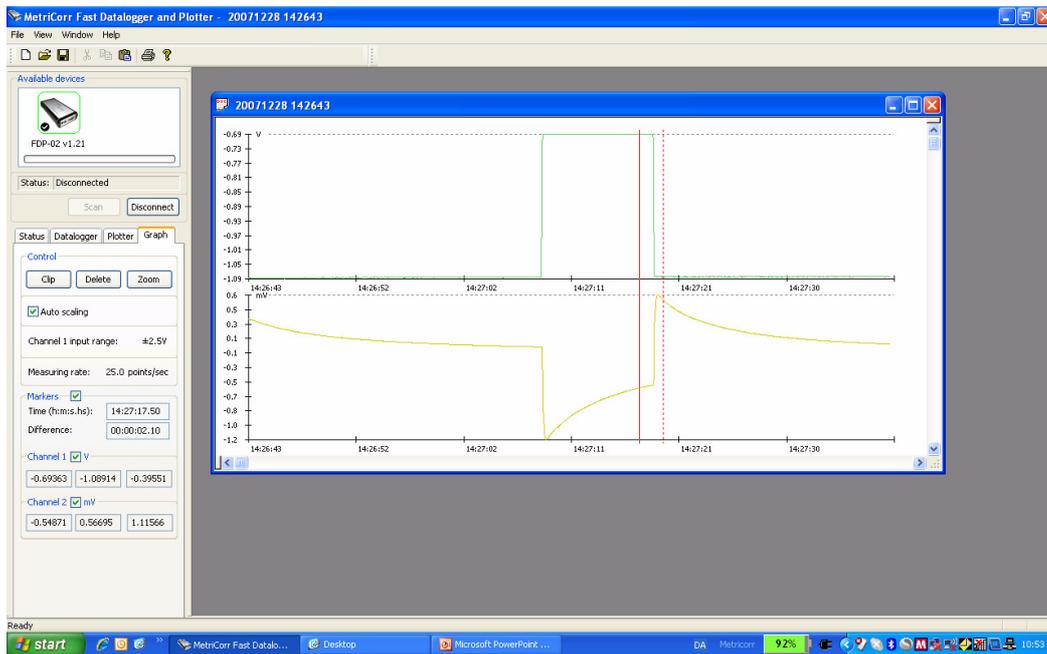




Fast Datalogger & Plotter

FDP-02



MANUAL

100153



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WARNING – SAFETY PRECAUTIONS

This product is designed to be electrically connected to buried pipelines. Hazardous voltage levels may occur on the pipelines and will in such cases also be present on the instrument pipe connections and the electrical parts of the probe. Do not touch these parts when the instrument is connected to the pipeline. Do not install or operate during thunderstorms.

Operation of the FDP-02 Fast Datalogger & plotter should be made by authorized personnel only.

Disposal

The FDP-02 is electronic equipment and must not be disposed.

The instrument shall be returned to the manufacturer.



Content

Warning – safety precautions - disposal	2
Content	3
Thank You	4
This product includes	5
1. Working with the FDP-02	6
2. Functionality Overview	7
3. PC requirements	8
4. Installation	9
5. Connection	10
6. Status reading	12
7. Calibration – zero adjustment	13
8. Plotter mode	15
9. Datalogger mode	16
10. Saving data files	20
11. Graphical presentation - Viewing data files	21
- Markers – use of	21
- Zoom and Clip	22
- Exporting data files	22
Windows menus at a glance	23
Technical data	Rear

Thank You for choosing the FDP-02 DC-datalogger. The datalogger is intended for analytical measurements of pipeline ON/OFF-potentials, line-currents, coupon currents, DC stray currents etc.

The FDP-02 datalogger is part of our product line for evaluation of cathodic protection (CP) efficiency. We have focused on making operation of this instrument as simple as possible.

On the MetriCorr homepage, you will always find the latest updated manual, and the latest updated PC User Software.

We hope you will find the instrument to be an operational and useful tool in your pipeline integrity management. Always be welcome to contact us with questions and/or comments.

[MetriCorr ApS](#)

Note

Using this product is advisory in nature and does not prevent corrosion nor does it represent all parts of the structure under investigation.

This Product includes



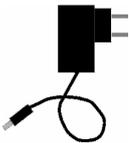
The FDP-02 Datalogger device including this manual



