FluidInspectIR® PORTABLE by Spectrolytic

FluidInspectIR® Portable

User Manual

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1. Product Overview

The FluidInspectIR® Oil Condition Monitoring Analyser uses Mid Infrared Spectroscopy to extract the key fluid parameters. The Analyser is basically maintenance free being exclusively constructed from solid state dispersion elements, a black body infrared emitter and infrared sensor element. The Analyser comes with a sophisticated but user-friendly software which is run from a connected tablet/laptop.

It is to be operated via a uUSB cable to a laptop / tablet and does not need any power supply.

2. Warning and Safety Information

2.1 General Safety

The FluidInspectIR® Analyser has been designed and tested in accordance with the safety requirements of the International Electrotechnical Commission (IEC). The analyser conforms to IEC / EN publication 61010-1 (Safety requirements for electrical equipment for measurement, control, and laboratory use).

If the instrument is used in a manner not specified by the manufacturer, the protection provided by the instrument may be impaired. Only use the Analyser under following conditions:

Temperature: 0°C to 70°C

Humidity: 75% maximum (non-condensing)

Whenever it is likely that the FluidInspectIR® Analyser is unsafe make it inoperative. The Analyser may be unsafe if it:

- Shows visible damage.
- Fails to perform the intended measurement.
- Has been subjected to prolonged storage in unfavorable conditions.
- Has been subjected to severe transport stresses.

If the equipment is used in a manner not specified herein the protection provided by the equipment may be impaired.

The FluidInspectIR® Analyser contains a pulsed hot source and contact with flammable vapors may cause an explosion. When working with flammable solvents or samples make sure that no flammable vapor is entering the system. If there is any possibility that they have entered the interior the instrument must be switched off immediately and disconnected from the power supply.

2.2 EMC Compliance

The FluidInspectIR® Analyser complies with the EMC standard DIN EN 61000-6-2 VDE 0839-6-2:2006-03, B1:2011-06

2.3 Battery - LiPo Accumulator

Lithium-Polymer (abbreviation: LiPo) batteries require particularly careful handling. This applies to charging and discharging techniques, and also to storage and other aspects of general handling.

Mishandling these batteries may lead to explosions, fire, smoke and a risk of poisoning. In addition to these hazards ignoring our instructions and warnings will result in loss of battery performance and other problems. The capacity of a LiPo battery declines every time you charge or discharge it. Storing these batteries at excessively high or low temperatures may also cause a gradual reduction in capacity.

2.4 Device Charging

Connecting the microUSB cable to USB adaptor cable to the USB Plug head provided will charge the internal battery in the device.
It is recommended to keep the device on charge when not in use.

3. Portable Case Contents

The standard portable case contents is as follows:

(1) 50ml waste bottle with lid

(2) Charger with international adaptor

(3) USB stick with software, certificate(s) and measurement program(s)

(4) microUSB device cable and female-male USB laptop connector cable.

(5) FluidInspectIR® device

(6) Flow-cell

4. Installing the Console

4.1 PC/Tablet Hardware Requirements

We recommend a hardware configuration with the following minimum requirements:

- Windows 7 or higher (32 or 64bit)
- Processor: Intel Atom Z530 or higher
- 4 GB RAM
- At least 200 MB of Hard Disk Space (Run-Time included)
- USB 3.0 port or higher for communication over USB

4.2 Software Installation

The installation package contains two files:

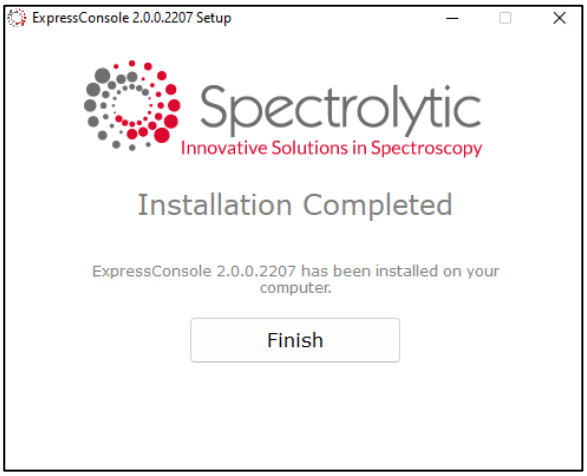
- ExpressConsoleSetup.exe
- DotNet-Runtime.exe

the second file containing the Microsoft framework upon which the Console.

