STAC2

SECOMAM
BY AQUALABO

ON-LINE ANALYZER

INSTALLATION & USER'S MANUAL

STAC2

SUMMARY

- 6 -

1 REMARK

The Automatic aspiration system kit is manufactured by AQUALABO.

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SECOMAM
STAC2

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2 WARRANTY

The new equipment and material sold by AQUALABO is guaranteed against any manufacturing defects for one year (unless otherwise stated by AQUALABO) with effect:
- From the technical acceptance of the equipment in the factory by the buyer or his designee,
- or failing this :
  * For Metropolitan France: from the date on the delivery note.
  * For other destinations: from the date of factory shipment certified by air waybill, consignment note or bill of lading.

The AQUALABO company guarantee applies exclusively to defectiveness arising from a design fault or from a concealed defect. It is strictly limited to the free dispatching of replacement parts (except for consumable items) or to the repairing of the equipment in our workshops within a deadline of 10 working days (shipping delay not included).

By express agreement, the following are strictly excluded from our guarantee:
- All damages, notably for staff costs, loss of earnings, business trouble, etc
- Any breakdown due to an incorrect use of the equipment (non adapted mains, fall, attempt at transformation, etc) or to a lack of maintenance by the user or to poor storage conditions.
- Any breakdown due to the use of parts not supplied by AQUALABO, on AQUALABO equipment
- Any breakdown due to the transporting of the equipment in packaging which is not its original packaging
- The lamps, the cells and generally any item which appears in the "accessories" section on the price list.

Our customers are kindly asked to apply for our consent before returning any instrument for repair. No return of materials may be accepted without the prior written consent of our Servicing after Sales Management which will precise the terms of such return.
If the above consent is given, articles shall be returned in their original packaging on a prepaid basis to the following address:

AQUALABO Services - 91 Avenue Des Pins d'Alep – 30319 ALES Cedex FRANCE

We reserve the right to reship all instruments received collect failing such consent.

Whatever method and conditions of transport are chosen for the shipment of the equipment to be repaired under guarantee, in the original packaging, the corresponding costs and the insurance costs will be payable by the customer.

Any damage connected to the return transport of the equipment falls within the framework of the guarantee on the express condition that the customer has sent his complaint within forty-eight hours by registered letter with acknowledgement of receipt to the carrier. A copy of the letter should be sent to AQUALABO.

NOTE: For transport, the manufacturer recommends a return on a pallet.

For equipment with a guaranty card, this is only applicable if the card delivered with the equipment is returned to AQUALABO duly completed.

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SOFTWARE WARRANTY

The software is guaranteed by the designer or the distributor of the software under the conditions specified in the literature accompanying the aforementioned software packages.

Under no circumstances whatsoever will AQUALABO supply any type of guarantee for software packages.

By express agreement, all damages, notably for staff costs, loss of earnings; business trouble, etc are strictly excluded from our guarantee.

The customer is informed that the software cannot be guaranteed exempt from defects or bugs.

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3 INFORMATION

The AQUALABO equipment has been designed, manufactured, tested and inspected according to the ISO 9001 standards (Version 2000).

If the unit is not immediately installed, it should be stored in a dry and clean area. The storage temperature should be between 10 and 40°C.

AQUALABO equipment is carefully inspected before it is packed. As soon as you receive your equipment, check the condition of the packaging and if you notice any problems, notify your carrier within 48 hours. Then consult the packing list and check that everything is in order. Finally, if you discover that something is missing, or if the goods are damaged immediately notify AQUALABO.

IMPORTANT:
In order to benefit from AQUALABO's service (application notes, AQUALABO information, technical assistance, etc.) immediately complete the attached guarantee card and return it to the following address:

AQUALABO Services
91 Avenue des Pins d'Alep
30319 ALES Cedex
FRANCE

Tel: +33 4 66 54 35 60
Fax: +33 4 66 54 35 69
Web: www.aqualabo.fr

4 PRECAUTIONS OF USE

> Always make sure that the instrument is connected on the good voltage.
(24VDC +/-0.5VDC 3A or Between 100 – 240V 50-60Hz with External Power supply option)

> Always disconnect the instrument mains power plug before starting any work inside the instrument.

> When dangerous substances for health and environment are used, the laboratory or site rules, where the instrument is installed must be followed.

> Take all the necessary precautions, during the use the instrument, to protect the operator from eventual liquids leaks or spills or possible radiations (protective gloves, anti-UV radiation glasses , protected clothes, etc)

> Keep the sample and cuvette area clean (no liquids or spills).

> The XENON lamp used in this unit emits UV radiation and must be never touched or dismounted outside expert people.

> Install the instrument in a ventilated area because of ambient temperature limits (see details) for a correct measurement working.

> All operations made inside the instrument, must be done by AQUALABO or by AQUALABO's authorized technicians.

> Use of the spectrophotometer without danger

If it is necessary to suppose that it is not possible any more to use the spectrophotometer without danger, it is necessary to put it out of service and to protect it from involuntary starting up again.

Use without danger will not be possible when the spectrophotometer

- suffered damage during transportation.
- was stored under inadequate conditions for one relatively long period
- present some visible damages.
- does not function any more as described in the user's manual.

In case of doubt, consult the spectrophotometer supplier.

5 INSTALLATION

5.1 ANALYZER INSTALLATION

The STAC2 has to be installed in:
- dry and clean place, (see recommendation in case of this situation)
- away from humidity, (see recommendation in case of this situation)
- away from corrosive vapors (see recommendation in case of this situation)
- heated during the winter
- ventilated during the summer
- temperature room must be between 10°C and 40°C.

5.2 ANALYZER DESCRIPTION

The basic version of the STAC2 is made for one sample measurement. It is constituted with one case and have to be installed on a vertical wall with dedicated fixation parts:

5.2.1 COMPLETE SIZE OF THE ANALYZER

.Fig. 1 Complete size of the analyzer

Place needed:

- Around 1 meter between the bottom of the analyzer and the floor
- 0.3 meter minimum all around the analyzer (at right and left)
- 1 meter, minimum, in front of the analyzer.

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5.2.2 CASE DETAILS

5.2.2.1 Sizes

.Fig. 2 Front & Rear case

Height: 500 mm   Width: 400 mm   Deep: 265 mm   Fixation: 535mm x 375mm
Weight: 25 kg

5.2.2.2 Connections view

.Fig. 5 Top fluid output & Air pressure port

.Fig. 4 Left electrical connections

.Fig. 3 Bottom fluid inputs

The electronic case includes:
- Electronic boards.
- Optical measurement system.
- Dedicated internal power supplies.
- Connections for main power, MODBUS, Ethernet and USB ports.

5.2.3 FLUID COMPONENTS

5.2.3.1 Description

.Fig. 6 External view of the flowing components

The flowing parts includes:
- One channel for rinsing solution.
- One channel for blank (distilled or demineralized water).
- From 1 up to 4 programmable channels for samples.
- From 3 up to 6 pinch electro-valves to control the liquids.
- A peristaltic pump.
- A dilution loop.

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5.2.4 MEASUREMENT SYSTEM

5.2.4.1 Description

Measurement system
protection cover

Flow cell

Optical light passing
through Flow cell

.Fig. 7 View of the monochromator case

The monochromator parts includes:
- Optical system including XENON lamp and dedicated electronics & optics.
- Flow cell (2, 5 or 50 mm optical path following the concentration to measure).

⚠ Only expert AQUALABO service people are allowed to access internal monochromator system. Any customer damages or access inside this area will automatically avoid warranty.

5.3 FLUIDS CONNECTION (SAMPLE & AIR PRESSURE)

.Fig. 8 Fluids connection drawing

Output tube (Flowing case) is going towards the waste.
Tube coming from electro valve labeled R is going to rinse solution tank
Tube coming from electro valve labeled B is going to blank tank
Tube coming from electro valve labeled S1 is going to sample 1 inlet.
Tube coming from electro valve labeled S2 is going to sample 2 inlet.
Tube coming from electro valve labeled S3 is going to sample 3 inlet.
Tube coming from electro valve labeled S4 is going to sample 4 inlet.

Clean air pressure optional port allow customer to inject pressured air to avoid any contamination from outside in case of hard environment use. Clean air, means air without any dust, humidity and oil vapor from outside air compressor. Maximum allowed air pressure is 0.5bar !

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5.4 SAMPLE INLET

5.4.1 PERISTALTIC PUMP RATE OF FLOW

Approximately 13 liters per hour or 220 mL per minute.

Theoretic volume = 0.019 liter per tube length meter (tube internal diameter: 5 mm).

5.4.2 SAMPLE CHARACTERISTICS

Generally the sample does not need to be prepared before the measuring.

NOTE 1
Nevertheless, in certain conditions, it must be cooled or warmed to avoid the condensation on the measure flow through cuvette.
Minimum temperature =10°C   Maximum temperature = 40°C

NOTE 2
With the installed tubes, it is advised against passing samples containing concentrated solvents, oils, concentrated acids and concentrated NaOH.

5.4.3 TAKING SAMPLE CONSTRAINTS

The peristaltic pump can bring a sample from a distance of **5 meters maximum** and a depth of **2 meters maximum** (see drawing under).

.Fig. 9 Positioning of the STAC2

If the sample is not accessible near the device, install a constant level flow cuvette.

.Fig. 10 Synoptic of liquid circuit.

N.B.: DO NOT FORGET TO INSTALL A DRAIN GUTTER TO CARRY THE SAMPLES AND DRAIN TO THE SEWER.

MADE BY THE USER:
The user has to install the sample inlet equipped with stopping valve.
The user has to install the drain gutter.

5.4.4 OVERFLOW POT

The silicone tube coming from the electro valve EV1 is connected to the outlet of overflow can.

.Fig. 11 Example of overflow pot.

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Overflow pot includes:
- a cuvette with overflow,
- a stopping valve to isolated the system,
- a purge valve to empty the cuvette,
- a strainer (if necessary) to stop big particles.

5.4.5 RINSING SOLUTION

The rinsing solution can be different according with the solution to analyze. Generally, we advise you to use chlorine water at 48% diluted at 1%.
Sometimes it is possible to use:
- methanol (1 to 10%)
- diluted organic solvents (acetone, methylen chloride…)
- and so on

The consumption of rinsing solution depends on two things:
- the cycle rate of rinsing;
- the tube length of rinsing solution aspiration.

Example:
- The cycle rate of rinsing = 10 (every 10 main measurement sample)

5.4.6 BLANK SOLUTION

5.4.6.1 Some definitions

High purity water: Indicate the water which almost does not contain dissolved substances

Distilled water: Indicate the water which is evaporated to be removed of all the dissolved particles and various pollutants.

Demineralized water: Indicate the water which does not contain any more dissolved mineral ions.

Drinking water: Indicate water suitable for human consumption.

5.4.6.2 The blank solution

The blank solution will have imperatively to be high purity water if the sample contains small quantity of COT and/or suspended matter (ground water, spring water,…). In the other cases, distilled or demineralized water will be enough.

WARNING: If the user manufactures the demineralized water in his laboratory, he has to be sure that this water is "clean" (without organic matter and without compounds as nitrate).
To check the quality of demineralized water, realize its spectrum against the air. The spectrum shape must be as the following one.

The STAC2 uses also blank to do the dilution.

The consumption of blank solution depends on various things:

- the dilution factor;
- the frequency of blank measure (multiple of main cycle process);
- the main sample measurement cycle duration;
- the blank aspiration duration.

Example of consumption:
- frequency or blank measure = 12 (2hours)
- frequency of sample measure = 20 minutes with a dilution;
- time of blank aspiration = 40 seconds.

Consumption = 42 liters for a week.

MADE BY THE USER:

The user has to provide cans with blank solution and rinsing solution.

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5.5 ELECTRICAL CONNECTIONS

5.5.1 OVERVIEW

RTU MODBUS RS485

RJ45 Ethernet port
(TCP/IP MODBUS)

USB port for USB key mass storage (only)

24VDC/3A power supply

.Fig. 12 General connection drawing

- 24VDC/3A +/-0.5VDC Power supply cable
- MODBUS RS485 cable
- Ethernet RJ45 cable
- USB-B connector for USB key ONLY.

5.5.2 MODBUS RTU (RS485)

The RS485 connection allows the analyzer to communicate with MODBUS protocol on a RS485 bus.

5.5.2.1 Pins connection details

N° pin DB9 connector	Color	Designation	Signification
5	Black	GND	Ground
3	Orange	RS485_A	MODBUS A signal
2	Brown	RS485_B	MODBUS B signal
6	Red	12VDC / 0.5A(max)	Optional 12VDC output

.Fig. 13 RTU MODBUS RS485 port pinout

5.5.3 DATA SIZE

1 START BIT - 8 S BITS - 2 STOP BITS - NO PARITY
Comply with MODBUS RTU protocol definition

5.5.4 DATA TRANSMISSION RATE

Bi-directional 9600 Baud.

IMPORTANT:
The distance between the STAC2 and the computer using the RS485 output must be lower than 30 meters.
Otherwise use on line amplifiers.
The standard RS485 is compatible with MODBUS protocol only!

