

NBM-580

Narda Broadband Radiation Meter

Operating Manual





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1

Useful information

This chapter contains basic information about measuring electromagnetic fields, about using the NBM-580, and about the structure of this operating manual.

[1.1 Measuring electromagnetic fields \(page 6\)](#)

[1.2 About this instrument \(page 6\)](#)

[1.3 About this operating manual \(page 7\)](#)

1.1 Measuring electromagnetic fields

In today's world, practically everyone lives and works in an environment surrounded by technical equipment that generates electromagnetic fields. Our recognition of the problems associated with such fields and our depth of information in this area has increased as the effects of such fields on the human body have been examined more closely. Various authorities have long defined limit values designed to protect users from the dangers of exposure to such emissions.

1.2 About this instrument

The Narda Broadband Field Meter NBM-580 provides virtually everyone concerned with this subject with an instrument for measuring non-ionizing radiation with utmost accuracy within the frequency range from 5 Hz to 60 GHz (depending on the probe used). The instrument has a wide range of functions, yet it is very easy to use. It also features the ability to work with various meter/probe combinations or as a central alarm point for Nardalert S3 monitors. Sensors for various measurement applications are connected to the NBM-580 basic unit. Flat frequency response probes are available, as well as so-called shaped probes that evaluate the field according to a specific human safety standard. These sensors are calibrated separately from the NBM-580 instrument, and include a non-volatile memory containing the probe parameters and calibration data. The NBM-580 can therefore be used with any instrument in the NBM-500 family without any loss in calibration accuracy.

Applications

The NBM-580 makes precision measurements for human safety purposes, particularly in workplace environments where high electric or magnetic field strengths are likely. It can also be used to demonstrate the electromagnetic compatibility (EMC) of devices and equipment.

Examples:

- Monitoring field strengths as part of general safety regulations
- Measuring the field strengths around transmitting and radar equipment to establish safety zones and for monitoring during operations
- Measuring the field strength emanating from mobile phone repeaters and satellite communications systems to ensure compliance with human safety limit values
- Measuring the field strength in the industrial workplace environment, such as plastics welding equipment, RF heating, tempering, and drying equipment
- Measurements to ensure the safety of persons using diathermy equipment and other medical equipment that generates high frequency radiation
- Field strength measurements in TEM cells and absorber chambers

1.3 About this operating manual

Structure of this operating manual

This operating manual is divided into two main parts:


1. Operating the NBM-580
You will find all you need to know about making the most important settings on the NBM-580 and how to deal with most measurement tasks in chapters 2 through 4.

Characters and symbols used

Various elements are used in this operating manual to indicate special meanings or particularly important passages in the text.


Symbols and terms used in warnings

According to the American National Standard ANSI Z535.6-2006, the following warnings, symbols, and terms are used in this document:

	The general danger symbol warns of risk of serious injury when used with the signal words CAUTION , WARNING , and DANGER . Follow all the instructions in order to avoid injuries or death.
NOTICE	Indicates a danger that results in damage to or destruction of the instrument.
CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

Structure of warnings

All warnings are structured as follows:

 SIGNAL WORD
Type and source of danger Consequences of failure to observe warning ⇒ Instructions for preventing danger

Symbols and marks used in this document

!	Important Instruction Indicates an instruction that must be followed to avoid danger.
✓	Requirement Indicates a requirement that must be met before the next instruction can be carried out, e.g. ✓ The instrument is switched off.
⇒	Instruction Indicates a single instruction, e.g. ⇒ Switch the instrument on.
1. 2. 3.	Sequence of instructions Indicates a sequence of instructions that must be carried out in the order given.
↪	Result Indicates the result of carrying out an instruction, e.g. ↪ The instrument starts a self test.
Bold Type	Control element Indicates a control element on the instrument, e.g. ⇒ Press the ENTER key.
CAPITALS	Menu name Indicates a menu name, e.g. ⇒ Open the MAIN menu.
Blue Type	Cross reference (in PDF document only) Indicates a cross reference to another part of the document. Click on the blue type in the PDF document to jump directly to the cross reference.

