

ENGLISH

Quick Start Guide



FS22SI

Industrial BraggMETER SI

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Subject to modifications.
All product descriptions are for general information
only. They are not to be understood as a guarantee of
quality or durability.

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1 INTRODUCTION

This document is a quick start guide for operating the FS22 - Industrial BraggMETER SI interrogator from HBK FiberSensing.

For more details please refer to the User Manual. This document is available for download on our website.

This document applies to the following equipment:

The BraggMETER is available either in Standard and Rack-mountable formats.

This Manual applies to the following equipment:

- K-FS22 (1S/s option)
- 1-FS22SI-ST/4CH
- 1-FS22SI-ST/8CH

The FS22 - Industrial BraggMETER SI set includes:

Standard format	Rack-mountable format
<ul style="list-style-type: none">- Interrogator- AC-DC power supply unit 24 V- Power cords (EU, US, UK, Aust/NZ)- Ethernet cable (L~2m)- Mounting blocks with M6 screws- Connector protection caps- Mounting holes protection caps- Quick start guide- Digital support material- Calibration certificate	<ul style="list-style-type: none">- Interrogator- Power cords (EU, US, UK, Aust/NZ)- Ethernet cable (L~2m)- Connector protection caps- Quick start guide- Digital support material- Calibration certificate

2 REGULATORY AND CERTIFICATION CONSIDERATIONS



Information

For complete detailed information about regulatory and certification considerations, please refer to the full user manual document. A04249 available for download on our website.

2.1 Environment Considerations

2.1.1 Disposal of your Old Appliance



All electrical and electronic products should be disposed of separately from the municipal waste stream or household via designated collection facilities appointed by the government or the local authorities. The correct disposal of your old appliance will help prevent potential negative consequences for the environment and human health.

2.2 Laser Safety



The FS22 - Industrial BraggMETER SI is a class 1 laser product: «Any laser or laser system containing a laser that cannot emit laser radiation at levels that are known to cause eye or skin injury during normal operation. ». It is safe under all conditions of normal use. No safety requirements are needed to use Class 1 laser devices

2.3 Certification

2.3.1 CE marking



This product carries the CE marking and complies with the applicable international requirements for product safety and electromagnetic compatibility.

2.3.2 UKCA Marking



This product carries the UKCA marking and complies with the applicable international requirements for product safety and electromagnetic compatibility.

2.3.3 Marking of pollutant emission limit values (for deliveries to China)



Statutory marking of compliance with emission limits in electronic equipment supplied to China.

3 INTERROGATOR SETUP

3.1 Buttons and Connectors

3.1.1 Standard Format

The FS22 - Industrial BraggMETER SI on its Standard format has the following buttons and connectors:

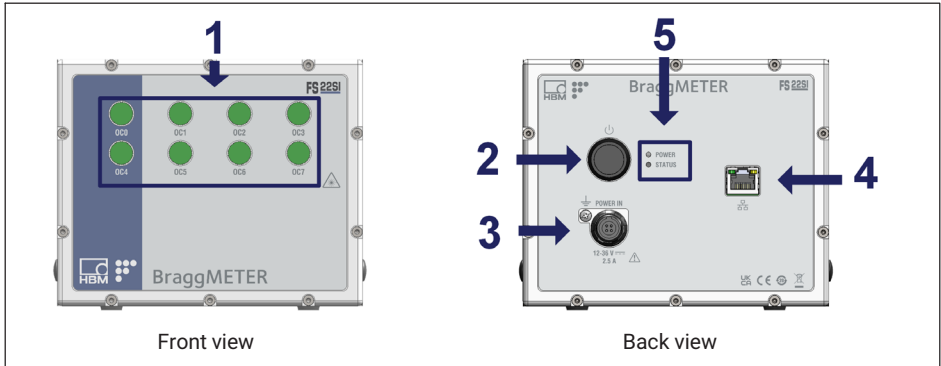


Fig. 3.1 Front and back views of FS22SI Standard format

The connectors and buttons in Fig. 3.1 are:

- 1 Optical Output Connectors
- 2 ON/OFF Button
- 3 Power Connector
- 4 Ethernet Connector
- 5 POWER and STATUS LEDs

3.1.2 Rack Mountable Format

The FS22 - Industrial BraggMETER SI on its Rack-Mountable format has the following buttons and connectors:

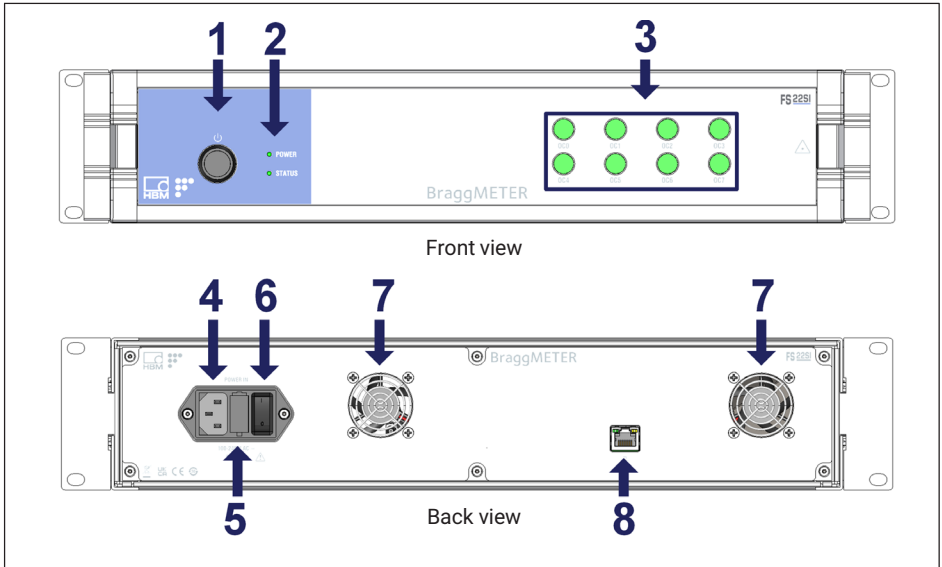


Fig. 3.2 Front and back views of FS22SI Rack-mountable format

The connectors and buttons in Fig. 3.2 are:

- 1 ON/OFF Button
- 2 POWER and STATUS LEDs
- 3 Optical Output Connectors
- 4 Power Connector
- 5 Electric fuse
- 6 Safety Power Button
- 7 Fans
- 8 Ethernet Connector

3.2 Turn On

3.2.1 Power

On the Standard format interrogator, connect the provided power adapter to a 100-240 V power line and the adapter to the interrogator's power connector. Alternatively, connect the interrogator directly to an 11-36 VDC power supply.

For the Rack-Mountable format connect the provided power cable to a 100-240 V power line and to the interrogator's power connector. Then, switch the safety power button to ON.

Notice

Powering above the specified limits will damage the equipment. For the Rack-mountable version there is a fuse protection that can be replaced. Please refer to the full user manual for details.

The Power LED will acknowledge the power supply by turning green for 2 seconds (Fig. 3.3):

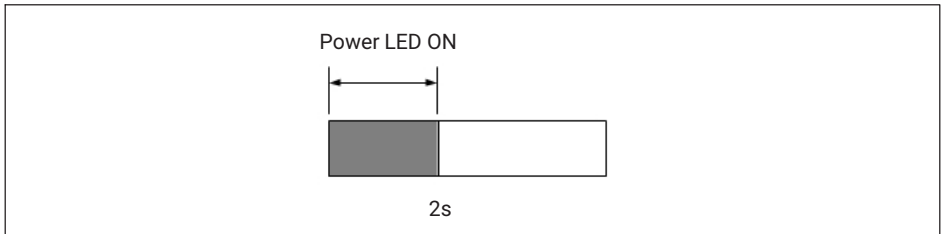


Fig. 3.3 Power LED behavior upon power supply

Start the interrogator by pressing the "ON/OFF" button.

The Status LED will start blinking with the following order and meaning:

