kg

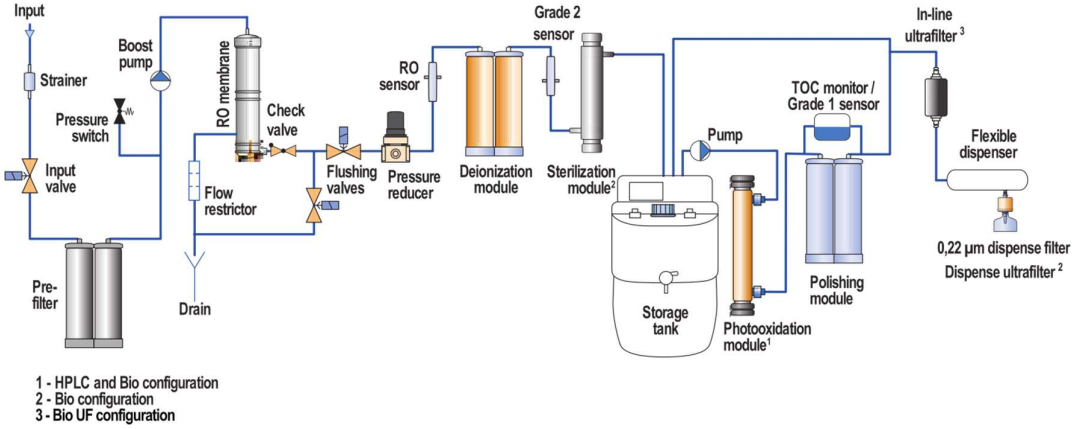
Noise level

Water purification system Q-Front N can generate a maximum sound pressure level of 47 dB at 1 m distance from the system.

Electrical requirements

The water purification system is configured for 230 V ± 5%, 3.15 A max.
In areas where the supplied power is subject to voltage fluctuations exceeding 10% of the nominal volume, a power line regulator may be required.
Power supply receptacle should be within 1.5 meters from the installation site.

System Components in Flow Chart



Principle

The hydraulic diagram (flowchart) of the Adrona Q-Front N water purification system is shown in Q-Front N Trace and Q-Front N HPLC/ Bio/ Bio UF flow charts above.

The input valve controls intake of feed water from the tap. The first purification stage consists of the pre-filter cartridge (part no. 10411) including activated carbon intended to remove particles, free chlorine, organics and colloids. A pressure switch controls feed water pressure.

The boost pump is used to maintain pressure at the level necessary for the efficient operation of the reverse osmosis membrane, deionization module (part no. 10311), and UV sterilization module (Bio configuration only). The feed flow goes to the membrane where it splits into two parts: the permeate, diffused through the membrane, and the concentrate which passes over the membrane, carrying away contaminants to drain. The permeate goes to the third purification step – deionization module (part no. 10311) where the remaining dissolved contaminants are removed.

Before entering the tank, water is sterilized by an UV lamp (Bio configuration only, also available as an option). Water quality is controlled by Grade II water conductivity sensor. LCD display provides information about the system status.

Purified water is stored in the tank. Water in the tank meets the requirements of ISO 3696 Grade II.

In order to obtain Grade I water, there is a recirculation loop connected to the tank.

- For Trace modification this loop includes recirculation pump, polishing module (part no. 10031), Grade I sensor as well as dispense port with microfilter (part no. 10012).
- HPLC, Bio and Bio UF configuration additionally includes photooxidation module (part no. 10018) and TOC monitor.
- Q-Front N Bio system has an ultrafilter (part no. 10120) instead of microfilter.
- Q-Front N Bio UF system has an *in-line* ultrafilter (part no. 11200) before microfilter.

PRE-INSTALLATION

Make sure the pre-installation requirements are met before installing the system.

Feedwater requirements

Feedwater properties:

Type of feedwater	Potable
Minimum pressure	≥ 0.4 bar
Maximum pressure	≤ 6 bars
Conductivity	<1500 µS/cm
Temperature	5 to 35°C
pH	4 - 10
Fouling Index	<5
Iron	<0.1 ppm as $CaCO_3$
Aluminum	<0.05 ppm as $CaCO_3$
Manganese	<0.05 ppm as $CaCO_3$
Free Chlorine	<1 ppm
Langelier Saturation Index	<+0.2
TOC	<2000 ppb

Feedwater connection

Feedwater Piping Connection	1/2" Male NPTF

Feedwater should be filtered with 1 µm sediment filter. **If the filter is not installed, the input strainer may become clogged thus blocking the water flow**.

Check if sediment filter is installed in tap water supply line. There should be at least one sediment filter (pore size 1 µm). The sediment filter is usually available from a local plumbing store. If you cannot obtain a sediment filter locally, you can order tap water line pre-filter set from Adrona. The part number is 10170 (carbonpp/ PP 1 µm) or 10171 (polyphosphate/carbonpp/1 µm).

Feedwater connection

Feed water hardness does affect produced water quality. Operation of the system with hard feed water may result in pre-mature clogging of reverse osmosis membranes and reduced Grade II or Grade I water flow.

Therefore, it is strongly recommended to install a water softener or polyphosphate filter if water hardness is above 160 ppm.

Feed water connection port has to be 1/2" NPTF (male) thread. The system is equipped with feed water tube (1/4'' OD) and adapter for 1/2" NPTF (female) water supply connection. The feed water tube should be connected to the 1/4" John Guest port of the adapter. Feed water connection port should be equipped with a valve allowing shutting off water supply.

Drain pipe should be lower that the level of the instrument and the level of the OVERFLOW port of the tank. The water purification system has 1/4" OD drain pipe. The OVERFLOW port of the tank is intended for 3/8" OD pipe with stem elbow 3/8".

Feed water supply connector and drain should be within 3 meters from the installation site.

Please note that in case of Q-Front N system pre-filter Q (part no. 10411) module pre-mature clogging, we will ship the new pre-filters under warranty only if we get a photo of the sediment filter installed in the tap water line.

Site requirements

The system requires up to 350*390*540 mm (W*D*H) space on the bench. The system is equipped with water storage tank "Pro" that requires up to 390*440*600 mm (W*D*H) space. The tank can be placed under the bench. The system can also be mounted on a wall to save space on the laboratory bench.

Environmental requirements

The water purification system is intended for indoor use only, in an environment that has nonconductive pollutants only.

Ensure that the site is maintained under the following conditions:

Condition	Acceptable range
Temperature	15 to 30 °C (59 to 86 °F)
Humidity	20% to 80% relative humidity, noncondensing

Water leakage safety

- Make sure that all water connection tubes are kink-free.
- Make sure that all water connections are tight.
- Feed water supply connector and drain should be within 3 meters or less from the installation site.
- Feedwater connection port has to be 1/2" NPTF male thread.

When installing the tank, connect the fitting marked OVERFLOW to the drain. Make sure that the drain level is lower than the OVERFLOW fitting level. This will prevent water leakage in case of tank level sensor failure.

A 1 µm sediment filter has to be installed in the feedwater supply line. Failure to install the filter may result in clogging of the strainer inside the system and water flow blockage.

UNPACKING

Remove packing materials carefully and retain for them future shipment or storage of the unit. Examine the unit carefully for any damage incurred during transit. The warranty does not cover in-transit damage.

Due to the unit's weight its unpacking and installing is to be carried out by two persons.
When opening the shipping box, we advise to compare received parts with the Packing List included.

Contact Adrona if any part is missing.