2

Safety instructions



This chapter contains important instructions on how to use the NBM-580 safely. Please therefore read this chapter carefully and follow the instructions closely.

- [2.1 Using this operating manual \(page 12\)](#)
- [2.2 Proper use \(page 12\)](#)
- [2.3 Improper use \(page 12\)](#)
- [2.4 Dangers from electromagnetic fields \(page 13\)](#)
- [2.5 Dangers from AC mains supply \(page 14\)](#)

2.1 Using this operating manual

- ! Carefully read this entire operating manual before you start using the instrument.
- ! Keep this operating manual so that it is available to everyone who uses the instrument, and ensure that this operating manual is with the instrument if you pass it on to a third party.

2.2 Proper use

The NBM-580 is designed to monitor and evaluate electro-magnetic fields from remote mounted sensors. It is NOT designed to be exposed to high levels of RF/microwave energy itself.

- ! Only use the instrument for the purpose and under the conditions for which it has been designed.
- ! In particular, observe the technical data given in the [Specifications on page 50](#).

Proper use also includes:

- ! observing any national accident prevention regulations at the place of use.
- ! ensuring that the instrument is used only by appropriately qualified and trained persons.

2.3 Improper use

- ! The NBM-580 is not a warning device that gives active notice of the existence of dangerous fields by means of a visible or audible warning signal.
- ! Remember that this instrument is a measuring device, not a warning device.
- ! Carefully observe the actual measurement displayed when you are approaching an unknown field source.
- ! If in doubt, use an additional warning device such as “RadMan” or “Nardalert XT”, available from Narda Safety Test Solutions.

2.4 Dangers from electromagnetic fields

Strong Fields

Very high field strengths can occur in the vicinity of some radiation sources.

- ⇒ Do not cross or ignore safety barriers or markings.
- ⇒ Persons with electronic implants (e.g. heart pacemakers) must avoid danger zones.

Measurement Errors

Metallic labels (stickers) affixed to the yellow sensor area of the probe can lead to measurement errors, usually an underestimation of the electromagnetic field strength.

- ⇒ Affix labels of any type only to the black probe shaft.
- ⇒ If the instrument malfunctions, take it out of service and contact your Narda Service Center. The addresses are listed at the end of this operating manual and on the Internet at <http://www.narda-sts.com>.

Sensor is not operating properly

Possibly present high radiation values are not recognized if field strengths exceed meter's rated immunity. Narda offers additional shielding covers for meters when high field levels are expected. (see Accessories on page 58).

- ⇒ Check probes for proper operation with a signal source before using this measuring instrument. This is especially important for thermocouples because the sensors can be affected by various mechanical and environmental stressors.
Narda offers portable sources to accomplish this important step (see [Accessories on page 58](#)).
- ⇒ Before beginning any RF radiation measurement, always inform yourself of the frequencies and field strengths that you could expect to encounter.

2.5 Dangers from AC mains supply

You could experience electric shock from the internal power supply

- ⇒ Do not open the instrument as there are no user serviceable parts inside.
- ⇒ Do not expose or submerge the instrument in water at any time. It is designed to be used in an indoor, protected environment.
- ⇒ Only use appropriate, approved AC line cords. Never use a damaged line cord.

The AC mains supply could be destroyed if the voltage specification of the NBM-580 does not match the AC line voltage.

- ⇒ Only supply AC voltage that meets the voltage specified at the AC input on the rear panel.

3

Preparing the NBM-580 for use

This chapter describes all you need to do before starting to use the NBM-580.

[3.1 Unpacking \(page 16\)](#)

[3.2 Instrument overview \(page 17\)](#)

[3.3 Connecting the sensor \(page 19\)](#)

3.1 Unpacking

Packaging

The packaging is designed to be re-used as long as it has not been damaged.

- ⇒ Keep the original packaging and use it whenever the instrument needs to be shipped or transported.