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5.5.5 POWER SUPPLY

If connected to an external source without power supply case.
Characteristic: **24VDC/3A +/-0.5VDC**

If connected to the main through power supply optional module
Mains: **230 V single phases, 50/60 Hz.**
Power: **100 W**

GND
(Black wire)

+24VDC / 3A
+/-0.5VDC
(Blue wire)

Unused

.Fig. 14 Power supply pinout

MADE BY THE USER:

Install a plug near the analyzer.
If possible, install an ON/OFF external switch closed to the analyzer.

If this analyzer must working inside a very strong humidity environment, it is recommended to install it inside an IP54 case.

In case of large fluctuations in AC voltage (Fluctuation above +/- 10% of nominal voltage) it is advised to connect a voltage regulator or an inverter.

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6 CONNECTIVITY SETUP

STAC2 analyzer is a modern instrument, able to be connected on Ethernet or WIFI network.
There is no physical screen on the instrument itself, and the human interface is based on an embedded Web page, user can access thru the network. This Web Page able the customer to manage the complete configuration, status and results of the STAC2.

6.1 CONNECTION SETUP

6.1.1 WIRE ETHERNET SETTINGS

Wire Ethernet connection allow user to connect the STAC2 in a network or directly on a computer.
During instrument startup, a DHCP negotiation is engaged to setup the STAC2 in the current network.
If the DHCP process succeed, an automatic IP is given by the network DHCP service, otherwise the default 192.168.200.200 IP address is managed by the STAC2 if the user has not changed it in settings.

STAC2 Ethernet port

6.1.1.1 Direct connection with computer

In the case of direct wire connection to a computer, there is no DHCP service running. Consequently, the Ethernet network computer port must be configured with the same IP address class than the default STAC2 IP address : 192.168.200.xxx where "xxx" represent a value from 1 to 255 (except the STAC2 value itself).

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Direct wire connection

IP :   192.168.200.201
MASK :   255.255.255.0
GATEWAY : 192.168.200.200 (STAC2 IP)

IP : 192.168.200.200

6.1.1.2 Connection on a wired network

In the case of a connection on a network, there is generally a running DHCP service distributing IP address to any devices connected on the network. Consequently, the STAC2 Ethernet port is automatically configured with an IP address.

In the case of connection on a network without DHCP service, STAC2 must be configured with the same IP address class than the default network IP address : 192.168.200.xxx where "xxx" represent a value from 1 to 255 . This last value must be selected as a free address value on the network to avoid any IP address conflict on the network between STAC2 and another system.

IP : AAA.BBB.CCC.DDD
(IP is given by a DHCP service or fixed to a defined value)

IP : AAA.BBB.CCC.DDD
 (IP is given by a DHCP service or fixed to a defined value)

6.1.2 WIFI SETTINGS

WIFI connection allow user to connect the STAC2 in a network without wire requirement (except if MODBUS TCP/IP function is needed, in this case a Wire connection is required : see MODBUS chapter).

The STAC2 is able to connect itself automatically to three identified WIFI only. A user defined WIFI and two rescue Wifi.
A WIFI identification is made of two parameters: "SSID" & "Password". The STAC2 try to connect every minutes to a known WIFI network and connect itself to the best WIFI quality and power reception.

As a result, STAC2 will be connected by WIFI connection if one of the known WIFI network in detected.

The user defined WIFI parameters can be set in the General Configuration page (see chapter XXX). A check box which shut down the wifi is also available on this page.

6.1.2.1 Recue wifi

The rescue WIFI, able the user to connect to the STAC2 with a smartphone or tablet in hotspot mode if no wire connection or user WIFI is not available.

The SmartPhone or Tablet WIFI hotspot must be set with the following SSID and Password:

SSID : STACV2_rescue
Password : STACV2_help

When it's done and if the STAC2 is not already connected to a WIFI connection, the connection to the opened hotspot will be automatic after minimum 1 minute.
Once connection is established, the SmartPhone or Tablet will show or can display you the STAC2 attributed IP you will have to use to access the STAC2 Web Page interface in a Web Browser application. This information is available in the peripheral connected list on the SmartPhone or Tablet.

For some SmartPhone, this information is not easily visible, thus an alternative hotspot on which the STAC2 has static IPs is available. It is important to understand that **this hotspot should not be used by default**. Indeed, IP conflicts could be created by using this hotspot.

The SmartPhone or Tablet WIFI hotspot in this particular case must be set with the following SSID and Password:

SSID : APSecoWifi
Password : AquaSeco01

Once connection is established, the SmartPhone or Tablet could reach the STAC2 to Static IP. Because of the none homogeneity of the SmartPhone manufacturer, this static IP depends on the device providing the hotspot :
- Android SmartPhone or Tablet should use the 192.168.43.10 IP address
- iOS SmartPhone or Tablet should use the 172.20.10.10 IP address

WIFI hotspot connection

7 MODBUS CONNECTIVITY

7.1 GENERALITY

STAC2 is compatible with MODBUS TCP/IP and MODBUS RTU.
MODBUS TCP/IP able an external system to communicate with STAC2 through the Ethernet STAC2 port (see **9.6.3** chapter for IP setting).

STAC2 Ethernet port

MODBUS RTU able an external system to communicate with STAC2 through the SubD9 port (see **5.5.2** for electrical and protocol definition)

STAC2 MODBUS definition comply with normalised MODBUS function definition:
-    Function 03 Read Holding Registers
-    Function 06 Write Single Register
-    Function 16 Write Multiple Registers

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7.2 MODBUS BASE ADDRESS & SLAVE ADDRESS

STAC2 base address is 0 based.
STAC2 default Slave Address is equal to 200 and is available only for MODBUS RTU mode.

Slave Address can be changed by writing into the corresponding MODBUS address register (see register' mapping bellow) and change is applied immediately.

Note:

MODBUS TCP/IP is not implementing a Slave address as IP itself is enough to control multiple peripherals on **Ethernet port 1502**

7.3 MODBUS REGISTER'S MAPPING

STAC2 include internal documentation you can access through the "Files Manager" page of Web Interface Software.

Open the STAC2_MODBUS_MAPPING PDF file documentation to have a full documentation of registers mapping description.

8 LED INDICATOR

8.1 LED DEFINITION

STAC2 has no display, and all configuration functions and results are accessible through the embed Web Page server (see chapter 9).

Nevertheless, STAC2 is equipped with small lights indicators and one digit display to show all the following primary base information:

- Power ON light indicator
- READY: Green light showing the STAC2 is ready to execute actions. After switching ON, wait this light will be ON to operate into the STAC2.
- RUNNING: Green light showing the cycle process measurement is running.
- RINSING: Green light showing the Rinse action is operate. Rinse solution is sucked.
- BLANKING: Green light showing the Blanking action is operate. Blank solution is sucked.
- SAMPLING: Green light showing the Sampling action is operate. Sample solution is sucked.
- MEASURING: Green light showing the Measurement process is operate. Spectra of the liquid inside flow cell is measured.
- UNCRITICAL Error: Yellow light showing an uncritical error has been detected. Uncritical errors are not stopping the Cycle process measurement.
- CRITICAL Error: Red light showing a critical error has been detected. Critical will stop the Cycle process measurement.

Digit display

Red dot indicate Power ON status

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8.2 SEVEN-SEGMENT DISPLAY

During normal situation, the eight segment digit don't display anything except during the time Cycle process measurement is waiting the next measurement to be done. During this phase, the digit display a 2 bars rotating indication showing the STAC2 is waiting next time to start a measurement.

In case of an error occur, the eight segment digit will display an error code related to the UNCRITICAL or CRITICAL one.

In this case try to solve the problem if you know it or contact AQUALABO's servicing department for support in analysing and solving problems.

8.3 ERROR CODE DEFINITION

1   Hardware server error
2   Not used
3   Measurement spectra saturation detected.
4   Communication with measurement system failure
5   Communication with I/O control failure
6   Recording data failure
7   Loading data failure
8   Measurement system configuration or data integrity failure
9   MODBUS initialization failure

CRITICAL errors are: 3, 4 and 5.
UNCRITICAL errors are all others.

9 SOFTWARE FUNCTIONS

STAC2 embed a Web Page server. The complete configuration or results management is accessible thru this internal Web site.
To access it, you have to use a Web Browser on the system connected to the STAC2.
For different technical compatibility aspect, we highly recommend to use Google Chrome browser.

9.1 STARTING

You must know the STAC2 IP to connect it.
In the Web Browser, enter the exact IP in place of Web Page address:

If IP address is correct, user will access to the "DASHBOARD" main page.

This main page display last measurement results (graphically and table) in addition to an events list.

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9.2 MAIN TOP INFORMATIONS

All top Web Page are identical and show important state, technical information related to STAC2 connection, heart temperature, and process cycle information

9.2.1 START / STOP MEASUREMENT PROCESS CYCLE

STAC2 - Interface   1848100002 ꔜ CGD Connected ꔜ Conf. Connected 品 WIRED IP: 192.168.30.200 ☞ WIFI IP: 192.168.30.76 🗎 20190411_0845 🌡 CPU Temp(°C): 55.8

START STOP ⇄ State: Running ⇅ Cycle: 1/0 ▦ Channel: Waiting next cycle in 0h 0min25s 🔧 Error: 0

Start cycle measurement process.
STAC2 will be in autonomous process until the user decide to stop it.
A new Period measurement will be created after first measurement point record.

Stop cycle measurement process.
The STAC2 will close the current Period measurement.

STAC2 - Interface   1848100002 ꔜ CGD Connected ꔜ Conf. Connected 品 WIRED IP: 192.168.30.200 ☞ WIFI IP: 192.168.30.76 🗎 20190411_0845 🌡 CPU Temp(°C): 55.8

START STOP ⇄ State: Running ⇅ Cycle: 1/0 ▦ Channel: Waiting next cycle in 0h 0min25s 🔧 Error: 0

STAC2 serial identification

STAC2 - Interface   1848100002 ꔜ CGD Connected ꔜ Conf. Connected 品 WIRED IP: 192.168.30.200 ☞ WIFI IP: 192.168.30.76 🗎 20190411_0845 🌡 CPU Temp(°C): 55.8

START STOP ⇄ State: Running ⇅ Cycle: 1/0 ▦ Channel: Waiting next cycle in 0h 0min25s 🔧 Error: 0

C, G, D letters represent a communication channel state between the STAC2 and WebBrowser. There are 3 channels for different purposes:
C : for control command, action on STAC2 components
G : for global data information exchange, such measurement cycle details, temperature, IPs
D : for measurement and special events.

If one of these letters are surrounded with "( )" symbol, this mean the channel communication is closed or broken for any reason.

STAC2 - Interface   1848100002 ꔜ CGD Connected ꔜ Conf. Connected 品 WIRED IP: 192.168.30.200 ☞ WIFI IP: 192.168.30.76 🗎 20190411_0845 🌡 CPU Temp(°C): 55.8

START STOP ⇄ State: Running ⇅ Cycle: 1/0 ▦ Channel: Waiting next cycle in 0h 0min25s 🔧 Error: 0

Conf: represent a communication channel state between the STAC2 and WebBrowser to manage its configuration.
STAC2 configuration able user to adapt STAC2 functions to user needs.

If Conf text is surrounded with "( )" symbol, this mean the channel communication is closed or broken for any reason.

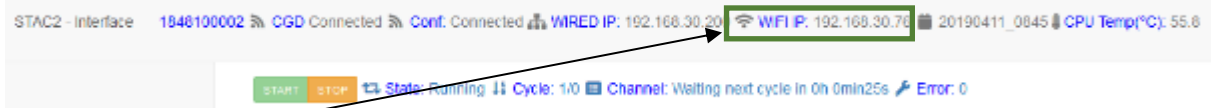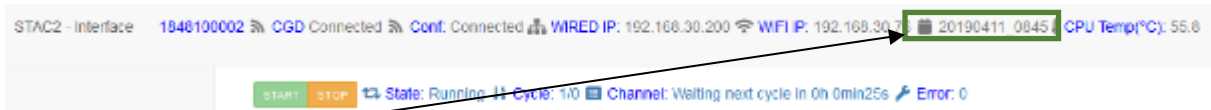STAC2 - Interface   1848100002 📶 CGD Connected 📶 Conf. Connected   WIRED IP: 192.168.30.200   WIFI IP: 192.168.30.76   20190411_0845   CPU Temp(°C): 55.6

START   STOP   State: Running   Cycle: 1/0   Channel: Waiting next cycle in 0h 0min25s   Error: 0

WIRED IP: display current IP when wire network is connected to STAC2.

STAC2 - Interface   1848100002 📶 CGD Connected 📶 Conf. Connected   WIRED IP: 192.168.30.200   WIFI IP: 192.168.30.76   20190411_0845   CPU Temp(°C): 55.6

START   STOP   State: Running   Cycle: 1/0   Channel: Waiting next cycle in 0h 0min25s   Error: 0

WIFI IP: display current IP when WIFI connection is established with STAC2.

STAC2 - Interface   1848100002 📶 CGD Connected 📶 Conf. Connected   WIRED IP: 192.168.30.200   WIFI IP: 192.168.30.76   20190411_0845   CPU Temp(°C): 55.6

START   STOP   State: Running   Cycle: 1/0   Channel: Waiting next cycle in 0h 0min25s   Error: 0

DATE_HOUR: display the current date & hour of the internal STAC2 calendar.
Format is "YYYYMMDD_HHMM"

STAC2 - Interface   1848100002 📶 CGD Connected 📶 Conf. Connected   WIRED IP: 192.168.30.200   WIFI IP: 192.168.30.76   20190411_0845   CPU Temp(°C): 55.6

START   STOP   State: Running   Cycle: 1/0   Channel: Waiting next cycle in 0h 0min25s   Error: 0

CPU Temp(°C): display the CPU heart temperature of the STAC2 system.

