NBM-550 with HP-01

DC and Low Frequency Magnetic Field Measurements

Manual Supplement

narda
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1 Contents

2 General Information

⇒ Store all documents with the devices and make them available to all users.
⇒ When transferring the devices to third parties, also forward all instructions to them.
⇒ For more detailed information about the NBM-550 and how to operate it, please read the “NBM-550 Operating manual” (2401/98.21).
⇒ For more detailed information about the HP-01 and how to operate it, please read the “HP-01 User’s manual”.

⚠ WARNING

Ferromagnetic objects in high magnetic fields.

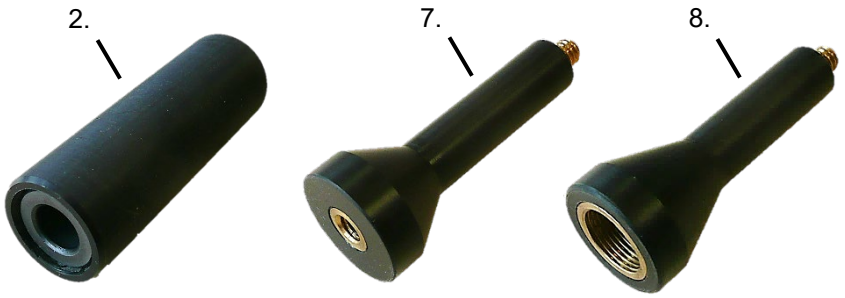
The NBM-550 may become a projectile in high magnetic fields.

⇒ The NBM-550 may only be operated in fields ≤ 30 mT.

HP-01 is a magnetic DC and low frequency isotropic field probe-analyzer. It provides an advanced technology solution for field analysis in the DC to 1 kHz frequency range in an extremely high dynamic range. This operating manual describes how measurements can be made using the NBM-550 for operation of the HP-01. Descriptions of operation from a PC are found in the User's manual for the HP-01, which is included on the HP01-TS CD-ROM as a PDF file.

The HP-01 set for NBM-550 and PC use

1. HP-01 Basic Unit
2. Zero-Gauss Chamber
3. AC/DC Battery Charger
4. Cable, FO Duplex, RP-02, 10 m
5. USB-OC Optical Converter
6. Cable, FO Duplex, RP-02, 25 cm
7. Conical Tripod support
8. HP-01 / NBM Adapter
9. Carrying Case 170/37
10. HP-TS Software, CD-ROM including User's Manual
11. Certificate of Calibration



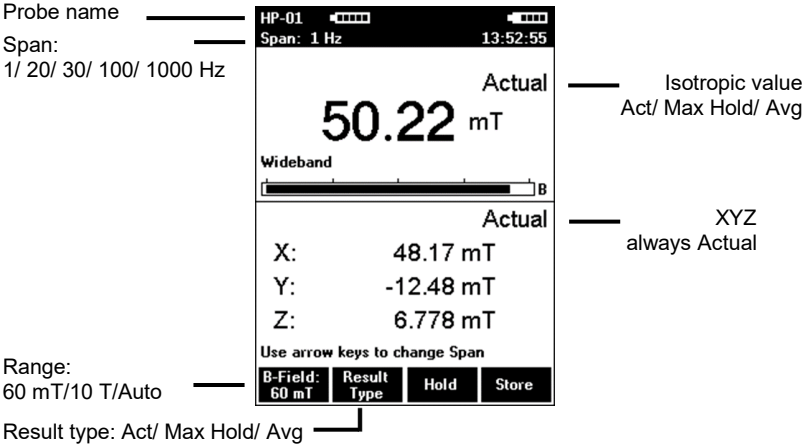
3 Connecting HP-01 with the NBM-550

Connect the HP-01 and the NBM-550 via the optical cable. Start with switching on the HP-01 and then the NBM-550. The NBM-550 is automatically detecting the HP-01. If however an RF probe is already connected, that probe has priority and the HP-01 will not automatically be detected. Therefore, if the HP-01 is connected or switched on after starting the NBM-550 or if an additional device is connected to the probe connector socket, the HP-01 mode will have to be selected manually.

Selecting the HP-01 mode manually

- ✓ The display is in measuring mode
1. Press the **OK** key to open the main menu.
2. Use the arrow keys ▲/▼ to select the **Interface** sub-menu and press the **OK** key to confirm.
3. Use the arrow keys ▲/▼ to select the **HP-01 Display** function and press **OK** to activate.
4. Use the arrow keys ▲/▼ to toggle the setting (**On**/**Off**) to **On**. Press the **OK** key to confirm.
   - ↳ Connection will be established and the display switches to the measuring mode immediately.

4 Display / Measurement view



Applied frequency range:
For span 1 Hz (→ DC to 1 Hz), Filter mode
All other spans (→ DC to x Hz), FFT mode.