Serial interface cable



CD Rom containing the PC software

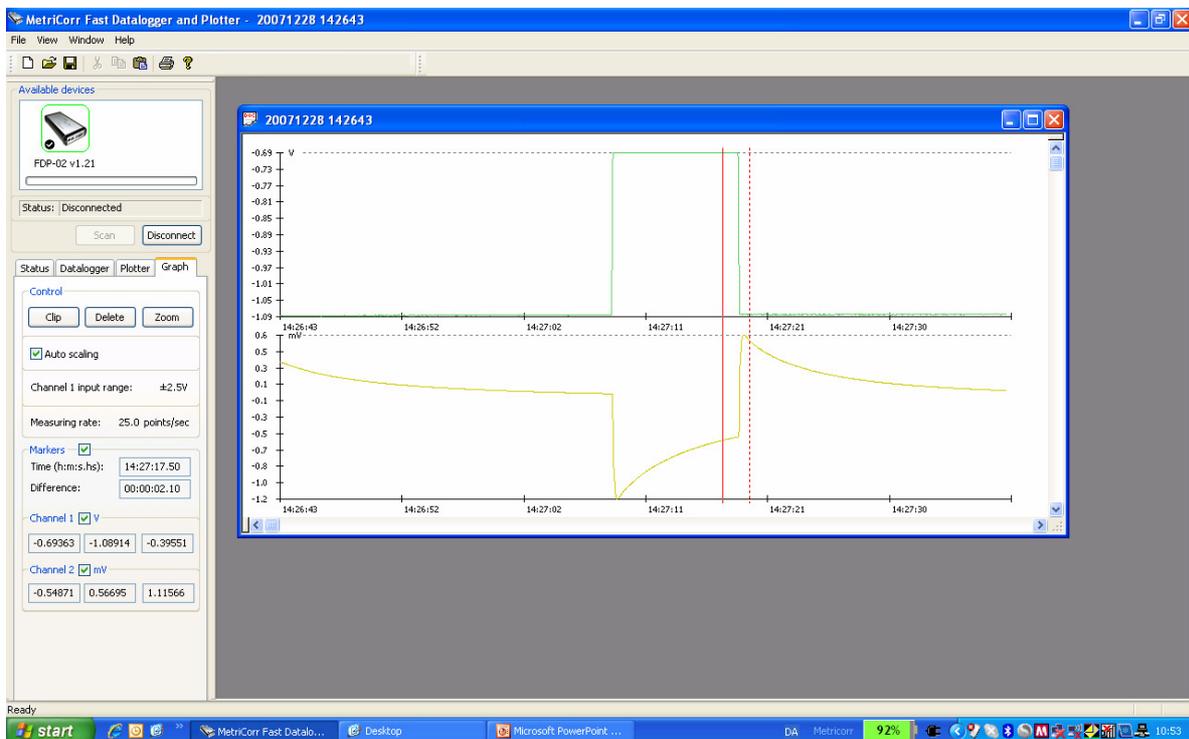


Power supply for connecting
The FDP-02 to mains supply

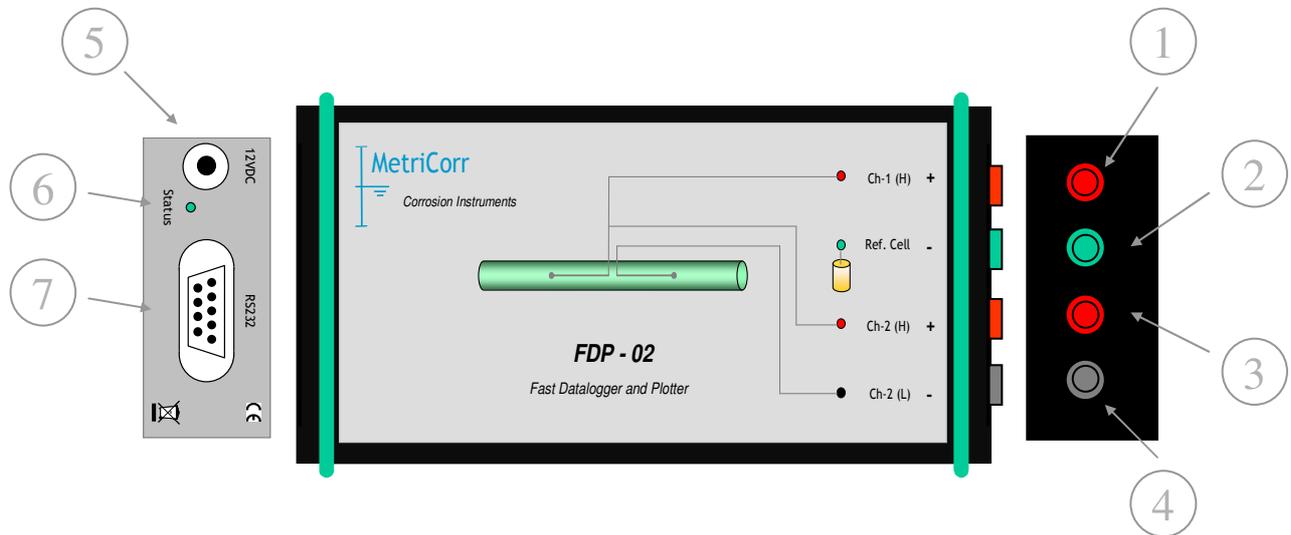
1. Working with the FDP-02 Datalogger & plotter

The FDP-02 (2-channel fast datalogger and plotter) is intended for simultaneous measurements of pipeline DC potential and line currents or coupon currents in the DC mode. The optional high logging frequency of 25 measurements per second makes the datalogger particularly well suited for accurate assessment of the pipeline OFF potential as well as characterization of DC interference.

The logger can be operated in a real time plotter mode, or it can be programmed to initiate logging sequences at pre-selected time intervals. In either case, the data can be displayed in a graphic manner allowing for ZOOM and CLIP selection of a data interval that can be exported in a text format (.csv) for use in a spread sheet like Excel.



2. Functionality overview



1 and 2: Channel 1 (Scaled +/- 2.5 V or +/- 25 V)

1. Channel 1 (High) - Socket terminal 4 mm plug.
2. Channel 1 (Low – Reference cell) - Socket terminal 4 mm plug.

3 and 4: Channel 2 (Scaled +/- 250 mV)

3. Channel 2 (High) - Socket terminal 4 mm plug.
4. Channel 2 (Low) - Socket terminal 4 mm plug.

5. $12V_{DC}$ input - 2,5mm Jack connector. Positive (+) in the centre.
(Logger operates from 8-15 V_{DC}).

6. **Green LED indicator for status information from the logger**
Flashes during a measurement (same frequency as the sample rate).

7. **RS232 - 9 pole female Sub D connector for serial interface to a PC**
A USB to serial adaptor can be applied for the PC end.

3. PC requirements

Hardware

- Intel/AMD 1.6 GHz minimum
- 256 MB RAM (512 MB recommended)
- 100 MB free disk space on hard disk prior to installation (1GB recommended).
- Min 1024x768, 256 compatible screen (higher recommended).
- CD-ROM drive for installation of program.
- 1 free RS-232 serial port or a virtual serial port through USB to serial adaptor.

Software

- Microsoft Windows® XP SP2 or higher.
- Spreadsheet software e.g. Microsoft Excel®.

4. Installation

Installing the PC Software

The FDP software is supplied on a CD-ROM and comes complete with its own installation program.

Simply insert the CD, run the setup.exe file and follow instructions on screen.

By default the software is installed in the directory:

Default program folder\MetriCorr\FDP

Such as:

C:\Program Files\MetriCorr\FDP

An icon appears in the programs menu and as a shortcut on the desktop.



FDP v1.21

5. Connection

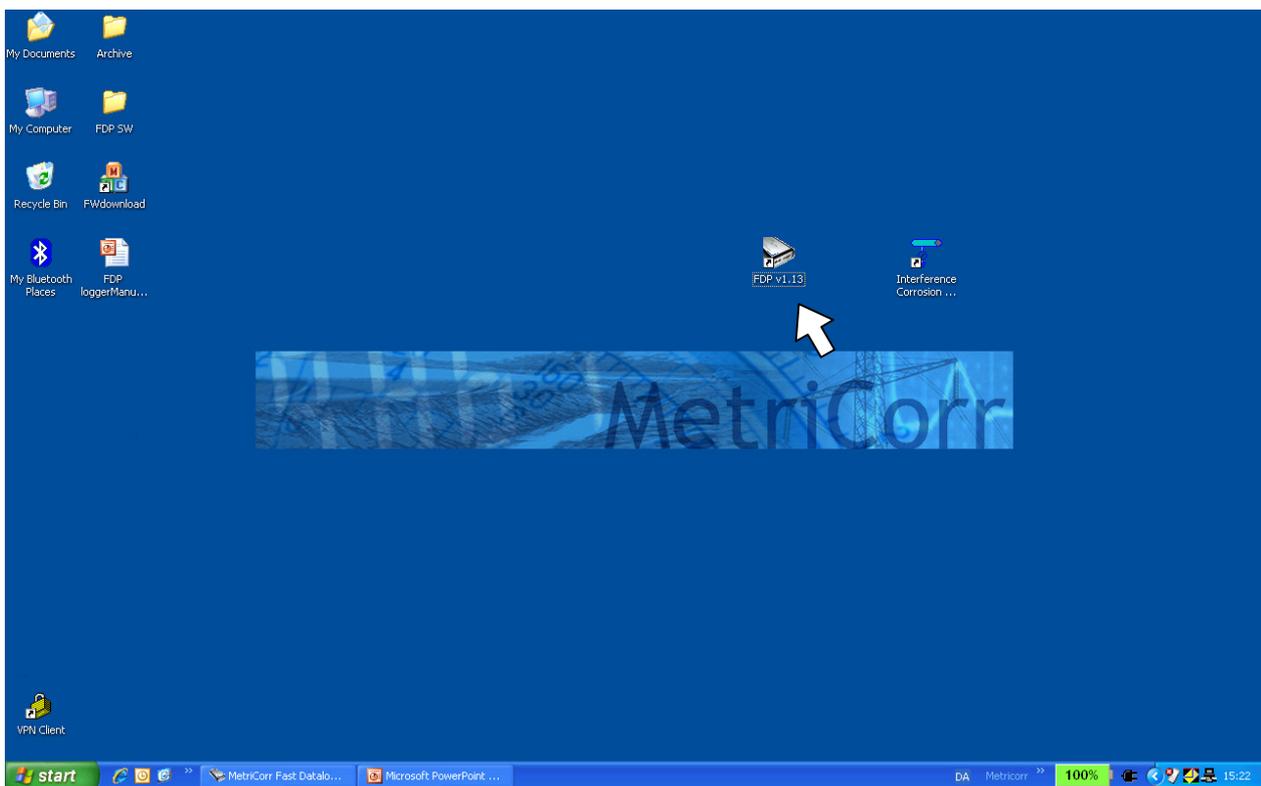
Making connection with the logger

The connection between the FDP and the PC is made through an RS 232 serial cable. If your computer is not equipped with such serial interface, a USB to serial adaptor can be used. Please follow the instructions provided by the supplier of the adaptor. The USB to serial adaptor must be connected to the FDP before connecting the USB connector to the computer, otherwise the adaptor can be damaged.