STAC2 - Interface   1848100002 📶 CGD Connected 📶 Conf. Connected   WIRED IP: 192.168.30.200   WIFI IP: 192.168.30.76   20190411_0845   CPU Temp(°C): 55.6

START   STOP   State: Running   Cycle: 1/0   Channel: Waiting next cycle in 0h 0min25s   Error: 0

State: display the state of measurement cycle. Two state available :
"Stopped" : The measurement process cycle is stopped and STAC2 can be configured fully.
" Running" : The measurement process is running. STAC2 configuration is blocked. Measurement data are accessible for exploration.

STAC2 - Interface   1848100002 📶 CGD Connected 📶 Conf. Connected   WIRED IP: 192.168.30.200   WIFI IP: 192.168.30.76   20190411_0845   CPU Temp(°C): 55.6

START   STOP   State: Running   Cycle: 1/0   Channel: Waiting next cycle in 0h 0min25s   Error: 0

Cycle X/X: display the cycle number currently running and how many cycle the STAC2 process must run. If the maximum number of cycle is equal to 0, STAC2 process will never end until user stop it manually.

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STAC2 - Interface   1948100002 🔊 CGD Connected 🔊 Conf: Connected 🖧 WIRED IP: 192.168.30.200 📶 WIFI IP: 192.168.30.76 📅 20190411_0845 🌡 CPU Temp(°C): 55.8

START STOP ⇄ State: Running ⬍ Cycle: 1/0 ▣ Channel: Waiting next cycle in 0h 0min25s 🔧 Error: 0

Channel: display the current action running in the complete process measurement.
Some actions : "Blank Asp", "Rinse Asp", Sample Asp", "Measurement", "Waiting next cycle"

STAC2 - Interface   1948100002 🔊 CGD Connected 🔊 Conf: Connected 🖧 WIRED IP: 192.168.30.200 📶 WIFI IP: 192.168.30.76 📅 20190411_0845 🌡 CPU Temp(°C): 55.8

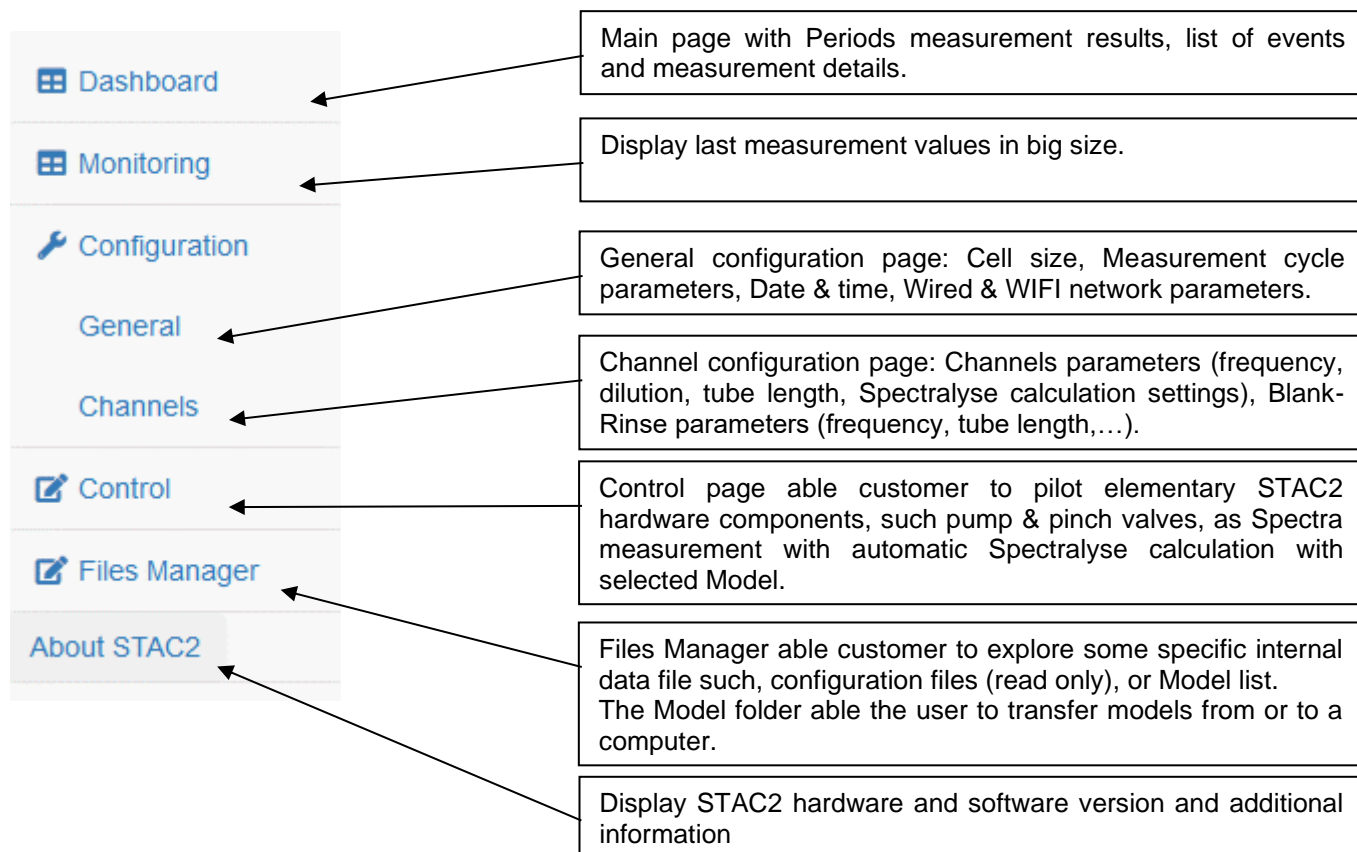START STOP ⇄ State: Running ⬍ Cycle: 1/0 ▣ Channel: Waiting next cycle in 0h 0min25s 🔧 Error: 0

Error: display the current error if occurred. Display 0 if no error.
List of error code:
0 : No error
1 : Hardware server error
3 : Spectra measurement saturation
4 : Optical measurement system error
5 : Input/Output system error.
6 : Data saving process error
7 : Data loading process error
9 : MODBUS error

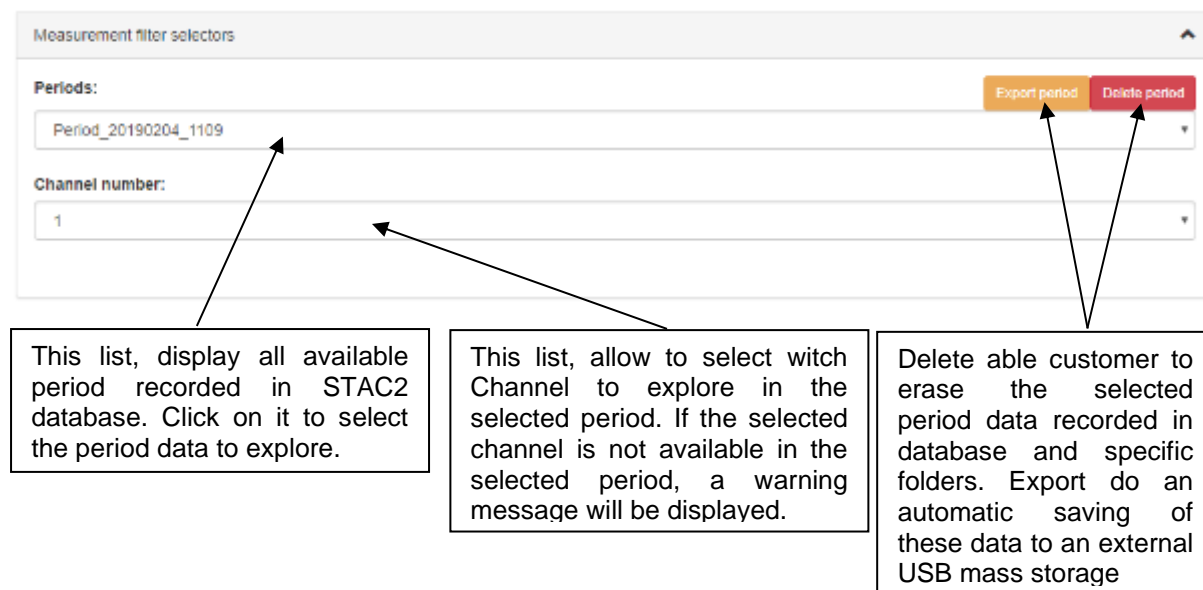## 9.3 MAIN MENU

Main page with Periods measurement results, list of events and measurement details.

Display last measurement values in big size.

General configuration page: Cell size, Measurement cycle parameters, Date & time, Wired & WIFI network parameters.

Channel configuration page: Channels parameters (frequency, dilution, tube length, Spectralyse calculation settings), Blank-Rinse parameters (frequency, tube length,…).

Control page able customer to pilot elementary STAC2 hardware components, such pump & pinch valves, as Spectra measurement with automatic Spectralyse calculation with selected Model.

Files Manager able customer to explore some specific internal data file such, configuration files (read only), or Model list.
The Model folder able the user to transfer models from or to a computer.

Display STAC2 hardware and software version and additional information

9.4 DASHBOARD PAGE

This page include measurement period exploration and recorded events list. Each time STAC2 start a measurement process cycle, a new time-dated period of measurement is created. The period stop when STAC2 is manually stopped or a critical error occurred.

9.4.1 MEASUREMENT FILTER SELECTOR

This list, display all available period recorded in STAC2 database. Click on it to select the period data to explore.

This list, allow to select witch Channel to explore in the selected period. If the selected channel is not available in the selected period, a warning message will be displayed.

Delete able customer to erase the selected period data recorded in database and specific folders. Export do an automatic saving of these data to an external USB mass storage

STAC2

A measurement period is a collection of sequences measurements recorded between a "START" and a "STOP" STAC2 process. As a result each measurement campain are automaticcaly separated and heuro-dated for better tracability and filtering.

9.4.1.1 Export or delete measurement periods

It's also possible to erase or export the selected period:

Erasing a period will delete all related recorded data (results, spectrum, and database related data). This process is not reversible, and you must be carrefull before confirming erasing process to start.

A memory check is done every day at midnight. If there is less than 70% of memory used, nothing will append. Between 70% and 80% a warning event will be created when the dashboard is loaded, with a message asking to delete data. Above 80% an automatic deletion of every data older than 3 mounthes ago will be tried following the midnight test. If this deletion failed an Alert message will be created at every dashboard page load.

Exporting a period consist of recording inside an external USB mass sorage plugged on the USB port, all related period's stored data (results and spectrum), and also the complete data base (all STAC2 data) you will be able to explore and filter in an external computer database software.
STAC2 database format file is SQLITE3.

Once the export process is finished, you will find the following contain in your USB Key:
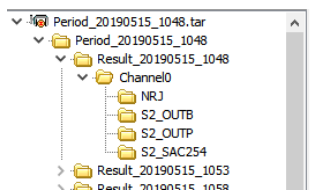
A named folder with STAC2 serial number:

Inside each STAC2 folder, you will find exported data. Each period data are stored in a compressed file (TAR.GZ file format) you can open easely with a free software like WinZip / WinRar or IZArc, for Windows or MacOS operating systems to navigate onto data. Additionally the complete database file "StacV2Data.db" is also exported.

The compressed file contain all results data (one folder per result) :

All SCN file type are recorded spectrum in UV-PRO software file format.
All TXT file type are recorded detailed data in text format for easy reading or EXCEL easy import for post data treatments.
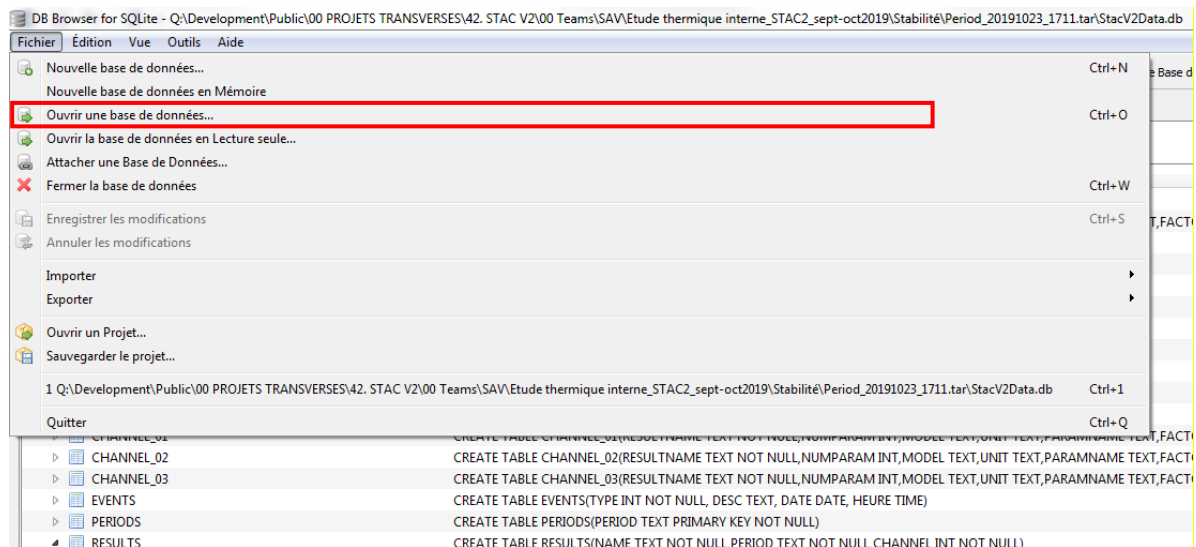
9.4.2 OPENING AND USE OF THE DATA BASE

In order to facilitate the handling of the data generated by STAC2, a StacV2Data.db file is available. This type of file, opened by a compatible database utility, allows the application of numerous filters for sorting the data before exporting to a ".csv" file. File from which a data processing can be executed for example, to display a graph, close to the one visible, in real time, in the Dashboard tab of the web page.
The file is in SQLITE3 format. In order to be able to easily manipulate the data, we recommend the SQLitebrowser software.