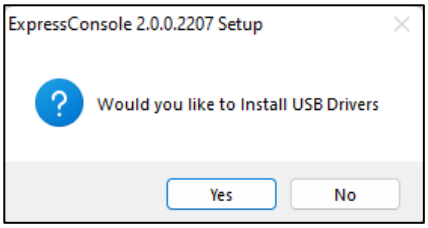
Modern machines will have the Microsoft Framework preinstalled but, just in case please click on DotNet-Runtime.exe first and simply follow the instructions.

Then click on ExpressConsoleSetup.exe to start the Express Console installation. You will see the following screen:

- Click the Install button and installation will begin. When done, you are presented with the screen below:



- Upon clicking Finish you are asked if you want to install the device drivers for your instrument. Please click Yes (this needs to be done only at the first installation – if you are installing an Express Console update you can skip this step by clicking No)



Your installation is now complete, and you can start using the Express console.

4.3 Adding and Updating Models

The models with which the device operates are located at:

C:\Users\Public\Documents\Spectrolytic\ExpressConsole\Models

This folder will be created (if it doesn't already exist) the first time the console is run. Any model file placed there will appear as an option when the device that it corresponds to is connected.

5. Switching on the Analyser

You can connect to FluidInspectIR® Analyser over USB to a laptop or tablet.

- Connect the uUSB cable end at the port situated at the front on the system (1)
- It is advised that this cable remains in place and the USB **adaptor** cable is added and removed before and after system operation.
- Connect the USB **adaptor** cable to the laptop / tablet being used (2)

- On the back of the device toggle the On/Off power switch from left (Off position) to right. Once powered on the green LED will be ON.

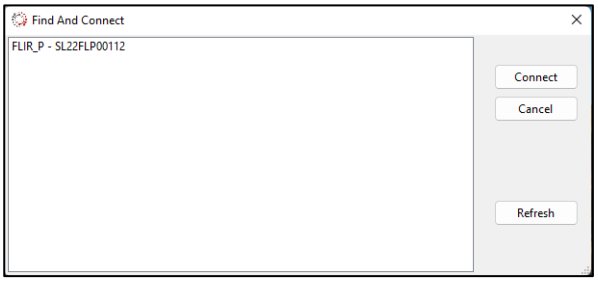
6. Connecting to the Console

6.1 Connection

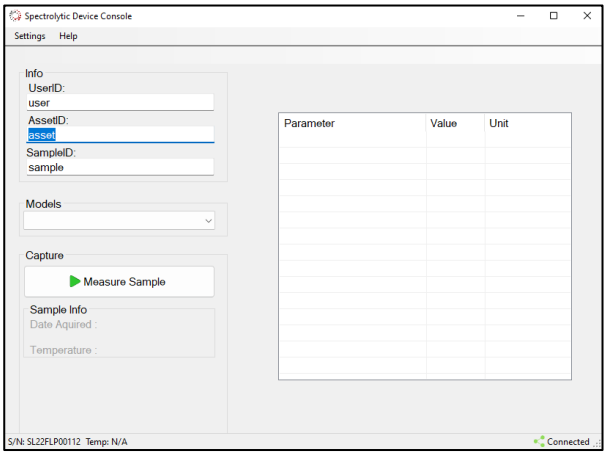
Once the device is connected to the PC via USB and switched on, you can switch on the Express Console by clicking on the shortcut or opening the program.

- The first screen will show you the devices connected to the system (typically only one) and ask you to select the connection as seen below.

- Note here, as shown, the serial number of your device after the '-' in the displayed name. If the correct serial number is not shown, there was an issue connecting to the device. Please close the console, disconnect and reconnect the device to the PC and try again. If the issue persists, contact Spectrolytic.



