FiberSensing by HBK
HOTTINGER BRÜEL & KJÆR

ENGLISH

Quick Start Guide

FS22DI

Industrial BraggMETER DI

HBK FiberSensing, S.A.
Via José Régio, 256
4485-860 Vilar do Pinheiro
Portugal
Tel. +351 229 613 010
support.fs@hbkworld.com
www.hbkworld.com

Mat.: 7-2002.4609
DVS: A04609 06 E00 00
09.2024

Interrogator version: v3
SW version: v1.8

TABLE OF CONTENTS

1 Introduction 4

2 regulatory and certification considerations 5
2.1 Environment Considerations 5
2.1.1 Disposal of your Old Appliance 5
2.1.2 Packing disposal 5
2.2 Laser Safety 5
2.3 Certification 6
2.3.1 CE marking 6
2.3.2 UKCA Marking 6
2.3.3 Marking of pollutant emission limit values (for deliveries to China) 6

3 Interrogator Setup 7
3.1 Buttons and Connectors 7
3.1.1 Standard Format 7
3.1.2 Rack Mountable Format 7
3.2 Turn On 8
3.2.1 Power 8
3.2.2 Ethernet 10
3.2.3 Optical 10
3.3 Turn Off 10

4 Remote Communications 12

5 BraggMONITOR DI Software 14
5.1 Installation 14
5.2 Graphical User Interface 14
5.2.1 Connect to the Interrogator 14
5.2.2 Configure Measurements 15
5.2.3 Set the Configuration 16
5.2.4 Start Acquisition 17

1 INTRODUCTION

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

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

The BraggMETER is available either in Standard and Rack-mountable formats.
This Manual applies to the following equipment:

- K-FS22 (1000 S/s option)
- 1-FS22DI-ST/4CH
- 1-FS22DI-ST/8CH

The FS22 - Industrial BraggMETER DI set includes:

Standard format	Rack-mountable format
- Interrogator - AC-DC power supply unit 24V - Ethernet cable (L~2m) - Mounting blocks with M6 screws - Connector protection caps - Mounting hole protection caps - Quick start guide - Digital support material - Calibration certificate	- Interrogator - Power cord - 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.

2.1.2 Packing disposal

The packaging of this equipment is designed to protect it from damage during transportation and storage. It is also made of materials that can be recycled or reused, in accordance with the European Union's waste management regulations to minimize its environmental impact.

If you plan to move your equipment to different locations it is advisable that you keep the original package for reuse. This will not only grant proper protection for transportation, but also ensure the reduction of waste creation. Packing boxes include a label with information on the materials used on that specific package.

Please dispose the packaging properly and responsibly. Detailed information is given on the full equipment user manual that is available for download on our website. Thank to cooperate and contribute to the preservation of our planet!

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)

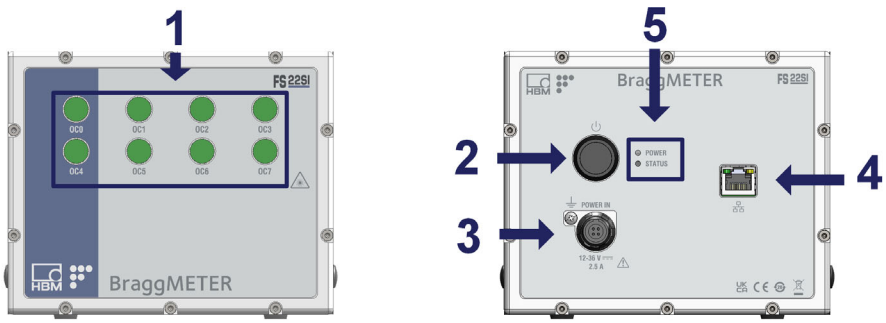
Statutory marking of compliance with emission limits in electronic equipment supplied to China.