9.4.2.1 Opening the file

A simple drag and drop in the first tab of the software is possible. The manual way is also present, by clicking on "File-> Open a data base…"
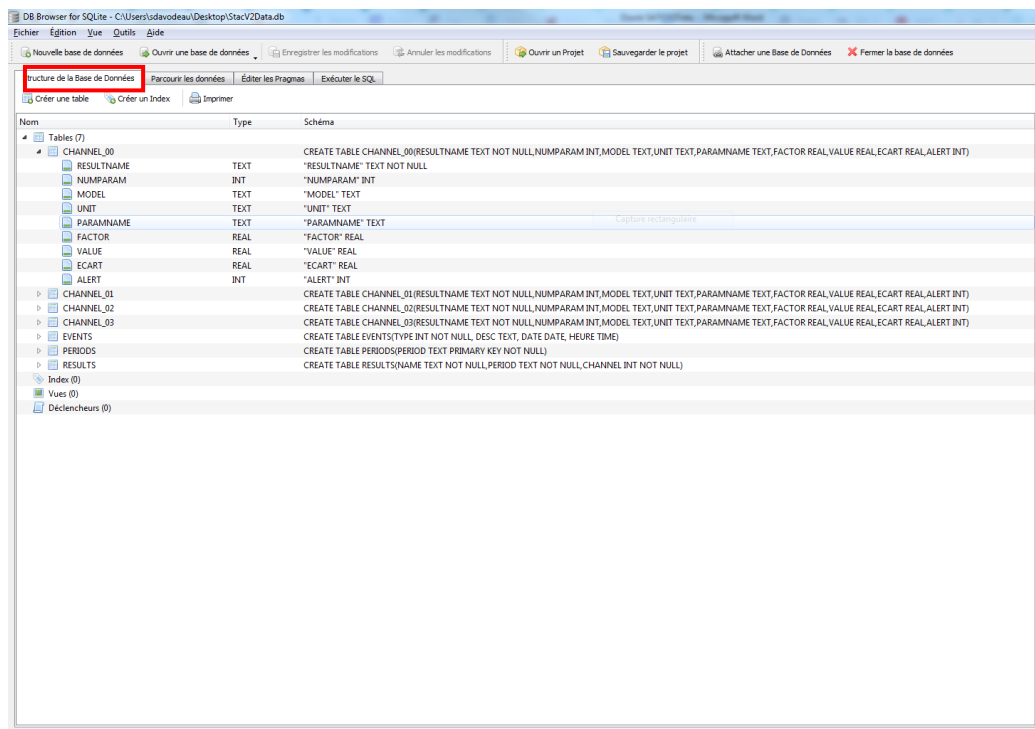

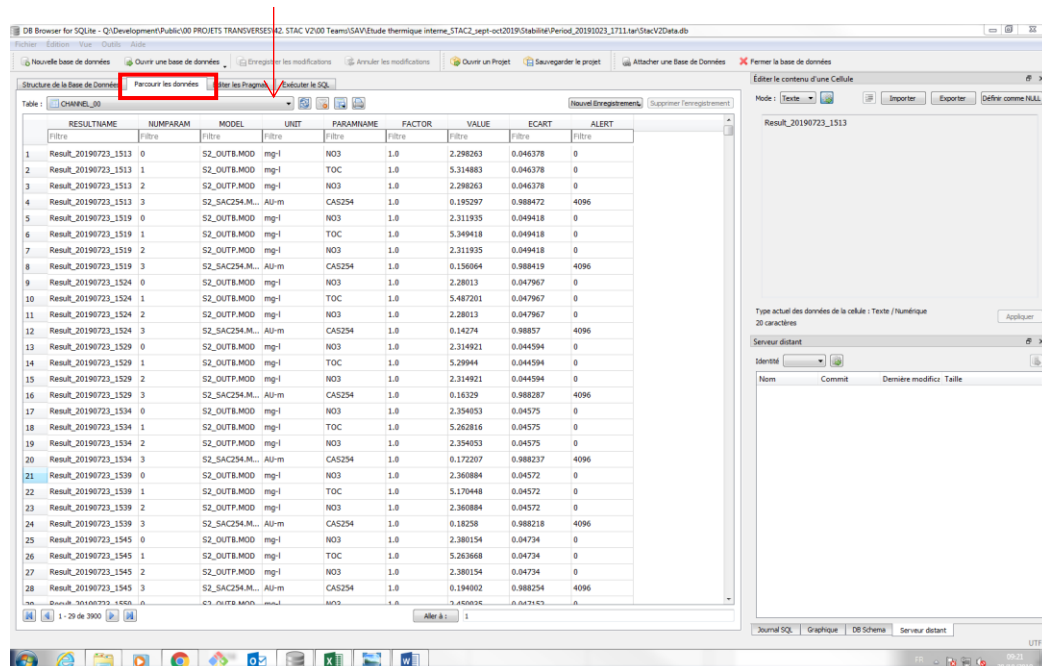And then selecting the file with the ".db" extension.

9.4.2.2 Data computing

The first tab of this software "database structure" lets you understand how the data are grouped, by exploring the tree structure of the database.
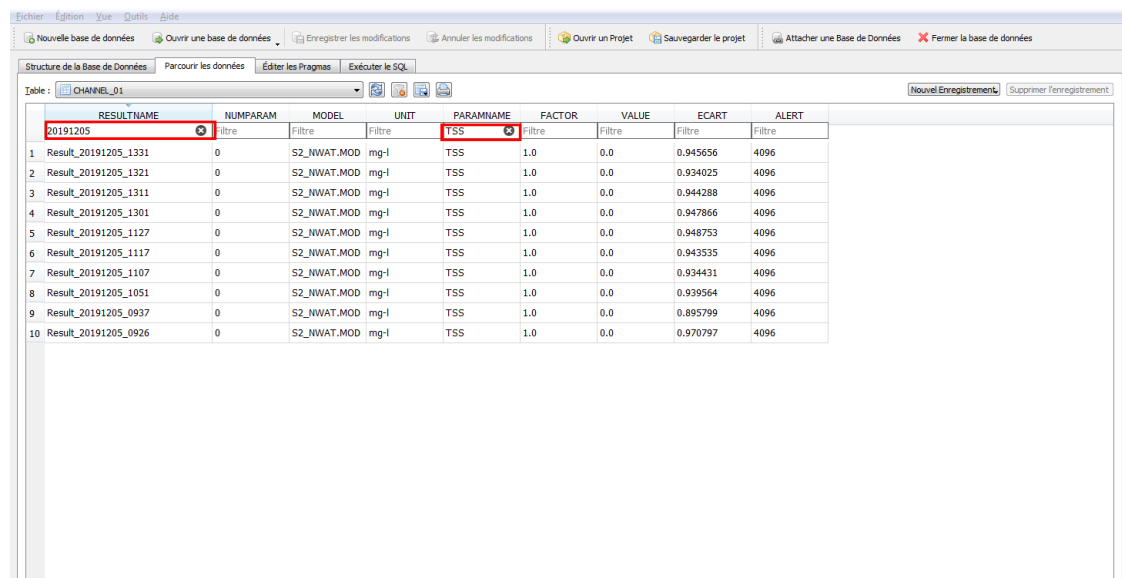
The second tab "…." Is the one letting you walking thru all the data congregated into tables, selectable thanks to the scrolling menu :
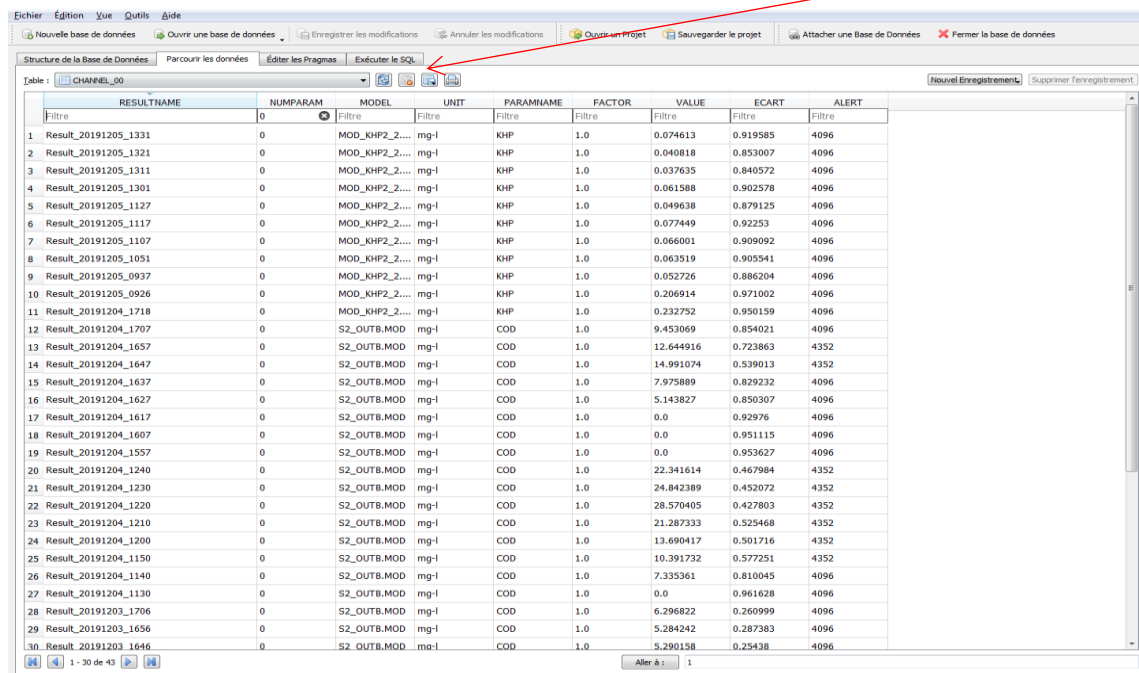

Above each column, a " Filter " field allows you to type a character string that will allow you to display only the lines containing the string.

For example if you want to retrieve all the values of "TSS" of channel 2 obtained on 2019-12-05. You will then have to fill in the information above the columns:
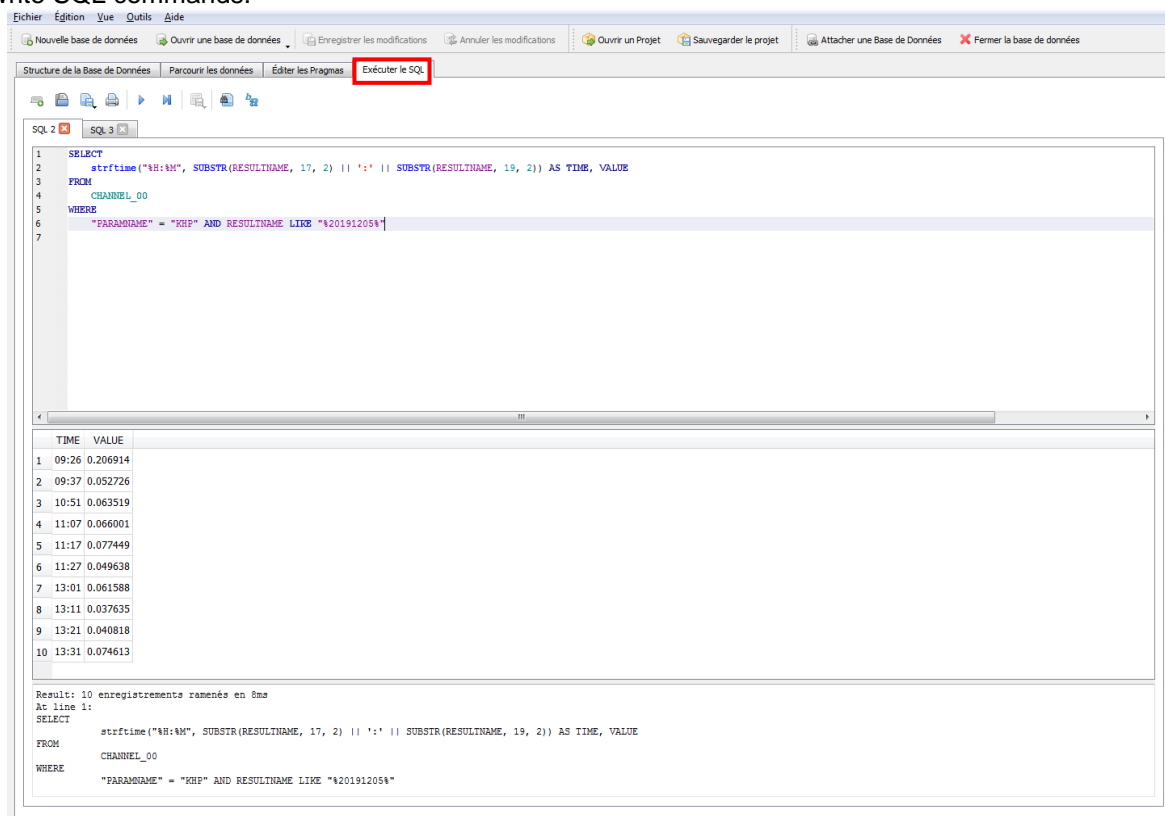
- RESULTNAME : «20191205»
- PARAMNAME : «TSS»

STAC2

After a successful sorting, it is possible to export the displayed data using the button [icon] visible here

9.4.2.3 SQL commands

It is also possible to use more complex filters by applying SQL commands to the database. To do this, you will need to go to the "Execute SQL" tab. An editable white area is then visible where you can write SQL commands.