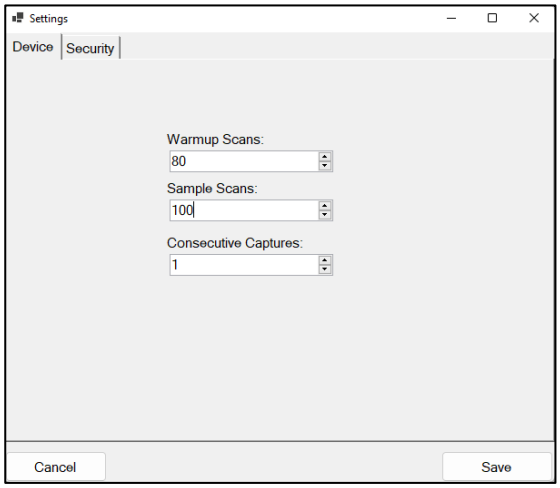
- Select your device and click the Connect button or double-click on the device name in the list. Note that if you click Cancel, the Console will terminate. After connecting, you are presented with the main Console screen, as seen below:



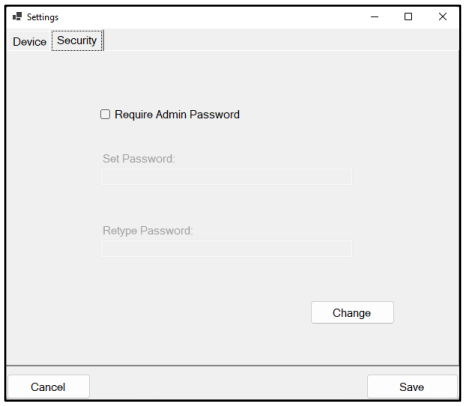
- Notice at the bottom left corner the Serial Number of the device you have connected to, and on the bottom right the green Connected icon.
- If the serial number is not displayed, or the icon is yellow or red, it means there was an issue connecting to the device. Please close the console, disconnect and reconnect the device to the PC and try again. If the issue persists, contact Spectrolytic.

6.2 Console Settings

- Clicking the Settings menu brings you to the Settings screen as seen below:



- In the device page there are three settings you can change. Please do not modify the Warmup and Sample Scans numbers, unless instructed to do so by Spectrolytic.
- The third option, Consecutive Captures, controls how many consecutive sample measurements will be performed back-to-back when the “Measure Sample” button is pressed. If the number is more than 1, then the produced files (one for each specified measurements) will have the suffix “_X-of-Y” to differentiate between measurements.
- The security page allows you to set a password so that the settings menu is only accessible by providing the correct password.



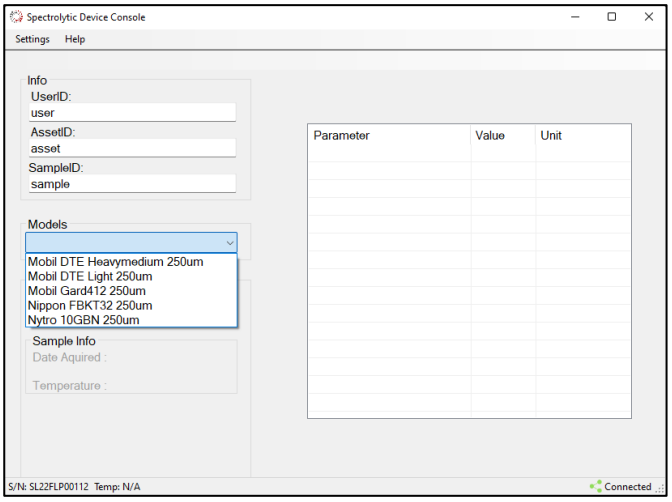
- As a default there is no password set. Please note that, if you set a password, it is kept encrypted and it is not straightforward to recover it in case you forget it. In such a case, please contact Spectrolytic for assistance.

7. Fluid Measurement Procedure

7.1 Warm Up Routine prior to Sample Measurement

- This process is only required when the device has been switched on for a measurement. Once completed multiple measurements can then be carried out.

- Please select a model from the Models dropdown (see example below). This will be the model that will be used to calculate the measured parameters.



- Note that once a model is selected, the names and units of the parameters in the model now appear in the list.
- Click the “Measure Sample” button.
  A progress bar at the bottom will inform you on how the capture is going.
- Ignore the result as this is just a warm routine capture – repeat the process again.
- Following this the fluid sampling process can be carried out for multiple measurements until the device is switched off after use.