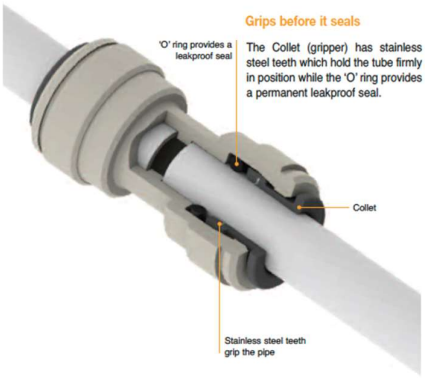
INSTALLATION

Preparation of the System

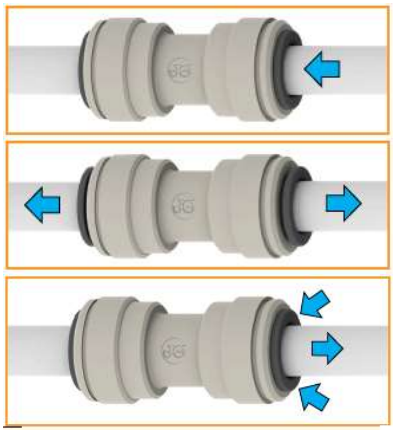
Review "Pre-installation requirements" chapter above.
Unpack the water purification system and place it on the laboratory bench.
Remove the protective packing materials.

Introduction to John Guest tubing system

Adrona water purification systems are equipped with John Guest push-fit fittings and tubes. We will use abbreviation JG for John Guest parts in further text.



To make a connection, the tube is simply pushed in by hand; the unique patented John Guest collet locking system then holds the tube firmly in place without deforming it or restricting flow



Push the tube into the fitting, to the tube stop

Pull on the tube to check it is secure. Test the system before use

To disconnect, ensure the system is depressurized, push the collet square against the fitting. With the collet held in this position the tube can be removed

Front and side panel

Look at the front and side panels of the Adrona Q-Front N water purification system and locate pre-filter and deionization module installation sites as well as inlet and outlet fittings.

Front panel

1 – pre-filter Q module (part no. 10411)
2 – polishing Q module (part no. 10031)

Rear panel

3 – flexible dispenser in holder
4 – deionization Q module (part no. 10311)

Side panel – right lower part

5 – connection to the dispenser "Flow Point 3" (available as additional equipment)
6 – connection to the flexible dispenser

Side panel – left upper part

1 – electric cable plug
2 – power switch
3 – Information about system & serial number (depending on configuration sticker could be placed on the rear panel)

Side panel – left lower part

4 – connection to PC
5 – operation/ validation port
6 – TANK LEVEL connection
7 – TAP WATER 1/4" connection
8 – OUT (connection to the tank)
9 – IN (connection to the tank)
10 – DRAIN 1/4" connection

Pro tank

Adrona Q-Front N systems are equipped with the “Pro” 30 l tank with level sensor, base and tap (part no. 11015). It is an optimal solution for Grade II water storage.
There are available other tanks with different volume. See price list for further information.

Front view

Rear view

Top close view

Rear close view

1 – “TANK LEVEL” connector
2 – “OVERFLOW” tube
3 – A cap
4 – Air filter
5 – Water tap

6 – “REC IN” (connection to the system)
7 – “REC OUT” (connection to the system)

Installation procedure

Open the front door where pre-filter set and polishing module are located.

[1]

Carefully open the front door holding the upper and lower part with both hands

[2]

Locate the installation slots.

We advise you to do installation in following order:

1 – pre-filter Q module (part no. 10411)
2 – polishing Q module (part no. 10031)
3 – deionization Q module (part no. 10311) is located on the rear panel

Installation process of pre-filter module, polishing and deionization module is identical

[3]

[4]

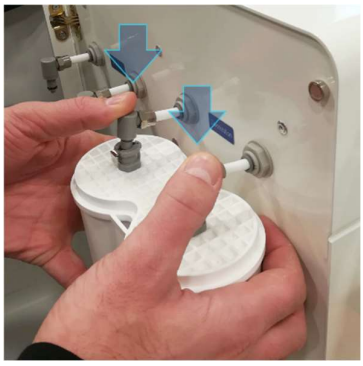
[5]

Locate the modules:

1 – pre-filter module is marked with BLUE sticker;
2 – polishing module is marked with SILVER sticker
3 – deionization module is marked with BLUE sticker;


[6]

Place the module in the slit


[7]

Place connector tubes in slots.
Make sure that connectors are properly attached


[8]


[9]

When the modules and prefilters are installed, it should to look like in pictures no. 8 and no. 9.
Make sure if all the connectors are properly attached and close the front panel.

Side mounted dispenser installation

[1]

Side mounted dispenser consists of:
- dispenser arm with flexible tube;
- ultrafilter or microfilter (depending on configuration);
- O-ring

[2]

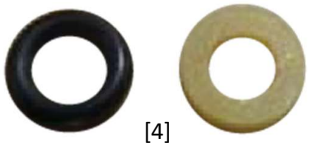
0.22 µm dispense filter packaging (part no. 10012)

For **HPLC**, **Trace** and **Bio UF** configuration only

[3]

Ultrafilter packaging (part no. 10120)

For **Bio** configuration only



[4] [5]

O-rings:
1 – black for 0.22 µm dispense filter
2 – yellow for ultrafilter

[6]

- Unpack the dispense filter and screw it to the dispenser.
- Before that, make sure that the O-ring is inside the holder

[7]

For Bio configuration:

1 – unpack the ultrafilter and screw it to the dispenser.
2 – before that, make sure that the yellow O-ring is inside the holder;
3 – loosen the degassing valve a little bit to get rid of air

[8]

Connect the flexible tube's connectors to the system

[9]

Use the side mounted holder to place dispenser while it is not in use

[10]

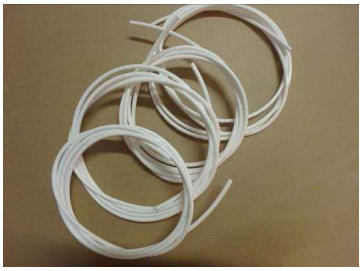
After water dispensing always put the bell cap back to the bell

The microfilter (or ultrafilter) should be rinsed prior to use!
When the tank is full, press the "Dispense" button and rinse the microfilter (or ultrafilter) with at least 10 liters (or 20 liters respectively) of purified water.

Connection of tubing

[1]

Locate the 1/2” NPT thread adapter



[2]

There are overall four 1/4” JG tubes in the set.

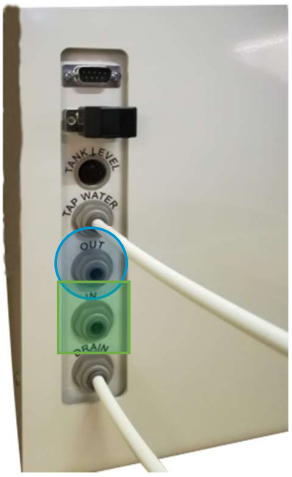
You should connect one 1/4” JG tube to the 1/2” NPT thread adapter

[3]

Connect the feed water to the 1/4” JG connection marked TAP WATER

[4]

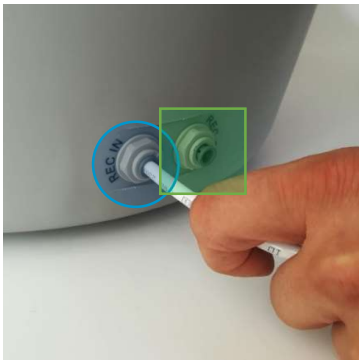
Connect 1/4” JG connection marked DRAIN to the local drain using 1/4” JG plastic tube



[5]

The next step is tank connection to the system:

1 – locate IN and OUT connections on the Q-Front lower left side of the side panel [pic. 5];
2 – locate REC IN and REC OUT connections on the tank's rear panel [pic. 6];
3 – use two 1/4" JG plastic tubes for connection [pic. 2];
4 – connect IN on Q-Front system [pic. 5] with REC OUT on the tank [pic. 6] (marked with GREEN square);
5 – connect OUT on Q-Front system [pic. 5] with REC IN on the tank [pic. 6] (marked with BLUE circle)



[6]


[7]

Locate 3/8" JG tube with JG elbow adapter


[8]

Connect OVERFLOW port of the tank to the drain using the 3/8" JG tube with JG elbow adapter (3/8")

When installing the tank, connect the fitting marked "OVERFLOW" to the drain. Make sure that the drain level is lower than the OVERFLOW fitting level. This will prevent water leakage in case of tank level sensor failure.