Power up the logger by battery or by mains power.

Note that when using mains power a grounded configuration should be applied.

Activate the PC software by double clicking on the FDP icon on the PC desktop.



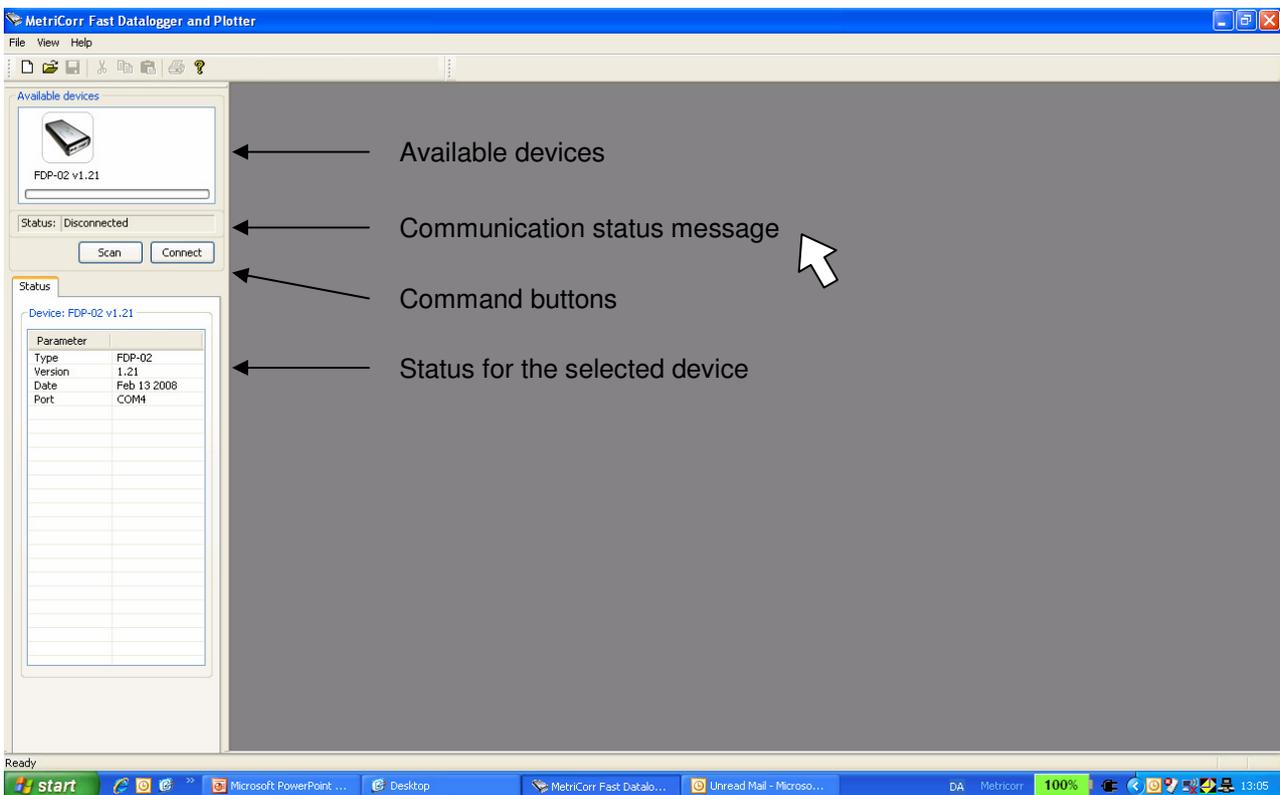
The FDP program opens in a separate window (see below). The software performs a scan searching for available devices. The device(s) will be shown in the upper window (see below). A communication status message will be shown which can either be

- a. One (or more) device(s) found
- b. No devices found
- c. Disconnected
- d. Connected

Two buttons below the communication status message show the possible commands (in this case SCAN for available devices or CONNECT to the selected device. Status for the selected device will be given in the lower table in terms of Type of device (in this case the FDP-02), Firmware version, Date of the firmware, and the Communication port for this device.

Note

Option b. will be displayed if no devices are available - in case the device hasn't been powered or the connection between the PC and the device is malfunctioning.



6. Status reading

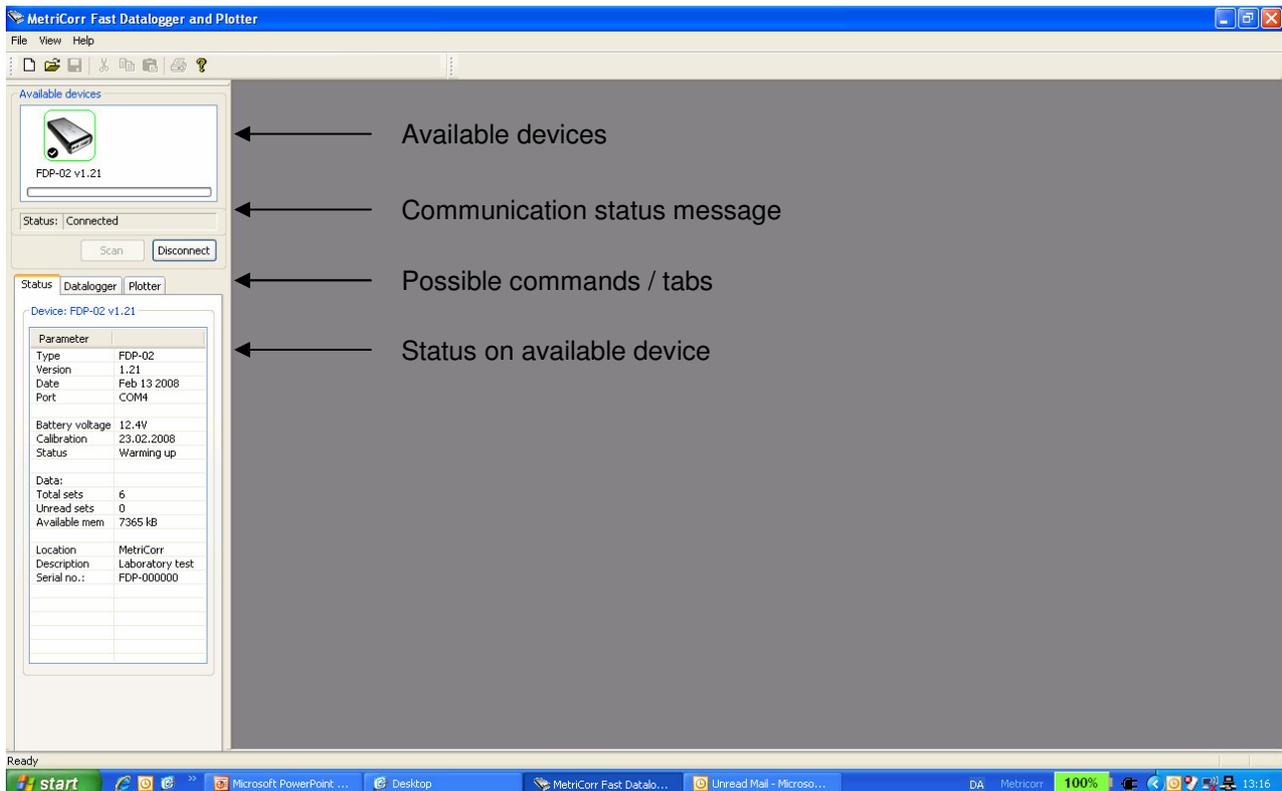
Pushing the CONNECT button will make connection between the selected device and the PC. In this mode the CONNECT button changes to DISCONNECT and the SCAN button becomes unavailable.