Items included

- ⇒ Check that all the following items have been delivered:

- NBM-580 (including line cord)
- USB Keyboard
- Rackmount angles with handles
- Benchtop stand
- Operating Manual

Transport damage

NOTICE:

Instrument/accessories damaged during transportation

Using damaged instrument/accessories can lead to subsequent damage.

- ⇒ Check the instrument and all accessories for damage when you have unpacked them.
- ⇒ If the instrument is damaged, contact your Narda Service Center.

The addresses of your Narda Service Center are listed at the end of this operating manual and on the Internet at <http://www.narda-sts.com>.

After transport and storage

NOTICE:

Condensation on an instrument can lead to damage

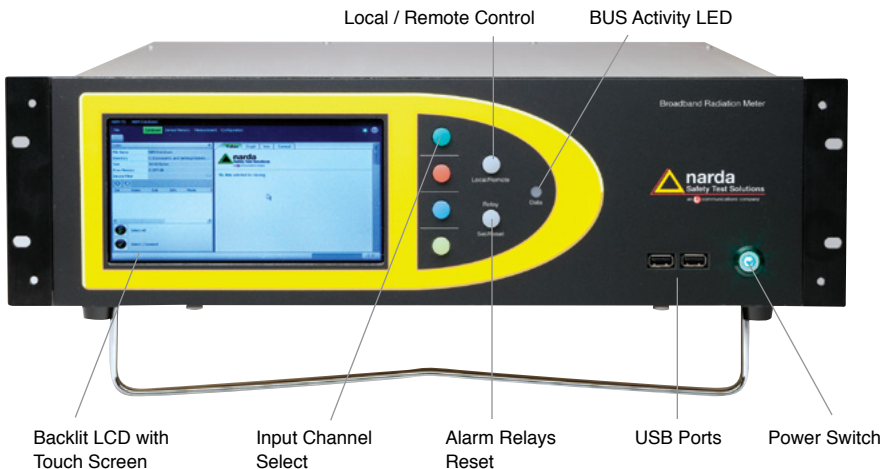
Condensation can form on an instrument that has been stored at a low temperature when it is brought into a warm room. It may be damaged if used.

⇒ Wait until all visible condensation has evaporated from the instrument surface to avoid damaging the instrument.

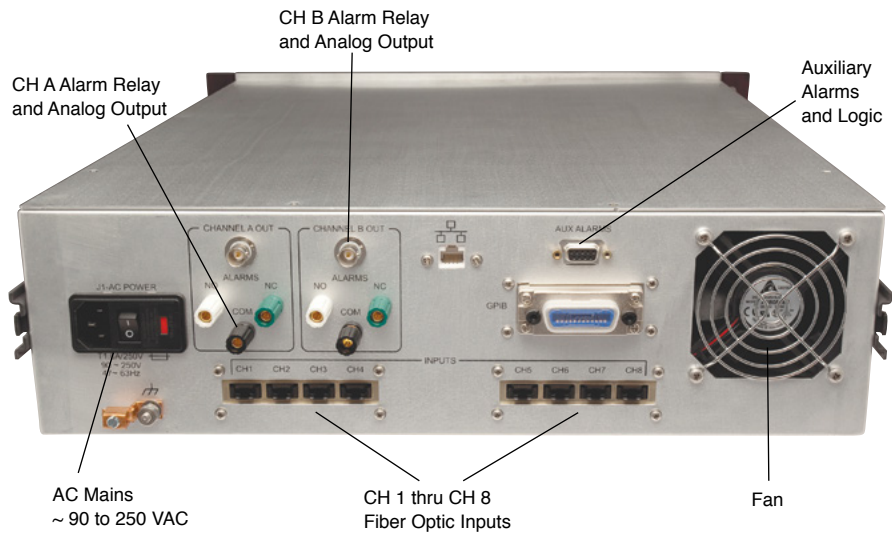
Note: The instrument is not ready for use until it has reached a temperature within the operating range of -10 to +50°C.

3.2 Instrument overview

Front Panel



Back Panel



3.3 Connecting the sensor



WARNING

Sensor is not operating properly

Possibly present high radiation values can not be recognized when a sensor is defective.