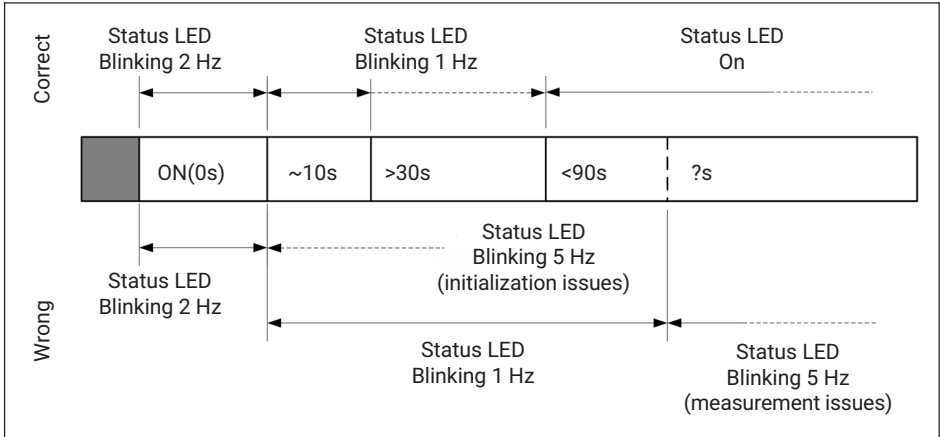


Fig. 3.4 Power ON/OFF button and status LED behavior

Please note that the durations stated in Fig. 3.4 are merely indicative and may vary.



Important

In case the interrogator does not start correctly, contact HKB FiberSensing for technical support.

3.2.2 Ethernet

Connect the provided Ethernet cable, or any other cross over cable, from the interrogator to your PC network.

In order to communicate with the interrogator using a computer, both elements should be configured in the same subnet:

- Set the TCP properties of the computer as follows:
 - IP address: 10.0.0.xxx (where xxx should not be 10: the default IP of the FS22SI is 10.0.0.10)
 - Subnet mask: 255.0.0.0
- Test the connection:
 - Launch a command line (e.g. Start → Run → type “cmd”, in Windows environment)
 - Type and execute the following command: “ping 10.0.0.10”
 - On a successful connection the response should be similar to: “Reply from 10.0.0.10: bytes= 32 time<1ms TTL=60”.



Important

The interrogator can be synchronized to other devices using NTP. For further details refer to the full user manual of the interrogator.

3.2.3 Optical

The FS22 - Industrial BraggMETER SI can be purchased either with FC/APC or SC/APC connectors. Select the appropriate connector type and adapter, if needed, to connect the Fiber Bragg Grating (FBG) sensors to the interrogator.

Attention should be paid to the cleaning of the optical connector(s). A dirty connector can compromise measurements.

3.3 Turn Off

To turn off the interrogator, the "ON/OFF" button should be pressed between 2 s to 6 s. The power LED will start blinking acknowledging the shutdown.

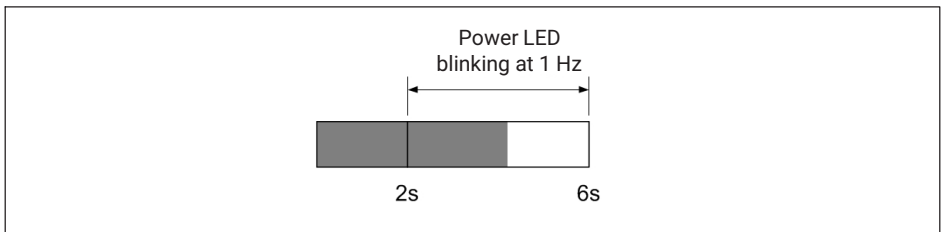


Fig. 3.5 Power LED while pressing Switching Off between 2 s and 6 s



Important

Pressing the power button between 6 to 10 s will cancel the shutdown.

Notice

Pressing the power button more than 10 s will reset the interrogators' IP address to its default value. Please see the full user manual for further details.

4 REMOTE COMMUNICATIONS

The FS22 - Industrial BraggMETER SI interrogator can be fully controlled using standard SCPI syntax commands.

The interrogator has 5 different operational states that answer to the listed commands on the next page.

For full information on the commands refer to the interrogator user manual.