SQL is a powerful language which because of our needs stay not so complicated. Here is the structure of a classical command :

```
SELECT
      expr [, expr ...]              → The column name or a function. It is the
                                     thing we want to see.
FROM
      Table                          → The table name containing the column we would
WHERE                                like to see.
      Conditions
                                     → The filtering conditions.
```

Opérateur	Description
=	Equal
<>	Not equal
!=	Not equal
>	Greater than
<	Less than
>=	Greater than or equal to
<=	Less than or equal to
ALL	Returns lines such that all conditions are checked.
AND	Returns lines such that both conditions are verified
ANY	Returns lines such that at least one of the conditions is verified.
BETWEEN	Returns lines whose value is between two limits
IN	Returns lines whose value is within a set of defined values
LIKE	Returns lines whose string matches a string pattern
NOT	inverts the condition of an operator, for example: NOT EXISTS, NOT IN, NOT BETWEEN, etc.

Here are some command exemples :

1. **In order to select the KHP results as well as the time of measurement (in time format) of channel 1 during the day 2019-12-05**

```
SELECT
      strftime("%H:%M", SUBSTR(RESULTNAME, 17, 2) || ':' ||
SUBSTR(RESULTNAME, 19, 2)) AS TIME, VALUE
FROM
      CHANNEL_00
WHERE
      PARAMNAME = "KHP" AND RESULTNAME LIKE "%20191205%"
```

2. **In order to select the date and time (Excel compatible format) as well as the value of the channel 1 COD measurement results such that the alert level is greater than 4300**

```
SELECT
        strftime("%Y-%m-%d %H:%M", SUBSTR(RESULTNAME, 8, 4) || '-' ||
SUBSTR(RESULTNAME, 12, 2) || '-' || SUBSTR(RESULTNAME, 14, 2) || ' ' ||
SUBSTR(RESULTNAME, 17, 2) || ':' || SUBSTR(RESULTNAME, 19, 2)) AS
DATE_TIME, VALUE
FROM
        CHANNEL_00
WHERE
        PARAMNAME = "COD" AND ALERT > 4300
```

3. **To select the date and time (Excel compatible format) as well as the value of the results of the TSS measurements of channel 2 made during the measurement period started on 05/12/2019 at 9:26 am.**

```
SELECT
        strftime("%Y-%m-%d %H:%M", SUBSTR(RESULTNAME, 8, 4) || '-' ||
SUBSTR(RESULTNAME, 12, 2) || '-' || SUBSTR(RESULTNAME, 14, 2) || ' ' ||
SUBSTR(RESULTNAME, 17, 2) || ':' || SUBSTR(RESULTNAME, 19, 2)) AS
DATE_TIME, VALUE, PERIOD
FROM
        CHANNEL_01
INNER JOIN RESULTS ON
        RESULTS.NAME = CHANNEL_01.RESULTNAME
WHERE
        PARAMNAME = "TSS"
        AND
        PERIOD LIKE "%20191205_0926%"
```

Don't forget to click on   in order to execute the command, and the csv save can be done here.

9.4.3 PARAMETERS TIME EVOLUTION CHART

The parameters time evolution chart, display the current selected period measurement history graphically. Each measured parameters evolution during time are drew with curves in different color. All curve points can be selected by approaching mouse pointer on them to display detailed measurement values. A click on this point will display the related spectra sample curve.

In the left top corner, some checkboxes able user to select parameter's curve to display.

In the right top corner, some button able user to "navigate" cross recorded data from the oldest to the newest one:
1st data: display period measurement curves from period start time.
Last data: display period measurement curves up to last period measurement point stop time.
Prev. data: display previous range of data in the period measurement.
Next. data: display next range of data in the period measurement.
Data view: display a list, able user to select the range of displayed period measurements points.

In the bottom page, first and last point's date of the graphical representation are displayed.

By default, automatic scale is enabled but there is possibility to use a custom scale. Scale input will automatically appear if automatic scale checkbox is disabled.

This table display detailed points values of the current graphical selected range period measurements. For each measurement point, date and time, and for each measured parameters, concentration and restitution quality level are displayed.

9.4.4 MEASUREMENT SPECTRA

In the graphical measurement history, if a point is selected (clicked), the related measurement spectra will be displayed. This allow experimented user to analyze each measurement in details if required.
Also, according to same principle than in graphical measurement history, each point value can be displayed by moving mouse over points.

The curve above represent the energy related to the selected point spectra. This is helpful in case of abnormal sample or blank measurement analysis.

9.4.5 EVENTS

This next area, display STAC2 events. Events are different important changes or alert the STAC2 is able to detect and record. All these events are time-dated and can be filtered by typology.

Buttons able user to "navigate" cross recorded events filtered list :
Prev. events : display previous range of events.
Next. events : display next range of events.
Data view : display a list, able user to select the range of displayed events.

Delete all filtered events. The erase take in account filtered type events.

Events filter type list. Enable to list only some specific type of events if required

Events list display according to selected events filter above.

9.5 MONITORING PAGE

This area, display STAC2 last available measurement result. It is useful to display main results in big size on a dedicated screen.

If STAC2 is running its own measurement process cycle, last result corresponding to the current measurement Period is displayed.

If STAC2 is stopped, the displayed result correspond to the last Period and measurement done.

Monitoring

Last recorded period: Period_20190318_1152 **Channel number:**

| 1 | ▼ |

Nwat.MOD - NO3	Nwat.MOD - COD	Nwat.MOD - TSS
0 mg-l 2.6 %	**0 mg-l** 1.2 %	**0 mg-l** 1.5 %

Last Period measurement name.

One parameter result.
This example show 3 results for channel 1 and last Period measurement. The screen can display up to 10 parameters per Channel.

List to select displayed channel (1 to 4)

STAC2

9.6 GENERAL CONFIGURATION PAGE

The general page configuration, able the user to specify general STAC2 parameters as:
- Flow cell optical size (2, 5 or 50mm)
- Measurement cycle frequency in minutes
- Automatic cycle measurement start in case of power failure.
- Date and Time
- Fixed Wire Ethernet connection for MODBUS & remote control
- WIFI SSID/Password for remote control.

9.6.1 GENERAL PARAMETERS

Fluid parameters ∧

Cell size (mm):

5 ▾

Flow cell size factor (0.70-1.20):

0,84

Measurement Cycle ∧

☐ Auto Start

Period (5-360 min):

5

| Automatic cycle measurement start in case of power failure | Measurement cycle period | Flow cell size selection | Flow cell size factor : In case of 2mm or 5mm Flow cell size selection, real optical path length can varies around nominal path length; because of gaskets compression factor and mechanical machining effects. As a result, a linked factor to the Flow cell itself must be entered (check this value on the flow cell's bottom side and enter it there). |

General Configuration `Apply to STAC`

Parameters changes will be effective and recorded in STAC2 memory only after pressing red button "Apply to STAC". Otherwise changes will not be taken in account.

9.6.2 DATE AND TIME

Date / Time ^

Date:

[   ] 📅

Time:

[   ] 🕐

Set Date & Time

| Display calendar to select correct day. The current day is highlighted in blue color. Click on the correct date to set correct date. | Display hours in a calendar form to choice hour / minutes. The current hour or minutes is highlighted in blue color. Click on the correct hour and minutes to set correct hour. |

User can change Date and Time according to their installtion location.
Change is immediatelly taken in account by pressing "Set Date & Time" button

9.6.3 WIRE NETWORK SETTING

Fixed WIRED Ethernet connexion for MODBUS TCP/IP & Remote Control ^

IP address (if no DHCP exist):

192 . 168 . 200 . 200

Set IP address

Specified wired TCP/IP address if no DHCP service exist on the network.
Click on "Set IP address" button to set IP address.

STAC2

In the connectivity chapter, we have seen the STAC2 is able to be connected in a wired network as any computer or network system. Also this wired network connection can be used to control and configure STAC2 thru TCP/IP MODBUS on **Ethernet port 1502**.
In the case there is no DHCP service on the network, STAC2 will take the specified IP address as identification.

Change is immediatelly taken in account by pressing "Set IP address" button.

9.6.4 WIFI NETWORK SETTING

WIFI parameters for Remote Control ∧

☐ Shutdown Wifi

SSID : APSecoWifi

Password : AquaSeco01

Set Wifi parameters

Turn off device Wifi.

Specify the customer WIFI SSID.

Specify the customer WIFI Password

STAC2 is able to be connected with WIFI wireless network connection.
This page section show you the current customer WIFI SSID & Password.
Customer can change them to able the STAC2 to connect automatically to a specified WIFI network.
In the case STAC2 is not connected to any WIFI network, an automatic try to connect occur every minutes.
If the customer do not want the WIFI STAC2 on, it is possible to turn it off by checking the box.

Change is immediatelly taken in account by pressing "Set Wifi parameters" button.

9.7 CHANNELS CONFIGURATION PAGE

The channels configuration page display the main configuration related to physical channel's parameters measurement analysis and their hardware configuration. Each channel is materialized by a sample suking thru a pinch valve and pump. Each pinch valve are multiplexing the differents fluid to select correct fluid to suck thru the flowcell.
Customer is also able to select a list of analytic parameters he want to measure for each sample channel.

Channel# parameters							^
Num.	Enabled	Cycle rate (1-100 measurement)	Dilution	Dilution factor (1-9)	Tube length (0.2-10m)	Spectralyse	
1	☑	1		1	0,2	Edit	
2		1		1	0,2	Edit	

Enable channel #
Channel enabling
Must be done in order. This it's not possible to enable channel 1 & 3 for example.
You must enable channel :
1 or
1 & 2 or
1 & 2 & 3 or
1 & 2 & 3 & 4
Others combination are not allowed

Set the cycle rate of measurement. This is a multiple of main cycle process measurement defined in general configuration.
Ex:
10min main cycle and frequency of 2 result in a sample measurement every 20 min
Each channel are independent.

Enable dilution if customer know sample concentration level is too high.
Sample dilution will be done with Blank fluid.

Set the dilution level:
0 = no dilution
1 = 1 blank / 1 sample
…

Total tube length for the related channel in meter. Pump suking duration will be automatically adjusted according tube length outside the STAC2 for each channel. Consequently, sample automatically reach the flow cell correctly.

Edit analytic chemical parameters to measure.

STAC2

9.7.1 BLANK SETTINGS

The next area, is dedicated to the blank channel. Blank is a specific fluid sample required as a reference sample for the spectra analytic measurement.
The STAC2 will then calculate each sample analytic chemical substances, against the Blank fluid.
The Blank fluid is considered as a neutral sample containing a level of 0 for each chemical analytic parameters.

Blank parameters	∧
Cycle rate (1-100 measurement):	
10	
Tube length (0.2-10 m):	
0,2	

Set the blank cycle rate. This is a multiple of main cycle process measurement defined in general configuration.
<u>Ex:</u>
10min main cycle and rate of 2 result in a sample measurement every 20 min
Each channel are independent.

Blank fluid is automatically measured one time during first cycle process after starting STAC2 in running process. Then next Blank measurement will occurred according to cycle rate parameter.

Total tube length for the related channel in meter. Pump suking duration will be automatically adjusted according tube length outside the STAC2 for blank channel. Consequently, blank fluid automatically reach the flow cell correctly.

9.7.2 RINSE SETTINGS

The next area, is dedicated to the Rinse channel. Rinse fluid solution is a specific fluid usefull to clean internal STAC2 tubing and flow cell windows inside a certain limit.
The customer can decide if this function is enabled or not, the frequency of this cleaning process and if the cleaning occur at begenning or end of a measurement cycle.

Generally, it's recommanded to clean system "after sample measurement" to clean potential dust deposite any Sample has dispersed in tubing and flow cell.
Depending on the target application and chemical analitic paramaters, a diluted javel water solution is a good cleaning sample. This remove and clean algaes and others particle.

Rinse parameters ∧

☐ Enabled

Rinse ◯ before measurement   ⦿ after measurement

Cycle rate (1-100 measurement):

10

Tube length (0.2-10 m):

1,5

Enabling or disabling Rinse function.