The status information on the device will be extended in terms of battery voltage, date of calibration, if the logger is stopped, warming up, calibrating, measuring, or waiting for the next measuring cycle. Further more, it will be noted how many sets of data are stored in the logger memory, how many sets that hasn't been uploaded, and the available memory space. Finally, there will be information on Location and Description (can be defined by the user when programming the datalogger) as well as the logger serial number.

Note that in the connected mode, two additional tabs appear besides the STATUS tab:

- Datalogger
- Plotter

Clicking on these tabs enables either the Datalogger mode or the Plotter mode.



7. Calibration – zero adjustment

Zero adjustment

When taking measurements with FDP, an automatic zero adjustment will be made according to the following schedules:

In the Plotter Mode (see section 8), the zero adjustment will be made automatically immediately after initiating the plotter function. After one second, the plotter function will proceed.

In the Datalogger mode (See section 9), the zero adjustment will be made prior to each scheduled datalogging sequence. The zero adjustment will start exactly one minute before each logging sequence by 55 seconds of powering up the electrical circuit concluded by the zero adjustment procedure (lasting 5 seconds).

Note

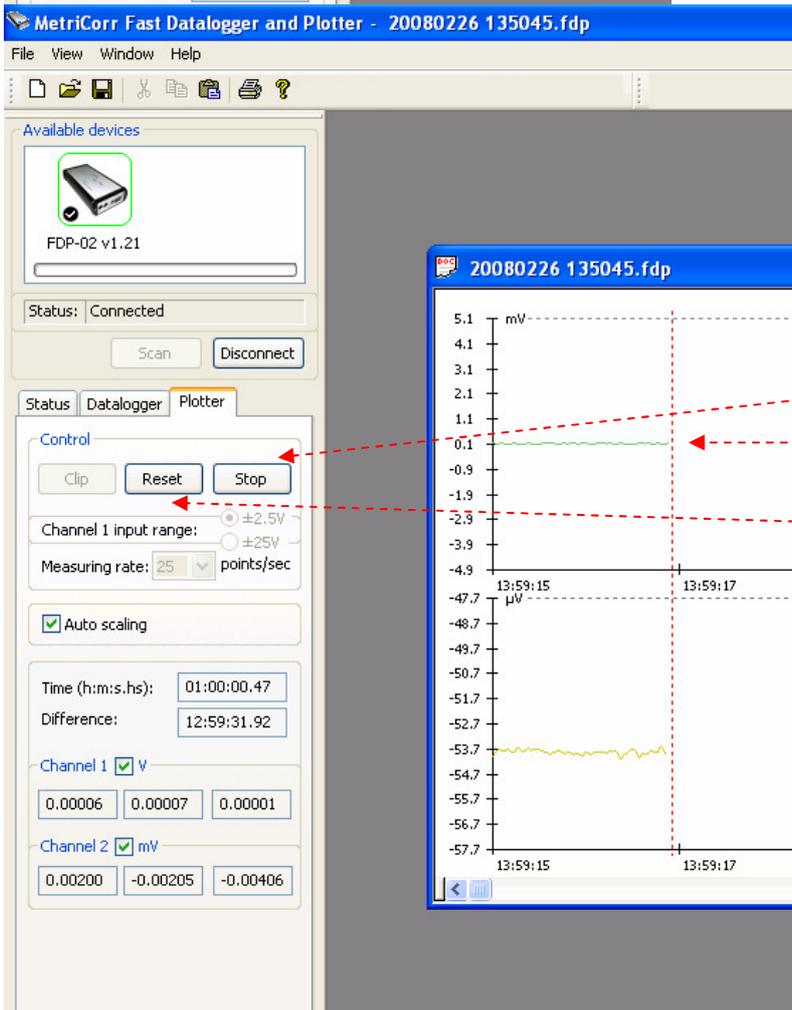
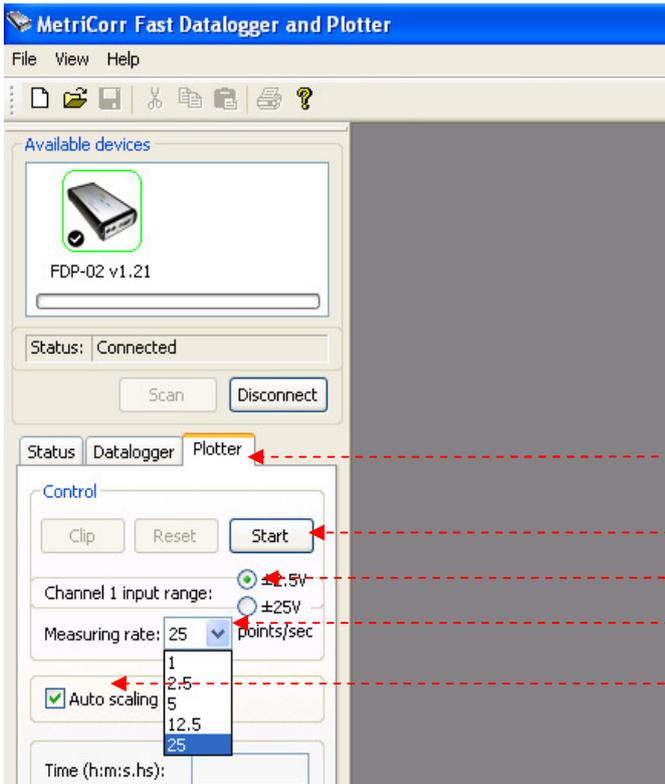
The pre-powering performed in the Datalogger mode is made in order to heat up the circuit before making the zero-adjustment. In the plotter mode, it is typical to perform several plots before actually choosing and saving a plot. The pre-heating in this case will therefore typically be performed during the previous plotting sequence.

Calibration - full scale adjustment

The full scale adjustment and calibration is made from factory and is documented at the certificate that comes with each datalogger. The calibration is made against accredited instruments as claimed in the test certificate.

We advise to calibrate the datalogger in accordance with your company procedures or once a year. It is advisable and recommendable that this calibration and adjustment procedure is made at MetriCorr.

The date of the latest calibration will appear in the status window (see section 6).