3 INTERROGATOR SETUP

3.1 Buttons and Connectors

3.1.1 Standard Format

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



Front view

Back view

Fig. 3.1

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 DI on its Rack-Mountable format has the following buttons and connectors:

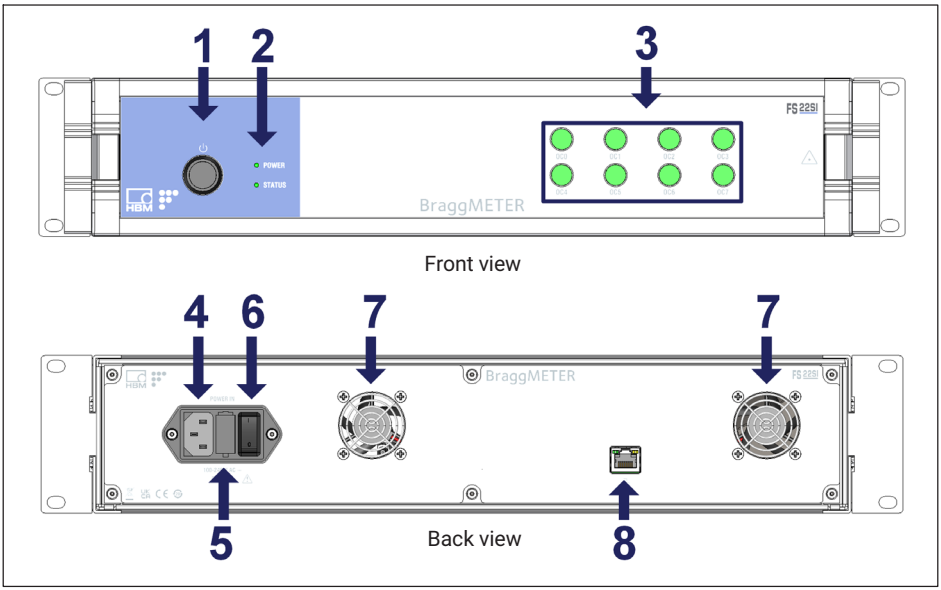


Fig. 3.2

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

For the Standard 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 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*):

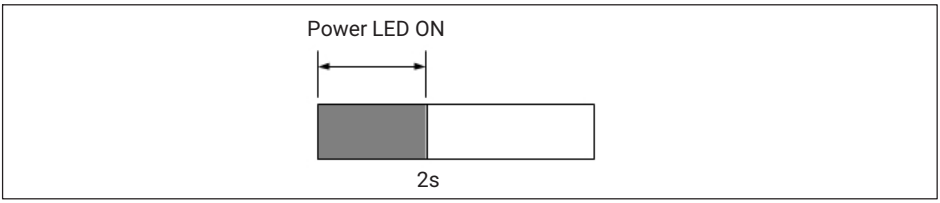


Fig. 3.3

Start the interrogator by pressing the “ON/OFF” button.

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

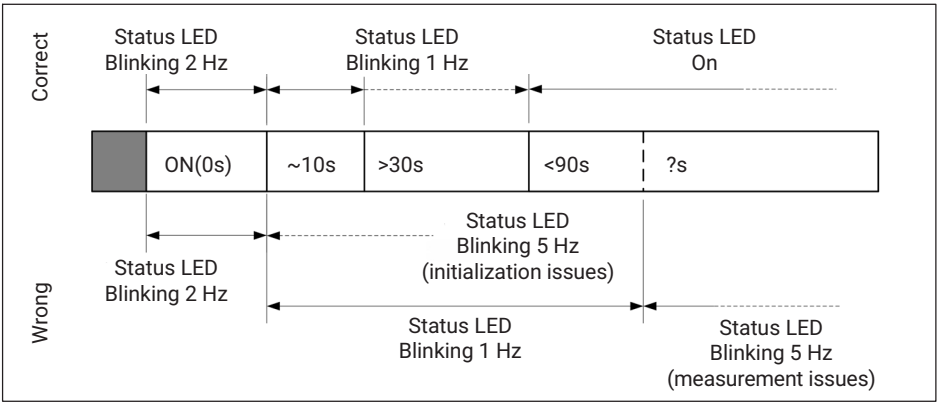


Fig. 3.4

Please note that the durations stated in *Fig. 3.4* are merely indicative and may vary depending, for example, on the sampling rate of the interrogator.