Change status commands	:ACQU:SCHE:STAR :ACQU:OSAT:CONT:STAR :ACQU:WAVE:CONT:STAR :ACQU:SAVE:CONT:STAR :ACQU:ENG:CONT:STAR :ACQU:WAVE:CONT:NTPS:STAR :ACQU:ENG:CONT:NTPS:STAR :ACQU:STAR	:ACQU:STOP	:ACQU:STOP	:ACQU:STOP	:ACQU:STOP	
Change status actions	Reset	Wait				
STATUS	0 Error	1 Ready	2 Free acquisition	3 Continuous acquisition	4 Scheduled acquisition	5 Warming-up
Available commands	:IDEN? :STAT? :SYST:TIME?HH:MM:SS :SYST:DATE? :SYST:DATE:YYYY:MM:DD :SYST:ITPS? :SYST:IPAD: :ACQU:SCHE:PERI? :ACQU:SCHE:PERI:HH:MM:SS :ACQU:SCHE:SAMP? :ACQU:SCHE:SAMP:S :MEMO:LIST:DIRE? :MEMO:RECA:DATA:YYYY:MM:DD? :MEMO:DELE:YYYY:MM:DD :MEMO:DELE:A	:IDEN? :STAT? :STOR :RECA :SYST:NTPS? :ACQU:CONF:THRE:CHAN:C? :ACQU:CONF:THRE:CHAN:C:T :ACQU:ENG:CHAN:C? :ACQU:ENG:CHAN:A :ACQU:WAVE:CHAN:C? :ACQU:WAVE:CHAN:A :ACQU:POWE:CHAN:C? :ACQU:POWE:CHAN:A :ACQU:OSAT:CHAN:C? :ACQU:OSAT:CHAN:A :ACQU:CONF:RANG:WAVE:C? :ACQU:CONF:RANG:WAVE:A :ACQU:CONF:RANG:WAVE:C:NR: R1_Min R1_Max.....Rn_Min Rn_Max :ACQU:CONF:RANG:FORM:C? :ACQU:CONF:RANG:FORM:A :ACQU:CONF:RANG:FORM:C:NR: [CWL1:F1]...[CWLn:Fn] :ACQU:CONF:RANG:DELE:C :ACQU:CONF:RANG:DELE:A :ACQU:CONF:RANG:ENAB :ACQU:CONF:RANG:DISA :ACQU:CONF:RANG:STAT?	:IDEN? :STAT?	:IDEN? :STAT?	:IDEN? :STAT?	

Fig. 4.1 Command list per operational status

5 BRAGGMONITOR SI SOFTWARE

5.1 Installation

The FS22 - Industrial BraggMETER SI interrogator is provided with the BraggMONITOR SI software.

- ▶ To install the software: Run Setup.exe (as administrator)
- ▶ Follow the described steps and press finish
- ▶ Restart the PC
- ▶ Run BraggMONITOR SI (as administrator)

5.2 Graphical User Interface

The following pages describe the main steps for achieving measurements with the BraggMONITOR SI Software. For a full description of the software please refer to the full user manual.

5.2.1 Connect to the Interrogator

To establish a connection to the interrogator press the “connect” button (number 1 in Fig. 5.1) on the general bar available at the bottom of the software window.

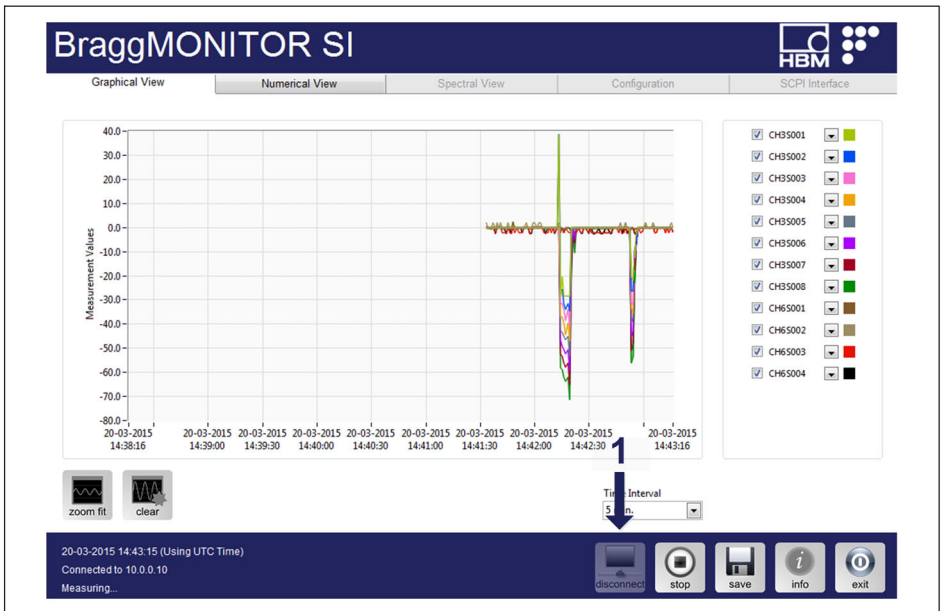


Fig. 5.1 Connecting BraggMONITOR SI to the interrogator

5.2.2 Prepare Measurement Settings

The reflected spectrum of the connected sensors can be checked under the Spectral View tab. Press the corresponding tab, on top of the graphical user interface, to select it (number 1 in Fig. 5.2).