Connection to tank cable

[1]

Locate the tank cable

[2]

Connect the tank cable to the TANK LEVEL connector that is located on the top of the tank

[3]

Connect the tank cable to the TANK LEVEL connector that is located on the side panel of the system

Connection to PC, validation port and power plug

[1]

Connection to PC (marked with BLUE circle) and connection to operation/ validation dongle (marked with GREEN square) is located on the left panel of the system

[2]

Operation dongle is used for receiving conductivity measurement

[3]

Validation dongle is used for system validation by performing IQ/OQ.
Refer to chapter “Sensor validation” for further information about validation process

It is available as an additional equipment, part no. 410913

[4]

Locate the power cord

[5]

Plug the power cord into the system.

Plug the other end of the power cord into an appropriate source of electrical power.

Make sure the system is properly grounded.

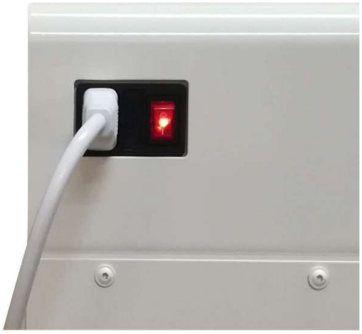
The water purification system is connected to the main supply via electric cable that is supplied with the unit.

In case the supply cord is damaged, it should be replaced with an equivalent cord, in accordance with manufacturer's specifications.

Calibration

Adrona water purification systems are already calibrated. Additional calibration is not needed.

USING THE SYSTEM

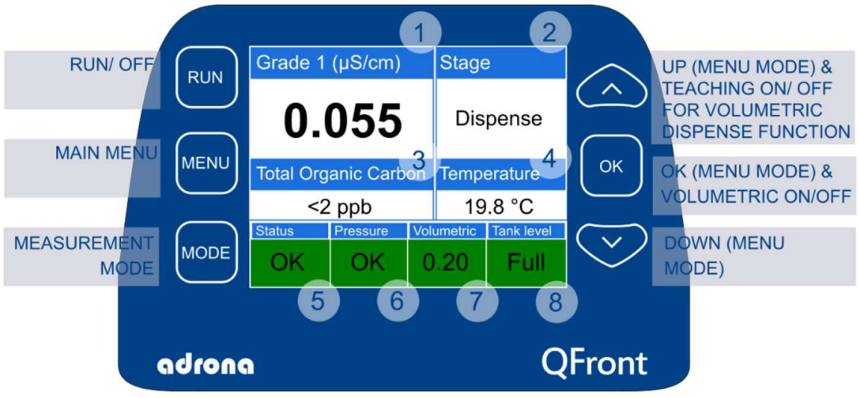


The system is switched on and off with the main switch at the left side of the unit

It is necessary to shut off the water supply valve when the system is not under observation.

Display

All functions are accessible via control buttons at the front panel.
The LCD screen displays information regarding water quality, TOC measurements, operation status, errors and button functions.



Description:

1 – Water quality
2 – Operation status
3 – TOC level/ Filter timer (for Trace configuration only)
4 – Water temperature
5 – Error message/ system status
6 – Pressure status
7 – Dispense volume
8 – Tank level status

Detailed description of each line can be found in the table below:

No.	Line	Description
1	Water quality	Displays quality of water filling the tank (Grade I or Grade II)
2	Operation status	Shows current status. Possible messages are: - LowPres – no feed water pressure; - TnkFull – tank is full or disconnected; - Filling tank - the unit is filling the tank
3	TOC level	Total organic carbon measurement
4	Water temperature	Displays water temperature. Water temperature measurement is necessary for accurate water quality measurement
5	Error messages	Errors occurred during operation. Possible errors are: - Error1 – deionization module error; - Error2 – polishing module error; - Error5 – filter error
6	Dispense status	Wait / ready
7	Dispense volume	You can indicate necessary dispense volume / Enable or disable the teaching mode
8	Tank level status	Shows tank level status

Sensor validation

It is possible to validate conductivity measuring circuits to check if they are operating properly.

Operation dongle

Validation dongle

Available as additional equipment

The validation procedure is as follows:

1 – Disconnect the operation dongle from the validation port at the side of the Q-Front system;
2 – Connect the validation dongle to the validation port at the side of the Q-Front system;
3 – Press “Menu” button. Move the cursor down to “Sensors” and press “OK” button;
4 – Press “Validate Grade 2 sensor” to test Grade II sensor measuring circuit:
If the display says “Grade 2 sensor OK”, then the measuring circuit works properly;
If the display says “Grade 2 sensor FAILED”, then the measuring circuit is damaged.
Grade II validation is available for EDI configurations only.
5 – Press “Validate Grade 1 sensor” to test Grade I sensor measuring circuit:
If the display says “Grade 1 sensor OK”, then the measuring circuit works properly;
If the display says “Grade 1 sensor FAILED”, then the measuring circuit is damaged.
6 – Disconnect the validation dongle and connect the operation dongle.

Contact Adrona If Grade I or Grade II sensor FAILED!

Validation dongle is available as an additional equipment, part no. 410913.

TOC reduction and monitoring

Total organic carbon (TOC) describes level of organic contaminants in pure water. High concentration of organic contaminants may affect results of several analytical methods, e.g. high-performance liquid chromatography. Therefore, for some applications TOC level should be controlled and kept minimal.

Grade II water, coming to the storage tank, generally has low TOC level, if proper deionization resins are used. However, TOC level may rise during storage, therefore water recirculation through photooxidation module and polishing cartridge is necessary to keep TOC level low.

Unfortunately, organic contaminants may not have effect on conductivity of water, so conductivity sensors cannot be used for TOC monitoring. A special TOC monitoring module is needed to measure TOC level. The monitoring module consists of a TOC photooxidation module, valve and a conductivity sensor.

TOC monitoring module (optional) operation principle

This section does not refer to Trace configuration.

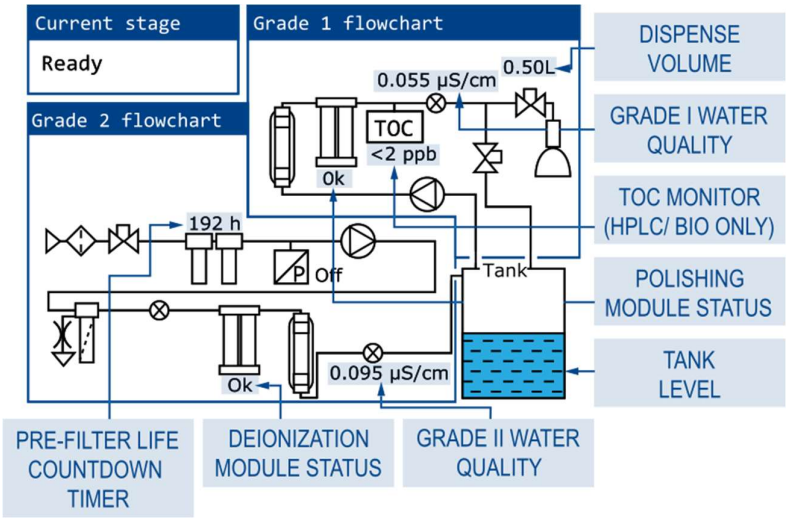
During recirculation stage a water sample is introduced into the TOC photooxidation module where it is oxidized for several minutes. During this phase water conductivity rises because of oxidation of organic molecules. The rise of conductivity is proportional to TOC level of water.

After the oxidation phase is finished, water is released from the TOC photooxidation module and its conductivity is measured by the conductivity sensor. TOC level is calculated from the rise of conductivity.

Note: As TOC measurement is made during the recirculation stage, the TOC value is shown on the display only after the system has partially filled the storage tank with water and completed at least one recirculation cycle.

Diagnostic screen

If the “Mode” has been pressed two times, the Diagnostic screen is shown. The diagnostic screen displays status of all the sensors and components as well as tank level.