8. Plotter mode

To activate the plotter mode perform the following steps:

- 1) Click the Plotter tab
- 2) Select the Channel 1 input range
- 3) Select the measuring rate in points per second
- 4) Enable or disable the Auto scaling facility
- 5) Click the Start button

When the Start button has been clicked, the following occurs:

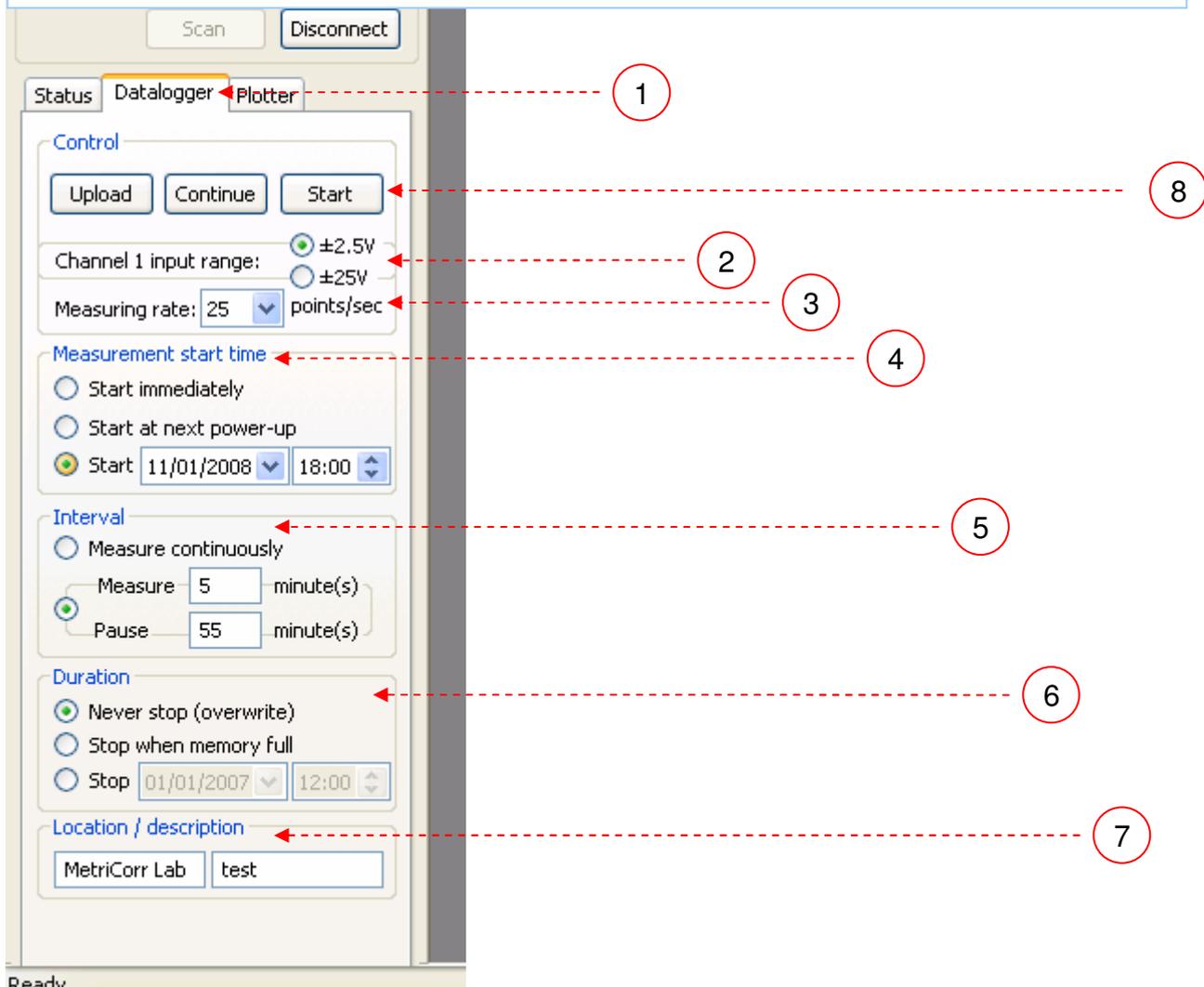
- 6) Zero adjustment after which a real time data presentation is made graphically
- 7) A Reset button will appear. Click it and the graphics starts over
- 8) The Start button is changed to a Stop button
- 9) Clicking the Stop button will terminate the measurement and a complete graph will appear in a separate window (see below). Please refer to section 10 and 11 for instructions on how to view and save data files.



9. Datalogger mode

To activate the datalogger mode and program the datalogger perform the following steps:

- 1) Click the Datalogger tab.
- 2) Select the Channel 1 input range.
- 3) Select the measuring rate in points per second.
- 4) Select the measurement start time (immediately, next time the datalogger is powered up, or at a selected date and time)
- 5) Select the measurement cycle interval. Continuously, or in cycles of X minutes of measurements followed by a pause of Y minutes.
- 6) Define the duration of the programmed cycle (never stop (overwrite), Stop when memory full or stop at a selected date and time).
- 7) Add a description / location to be used in the data files that will be created when data is uploaded n(e.g. Pipeline X, km Y or GPS co-ordinates).
- 8) Click Start – Please note the calibration procedures described in section 7



When started, the “Start” button is turned into a “Stop” button.

In the started condition, the Status tab will now give additional information on:

- 1) The battery voltage
- 2) The logger status:
 - Stopped: The datalogger is not programmed to perform any measurements
 - Warming up: The datalogger is programmed and is warming up prior to performing calibration and measurements
 - Calibrating: The datalogger is programmed and performing a zero adjustment
 - Measuring: The datalogger is programmed and is performing measurement and logging of data
- 3) Number of logged sets of data, how many of these sets are not uploaded, and the present available memory in kBytes.

The screenshot shows a software window with three tabs: Status, Datalogger, and Plotter. The Status tab is active, displaying information for a device labeled "Device: FDP-02 v1.15". The information is organized into several sections:

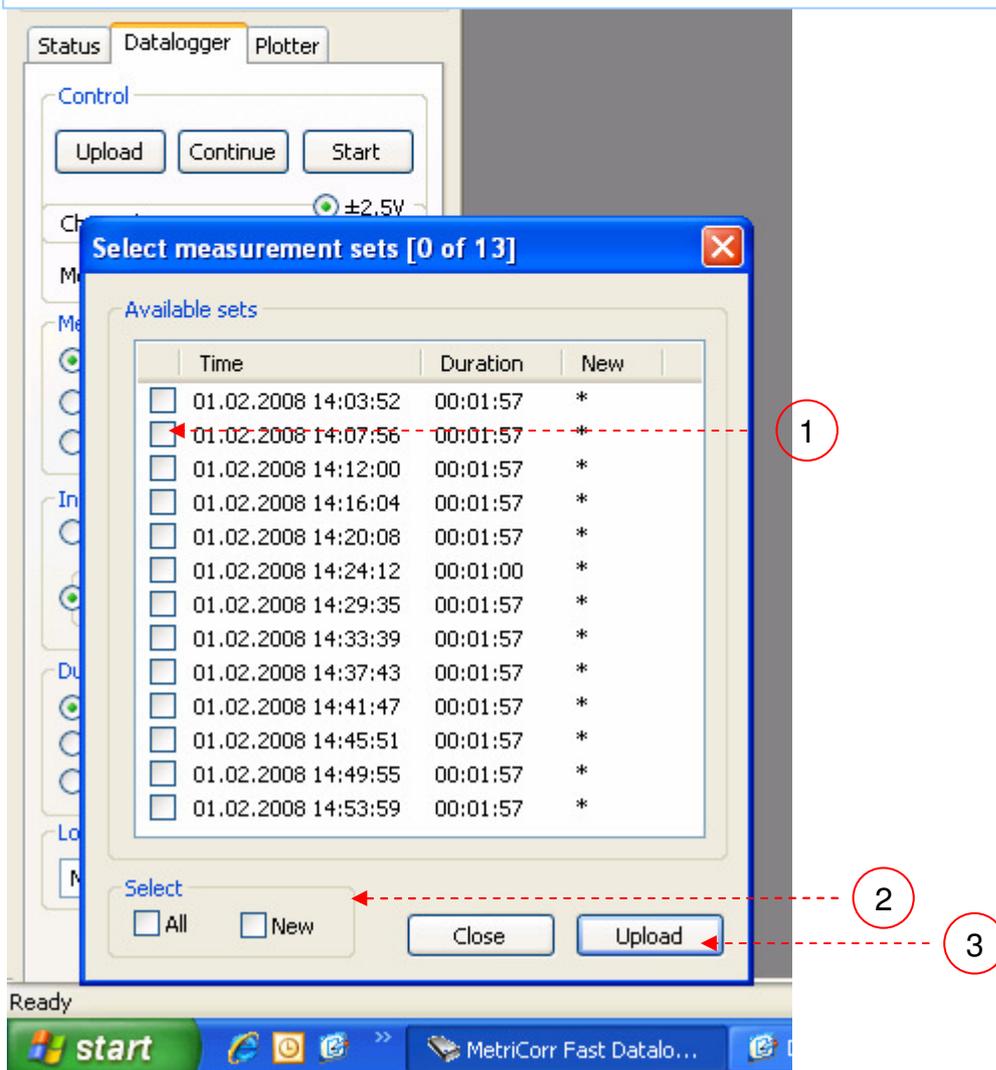
Parameter	
Type	FDP-02
Version	1.15
Date	Jan 9 2008
Port	COM4
Battery voltage	12.2V
Calibration	11.01.2008
Status	Waiting
Data:	
Total sets	66
Unread sets	64
Available mem	322 kB
Location	MetriCorr Lab
Description	test
Serial no.:	FDP-000000