Important

In case the interrogator does not start correctly, contact HBK 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 150: the default IP of the FS22DI is 10.0.0.150)
  - 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 10.0.0.150”
  - On a successful connection the response should be similar to: “Reply from 10.0.0.150: 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 DI 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.

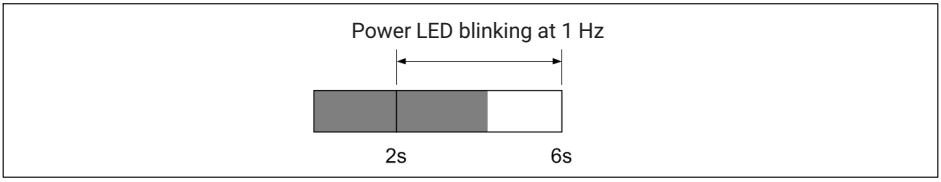


Fig. 3.5

Important

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

Information

Pressing the power button for more than 6 s will reset the interrogators' IP address to its default value. Please refer to the full user manual for further details.

4 REMOTE COMMUNICATIONS

The FS22 - Industrial BraggMETER DI 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:OSAT:CONT:STAR:CHAN:X * :ACQU:WAVE:CONT:STAR:CHAN:X :ACQU:WAVE:CONT:NTPS:STAR:CHAN:X :ACQU:STAR	:ACQU:STOP	:ACQU:STOP	
Change status actions	Reset				Wait
STATUS	**0** Error	**1** Ready	**2** Free acquisition	**3** Continuous acquisition	**5** Warming-up
Available commands	:IDEN? :STAT?	:IDEN? :STAT? :SYST:TIME? :SYST:TIME:HH:MM:SS :SYST:DATE? :SYST:DATE:YYYY:MM:DD :SYST:NTPS? :SYST:NTPS:ENAB :SYST:NTPS:DISA :SYST:NTPS? :SYST:NTPI? :SYST:NTPI:N.N.N.N:N :SYST:IPAD? :SYST:IPAD:N.N.N.N:N.N.N.N:N.N.N.N	:IDEN? :STAT? :STOR :RECA :SYST:NTPS? :ACQU:CONF:RATE:R :ACQU:CONF:RATE? :ACQU:CONF:THRE:CHAN:X? :ACQU:CONF:THRE:CHAN:X:T :ACQU:CONF:GAIN:CHAN:X? :ACQU:CONF:GAIN:CHAN:X:G :ACQU:WAVE:CHAN:X? :ACQU:POWE:CHAN:X? :ACQU:OSAT:CHAN:X? *	:IDEN? :STAT?	:IDEN? :STAT?

* only available at 50 S/s acquisition rate

Fig. 4.1

5 BRAGGMONITOR DI SOFTWARE

5.1 Installation

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

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

5.2 Graphical User Interface

The following pages describe the main steps for achieving measurements with the BraggMONITOR DI 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.