Connection to PC

To transfer log information from the system to PC you need:

1 – RS232-USB adapter;
2 – Install RS232 drivers on the PC that will be used for data collection;
3 – Download from Internet freeware program “RealTerm: Serial/TCP Terminal”;
4 – Install the program;
5 – Open program & set “Port” settings:
- Baud: 19200
- Data bits: 8
- Parity: None
- Stop bits: 1
- Hardware flow control: None

6 – Choose the right port and press “Open”. Data will be sent every 5 minutes.
7 – The log of water quality and errors is stored inside the microcontroller as well.
8 – To obtain the saved log go to:

Menu→Sensors→Send log to PC

The log is rewritten after it is sent to PC.

9 – To save data in file:
- Press Capture;
- Choose directory where you want to save the file;
- Press: “Start Append” or “Start Underwrite”;
- Files will be saved in your file directory and data will be sent every 5 minutes to this file;
- To obtain the saved log, you can go to:

Menu→Sensors→Send log to PC

- The log is rewritten after it is sent to PC.

Rinsing the system

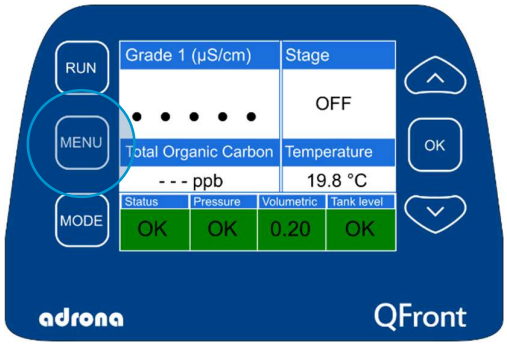
Press “Run” button to start operation. Leave the system running for 2 hours. Check through the front door that the connectors were not loosened during the transportation and that there are no water leaks.

Check water flows in OUT and Drain pipes. The water flow in the Drain pipe should be 2-5 times higher than in the OUT pipe. If the water flow in the OUT pipe is higher than in Drain, the RO membrane is damaged.

The microfilter (or ultrafilter) should be rinsed prior to use! When the tank is full, press the “Dispense” button and rinse the microfilter (or ultrafilter) with at least 10 liters (or 20 liters respectively) of purified water.

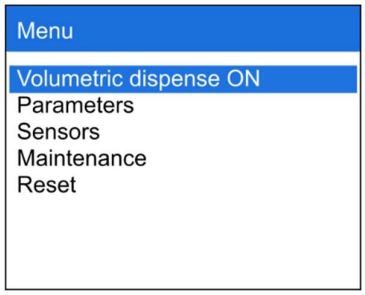
Allow the Q-Front system to fill the tank, shut off feed water supply and leave the system in operation overnight to allow it to recirculate water in the tank, remove all the residual organic contamination and reduce TOC reading to <2 ppb (for HPLC and Bio configurations).

Introduction to Q-Front N operating modes



[1]

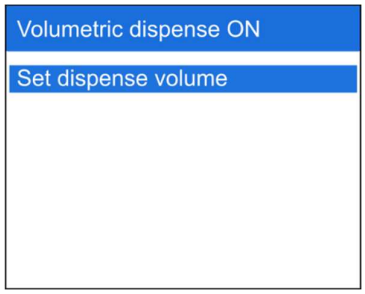
To enter Menu, press the “Menu” button



[2]

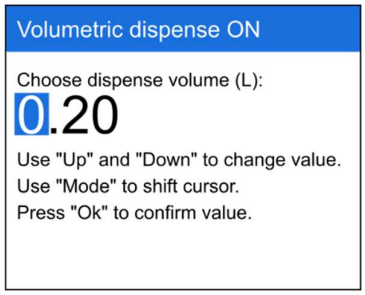
The display will show menu, consisting of:

- Volumetric Dispense;
- Parameters;
- Sensors;
- Maintenance;
- Reset



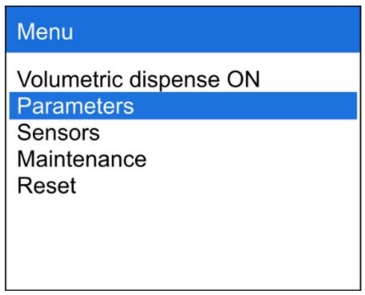
[3]

VOLUMETRIC DISPENSE ON
To enable volumetric dispense function, enter the first section “Volumetric Dispense ON” and press “Set dispense volume”



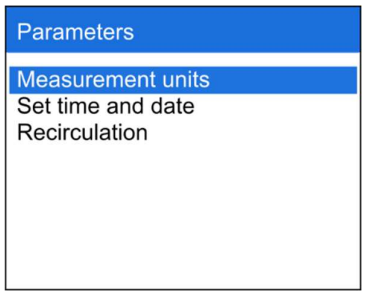
[4]

Set the dispensing volume as described on the display



[5]

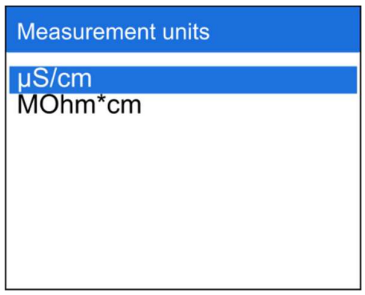
PARAMETERS
Choose section “Parameters” if you need to change measurement units, to set date or recirculation parameters



[6]

The display will show sub-menu, consisting of:

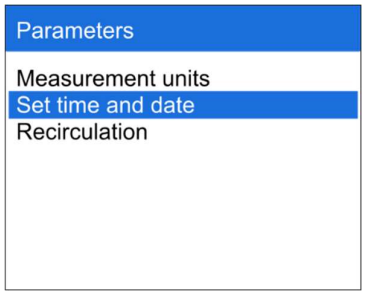
- Measurement units;
- Set date and time;
- Recirculation



[7]

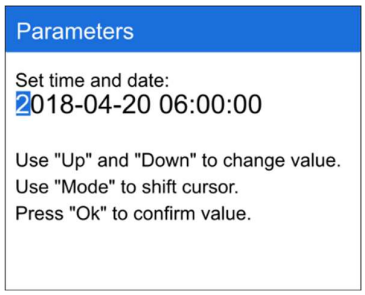
Section “Measurement units” allow you to set following units:

- µS/ cm;
- MOhm*cm



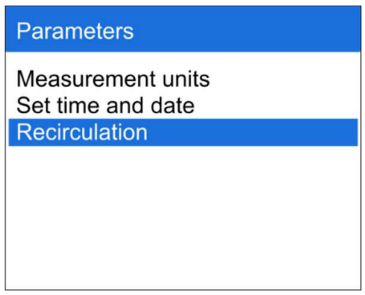
[8]

Section “Set time and date”



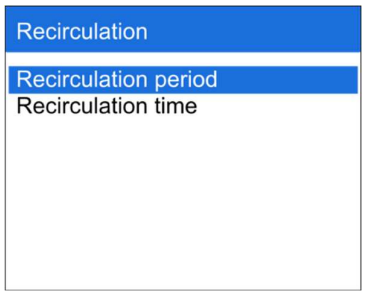
[9]

Set the current time and date as described on the display



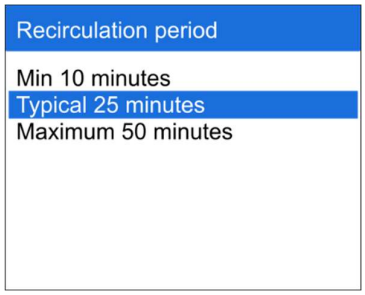
[10]

Section “Recirculation”



[11]

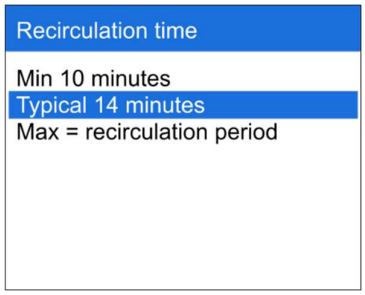
In section “Recirculation” you can set period and time



[12]

In section “Recirculation period” you can choose one of three pre-sets:

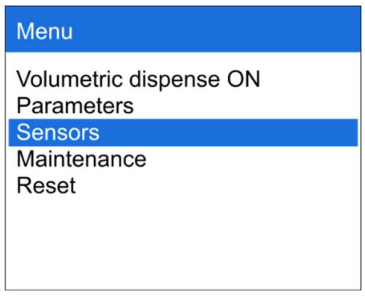
- 10 minutes;
- 25 minutes;
- 50 minutes



[13]

In section “Recirculation time” you can choose one of three pre-sets:

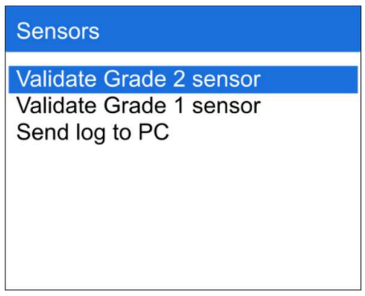
- 10 minutes;
- 14 minutes;
- Max (recirculation period)



[14]

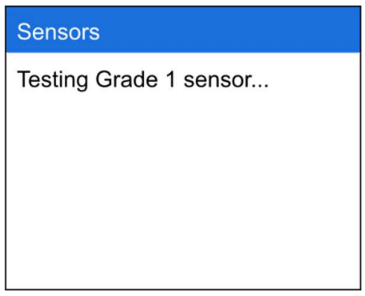
SENSORS

Choose section “Sensors” if you need to validate Grade I and Grade II sensors or send information to PC



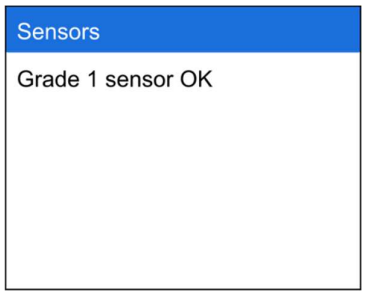
[15]

EDI configuration: validation of Grade I or Grade II sensors.
Non-EDI configuration: Grade I validation



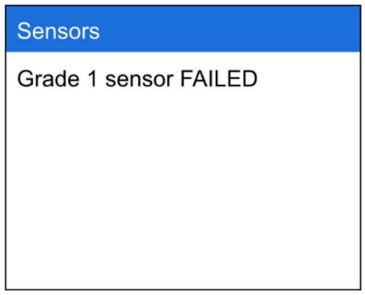
[16]

Testing Grade I (or Grade II) sensor



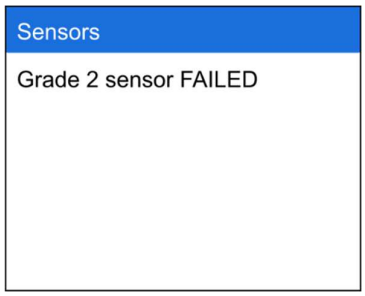
[17]

System message shows that Grade I (Grade II) sensor is in order



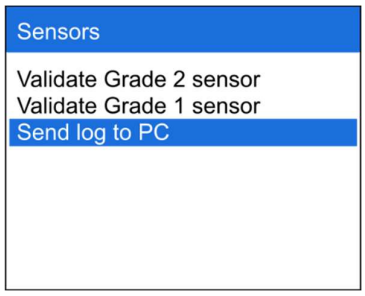
[18A]

Contact Adrona if sensor has FAILED



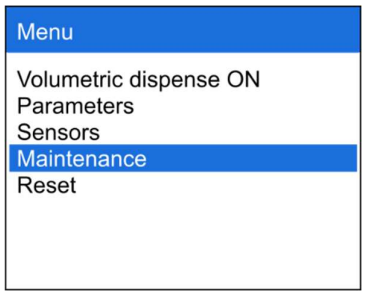
[18B]

Non-EDI configuration:
As system is not equipped with Grade II sensor, validation is not possible.
The system always will show FAILED message if you try to fulfill the Grade II validation precedure



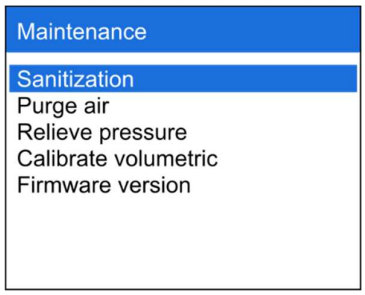
[19]

Refer to chapter “Connection to PC” for instruction on how to transfer information to PC



[20]

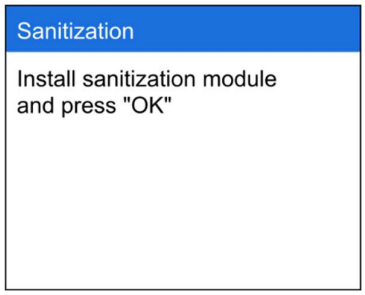
MAINTENANCE
Choose section “Maintenance” if you need to change modules, calibration or to check firmware version



[21]

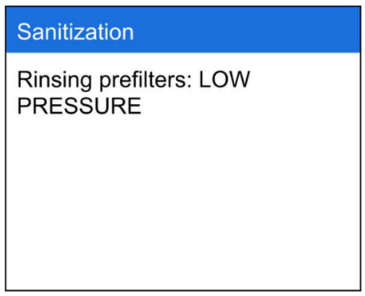
Choose section “Sanitization” if you need to fulfill sanitization process.

Before the process review the chapter “Adrona Recirculation Sanitization” and carry out the necessary preparatory work

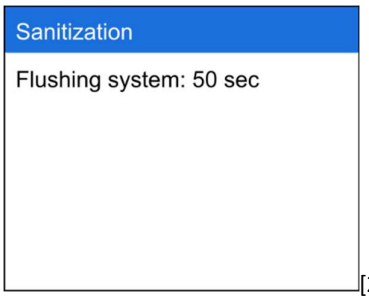


[21 A]

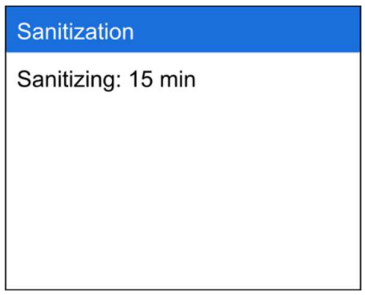
After pressing “Sanitization” the system turns in “OFF” stage.
Message about sanitization module installation appears on the screen.
After pressing “OK”, sanitization liquid goes into the system and sanitization process begins.



[21 B]

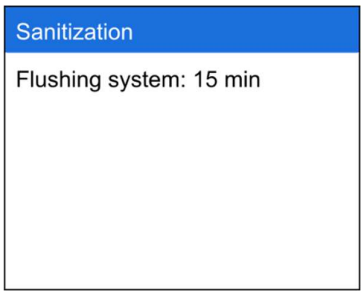


[21 C]



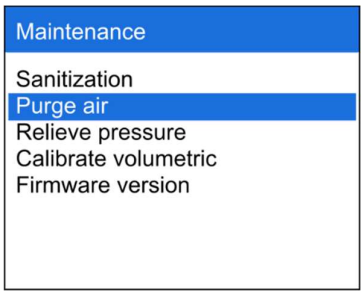
[21 D]

Sanitization takes 15 minutes



[21 E]

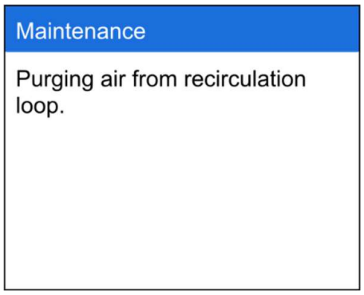
The next step is system flushing that takes 15 minutes.
After that, you need to reinstall a pre-filter.
Now system is in working order



[22]

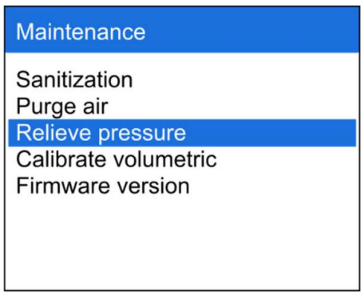
You need to choose section “Purge air” in following cases:

1 – before recirculation process during the first installation of the system;
2 – after polishing module replacement;
3 – before installation of dispense port



[23]

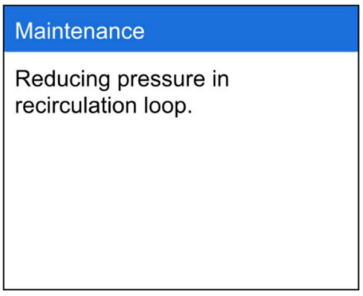
System notification during recirculation process



[24]

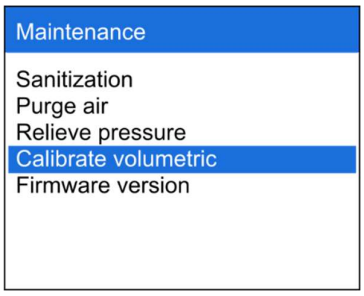
Choose section “Relieve pressure” if you need:

- to replace a polishing module;
- uninstall a dispenser



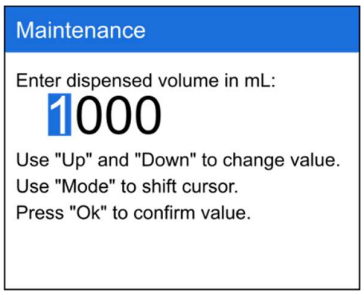
[25]

System notification during pressure reduction process



[26]

Press “Calibrate volumetric” to fulfill dispensed volume calibration

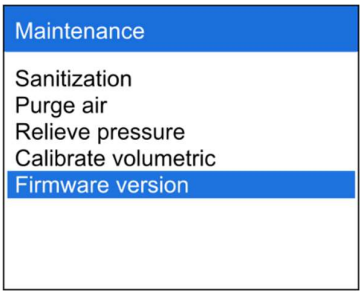


[27]

To calibrate volumetric dispense function please follow the procedure below:

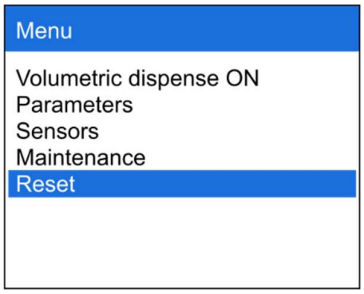
1. Set dispense volume to 1 liter (Menu -> Volumetric dispense);
2. Dispense water to 2 liters measuring beaker;
3. Note the actual dispensed volume in milliliters;
4. Go to Menu -> Maintenance -> Calibrate volumetric;
5. Enter the actual dispensed volume (in mL);
6. Press OK

Calibration can be fulfilled per 1 liter only



[28]

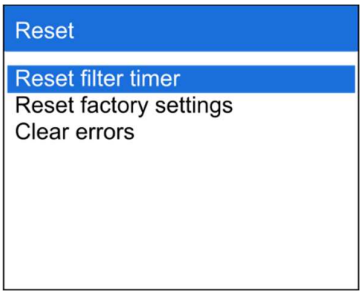
Press “Firmware version” to get information about the version of system



[29]

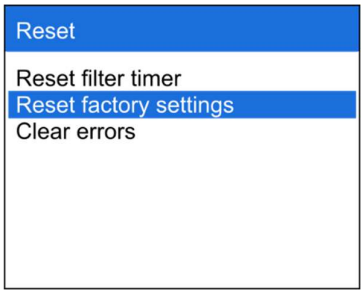
RESET

Choose section “Reset” if you need to reset filter timer and factory settings or to clear error message



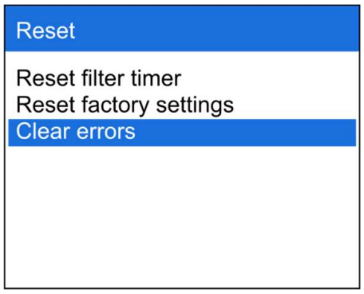
[30]

Press “Reset filter timer” after pre-filter change



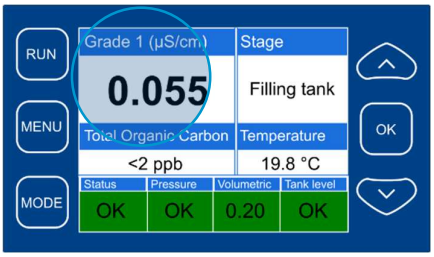
[31]

Press “Reset factory settings” to clear all system settings



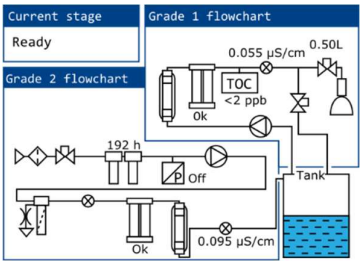
[32]

Press “Clear errors” after errors are solved



[33]

Press “Mode” once to display Grade I or Grade III water quality.

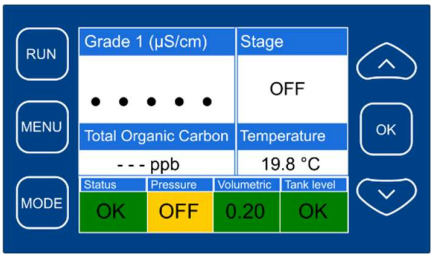


[34]

Press “Mode” twice to display the Diagnostic screen.
It displays status of all sensors and components as well as tank level

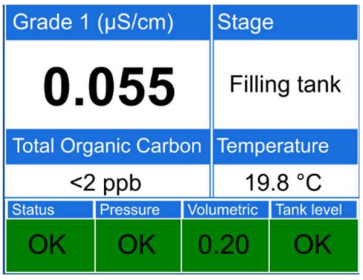
Operating Q-Front N tap water systems

- Open the tap water supply.
- Switch on the system using power switch on the left side of the unit.



[1]

- Press “Run” button on the keypad;
- The display indicates the status window after few seconds;
- Unit will flush the RO system and then star to produce Grade II water;
- Allow half an hour for output conductivity to settle

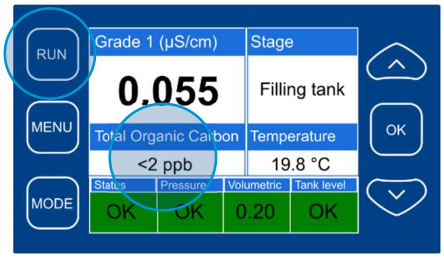


[2]

The status window shows the system status and temperature.
There is also indication of water quality.

However, the precise reading of water quality can be obtained only when:

- the system is in “Filling tank” mode;
- the system is in Grade I “Dispense” mode;
- the system is in “Recirculation” mode;
- after performing “Purge air”



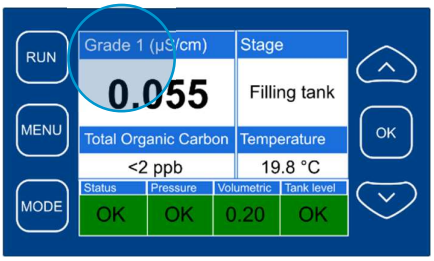
[3]

The display shows TOC reading.

However, the TOC reading will be shown when:

- the storage tank is at least partially filled with water;
- at least one recirculation cycle has finished;
- the system is in “Filling tank” mode;
- the system is in Grade I “Dispense” mode;
- the system is in “Recirculation” mode;
- after performing “Purge air”.