7.2 Fluid Sampling

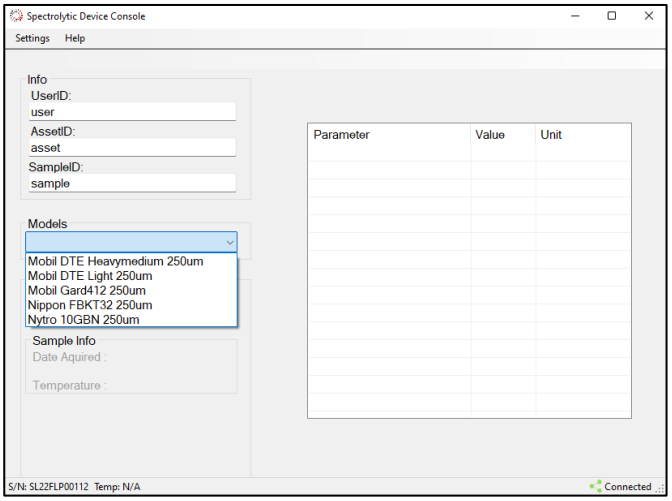
- Using a syringe to insert 10ml of oil Fluid into/through the flow-cell using a syringe. Ensure you have a waste fluid container to trap the excess fluid from the outlet connector.

- Use the black caps or locking nuts provided to cap-off the end of the tubes in preparation for inserting the fluid filled flow-cell into the device.

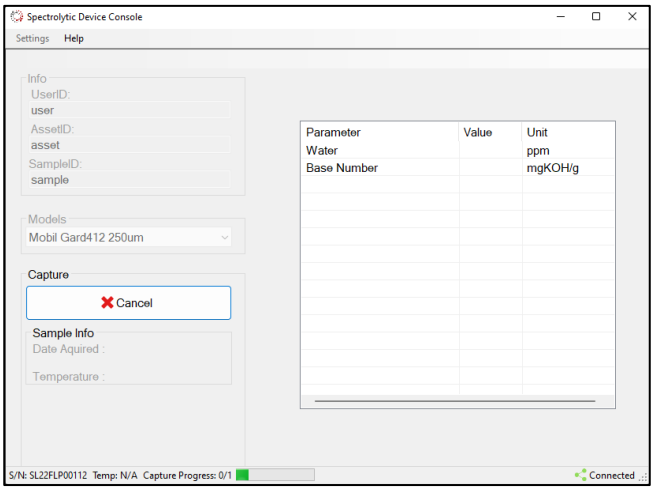
- Insert the flow-cell port into the analyser via the push-spring-locks on the left and right hand side.

7.3 Fluid Measurement

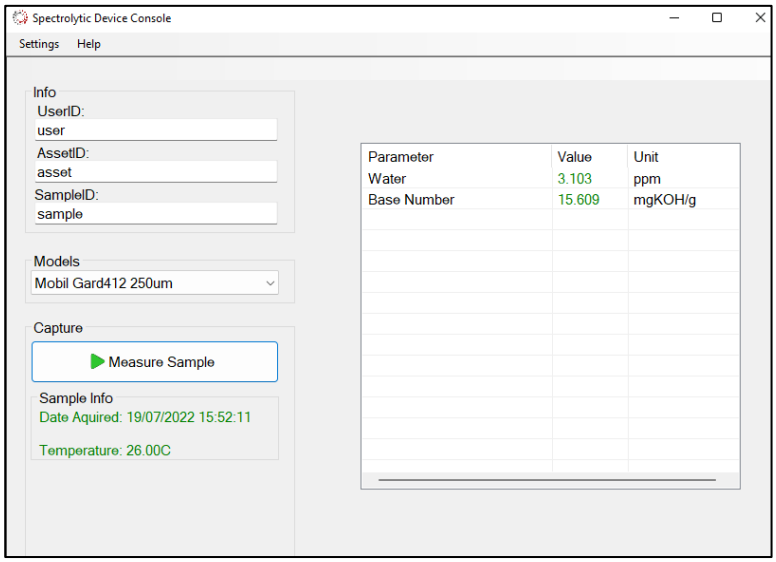
- From the express mode console page please type in the appropriate information in the UserID, AssetID and SampleID fields.
- This information is used as identifying text in the filenames for measurements and parameters that are produced by the console.
- Next, please select a model from the Models dropdown (see example below). This will be the model that will be used to calculate the measured parameters.