Select, when rinsing action occur inside a cycle measurement process.

Total tube length for rinse channel in meter. Pump sucking duration will be automatically adjusted according tube length outside the STAC2. Consequently, Rinse solution automatically reach the flow cell correctly.

Set the rise cycle rate. This is a multiple of main cycle process measurement defined in general configuration.

Ex:
10min main cycle and frequency of 6 results in a Rinsing process every 60 min = 1 hour.

9.7.3 CHEMICAL ANALYTIC PARAMETERS SETTINGS

Each sample channel will be analyzed by Spectralyse calculation, to obtain chemical analytic parameters concentrations.

Spectralyse calculation is based on Models, user can select according to their installation and sample typology. Each Model able to provide specific chemical parameters, user will have to select to configure STAC2.

STAC2 is able to calculate up to 10 different parameters for each sample channel. As a result, STAC2 is really flexible in term of combination and configuration, to achieve customer's requirements.

Each channel can be configured by clicking the "Edit" button on the related channel to edit.

| Enabling parameter calculation | Select model to be used for each chemical analytic parameter. The list present all available STAC2 models. | Select chemical analytic parameter related to the selected model. The parameter will be evaluated in concentration at each channel measurement. | Chemical analytic parameter unit. This is a free text user can define. |

Num.	Enabled	Model	Parameter	Unit	Correction factor	Sensibility level	Alert	Restitution Alert (%)
1	✔	Nival MOD	NO3	mg-l	1,0	10,0	20,0	4,0
2	✔	Nival MOD	COD	mg-l	1,0	0,0	70,0	4,0
3	✔	Nival MOD	TSS	mg l	1,0	0,0	370,0	4,0
4	✔	EauNormale_Arth MOD	NB3	mg l	1,0	0,0	0,4	1,0
5	✔	Nival MOD	BOD	mg l	1,0	0,0	0,0	1,0
6	☐	Nival MOD	TOC	mg-l	1,0	0,0	0,0	1,0
7	☐	Cfsrg MOD		mg-l	1,0	0,0	0,0	1,0
8	☐	Cfsrg MOD		mg-l	1,0	0,0	0,0	1,0
9	☐	Cfsrg MOD		mg-l	1,0	0,0	0,0	1,0
10	☐	Cfsrg MOD		mg l	1,0	0,0	0,0	1,0

Correction factor able customer to apply a multiplication factor to the calculated result.
A linear compensation can correct imperfection in flow cell exact internal optical size versus theoretical one for example.

Sensibility level is the low limit below which the result is considered as too low to be correctly evaluated / measured.
An event is recorded in the STAC2 events database each time result is below this limit

Alert is the high limit over which the result is considered as too high for the application.
An Alert event is recorded in the STAC2 events database each time result is over this limit

Restitution Alert, is the maximum value, the user can defined, which represent a confident level below the measured value can be considered as good.
See Restitution value explanation for more details.
An Alert event is recorded in the STAC2 events database each time the restitution level above this user defined limit.

WARNING: It's not allowed to set more than one time the same parameter name even if coming from different model.

9.8 CONTROL PAGE

This page give access to the user to Start or Stop main measurement process cycle, or control directly some hardware function for:
- Servicing manipulation of fluidic components (pump, pinch valves, …)
- Manually make some measurement for concentration estimation or model testing.
- Starting fluidic initialization in tubing and flow cell to avoid any air in the system.

9.8.1 FLUIDIC HARDWARE CONTROL

Fluid elementary components

○ Rince ● Blank ○ Sample 1 ○ Sample 2 ○ Sample 3 ○ Sample 4

Pump duration (10-120 sec):
10

Dilution factor (0-9):
0

[Start pump] [Stop pump]

Start fluid pumping according to selected channel and time.
If a dilution value is different than 0 (in case of Sample 1 to 4 sucking), dilution process is automatically done between Blank and Sample #.

Customer can Stop the pump before time duration ending sucking action.

Dilution factor value. If 0, then there is no dilution

Channel selection.

9.8.2 OPTICAL MEASUREMENT HARDWARE CONTROL

The drop list allows to import an absorbance spectrum previously saved in .SCN. It is then possible to apply models on it.

Elementary measurement

[Blank] [Sample] Load a spectrum : Spectrum_Sample_20200908_1533.SCN

By pressing Blank button, the optical measurement system will do zeroing measurement of the current fluid inside flow cell for its own purpose.
Expert user will be able to appreciate their blank fluid quality.

By pressing Sample button, the optical measurement system will do a spectra measurement of the current fluid inside flow cell. Its energy spectrum will then be displayed as well as the absorbance spectrum related to the last blank measurement.

Note: **If a Sample is performed when the energy of the blank is not displayed, the absorbance spectrum of this sample is then function of the last blank measured. It can be either the energy spectrum of the blank taken during a cycle or from a manual measurement.**

📊 Measurement Spectra (Abs)

At the end of a measurement or after a spectrum loading, Spectralyse calculation is automatically done with the already selected model in the list. A new model can be selected to do another calculation on the last measurement.

📊 Spectralyse Results

Selected model:

Outp.MOD ▼

Model	Param.1	Param.2	Param.3	Param.4	Param.5	Param.6	Restitution
Nwat.MOD	TSS	TOC	NO3	SUR	COD	BOD	-114.1%
	0.00 mg/l	0.01 mg/l	0.00 mg/l	0.02 mg/l	0.01 mg/l	0.01 mg/l	
Outp.MOD	TSS	COD	BOD	TOC	NO3	SUR	-114.1%
	0.00 mg/l	0.02 mg/l	0.00 mg/l	0.01 mg/l	0.00 mg/l	0.02 mg/l	

9.8.3 FILES MANAGER

In this section, user is able to explore STAC2 Documentation, Configuration files and Models files.

Configuration section is for experimented users for saving configuration files or checking them.
The configuration file is read-only attribute. This mean it's not possible to erase or write configuration by this way.

Concerning Models, the user is able to delete or add new model files.
To delete a model, select the one to delete and click on the Red Cross button in the top left button menu.

To add a new model in STAC2, user have to slide the model to transfer from the computer explorer to the STAC2 one.

In the STAC2Manuals section you can find all kind of STAC2's documentation for users.

9.9 STAC2'S RESULTS ACCESS

An additional function able the user to access STAC2 major files without the need to export and record data in an external USB mass storage.

STAC2 is using a very common exchange file system protocol.
FTP files access is a standard network protocol (File Transfer Protocol) to exchange files between two systems connected to same Ethernet network. One system is assuming fil server function, and one other (or several one) is able to access to this file server system.

STAC2 is equipped with a FTP server to assure STAC2 files exploration and download to an external system. File transfer is unidirectional to secure STAC2 data integrity. Downloading files from STAC2 to an external system is only possible.

You can access to STAC2 files by using the following identification and FTP connection parameters:

Host   : <STAC2 IP> with XXX.XXX.XXX.XXX IP standard format.
Login   : files
Password   : files
Port   : 21

You can see bellow an access with the free Windows software FileZilla:

User is now able to access to STAC2 files and folders:
- Config   → STAC2 mains configuration files
- Models   → STAC2's available models for measurement's parameters evaluation
- Results   → STAC2's all available results (See chapter 9.4.1.1 for data format and folders)

10 LOCAL DISPLAY

10.1 GENERAL OVERVIEW

The S200 can display the data measured by the STAC2. It doesn't allow the control of the STAC2 which remains controlled by the web interface.
Note that this solution for local display of the STAC2 uses a custom S200 which is not in its classical configuration. Thus it is not possible to use a S200 made for sensor management.
In this part we will see the functionalities available with the coupling of the S200 and the STAC2.

10.1.1 WARRANTY

The manufacturer shall ensure the operational safety and reliability of the system when, and only when, the following conditions have been met :

> ➢ Installation, connection, adjustment, maintenance and repairs are carried out exclusively by qualified and authorized expert staff.
>
> ➢ Only original spare parts are used for repairs.
>
> ➢ The measuring and monitoring device shall be used in accordance with the information and instructions set out in this manual.

Warning: **The warranty shall not apply if the device is not used as intended.**
Note: **Wear parts are not under warranty (see table at end of manual).**

10.1.2 ELECTRICAL CONNECTION

Warning: **Only use the power supply specified on the nameplate to run the S200 measurement and monitoring device!**
The device is delivered to run, by default, on a 230V/50Hz or 110V/50Hz power supply.

10.1.3 SAFETY INSTRUCTIONS

S200 measuring and monitoring devices are manufactured and tested according to standards DIN EN 61010-1 / VDE 0411-1. This device left the factory in good condition. In order to maintain this condition, and to ensure the safety during use, the user must comply with the information and warnings given in this manual. If it is suspected that operating in total safety is no longer possible, we recommend that you turn off the device and disable it to prevent any accidental operation.
Follow these instructions:

> ➢ if the system shows visible signs of deterioration
>
> ➢ if the system is apparently no longer operational
>
> ➢ after an extended period of storage under poor conditions.

STAC2

10.1.4 DAMAGE DUE TO TRANSPORT

We carefully pack the S200 measuring and monitoring devices for transport. Please check that the content of the delivery is complete and in good condition. Any damage due to transport **must be reported immediately** (carrier).
The device must never be exposed to temperatures outside the range of -20 to +70°C (transport and intermediate storage).
Subject to technical amendments. Subject to changing the assembly of components.

TECHNICAL DATA

Article	Adjustment ranges
Power supply unit	230 V/AC ± 10 % (50/60Hz) 117 V/AC ± 10 % (50/60Hz)
Power consumption	16 VA
Level of protection	IP 65
Fuse (device)	80 mAT (230V) 160 mAT (117V)
Electrical properties of the contact relay : Max. direct current/max. start-up current Rated voltage/max. switching voltage Max AC switching capability to direct current	6A/16A 250Vac / 24Vdc 6A
Operating temperature	-20° to 50°C
Permissible storage temperature	-20°C to +65°C
Permissible humidity	Max. 90% to +40°C (non-condensing)
Device dimensions	166 x 161 x 73.5 mm (l x h x d)
Weight	Approx. 1.1 kg

Warning: **Unit fuse of 16A max.**

10.2 DESCRIPTION

The S200 measuring and monitoring device is easy to use.
Equipment:

- Backlit display

- Cursor-controlled operation with only 5 keys

- Browser menu in plain text

- Up to 6 different settings simultaneously (depending on the type of code)

- Password protected access

- Ease of integration into process technology via the existing Modbus RTU

- 3 relay outputs

- 2 electrically insulated Modbus RTU interfaces

- 2 electrically insulated 0/4 - 20mA outputs

- Real-time clock with backup battery

10.2.1 OPERATION

STAC2

10.2.2 CONTROLS

1.   Display Backlit LCD screen with 4 lines of 20 characters each

2.   Key   ⬥↑   Cursor control/Numerical value increase

3.   Key   ⬥→   Choice confirmation/Function change

4.   Key   ⬥↓   Cursor control/Numerical value decrease Choice of operating menu

5.   Key   ⬥←   Value backup/Return to level 1 menu

6.   Key   ESC   Cancel input without saving/Return to the home screen

10.3 INSTALLATION

	WARNING
⚠️	Potential risk of electrocution: Always shut off power to the equipment when connecting it. The lower part of the housing, protective cover of the housing may only be removed after switching off the device.

	CAUTION
⚠️	Potential damage to the device: The internal electronic components of the device may be damaged by static electricity which in turn may adversely affect its performance and function. Discharge static electricity from your body before working on the equipment.

10.3.1 ASSIGNEMENT OF TERMINALS

10.3.1.1 ASSIGNEMENT OF PINS

Function	Terminals	Description
Power supply voltage	L/N/PE	230 V/AC ± 10 % (50/60 Hz)
PE distribution block	PE, PE, PE, PE	PE distributor
Analog output 1 0 / 4-20 mA max. load 500Ω	30+31	-30/+31
Analog output 2 0 / 4-20 mA max. load 500Ω	32+33	-32/+33
Union	**Terminals**	**Description**
Modbus RS485 interface for connecting STAC2 12VDC power supply voltage	90+91+92+93+94	90 = 0 V ; 91 = +12 V, 92 = B, communication 93 = A, communication 94 = shielding
Modbus RS485 interface for communication with the management system	95+96+97	95 = B 96 = A 97 = shielding

STAC2

10.3.1.2 STAC2 CONNECTION

Only use the cable provided by Aqualabo to link the STAC2 and the local display. The connection is done by using the Modbus RS485 interface of both devices. This cable follows these features:

- ➢ IP65 (when connected to both devices)
- ➢ Typical length 1,5m

.Fig. 15 Ends of the cable

.Fig. 16 Connection to the S200

.Fig. 17 Connection to the STAC2

.Fig. 18 : Coupling of the S200 and the STAC2.

10.3.2 SETTING UP THE EQUIPMENT

10.3.2.1 DESCRIPTION OF THE WALL MOUNTING

	WARNING
⚠️	Risk of bodily injury: Only qualified personnel is authorized to undertake the operations of setting up the equipment on its support. Improper fastening = risk of equipment falling, deterioration of equipment and risk for operators.

10.4 ACCESS AND DISPLAY

10.4.1 CODES

There are 3 access levels to provide access using codes that protect the device from unauthorized operation.