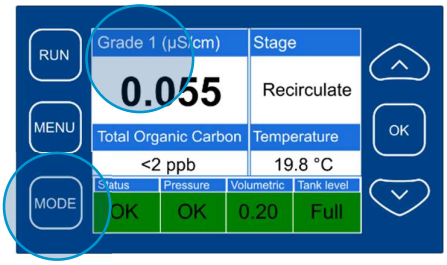
Normally it takes about one hour after the system has been switched on and the “Run” button has been pressed



[4]

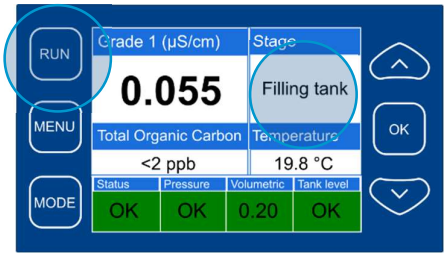
The purified water quality is controlled by two sensors:

- The Grade II sensor that measures conductivity for Grade II water, flowing into the storage tank;
- The Grade I sensor used for controlling quality of Grade I water that is dispensed via the dispense port



[5]

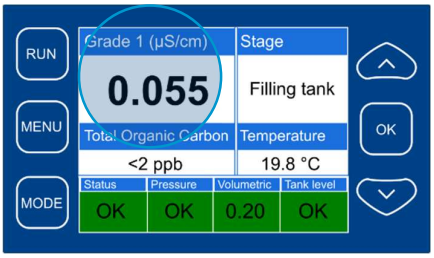
The system shows automatically either Grade I sensor reading or Grade II sensor reading, depending on in which mode it is.
You can switch between Grade I and Grade II manually by pressing "Mode" button



[6]

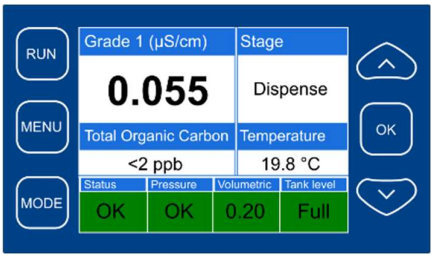
To fill the tank with purified water:

- press the "Run" button and hold it for 2 seconds;
- If tank is not full or it is disconnected and the feed water pressure is enough, the display shows "Filling tank";
- Now the Q-Front N system is filling the tank with Grade II water;
- As soon as the tank is full, the system shuts down the water supply and shows the "Tank Full" message



[7]

When the system is in "Filling tank" mode, the reading of the Grade I water sensor is shown on the display



[8]

To dispense Grade I water:

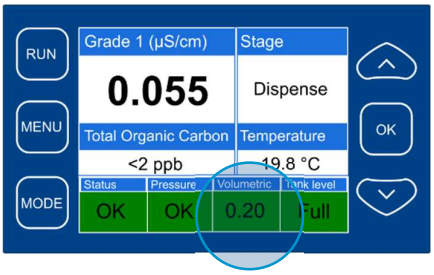
- Use universal flexible dispenser;
- The system rinses the tubing for 5-10 seconds;
- Then Grade I water is dispensed via side mounted 0.22 µm dispenser (Trace, HPLC and Bio UF configuration)

[9]

In Bio configuration ultrafilter has to be installed instead of 0.22 µm dispenser.

To dispense Grade I water via ultrafilter:

- Loosen the degassing valve a little bit to get rid of air;
- Press the "Dispense" button again, to stop water dispensing

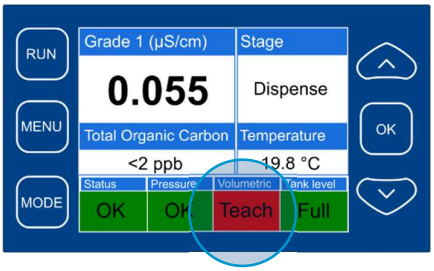


[10]

If volumetric dispense is on, water dispensing will be finished after the pre-set volume has been dispensed.

The volume can be set either:

- through menu command;
- or by using teaching mode



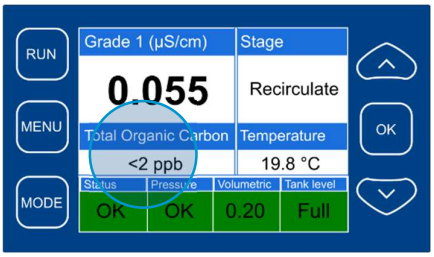
[11]

When "Up" button is pressed, the system switches on teaching mode:

- Operator should press the dispense button to start dispensing of water;
- Once necessary volume is dispensed, the operator should press "Dispense" button again to stop dispensing;
- The dispensed volume will be memorized and used for further volumetric dispense cycles

[12]

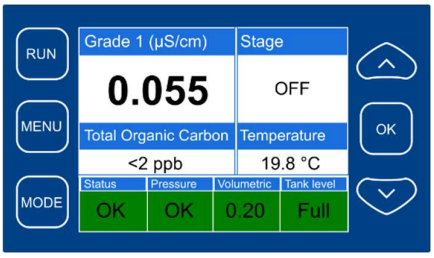
To dispense Grade II water from the tank open the stopcock at the "Pro" storage tank



[13]

Recirculation:

- The water purification system will circulate water on periodical basis to prevent growth of microorganisms in the system;
- During recirculation phase the reading of Grade I water is shown on the display;
- For the systems with TOC monitoring module, display shows TOC reading in *ppb*;
- TOC reading appears in the left bottom display area when at least one recirculation stage is completed



[14]

Recirculation is switched off when the system is in the OFF mode.

To prolong life of polishing module, please set the system to the OFF mode by pressing "Run" button if it is not used for long time (e.g. for the weekend)

Always shut off water supply to the system when it is left unattended (e. g. overnight).

If the system is newly-installed or has not been used for a long time, it recommended to leave it in the running mode for several hours before usage. It will allow the system to fill the tank and recirculate water to reduce TOC content.

MAINTENANCE

Maintenance schedule

Only the replacement components that meet the manufacturer's specifications should be used. Components have to be replaced according to the table:

Part number	Description	Replacement interval	Comments
10411	Pre-filter Q w/ quick connectors	Filter life counter is 0 (zero) or the filter is clogged	
10311	Deionization Q w/ quick connectors	When "Error 1" error message is shown, or when Grade II water conductivity is constantly >0.5 µS/cm	
10031	Polishing Q w/ quick connectors	When conductivity of dispensed Grade I water is constantly >0.1 µS/cm or when Error 2 is shown	Depends on water consumption
10011	Sterilization UV bulb	When required (on average every 2 years)	For Bio configuration
10018	UV photooxidation bulb	2 years on average	For HPLC and Bio configuration
10012	0.22 µm dispense microfilter	Every 6–12 months	For HPLC, Trace and Bio UF configurations
10120	Ultrafilter	Every 3–6 months	For Bio configuration
11200	Replacement *in-line* ultrafilter	Every 6–12 months	For Bio UF configuration

The water storage tank should be cleaned and disinfected every 2-3 months.

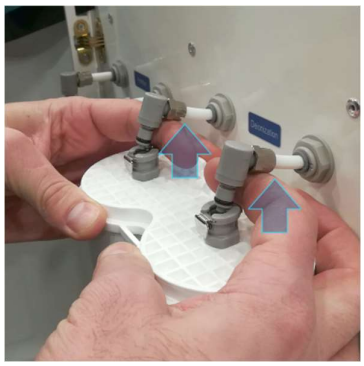
Replacement of pre-filter module

When the filter counter goes to zero, the pre-filters should be replaced:

- Press the “Run” button to set the system into the OFF mode;
- Close the local tap water valve;
- Allow a minute for water pressure to drop in the tubing;
- Open the front door;
- Disconnect the old pre-filters;
- Install the new pre-filter Q (part no. 10411).