Filter Mode (1 Hz Span)

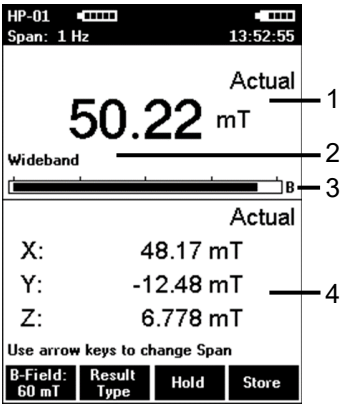
The “DC – 1 Hz” operating mode is particularly suitable for standard-compliant measurements according to human safety standards. The limit values are usually specified for static fields and variable fields with frequencies of up to 1 Hz. A finite impulse response (FIR) filter used in the HP-01 captures just these frequency components. The measurement is made using a high sampling rate and delivers the instantaneous wideband value for the 0 Hz to 1 Hz range, which is required in order to demonstrate compliance with the limit values. Since the instantaneous values are determined for each of the three spatial axes, the measured values are signed (can be either positive or negative).

FFT Mode (Span 20 /30 /100 /1000 Hz)

The wideband measurement results for wider spans are determined by means of an FFT analysis. The results are displayed as RMS values. The values of individual spatial axes are therefore always positive in the FFT mode.

XYZ display

Numerical display of measurement results for each separate axis of the HP-01 and the isotropic value (RSS).



The XYZ display allows you to display the numerical measurement results for each separate axis of the HP-01 as well as the isotropic value (RSS). This is useful for optimum alignment of the HP-01 and allows you to see if an axis is overdriven and correct this by adjusting the alignment. For the isotropic value, the result type displayed can be set to the actual value (Actual), maximum hold value (Max Hold) or the average value (Avg). For details on setting the average and resetting the maximum hold value, refer to the NBM manual.

1. Numerical display of the measured RSS value
2. Frequency mode (always Wideband)
3. Graphical display of field strength with indication of the field type (B-field)
4. Numerical display of the actual measured values for the X, Y and Z axis.

The isotropic RSS value is always positive (squaring always gives a positive value). The XYZ values can be negative in the filter mode only (span 1 Hz).

5 Measuring

Mounting options

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Mounted on the NBM-550

For operation in fields up to 30 mT, the HP-01 can be mounted directly on the NBM-550 using the therefore intended threaded coupling adapter (see 8. HP-01 / NBM Adapter on page 6).

Mounted on a Tripod

When measuring with a long fiber optic cable the HP-01 can be mounted on a tripod, using the tripod support (see 7. Conical Tripod support on page 6).

Zeroing

Zeroing is used for offset correction in order to optimize the sensitivity for low static fields.
To zero the probe, insert the tip of the probe into the zero gauss chamber (see 2. Zero-Gauss Chamber) to eliminate the Earth magnetic field:

- ✓ The display is in measuring mode.
1. Press the **OK** key to open the main menu.
2. Press the **Zero** soft-key to start the zeroing.
3. Insert the probe tip into the zero field chamber.
4. Press the **Continue** soft-key.
5. Remove the zero field chamber after the zeroing process is finished and “Finished” is shown on the display.
6. Press the **Continue** soft-key to close the zeroing process.
7. Press the **ESC** key to return to the measuring mode display.
   - ↳ The analyzer is immediately ready to be used.

6 Relevant Settings and Soft-Keys

Changing the frequency span

✓ The display is in measuring mode.

1. Press the **OK** key to open the main menu.
2. Use the arrow keys ▲/▼ to select the **Measurement Settings** sub-menu and press the **OK** key to confirm.
3. Use the arrow keys ▲/▼ to select the **Stop Frequency (Span)** function and press **OK** to activate.
4. Use the arrow keys ▲/▼ to step through the list of span values (**1 Hz**, **20 Hz**, **30 Hz**, **100 Hz** and **1000 Hz**) to select the desired value. Press the **OK** key to confirm.
5. Press the **ESC** key until the display is back in measuring mode.

or

✓ The display is in measuring mode.

⇒ Use the arrow keys ▲/▼ to step through the list of span values until the wanted/required span is displayed in the upper left corner of the display (**1 Hz**, **20 Hz**, **30 Hz**, **100 Hz** and **1000 Hz**).

↳ The span is changed immediately.

Changing the measurement range

✓ The display is in measuring mode or in the main menu.

⇒ Press the **B-Field:** soft-key repeatedly until the desired B-field range is shown (**Auto**, **60 mT** or **10 T**).

↳ The measurement range is updated automatically.

Changing the result type

You can only change the result type for the upper display area.

✓ The display is in measuring mode.

⇒ Press the **Result Type** soft-key repeatedly until the desired result type is displayed in the upper right corner of the measuring mode display (**Act**, **Max Hold** or **Avg**).

↳ The result type is updated automatically.

Freezing a measured value (Hold)

✓ The display is in measuring mode.

1. Press the **Hold** soft-key to freeze the measured value being displayed at the moment.
   - ↳ **Hold** appears flashing in upper left corner of the display.
   - ↳ The soft-key label changes to **Release**.
2. Press the **Release** soft-key to resume the measurement or alternatively first the **Store** soft-key (see 7 Recording data) to save the current value and then the **Release** soft-key to resume the measurement.