1. Code A - 00: all entries are locked, except codes B, C and D

2. Code B - 15: user code

3. Code C - 55: maintenance code

4. Code D - NN: code for factory service

10.4.2 LCD DISPLAY ADJUSTEMENTS

10.4.2.1 CONTRAST ADJUSTEMENT

From the general menu, SERVICE sub-menu then, display setting:

```
        ▮▮▮▮▮▮▮▯▯▯▯▯▯▯▯▯
  ↕→    Contrast. adjust.
        ▮▮▮▮▮▮▮▮▮▯▯▯▯▯▯▯
        Backlight
```

The contrast level of the LCD display can be adjusted.

   Note: **It may not be possible to adjust the contrast too high or too low.**
   Please adjust the contrast as follows:

Press the `ESC` **key in, keep it in while pressing** ⬦ **to increase contrast.**

To decrease contrast, press the `ESC` **key while pressing** ⬦ **at the same time.**

This function may need to be adjusted after a factory reset.

10.4.2.2 ADJUSTING THE BACKLIGHT

The intensity of the backlight can be changed using the "backlight" menu.
   Note: **Backlight intensity: it should be as bright as required. A backlight that is too bright reduces the useful life of the display.**

10.4.3 LANGUAGE

There are two different languages available: English and French.
From the general menu, BASIC SETTINGS sub-menu then, LANGUAGE

```
        We speak
  ↑→    English


```

By pressing ⬦ the language switches to the other one.

10.4.4 DISPLAY – LOSS OF COMMUNICATION

If communication with a STAC2 is lost, the data displayed on the main screen, will be the last ones received from the STAC2.

10.5 MAIN SCREEN FOR VISUALIZATION OF DATA MEASUREMENTS AND RELATED UNITS

0.4	NO3	0.0	COD
0.1	TOC	0.1	TSS
0.1	BOD	0.1	DBS
↕			CH2→

Every second the result parameter names toggle with units ones.

0.4	mg/1	0.0	mg/1
0.1	mg/1	0.1	mg/1
0.0	mg/1	0.1	mg/1
↕			CH2→

Note: **The above example displays data which depends on STAC2 configuration and measurement results.**

The displayed graphic symbols on the last line indicate which keys are available to operate the device.

↕ Indicates that the cursor can be moved up or down using the cursor keys.

To visualize the restitution value of the selected channel (bottom right corner). Press this key a second time to come back at the real value display.

To switch to the menu interface.

→ This indicates that the operator can access to other channel samples (depending on the

STAC2 configuration) by pressing the key.

Note: **Values are round to the first decimal, and the maximal value displayed is 3276,7.**

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10.6 MENU

When switching to the menu interface, the operator gets this display:

```
↕→   Time / Date
     Basic settings
     Service
     Enter the code
```

10.6.1 Time/Date

This sub menu lets the customer set the date:

```
     hh:mm dd.MM.YY
↕→   Minute     mm
     Hours      hh
     Day        dd
     Mouth      MM
     Year       YY
```

Note: **Grey lines are accessible by going down with the** ⬇ **key when being on the last line.**

To change a value, firstly move the cursor on the proper line, then press ➡ and then

⬇ to decrease or ⬆ to increase the value.

Note: **To validate a modification press** ⬅ **to save it.**

10.6.2 BASIC SETTINGS

Thanks to this sub menu it is possible to change some settings:

```
↕→   Analog output
     Language
     Bus address
```

10.6.2.1 ANALOG OUTPUT

Analogue output lets the customer set up the current loops available on this device. It is indeed possible to configure two loops of 4-20mA referring to values measured by the STAC2.

```
↕→   Analog output 1
     Analog output 2
```

After placing the cursor on one of the two analog outputs press the button ➡ to access at the following window.

```
↕→   CH1 - DBS
     Range 4- 20 mA
        0/4mA = 2.0 mg/l
        20 mA = 65.0 mg/l
```

➢ First line lets you select the value you want to follow. To do so, press as many times as

necessary on the ➡ key

➢ Second line lets you choose the lower value of the current loop : 4-20mA or 0-20mA

➢ Third line lets you choose the value of the lower limit (0mA or 4mA depending on the line right above)

➢ Last line lets you choose the value of the 20mA limit

Note: **Values for the limits have a maximum set at 3276,7.**

10.6.2.2 LANGUAGE

This sub menu has been seen in the point 10.4.3

10.6.2.3 BUS ADDRESS

```
      Bus address
→     No.          1

```

Bus address is the output slave ID for a Modbus RS485 master. This slave ID has the following range: 0 → 31
The address mapping of this device is available in the STAC2 manager, at the same location than the STAC2 Modbus mapping.

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10.6.2.4 MODBUS MAPPING LOCAL DISPLAY

Register definition	Dec. Addr.	Hex Addr.	Type	Size
Ch.1 Result Parameter 1	55	0x37	int	1
Ch.1 Result Parameter 2	56	0x38	int	1
Ch.1 Result Parameter 3	57	0x39	int	1
Ch.1 Result Parameter 4	58	0x3A	int	1
Ch.1 Result Parameter 5	59	0x3B	int	1
Ch.1 Result Parameter 6	60	0x3C	int	1
Ch.1 Result Parameter 7	61	0x3D	int	1
Ch.1 Result Parameter 8	62	0x3E	int	1
Ch.1 Result Parameter 9	63	0x3F	int	1
Ch.1 Result Parameter 10	64	0x40	int	1
Ch.2 Result Parameter 1	65	0x41	int	1
Ch.2 Result Parameter 2	66	0x42	int	1
Ch.2 Result Parameter 3	67	0x43	int	1
Ch.2 Result Parameter 4	68	0x44	int	1
Ch.2 Result Parameter 5	69	0x45	int	1
Ch.2 Result Parameter 6	70	0x46	int	1
Ch.2 Result Parameter 7	71	0x47	int	1
Ch.2 Result Parameter 8	72	0x48	int	1
Ch.2 Result Parameter 9	73	0x49	int	1
Ch.2 Result Parameter 10	74	0x4A	int	1
Ch.3 Result Parameter 1	75	0x4B	int	1
Ch.3 Result Parameter 2	76	0x4C	int	1
Ch.3 Result Parameter 3	77	0x4D	int	1
Ch.3 Result Parameter 4	78	0x4E	int	1
Ch.3 Result Parameter 5	79	0x4F	int	1
Ch.3 Result Parameter 6	80	0x50	int	1
Ch.3 Result Parameter 7	81	0x51	int	1
Ch.3 Result Parameter 8	82	0x52	int	1
Ch.3 Result Parameter 9	83	0x53	int	1
Ch.3 Result Parameter 10	84	0x54	int	1
Ch.4 Result Parameter 1	85	0x55	int	1

Ch.4 Result Parameter 2	86	0x56	int	1
Ch.4 Result Parameter 3	87	0x57	int	1
Ch.4 Result Parameter 4	88	0x58	int	1
Ch.4 Result Parameter 5	89	0x59	int	1
Ch.4 Result Parameter 6	90	0x5A	int	1
Ch.4 Result Parameter 7	91	0x5B	int	1
Ch.4 Result Parameter 8	92	0x5C	int	1
Ch.4 Result Parameter 9	93	0x5D	int	1
Ch.4 Result Parameter 10	94	0x5E	int	1
Ch.1 Restitution level Parameter 1	95	0x5F	int	1
Ch.1 Restitution level Parameter 2	96	0x60	int	1
Ch.1 Restitution level Parameter 3	97	0x61	int	1
Ch.1 Restitution level Parameter 4	98	0x62	int	1
Ch.1 Restitution level Parameter 5	99	0x63	int	1
Ch.1 Restitution level Parameter 6	100	0x64	int	1
Ch.1 Restitution level Parameter 7	101	0x65	int	1
Ch.1 Restitution level Parameter 8	102	0x66	int	1
Ch.1 Restitution level Parameter 9	103	0x67	int	1
Ch.1 Restitution level Parameter 10	104	0x68	int	1
Ch.2 Restitution level Parameter 1	105	0x69	int	1
Ch.2 Restitution level Parameter 2	106	0x6A	int	1
Ch.2 Restitution level Parameter 3	107	0x6B	int	1
Ch.2 Restitution level Parameter 4	108	0x6C	int	1
Ch.2 Restitution level Parameter 5	109	0x6D	int	1
Ch.2 Restitution level Parameter 6	110	0x6E	int	1
Ch.2 Restitution level Parameter 7	111	0x6F	int	1
Ch.2 Restitution level Parameter 8	112	0x70	int	1
Ch.2 Restitution level Parameter 9	113	0x71	int	1
Ch.2 Restitution level Parameter 10	114	0x72	int	1
Ch.3 Restitution level Parameter 1	115	0x73	int	1
Ch.3 Restitution level Parameter 2	116	0x74	int	1
Ch.3 Restitution level Parameter 3	117	0x75	int	1
Ch.3 Restitution level Parameter 4	118	0x76	int	1

Ch.3 Restitution level Parameter 5	119	0x77	int	1
Ch.3 Restitution level Parameter 6	120	0x78	int	1
Ch.3 Restitution level Parameter 7	121	0x79	int	1
Ch.3 Restitution level Parameter 8	122	0x7A	int	1
Ch.3 Restitution level Parameter 9	123	0x7B	int	1
Ch.3 Restitution level Parameter 10	124	0x7C	int	1
Ch.4 Restitution level Parameter 1	125	0x7D	int	1
Ch.4 Restitution level Parameter 2	126	0x7E	int	1
Ch.4 Restitution level Parameter 3	127	0x7F	int	1
Ch.4 Restitution level Parameter 4	128	0x80	int	1
Ch.4 Restitution level Parameter 5	129	0x81	int	1
Ch.4 Restitution level Parameter 6	130	0x82	int	1
Ch.4 Restitution level Parameter 7	131	0x83	int	1
Ch.4 Restitution level Parameter 8	132	0x84	int	1
Ch.4 Restitution level Parameter 9	133	0x85	int	1
Ch.4 Restitution level Parameter 10	134	0x86	int	1

10.6.3 SERVICE

This sub menu gives you access to services of the local display :

```
↓→    Display setting
      Device data


```

10.6.3.1 DISPLAY SETTING

This sub menu has been seen in the point 10.4.2

10.6.3.2 DEVICE DATA

This sub-menu gives access to information about the S200 :

```
      Instrument no.
↓→                  1597
      Software date
      M/Y       1.20
```

10.6.4 ENTER THE CODE

This menu has been seen in the point 10.4.1

11 START UP PROCEDURE

1/ Install STAC2 vertically taking in account instrument constraint and recommendation

2/ Make the electrical connections required following the required functions (MODBUS, Ethernet, USB)

3/ Open the front door of the flowing case.

4/ Install and Connect the FlowCell cuvette to the Pump output tube and STAC2 main output tubes. (**Warning :** FlowCell cuvette is delivered in its own package outside the STAC2 case).

Flow-through cuvette

WARNING : Each FlowCell cuvette has its own FlowCell size Factor written on the bottom of FlowCell cuvette (sticker). This value MUST be entered in the STAC2 software parameter to give you correct measurement results (see FlowCell size factor description in software description chapter)

5/ Connect each Rinse, Blank and Samples tube to each the related inlet valves.

6/ Install carefully the tubes in the electro-valve by pushing the black mobile part in the electro-valve head as shown in the drawing under.

IXOEV01

Slide the tygon tube inside the
electro-valve head

Tygon tube

ELECTRO-VALVE TOP VIEW

Electro-valve head

PUSH

ELECTRO-VALVE FRONT VIEW

.*Fig. 19 How to install silicon tube in the electro-valve head*

.Fig. 20 Tubes setting

7/ Put the rising and blank solutions tubes into 50 liters.
The blank should be good quality distilled or demineralized water and the rinsing solution is tape water with hypo chlorine.

8/ Switch on the STAC2, by connecting and turning on the main power supply.

If STAC2 is configured to start cycle measurement automatically, the following sequence start.

WARNING : First measurement could be affected by bubbles and air in tubing,

In this case, air bubbles must be expelled during blank or sample aspiration by rotating the entire flowcell holder to the left until the end of aspiration.

First unlock the flowcell support using the QuickLock system.

STAC2

.*Fig. 21* Rotation of the 50mm flowcell holder

Note : Make sure that the tubes remain immersed during the aspiration phases to avoid introducing air bubbles into the flowcell during measurments.

.*Fig. 22* Examples of air bubbles inside the 50mm flowcell

11.1 MEASUREMENT CYCLE PROCESS ORGANIGRAM :

```
                    ┌─────────────────────┐
                    │  Waiting start order │
                    │          Or          │
                    │   Automatic start    │
                    └─────────────────────┘
                              │
                              ▼
                    ┌─────────────────────┐
                    │   Blank aspiration   │
  If blank          └─────────────────────┘
  measurement                 │
  is required                 ▼
                    ┌─────────────────────┐
                    │        Blank         │
                    │     measurement      │
                    └─────────────────────┘
                              │
                              ▼
                    ┌─────────────────────┐
                    │       Sample         │
                    │    aspiration N      │
                    └─────────────────────┘
                              │
                              ▼
                    ┌─────────────────────┐
                    │  Sample measurement  │
                    │          N           │
                    └─────────────────────┘
                              │
                              ▼
                         ╱─────────╲        Yes      ┌──────────────┐
                        ╱  Dilution? ╲────────────▶  │   Dilution   │
                        ╲            ╱               │   process    │
                         ╲─────────╱                └──────────────┘
  Sample N + 1              │                              │
                           No                              ▼
                            │                        ┌──────────────┐
                            ▼                        │   Diluted    │
                    ┌─────────────────────┐          │   Sample     │
                    │  Results calculation │◀─────────│ measurement  │
                    └─────────────────────┘          └──────────────┘
                              │
                              ▼
                    ┌─────────────────────┐
                    │ Recording results    │
                    │ and linked data      │
                    └─────────────────────┘
                              │
                              ▼
  If Rinse is       ┌─────────────────────┐
  enabled           │   Rinse solution     │
                    │    aspiration        │
                    └─────────────────────┘
```

12 STAND-BY & STORAGE PROCEDURE

1/ Install all Sample's tubes, in the rinsing liquid pot.