[1]

Open front door and remove pre-filter by pressing both clamps buttons at the same time



[2]

Pull up connectors from the pre-filter module

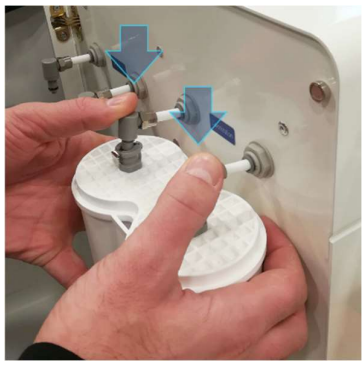
Take the pre-filter out

[3]

[4]

During replacement message “Error 5” is displayed on the control panel

1 – Remove both protective plugs from the new pre-filter
2 – Install the spare prefilter in the place of the old pre-filter

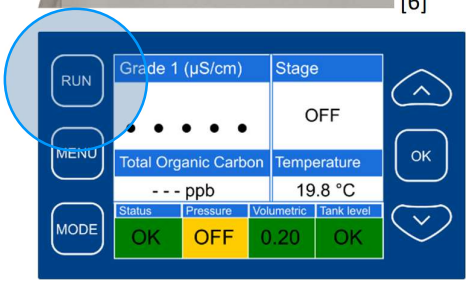


[5]

Place connector tubes in slots.
Make sure that connectors are properly attached

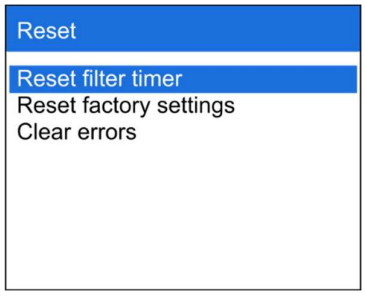
[6]

- Open the local tap water valve;
- Switch on the unit



[7]

Press “Run” button to put the unit in the “Running” mode and observe for water leakages



[8]

Reset filter counter:

- Press “Menu” button;
- Go to “Reset→Reset filter timer”;
- Reset filter timer

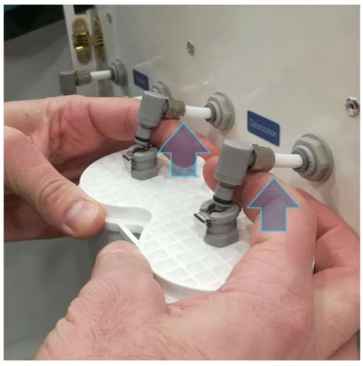
Replacement of polishing module

When conductivity of dispensed Grade I water is constantly >0.1 µS/cm or when *Error 2* is shown the polishing module should be replaced:

- Press the “Run” button to set the system into the OFF mode;
- Using “Menu” button, go to “Maintenance→Relieve pressure”;
- Unit will open recirculation purging valve for 10 seconds to decrease water pressure in recirculation loop;
- After 10 seconds it is safe to open the front door and remove polishing module.

[1]

Open front door and remove polishing Q module by pressing both clamps buttons at the same time



[2]

Pull up connectors from the polishing Q module

Take the module out

[3]

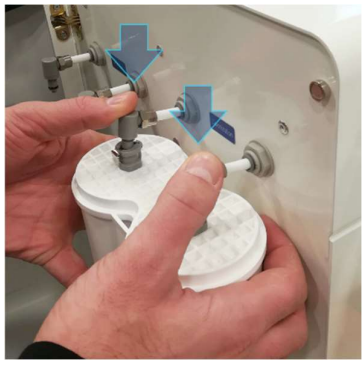
[4]

.

1 – Remove both protective plugs from polishing Q module

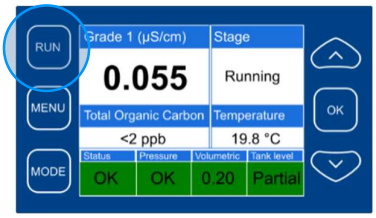
Do not store polishing filters with removed caps!

2 – Insert the module into the system and connect both connectors to the module



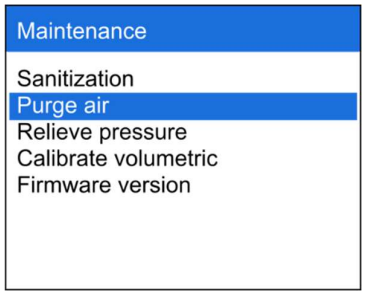
[5]

Place connector tubes in slots.
Make sure that connectors are properly attached



[6]

Press “Run” button to put the unit in the “Running” mode



[7]

Press “Menu” button and go to “Maintenance→Purge air” to purge air from polishing cartridge.

Tank should be in “Partial” stage

- Observe for any water leakages from polishing module connections.
- Allow unit to run for 2 hours to decrease TOC level and decrease output conductivity.

Installation and replacement process of polishing and deionization module is **identical**

Calibration

Adrona water purification systems are already calibrated. Additional calibration is not needed.

Empty the tank


[1]

[2]

1 – Open the water dispense tap;
2 – Empty the tank;
3 – When the water does not flow anymore, open the “REC OUT” tube;
4 – Pour out the remaining water

Adrona Recirculation Sanitization

1 – Allow for Adrona water purification system to fill the tank.
2 – It is possible to proceed with sanitization with partial tank by disconnecting tank level sensor.
3 – Press “Run” button to switch unit to “StandBy” mode.
4 – Disconnect pre-filter and Polishing module. Connect pre-filter and Polishing module outlets with a bypass (see picture below for reference):

Front panel

Rear panel

5 – Remove storage tank cap and add *hydrogen peroxide* to the tank. Final solution should be 1% *hydrogen peroxide*.

30% hydrogen peroxide solution can damage polypropylene components.

Use safety equipment when handling unsafe liquids.

6 – After adding sanitization liquid switch unit to running mode.
7 – It is advised to leave recirculation interval and recirculation time to the standard 10 and 5 minutes respectively.

8 – Leave unit recirculating for 4-6 hours.
9 – After sanitization period, disconnect 0.22 µm dispense filter and tank level sensor, if it was not disconnected in point 2. Dispense part of the liquid. If the tank is equipped with tank pump, dispense other half of the liquid using it.
10 – Connect tank level sensor fill in the tank partially. Disconnect the tank level sensor and let the unit recirculate for an hour.
11 – Drain water and repeat point 10. one more time.
12 – Drain water, connect polishing cartridge and 0.22 µm dispense filter.
13 – Proceed working with unit as described in manual.

Clean the exterior of the system with soft tissue and water. Do not use any chemicals.

TROUBLESHOOTING

Problem	Solution
Q-Front N system is switching from „Filling Tank" mode to „Low Pressure" and back	Prefilters are clogged and need to be replaced
Error 2	Polishing Q (part no. 10031) module needs to be replaced
Error 5	Pre-filter Q (part no. 10411) needs to be replaced
Conductivity reading is "…."	Conductivity sensor is empty (not filled with water). Operation dongle is not connected
Conductivity reading is in the 1.0 – 1.5 µS/cm range and does not change.	Validation dongle is connected instead of operation dongle
Resistivity reading is in the 0.6 – 0.9 MOhm*cm range and does not change.	Validation dongle is connected instead of operation dongle
Temperature reading is "--.-"	Temperature sensor is not connected or it is damaged
TOC reading is "---"	TOC has not been measured yet. Wait approx. 1 hour until at least one recirculation cycle completes and TOC measurement is made
Beeping sound during Filling Tank mode	UV sterilization bulb (part no. 10011) needs to be replaced

SPARE PARTS AND CONSUMABLES

Part number	Description
10411	Pre-filter Q w/ quick connectors
10311	Deionization Q w/ quick connectors
10031	Polishing Q w/ quick connectors
10011	UV sterilization bulb (for Bio configuration only)
10018	UV photooxidation bulb (for HPLC and Bio configuration only)
10012	0.22 µm dispense microfilter (for Trace, HPLC and Bio UF configuration)
10013	0.22 µm dispense microfilter, sterile (for Trace, HPLC and Bio UF configuration)
10120	Ultrafilter (for Bio configuration only)
11200	In-line ultrafilter (for Bio UF configuration only)

To obtain the best performance from Adrona systems, company advises regularly scheduled preventive maintenance operation.

WARRANTY AND CLAIMS

The Manufacturer guarantees the compliance of the unit with the Requirements of Specifications, provided the Customer follows the operation, storage and transportation instructions.

Warranty period for the new system is 24 months from installation date but no more than 26 months from the invoice date.

If any manufacturing defects are discovered by the Customer, an unsatisfactory equipment claim shall be compiled and sent to the local dealer address.

The following information will be required in the event that warranty or post-warranty service comes necessary. Complete and retain for your records.

Model (underline the appropriate system)	**Q-Front N Trace / Q-Front N HPLC / Q-Front N Bio / Q-Front N Bio UF**
Serial number	
Date of sale	