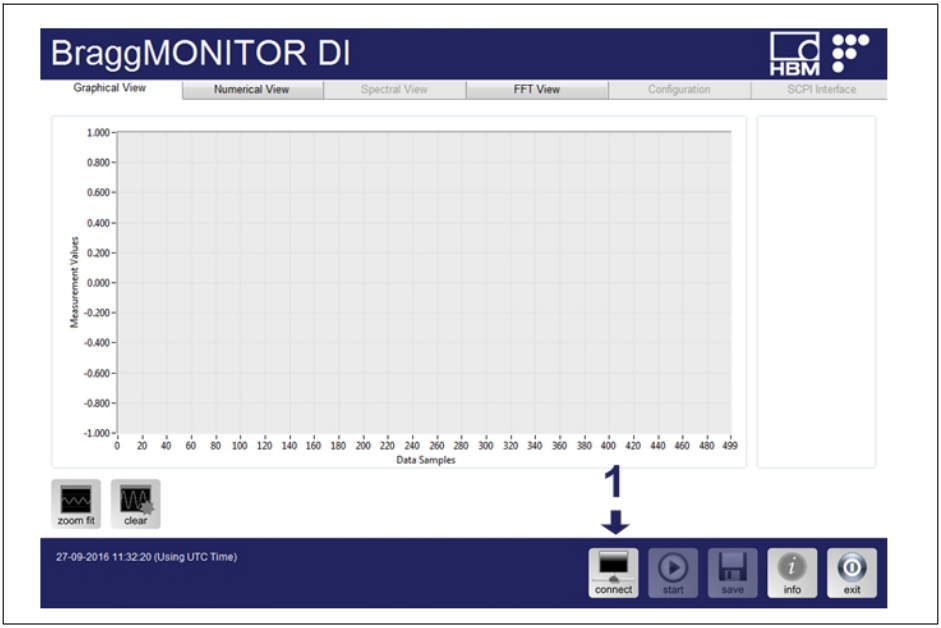


Fig. 5.1

5.2.2 Configure Measurements

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*).

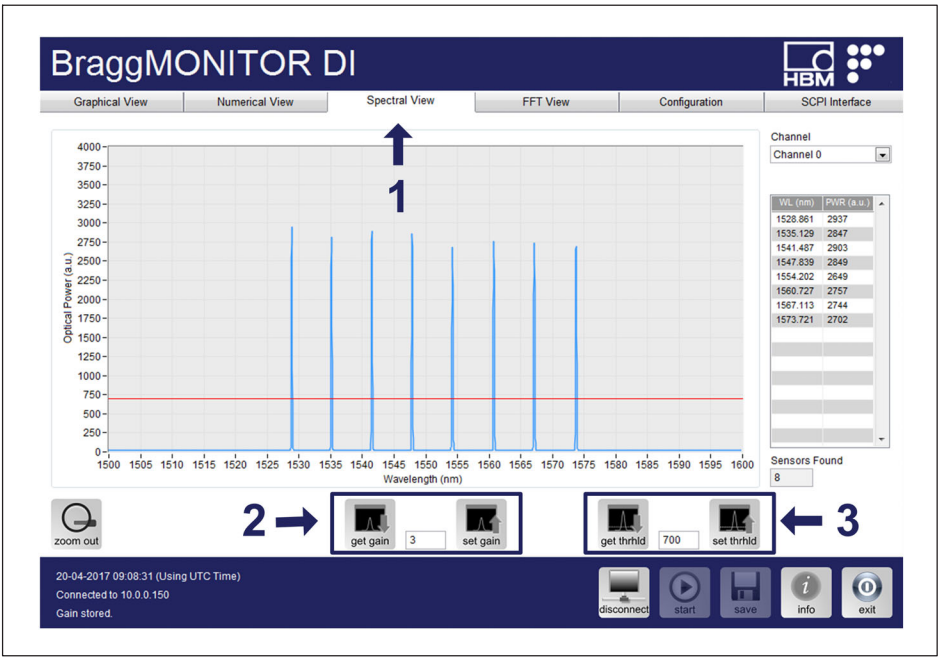


Fig. 5.2

The settings to adjust on the FS22DI Interrogator are the gain (number **2** in *Fig. 5.2*) and the threshold (number **3** in *Fig. 5.2*). The “get” buttons query the interrogator for the stored values and the “set” buttons send the new values to the interrogator and store them. The “set” buttons need to be pressed so that the defined value becomes active.

	Meaning	Possible values	Suited value
Gain	Factor for amplifying and optimizing the received signals.	0 to 255	Value that sets the power of the FBGs in the spectrum below saturation and above threshold. Saturation occurs when the peak value is above 4095.
Thresh-old	Optical power level that separates noise from rele-vant signal	200 to 3200	Value that leaves all peaks above and does not cross side lobes.