Red dashed arrows with circled numbers point to specific data points: arrow 1 points to "12.2V" under Battery voltage; arrow 2 points to "Waiting" under Status; arrow 3 points to "64" under Unread sets.

A datalogger session (series of measurements) can be stopped by clicking “Stop” in the Datalogger tab. When stopped, the “Stop” button is returned into a “Start” button.

For each of the individual – continuous – datalogger measurements, a file is created and stored in the logger memory for upload. Upload the file(s) by clicking the upload button and from the pop-up window do the following:

- 1) Select the files that is going to be uploaded from the logger memory by clicking the appropriate box
- 2) “All” or “New” can be selected separately. New files are those that have not previously been uploaded.
- 3) After having selected the files to be uploaded, click the “Upload” button.

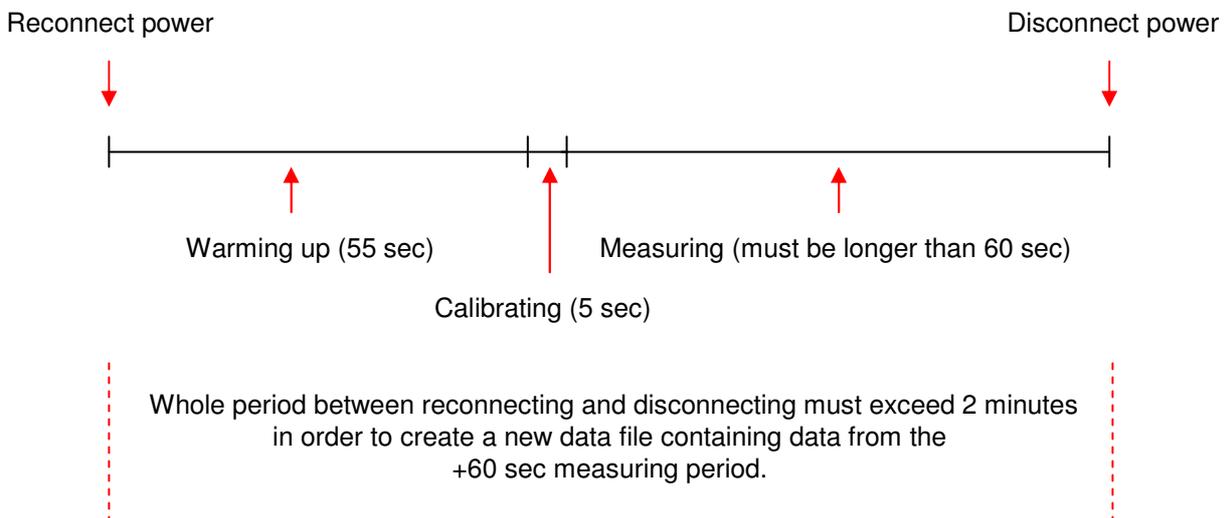


Tip

In the continuous datalogging mode, you can create new individual measurement files by disrupting the power supply, i.e. disconnecting and reconnecting the power supply Jack connector (page 7).

Using solely the logger and a battery when walking along a pipeline this will enable you to make a new measurement file for each test post by following simple rules:

- Program the logger in datalogging mode.
- Select "Start immediately" and "Measure continuously"
- Disconnect the power / Jack connector
- When connection to a test post is made, reconnect the Jack power connector. The below sketched cycle can be realized by which a new data file is created for each visited test post. The instrument will be warming up for 55 seconds, performing a zero calibration for 5 seconds, then measure for x seconds (must be longer than 60 seconds) until the power is yet again disconnected. A new file will be created for each such procedure performed.



10. Saving data files

Uploaded files are shown graphically in separate windows - one window per file. The individual windows are completely identical to the window that is created when measuring in Plotter mode (section 8).

Automatic backup files are saved in the directory:

Default program folder\MetriCorr\FDP\Data, such as:

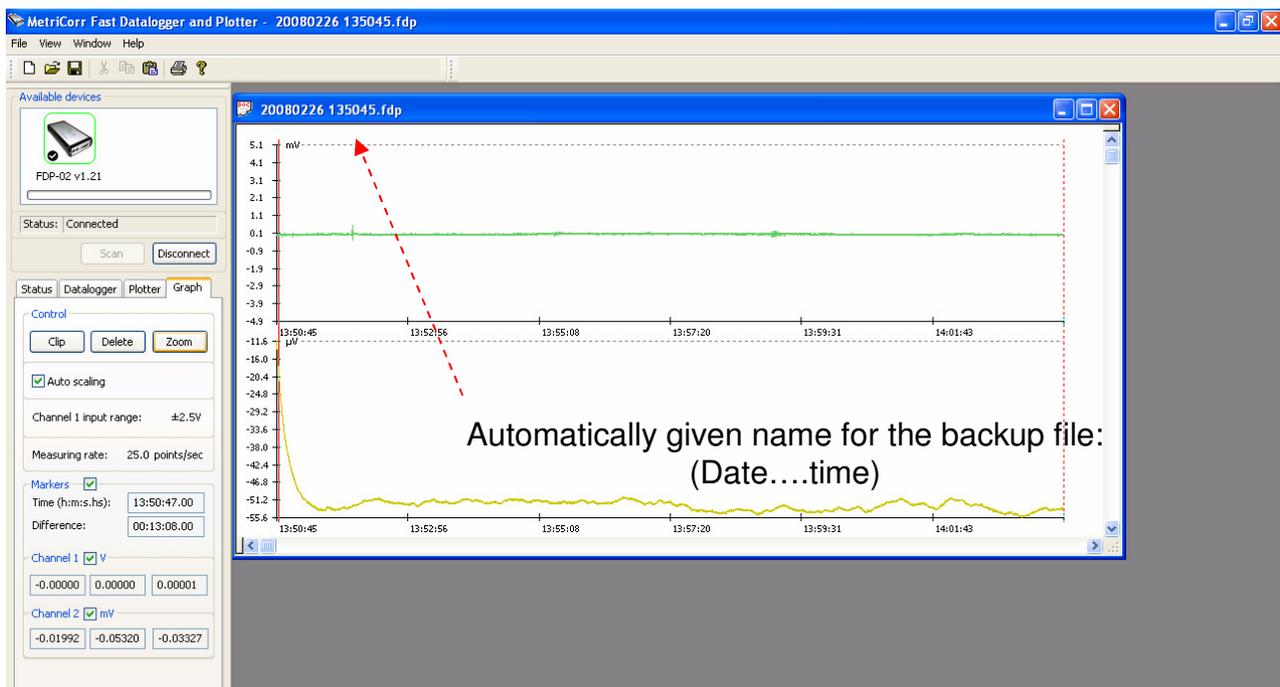
C:\Program Files\MetriCorr\FDP\Data

The files are automatically named after the date and time for the initiation of the measurement.