2/ Do 4 measurement's cycle process with enabled rinse and all samples option. (Sample's tubing will be cleaned by the rinse solution)

3 Stop the instrument.

4/ Disconnect it from the power supplies.

5/ Remove all the silicon tubes out of the electro-valves

6/ Remove the silicon tube out of the peristaltic pump head.

7/ Be careful to remove, avoid and clean any liquids projection or leak inside and over all instrument parts, before closing it completely.

NOTE:

In case of prolonged storage of the STAC2 :
- Empty completely the tube and flow-through cuvette.
- Clean and dry the flow-through cuvette.
- Installed the equipment in dry and clean place.
- Set the storage temperature between 10 and 40°C

13 MAINTENANCE

13.1 PRECAUTIONS FOR USING

Air bubbles must be avoided in tubes and especially in flow-through cuvette during the sample measuring. Bubbles are affecting a lot measurement results (see Chapter 11 : Start up Procedure). Tubes must be regularly changed when they become dirty or opaque.

Recommended frequency of tube change (especially those of the electro-valves): **3 MONTHS** Following the aspect of the tubes, the operator can shorten or lengthen this frequency.

13.2 FLOW-THROUGH CUVETTE MAINTENANCE

Our flow-through cuvette contains two quartz windows.
When these quartz windows are dirty it is advisable to clean or to change them. See drawing under.

Flow-through cuvette

.Fig. 23 monochromator area and flow-through cuvette (5mm path length in this picture)

- Switch off the STAC2.
- Open the STAC2 case.

.Fig. 24 Flow-through cuvette delivered with the QuickLock holder system.

Inlet and outlet tube

QuickLock system:
Press it one time to unlock and remove complete cuvette holder from monochromator area.

- Remove the inlet and outlet tube.
- Remove fastening nuts.
- Slide out flow-through cuvette subset.

.Fig. 25 Flow-through cuvette assembly details

Locking rings

Black joints

Quartz windows

Sample outlet

STAC23AN

Flowthrough cuvette body

STAC23AN

Sample inlet

Key for locking rings

QUARTZ WINDOW   REF: 0M7784

LOCKING RING   REF: 0M8322
KEY FOR LOCKING RING   REF: 0M6998
BLACK JOINT   REF: 0M7496B

- Unscrew the locking ring.
- Change the quartz windows (every 6 months) or thoroughly clean them with a soft tissue moisten with a hydro-alcoholic solution.

13.3 PERISTALTIC PUMP

13.3.1 PERISTALTIC PUMP TUBE CHANGING

WARNING: For proper operation, this subset must be change every three months.

A: External tube fixations

.Fig. 26 Peristaltic pump head and its pump tube subset

PERISTALTIC PUMP SUBSET   **REF: M0178A**

- Switch off the device.
- Remove the external tubes connected to the peristaltic pump subset by unscrewing fixations **A**

B: Pump rotating cover

- Remove pump cover with your fingers like in previous picture to access pump tube subset.

- Remove the pump rotating cover **B** part by hand.

C: Pump tube subset

- Remove the peristaltic pump tube subset **C** part.

- Re install a new one and do all actions in reverse order
- Re connect the external tubes
- Switch on the device
- Check the liquid aspiration.

13.4 REPLACEMENT FREQUENCY OF SPARE PARTS

DESIGNATION	REFERENCE	FREQUENCY
Silicon tube 6x9	0M6832	3 months
Silicon tube 5x8 (peristaltic pump connection)	0M8275	3 months
Pump tube subset	M0178A	3 months (depending on measurement frequency and aspiration duration time)
Quartz windows for flowthrough cuvette.	0M7784	6 months
Black Joint (diameter : 14 mm)	0M7496B	6 months

The frequency of change of the spare parts, indicated in the table above, is not a peremptory necessity. The user can adapt it according to the degree of wear of these parts or the frequency of use of the analyzer.

13.5 SOFTWARE UPDATE

An automatic software update can be initiated thru the WIFI or Ethernet connection.
A dedicated Windows software included in the update package file for STAC2 will have to be launched to start the update process.

Nom	Modifié le	Type	Taille
Tools	23/05/2019 15:21	Dossier de fichiers	
Update	23/05/2019 16:01	Dossier de fichiers	
Stac2Updater.exe	24/05/2019 11:59	Application	124 Ko

Procedure:

**NEVER POWER DOWN THE STAC2 DURING UPDATE PROCESS.
STAC2 DON'T NEED TO BE RESTARTED OR SWITCHED OFF AND ON TO ACCOMPISH A CORRECT UPDATE.**

1/ Launch **Stac2Updater.exe** program.

```
*** STAC2 UPDATER v1.00 ***
---> You must add STAC2 IP parameter to able updating it:
     use following syntax : Stac2Updater XXX.XXX.XXX.XXX by replacing XXX by correct STAC2 IP on the network.
   --> Enter STAC2 IP :
```

2/ You will have to enter STAC2 IP with the correct format as described, for example: 192.168.30.100
Press ENTER to validate your input.

If the following message appears: *"Store key in cache?"*, please enter "*n*".

STAC2

3/ Now Update process is fully automatic and you will see the STAC2's seven-segment display showing some numbers corresponding to each update process's steps and LED indictors with all LED lighting.

4/ When Stac2Updater software has finished all first update process, the seven-segment display show the number "5". In case of any problem, STAC2 will stop with a lower number and the Stac2Updater software will show you some error details.

5/ During the second update process phase, STAC2 will automatically run all next steps by itself until last phase "A" (shown on the seven-segment display). If STAC2 never reach this step after more than 10 minutes, restart update process to the first step **1/**

After a while, in case of normal operation STAC2 will automatically be ready to run normally with the "READY" green LED switched on (all others switched off) and no numbers displayed on the seven-segment display.

6/ You can use the STAC2 as usual.

14 FAQ

A. The « File manager » does not display correctly.

- This is due to the cache of the web browser. You can either empty it (note that the auto filling saved on your web browser will then be lost) or open the STAC2 pages in a new private tab (keyboard shortcut Ctrl + Shift + N on Google Chrome).

B. All the web tabs of the STAC2 are not displaying correctly (no color, displayed in a column).

- Your web browser does not allow JavaScript scripts. The procedure to activate JavaScript differs depending on the web browser used.

C. I cannot export the periods to my USB key.

- Check that the key is correctly connected to the STAC2 and not to your computer

D. I cannot find the STAC2's IP address after generating a hotspot with my SmartPhone.

- Some SmartPhone overlays prevent knowing IPs of the devices connected to the generated hotspot. The solution is to emit another hotspot on which the STAC2 will pair with a defined IP address. The fields of this hotspot as well as the STAC2 IP address are viewable in chapter 6.1.2.1.
- On your phone, the option "allow connection to all devices" may be disabled.

15 SPARE PARTS

Designation	AQUALABO Ref	Quantity
Complete STAC2 instrument	70MP0455	1
External case (empty)	M0179A	1
STAC2 Flow through cell module with 5 mm optical path	70MP0601	1
STAC2 Flow through cell module with 2 mm optical path	70MP0600	1
Optional Maintenance Kit	**70MP0604**	**1**
Silicon tube 6x9 (Reference for 1 meter).	0M6832	10
Silicon tube 5x8 (peristaltic pump connection)	0M8275	2
Tube Subset of peristaltic pump head	M0178A	1
Quartz window for flow-through cuvette	0M7784	2
Locking ring for flow-through cuvette	0M8322	2
Plate black joint (diameter 14 mm)	0M7496B	4
Locking key for flow-through cuvette	0M6998	1
Dilution loop	0M7002C	1
Main power supply cable (24VDC)	X0132A	1
Optional external power supply 100-230VAC to 24VDC	70MP0603	1

APPENDIX

Indicative chart of tube in Tygon compatibility

Fluid	compatibility
Acetaldehyde	D
Acetic acid<5%	A
Acetic acid>5%	B
Acetic anhydride	D
Acetone	D
Acetonitrile	D
Acetyl bromide	D
Acetyl chloride	D
Aliphatic hydrocarbons	C
Aluminum chloride	A
Aluminum sulfate	A
Alums	A
Ammonia	B
Ammonium acetate	A
Ammonium carbonate	A
Ammonium chloride	A
Ammonium hydroxide	B
Ammonium nitrate	A
Ammonium phosphate	A
Ammonium sulfate	A
Amyl acetate	D
Amyl alcohol	B
Amyl chloride	B
Aniline	D
Aniline hydrochloride	D
Aromatic hydrocarbons	D
Arsenic salts	A
Barium salts	A
Benzaldéhyde	D
Benzenesulfonic acid	B
Boric acid	A
Bromine	A
Butane	B
Butanol	B
Butyl acetate	D
Butyric acid	D
Calcium oxide	A
Carbon bisulfide	D
Carbon tétrachloride	D
Chlorine, wet	B
Chloroacetic acid	D
Chlorobenzene	D
Chlorobromomethane	D
Chloroform	D

Fluid	compatibility
Chlorosulfonic acid	B
Chromic acid	A
Chromic acid 30%	A
Chromium salts	A
Copper salts	A
Cyclohexanone	D
Diacetone alcohol	D
Dimethyl formamide	D
Fluid	compatibility
Ethanol	B
Ether	D
Ethyl acetate	D
Ethyl bromide	D
Ethyl chloride	D
Ethylamine	D
Ethylene chlorohydrin	D
Ethylene dichloride	D
Ethylene glycol	B
Ethylene oxide	B
Ferric chloride	A
Ferric sulfate	A
Ferrous chloride	A
Ferrous sulafte	A
Fluoboric acid	A
Fluoroborate salts	A
Fluosilicic acid	A
Formaldehyde	B
Formic acid	B
Freon TMS	D
Gasoline, high aromatic	D
Gasoline, nonaromatic	D
Glycerin	A
Hydriodic acid	A
Hydrobromic acid	A
Hydrochloric acid	A
Hydrocyanic acid	A
Hydrofluoric acid, 50%	C
Hydrofluoric acid, 75%	D
Hydrogen peroxide (dil)	A
Hydrogen peroxide, 90%	D
Hypochlorous acid	A
Iodine solution	A
Kerosene	D
Ketones	D

Fluid	compatibility
Lactic acid	A
Lead acetate	B
Lithium hydroxide	A
Magnesium chloride	A
Magnesium sulfate	A
Malic acid	A
Manganese salts	A
Mercury salts	A
Methane	A
Methanol	C
Methyl chloride	D
Methyl ethyl ketone	D
Mixed acid (40%H_2SO_4, 15% HNO_3)	B
Monoethanolamine	-
Naphta	B
Fluid	compatibility
Nickel salts	A
Nitric acid (dil)	A
Nitric acid (med)	A
Nitric acid (con)	B
Nitrobenzene	D
Nitrogen oxides	A
Nitrous acid	A
Oils, animal	D
Oils, mineral	D
Oleic acid	D
Oxalic acid	A
Perchloric acid	D
Perchloroethylene	D
Phenol	B
Phosphoric acid, 50%	A
Phtalic acid	A
Plating solution	A
Polyglycol	A
Potassium carbonate	A
Potassium chlorate	A
Potassium Hydroxide (med)	B
Potassium Hydroxide (conc)	D
Potassium iodide	A
Propanol	D
Pyridine	D
Silicone oils	B

Fluid	compatibility
Silver nitrate	A
Soap solutions	A
Sodium bicarbonate	A
Sodium bisulfate	A
Sodium bisulfite	A
Sodium borate	A
Sodium carbonate	A
Sodium chlorate	B
Sodium ferrocyanide	B
Sodium hydroxide (dil)	A
Sodium hydroxide, 25%	B
Sodium hydroxide (conc)	B
Sodium hypochlorite (dil)	B
Sodium nitrate	A
Sodium silicate	A
Sodium sulfide	A
Sodium sulfite	A
Stearic acid (dil)	A
Stearic acid (med)	A
Stearic acid (conc)	A
Sulfuric acid (dil)	A
Sulfuric acid (med)	A
Fluid	compatibility
Sulfuric acid (conc)	D
Sulfurous acid	A
Tannic acid	A
Tartaric acid	A
Tin salts	A
Toluene	D
Trichloroacetic acid	B
Trichloroethylene	D
Trisodium phosphate	A
Turpentine	B
Urea	A
Uric acid	A
Xylene	D
Zinc chloride	A

A: very good compatibility
B: Good compatibility
C: Almost good compatibility
D: Bad compatibility.
- : unknown Compatibility.