Set the values to the most appropriate ones taking into consideration the existing signals.

5.2.3 Set the Configuration

The configuration of the sensors can be adjusted under the Configuration tab (number **1** in *Fig. 5.3*).

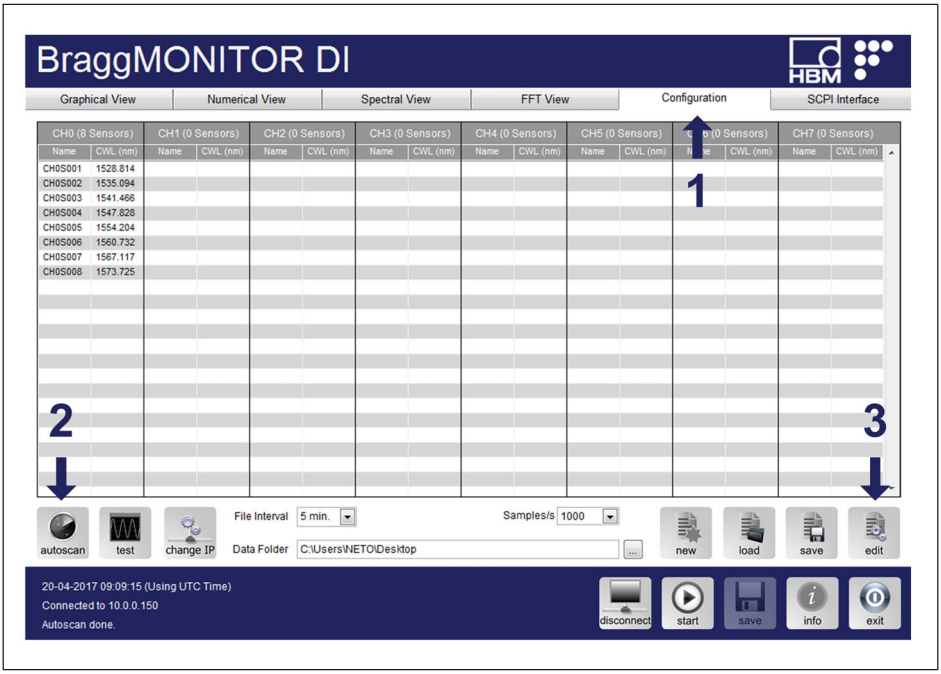


Fig. 5.3

Press the “autoscan” button (number **2** in *Fig. 5.3*) to automatically populate the sensor list 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 a measurement range of 2.5 nm wide (centered at the peak);
- 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 manually by selecting the sensors’ cell in the configuration table and pressing the “edit” button (number **3** in *Fig. 5.3*).

5.2.4 Start Acquisition

Still in the Configuration tab configure:

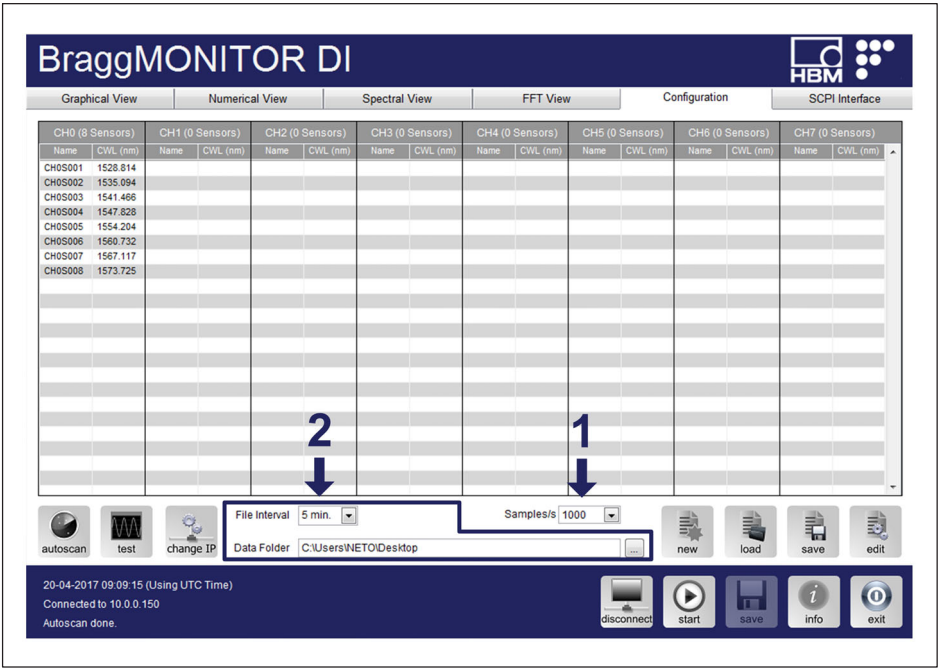


Fig. 5.4

- Measurement acquisition rate (number **1** in *Fig. 5.4*):
  - Possible values: 50 S/s; 100 S/s; 200 S/s; 500 S/s; 1000 S/s

- Data storage settings (number **2** in *Fig. 5.4*):
  - When saving, data is stored in separate files named automatically “BraggMONITOR DI 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. 5.5*) and press the “start” button (number **2** in *Fig. 5.5*).

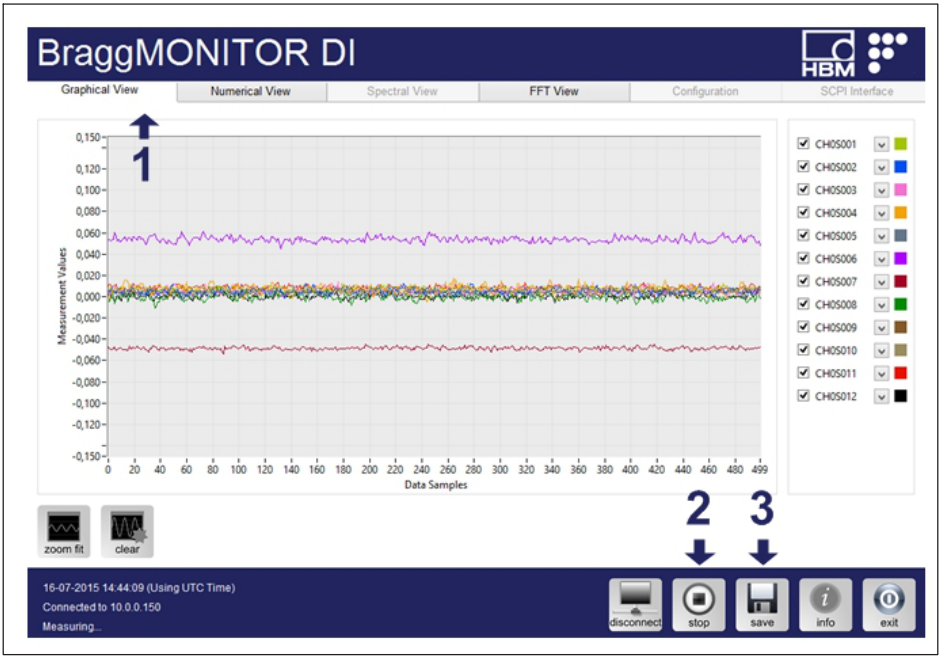


Fig. 5.5

Data will be plotted in the graph, which is updated every second. The sensors to plot can be selected on the channels' checkboxes.

To start saving data to a data file press the “save” button (number **3** in *Fig. 5.5*).

Important

For further information please refer to the user manual provided with the equipment. This document is also available on our website.

HBK - Hottinger Brüel & Kjaer
www.hbkworld.com
info@hbkworld.com

A04609 06 E00 00 7-2002.4609