Example: 20080201 145359.fdp
 (Date) (Time)

Tip:

A file can be saved under a different name and/or in a different folder by choosing “Save As” from the File menu.
(Example: Folder: “Pipeline XX”; File: “Kilometer YY”).

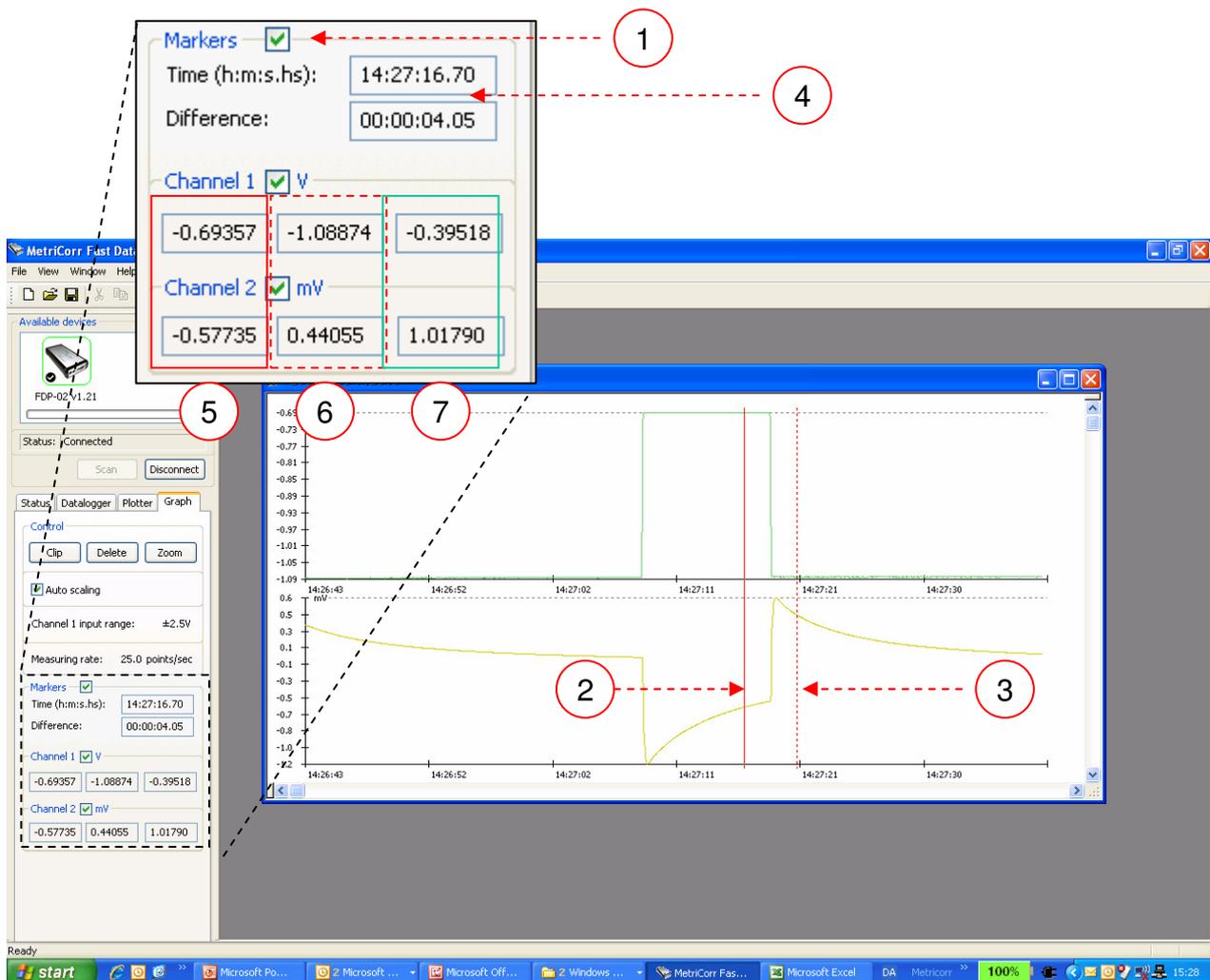


11. Graphical presentation – viewing data files

Using the Markers

The graphic data files (whether just created or opened through the File → Open... menu) can be analyzed using the Markers. Using this feature, you will be able to Zoom and Clip from the Graphs and save the clip as a separate .csv file.

- 1) Make sure the Markers are enabled.
- 2) Move the mouse to the left (lower) time limit of the time interval of interest. Left click on the mouse to establish a mark (red line)
- 3) Move the mouse to the right (upper) time limit of the time interval of interest. Right click on the mouse to establish a mark (red dotted line).
- 4) The markers will now embrace a time interval, and the time difference will be shown.
- 5) Values are given for the left side marker.
- 6) Values are given for the right side marker.
- 7) Differences in the values are given.