- Note that once a model is selected, the names and units of the parameters in the model now appear in the list.
- You are now ready to make a measurement, by clicking the “Measure Sample” button. A progress bar at the bottom will inform you on how the capture is going.



- At any point you can cancel the measurement, by clicking the now named “Cancel” button. Once the measurement process reaches the end, the progress bar disappears and the predicted parameter values are displayed in the list.
- The parameters values can be one of three colours, green, yellow or red, depending on whether thresholds have been set for the parameter in the model file.



- In addition to the visual display of the parameter values, measurement and predicted parameter files are also created for each sample measurement. You can find these at:

  C:\Users\Public\Documents\Spectrolytic\ExpressConsole\Data

The measurement files have the format:

<dateTime>_<UserID>_<AssetID>_<SampleID>.sl300

while the predicted parameters are stored in:

<dateTime>_<UserID>_<AssetID>_<SampleID>_PredictedParameters.csv

7.4 Further Fluid Measurements

- Slide out the flow-cell from the push-spring-locks.
- Insert 10ml of next fluid into flow-cell. The new fluid will displace the old fluid and there is no concern of carry-over.
- After daily measurements it is recommend to use a syringe to remove any remaining oil from the flow-cell by applying reverse vacuum (suck the oil out with syringe).
- On a daily basis it is recommended to flush some IPA/hexane through the flow-cell to remove any low-level fluid residues.

8. FluidInspectIR® Analyser Specifications

8.1 Analyser

Spectral range	800-4000cm^{-1}: Discrete Channels in spectrum
Cuvette	Stainless steel + Tubing
Spectrometer Housing Material	Stainless steel
Illumination Source	IR Broadband Source
Source Lifetime	>10,000 Hrs of continuous measurement
Detector	PIR Pyro-electric sensor
Measurement time (typical)	Typically 30 seconds
Operating Environment	0 - 70°C non-condensing
Storage environment	0 - 70°C non-condensing
Dimensions (approx)	L x W x H / 100 x 100 x 70 mm
Power Requirement	From Laptop / tablet
Standalone operation	Yes
Interface	USB
Weight	650g

8.2 Flow-Cell

Type	Cuvette Stainless Steel
Application	Demountable standard cell for easy
Dimensions	H x W x D / 20 x 60 x 50 mm
Weight	185g
Pressure	max. 25bar
Housing	Stainless steel
Windows	ZnS - Zinc Sulphide
Gasket	Viton
Spare parts	Window kit, gasket kit, spacer kit

9. Routine Maintenance and Service

9.1 Warranty And Hardware Consumables

All items are covered by 1-year warranty period unless the fault invoked directly by the user (scratches, strong oxidizers, physical damage)

The following are consumable items and can be replaced during servicing period:

(1) Flow-cell windows
(2) Light sources – 10,000hours continuous use lifetime. This is the equivalent of 300,000 sample measurements.

Any attempts to perform installation or maintenance operations that are not detailed in this manual are at the user's own risk.

If a user-attempted service results in a visit by a Spectrolytic Service Engineer, the visit will not be covered by the instrument warranty. Warranty is excluded when the seal on the bottom of the instrument is damaged.

Damage caused by the following is not covered by warranty:

i. Failure to flush or clean the system adequately after use.
ii. Failure to observe the precautions described in this manual.
iii. Failure which resulted after flooding liquids into the system.
iv. Failure which resulted after a drop of the system.

9.2 Sampling Consumables

- 5ml disposable sampling syringes can be provided by Spectrolytic as part of order or can be sourced locally by customer.
- Plastic container for excess waste fluid is provided as standard by Spectrolytic.

9.3 Servicing

To service the Analyser please contact:

Spectrolytic
Karl-Rapp-Str. 1,
92442 Wackersdorf,
Germany

Tel: + 49 9604 7749200
Website: www.spectrolytic.com
Email: info@spectrolytic.com