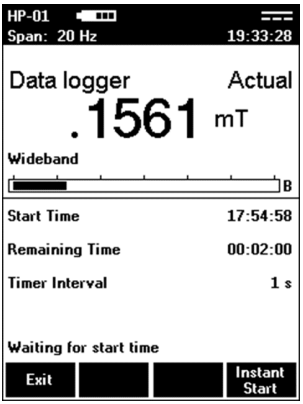
7 Recording data

Storing a measured value

You can store the measured values in an internal memory in the NBM-550 for documentation.

- ✓ The display is in measuring mode.
- ⇒ Press the **Store** soft-key.
  - ↳ The measured value displayed at the moment is stored with the date and time under the index number displayed. The remaining memory space is also displayed.

Using the Data Logger



In the **Data Logger** sub-menu, you can set the measurement value recording parameters and start a timer controlled recording at a desired time.

After successful recording, the measured values can be viewed with the Data Viewer (see Data Viewer soft-key).

Setting the Recording parameters

✓ The display is in measuring mode.
1. Press the **OK** key to open the main menu.
2. Use the arrow keys ▲/▼ to select the **Data Logger** sub-menu and press the **OK** key to confirm.

Timer Start:

3. Use the arrow keys ▲/▼ to select the **Timer Start** function and press the **OK** key to activate.
4. Use the ◄/► soft-keys to position the marker on the clock time to be changed/adjusted/updated (hour, minute and/or seconds).
5. Use the arrow keys ▲/▼ to change the time and press the **OK** key to confirm.

Timer Duration:

3. Use the arrow keys ▲/▼ to select the **Timer Duration** function and press the **OK** key to activate.
4. Use the ◄/► soft-keys to position the marker on the clock time to be changed/adjusted/updated (hour, minute and/or seconds).
5. Use the arrow keys ▲/▼ to change the time and press the **OK** key to confirm.

The actual duration is limited by the maximum number of 32000 intervals per data set.

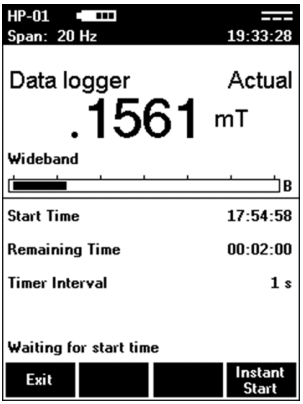
Timer Interval:

3. Use the arrow keys ▲/▼ to select the **Timer Interval** function and press the **OK** key to activate.
4. Use the arrow keys ▲/▼ to change the time (**1 s**, **2 s**, **3 s**, **5 s**, **10 s**, **20 s**, **30 s**, **1 min**, **2 min**, **3 min**, **6 min**) and press the **OK** key to confirm.

Start the recording:

⇒ Press the **Timer Logging** soft-key to start the recording.

↳ Timer logging is activated and the display switches to the measuring mode immediately. **Data Logger** appears in the upper left corner of the display.



It is possible to force the data logging to start immediately by pressing the **Instant Start** soft-key in the measuring mode display.
It is also possible to stop the data logging at an earlier time by pressing the **Exit** soft-key in the measuring mode display.

Timer logging results obtained in HP-01 mode can be subsequently averaged using the optionally available NBM-TS PC software. RMS/MEAN and MEDIAN post average evaluations are available.

8 Managing result data

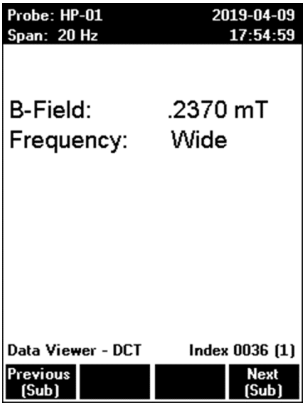
Memory Manager menu

It is possible to display information about the last stored set of measured values and delete stored measured values in the **Memory Manager** sub-menu.

Function	Meaning
Index	Memory position of saved measurement data set.
#	Number of measurements saved in this measurement data set.
Date	Date measured value was saved.
Time	Time measured value was saved.
Type	DCT – DC probe Timer: *RSS data set from the timer controlled recording.* DC3 – DC 3-axis storage: *single point RSS data and 3-axis data.*
Free Memory	Free memory space.
Delete Latest (*soft-key*)	Delete the last saved set of measured values (i.e. the displayed set).
Delete All (*soft-key*)	Delete all measurement data stored in the NBM-550.

Data Viewer soft-key

The Data Viewer displays a list of all saved measurement data sets (with soft-keys to skip through the list) as well as the possibility to delete the last saved measurement data set (soft-key).



When selecting a DCT entry from the list, the first measurement point from the data set is displayed. With the two soft-keys (**Previous (Sub)** / **Next (Sub)**) it is possible to skip through all measurement points (sub data sets) in the data set.
When selecting a DC3 entry from the list, the single point measurement is displayed with the RSS value and corresponding result type as well as the 3-axis Actual measurement.

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