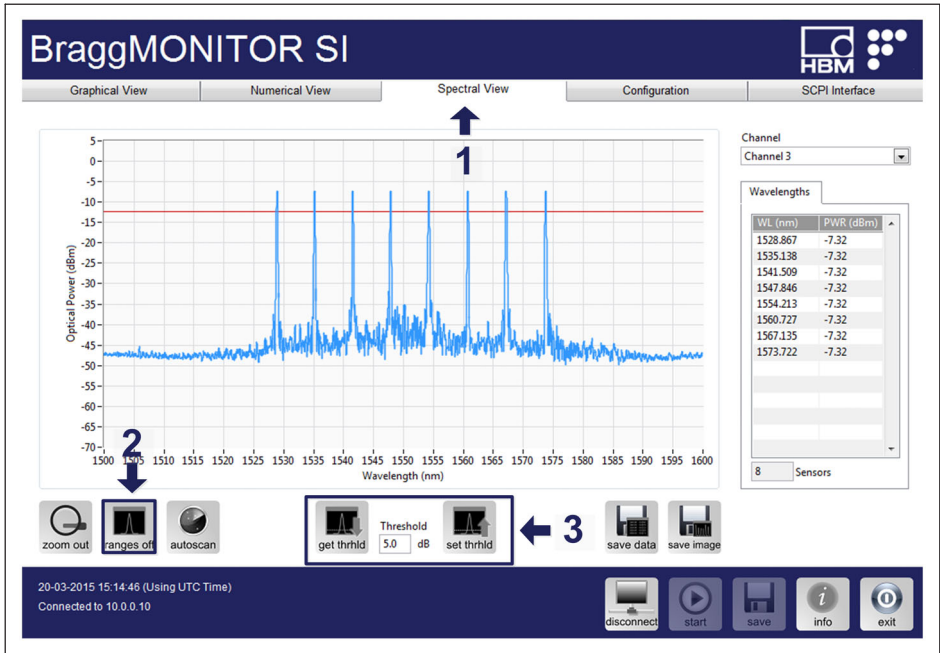


Fig. 5.2 Configuring measurement settings on BraggMONITOR SI

The FS22SI has two operation methods in terms of peak detection. The method to use must be selected using the “Ranges” button (see number 2 in Fig. 5.2 and number 1 in Fig. 5.3).

The setting to adjust on the FS22SI Interrogator is the threshold (see number 3 in Fig. 5.2). The “get” button query the interrogator for the stored value and the “set” button send the new values to the interrogator and store them. The “set” button needs to be pressed so that the defined value becomes active. Threshold value can be an integer between 0 to 60 dB.

Ranges off – Conventional Measurement Method

With the ranges off the interrogator operates in the Conventional Measurement Method. In this method the defined threshold value is valid for the full available spectrum and corresponds to the optical power distance from the highest peak on the full spectrum and the line that separates noise from relevant signal.

The definition of the sensors using the conventional method should use the following steps:

- Define the threshold (number **3** in *Fig. 5.2*) so that:
 - it is high enough for identifying all peaks, but
 - small enough so that no side lobes are accounted.
 - A good starting value is normally 5dB.
- Then, auto scan should be performed (number **2** in *Fig. 5.3*).

Ranges on – Smart Peak Detection (SPD) Measurement Method

With the ranges on (number **2** in *Fig. 5.3*) the interrogator operates in the SPD Measurement Method. With SPD, the available spectrum is divided in “windows” where only one sensor peak can be identified. The threshold value is relative to the maximum peak within each range.

The definition of the threshold and ranges using the SPD method should use the following steps:

- Define a value that is
 - high enough for identifying all peaks, and
 - high enough so that no noise peaks are detected, even if this means that side lobes are detected within each range.
 - A good value is normally 5 dB.
- Then, auto scan should be performed (number **2** in *Fig. 5.3*).
 - A pop up asks for ranges width and autoscan threshold. The ranges are a value in nm that will define the “window” that should be wider than the range of operation of the sensor. It is defined from the peak \pm half the width. The threshold will define a minimum peak amplitude for it to be considered as a sensor.
 - A usual value for the range is 3 nm. A usual value for the threshold is 20 dB.