Zoom and Clip

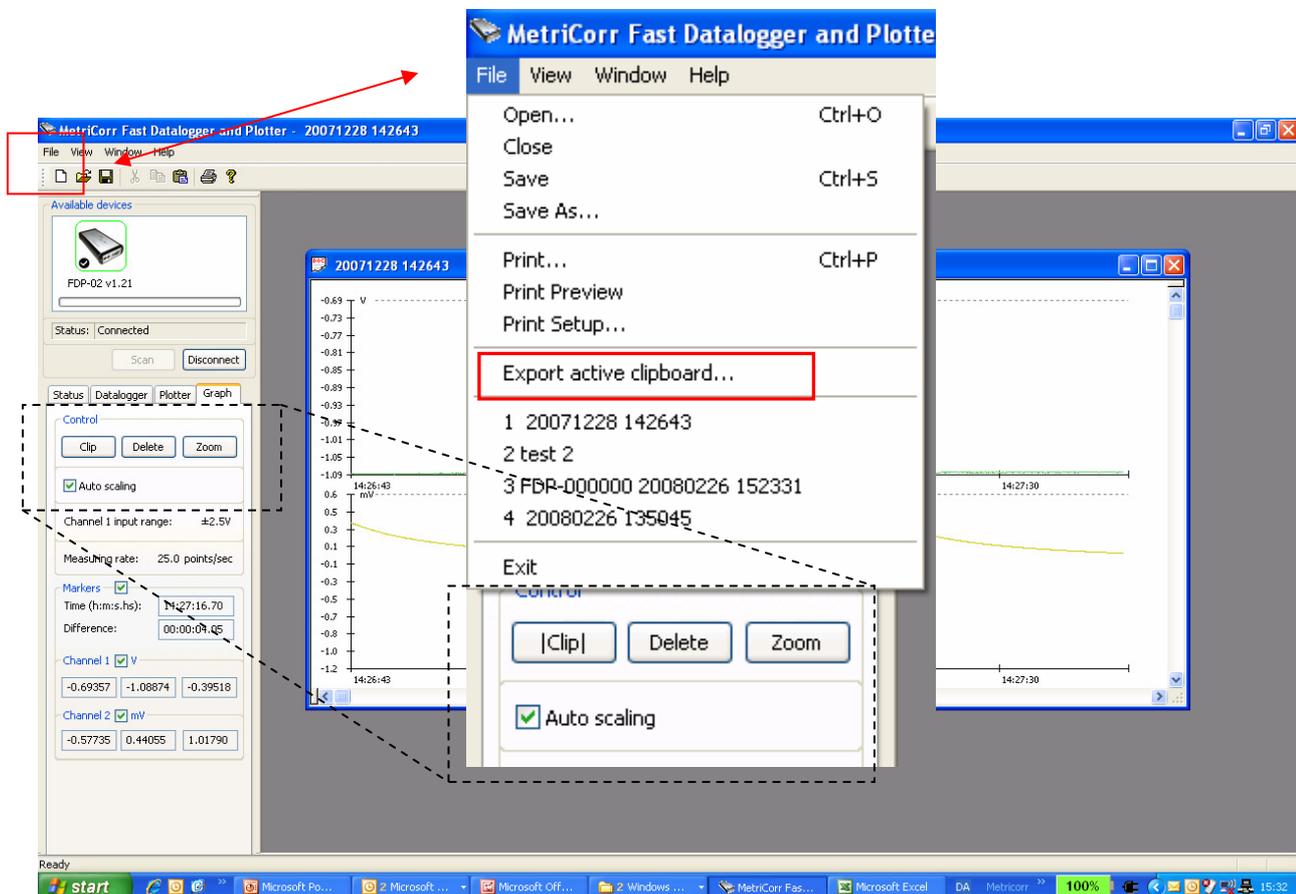
The time interval embraced by the markers can be enlarged by clicking the Zoom function. One click will zoom into the area between the marker. The next click will Zoom out again to return to the original time interval.

If – in the zoom condition – the markers are rearranged (for instance for a further zoom), then the next click on the Zoom button will zoom out again to the original size, whereas yet another click will perform a zoom to the new time interval defined between the two markers.

A specific file can be created covering the data enclosed within the markers. By clicking the Clip button, a clip is formed. The clip can be exported as a .csv file by going to the Windows File menu and clicking the “Export active clipboard...” menu. The .csv file will be saved in the Data folder.

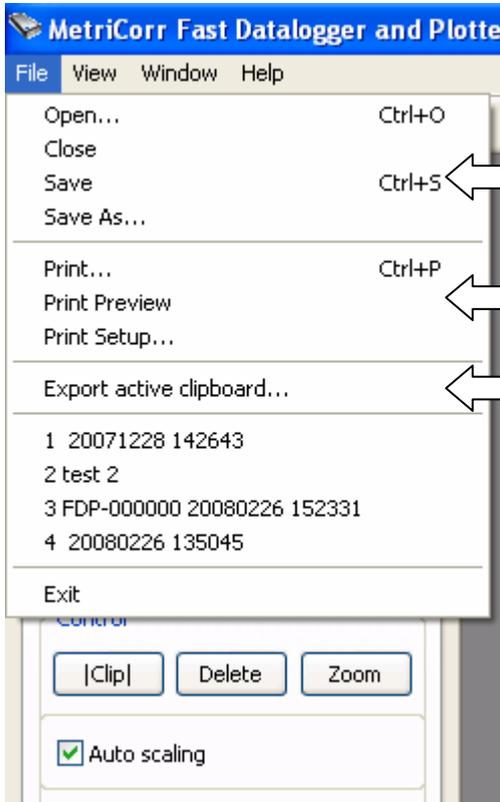
Note: When opening the .csv file in a spread sheet format like excel, first open excel then import data with Tab as delimiters.

A graph (data file) is deleted when clicking the Delete button in the Control box.



Window menus at a glance (1)

File menu

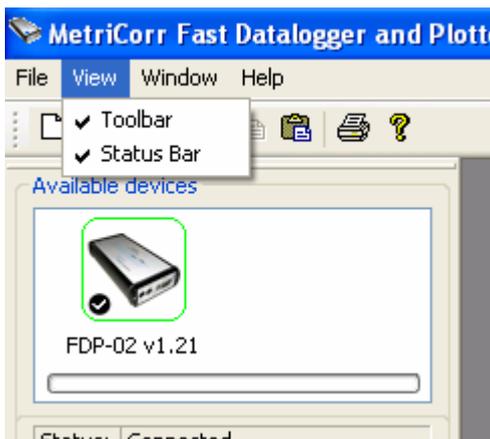


Open, closes, or saves data files. When opening a data file, a window is opened with graphic representation of the data in the file.

Prints the active data file (graph), preview of the print, or prints the setup program of the datalogger.

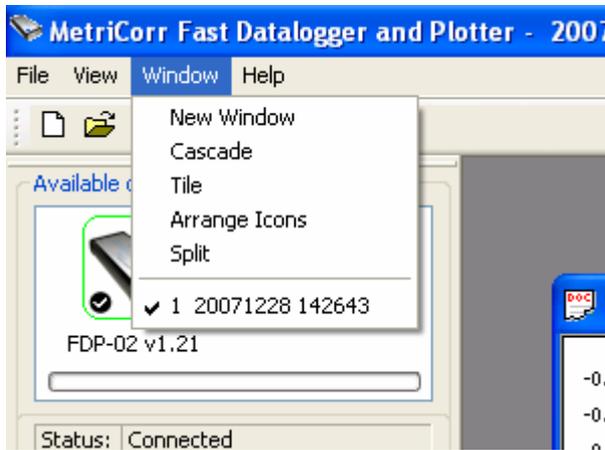
Export clips into a text file format

View menu



Window menus at a glance (2)

Window menu



Help menu



Technical data

Mechanical

Weight 400g
Size L x W x H 170 x 82 x 35 mm

Electrical

Two Channel datalogger with galvanically isolated measurement circuits

Selectable measuring rates 1, 2½, 5, 12½, 25 measurements per second
Power consumption @ 12V 80 mA (active measurement)
10 mA (connected to PC)
2.5 mA (stand by mode)

Channel 1 (V)

Input Resistance DC > 10 MΩ, AC > 1 MΩ
Range ± 2.5 V or ± 25 V (Selectable).
Resolution 0.1 mV, 1 mV
DC Accuracy ±1mV / ±10mV ±1% rdg.
AC Attenuation 60 dB (50Hz)
Max tolerated AC voltage* 250 V

Channel 2 (mV)

Input Resistance DC > 1 MΩ, AC > 10 kΩ
Range ± 2.5 mV
Resolution 0.1 μV
DC Accuracy ± 1μV ±1% rdg.
AC Attenuation 130 dB (50 Hz)
Max tolerated AC voltage* 50 V

General

Storage capacity 4096 kB (app. 500.000 readings on both channels)
Power requirements 8 - 15 V_{DC} (battery or mains adaptor)
Operating temperature -20 to +60°C

Communication

RS232 (Serial to USB adaptor applicable)

CE conformance

EN61326-1: 1997
Amendment A1: 1998
Amendment A2: 2001

*) NOTE: Exceeding this voltage will permanently damage the datalogger.

Information within this document is subject to change without notice.

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