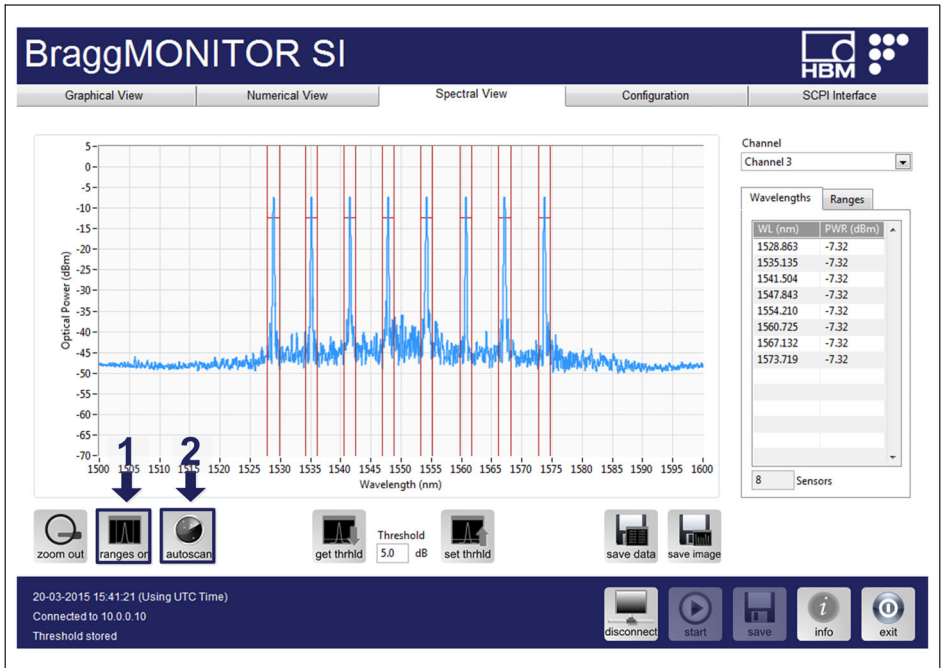


Fig. 5.3 Auto-scanning in BraggMONITOR SI

Upon a finished autoscan, independently of the used method, the configuration is populated with a list of found sensors (see Fig. 5.4).

5.2.3 Set the Configuration

The configuration of the sensors can be adjusted under the Configuration tab (number 1 in Fig. 5.4).

	Name	CWL (nm)	Range Min. Value (nm)	Range Max. Value (nm)	Formula
1	CH3S001	1528.867			x
2	CH3S002	1535.140			x
3	CH3S003	1541.509			x
4	CH3S004	1547.845			x
5	CH3S005	1554.213			x
6	CH3S006	1560.727			x
7	CH3S007	1567.137			x
8	CH3S008	1573.723			x

Fig. 5.4 Configuring sensors in BraggMONITOR SI

After pressing the “autoscan” button (number 2 in Fig. 5.3) the sensor list is automatically populated with the sensors found on the optical network considering the defined settings. The autoscan searches for peaks and defines those found as sensors. For each sensor the autoscan:

- defines an automatic name (CHxSzzz);
- sets the reference wavelength (CWL or λ_0 , in nm);
- defines the range limits in nm (centered at the peak), when operating with SPD;
- expresses the measurement formula as x (wavelength variation in nm). The measurement formula has to be a function of x.

Any of these values can be edited by the user by pressing the desired cell in the configuration table.

5.2.4 Start Acquisition

Still in the Configuration tab configure:

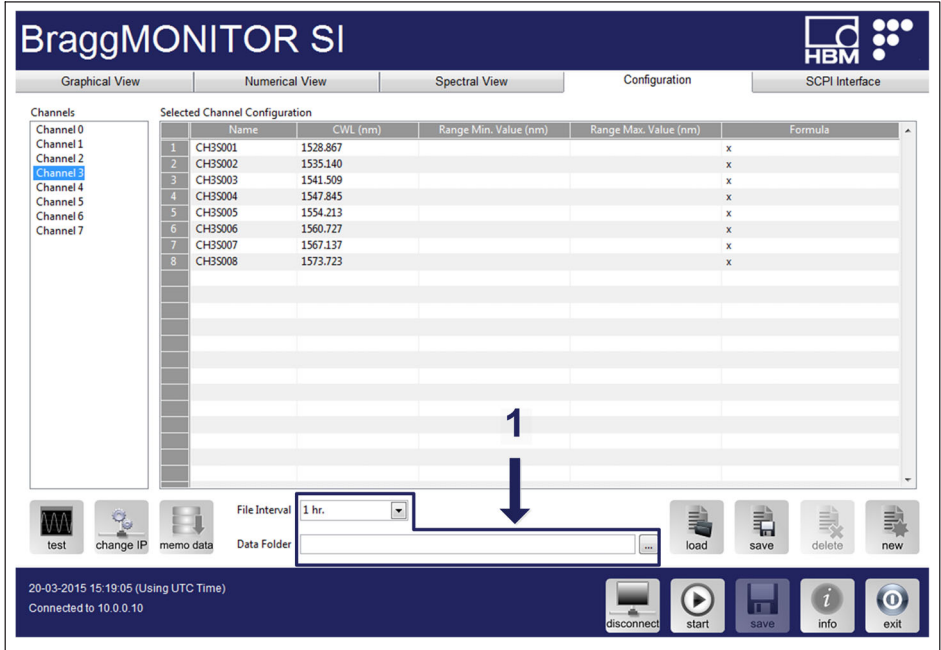


Fig. 5.5 Defining data storage settings in BraggMONITOR SI

- Data storage settings (number 1 in Fig. 5.5):
 - When saving, data is stored in separate files named automatically "BraggMONITOR SI Data [YYYY.MM.DD.hh.mm.ss ; YYYY.MM.DD.hh.mm.ss].txt"
 - File interval -> defines the length of the file in terms of acquisition time.
 - Data folder -> sets the folder to which data is stored.

To start acquisition, change to the Graphical View tab (number 1 in Fig. 5.6) and press the "start" button (number 2 in Fig. 5.6).

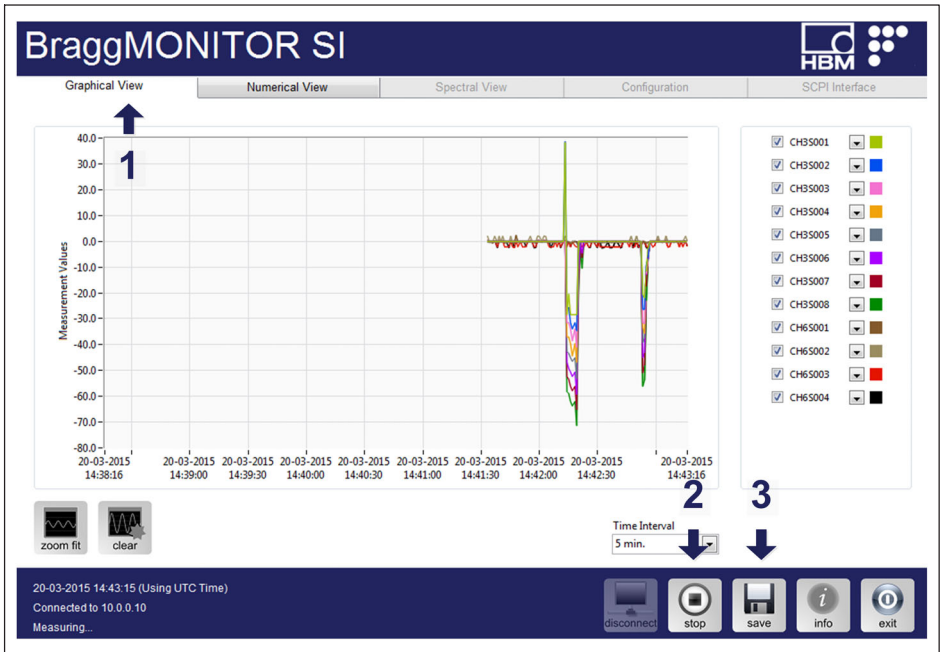


Fig. 5.6 Starting acquisition and data recording in BraggMONITOR SI

Data will be plotted in the graph that is updated every second. The sensors to plot can be selected on legend.

To start saving data to a data file press the “save” button (number 3 in Fig. 5.6).



Important

For further information please refer to the user manual available our website.