- ⇒ Check sensors for proper operation with a signal source before using this measuring instrument. This is especially important for thermocouples because the sensors can be affected by various mechanical and environmental stressors. Narda offers portable sources to accomplish this important step (see [Accessories on page 58](#)).
- ⇒ Before beginning any RF radiation measurement, always advise yourself of the frequencies and field strengths that you could expect to encounter.

There are many different probes available for different applications for the NBM-580. You can find more information about the order numbers and specifications of the probes under [Ordering information on page 56](#), as well as in the data sheets of the NBM-580 and probes. These documents can also be downloaded from the Narda web site on the Internet at <http://www.narda-sts.com>.

NOTICE:

Wrong handling of the probe

Damage of the probe head

- ⇒ Always hold the probe at the metal plug end.

4

Operation overview

- [4.1 Switching on \(page 22\)](#)
- [4.2 Normal operation \(page 22\)](#)
- [4.3 Front Panel Controls \(page 23\)](#)
 - [Status All \(page 23\)](#)
 - [Status Max \(page 24\)](#)
 - [Settings \(page 25\)](#)
- [4.4 NBM-580 remote protocol \(page 32\)](#)
- [4.5 Remote commands and instructions \(page 34\)](#)
- [4.6 Commands \(page 38\)](#)
- [4.7 Error codes \(page 44\)](#)
- [4.8 Alarm relay operation \(page 45\)](#)

4.1 Switching on

In order to simplify the turn on procedure it is recommended that the sensors (such as NBM meters and probes) be connected to the NBM-580 and be operating before turning on the NBM-580.

The AC input filter has a master power switch located on the back of the NBM-580. That needs to be in the operation position (I) in order for the front panel switch to be able to turn the NBM-580 ON.

Connect Fiber Optic cable between the NBM-580 meter and the sensor (such as the NBM meter and probe) using Port 1 on the NBM-580. If you are using an NBM-550 is must be set to communicate through its fiber optic connection rather than the USB.

The application will start automatically without any operator input.



NOTE: The NBM-580 utilizes a touch screen display. Front panel operation can be by depressing buttons next to screen or touching screen directly

4.2 Normal operation

The NBM-580 functions as an effective, multiple-input area or field monitoring device. It may be operated with up to eight NBM meter/probe sets or NS3 monitors, or combinations thereof. The NBM-580 was designed to cover two important capabilities:

1) Area Monitoring – The NBM-580 acts as a central alarm point for up to 8 field sensors. The NBM-580 can be set to follow sensor alarm levels or set to alarm under local control. This central capability allows it to communicate status virtually anywhere internet connections exist. Narda has various field sensors that can be interfaced depending on what needs to be measured. Nardalert S3 monitors can be supplied with various sensors and configurations for indoor or outdoor uses. Contact the factory for any particular need or questions.

2) Field Strength monitoring for EMC applications – Narda's NBM series of meters and probes allow accurate detection of fields between 10 kHz and 40 GHz (typical) for Commercial, Automotive or Military use. Multiple sensors can be connected to the Narda NBM-580 meter (up to 8) which functions as an interface between sensors and ATE systems and users. In the Accessories section, there are part numbers given for fiber optic cables of various lengths for typical EMC applications.

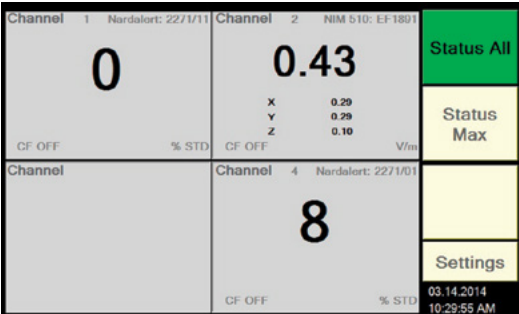
4.3 Front panel controls

Status All

The "Status All" mode allows the user to quickly view the readings detected by all monitors at one time. If the system is set to display all 8 channels, then the display looks like the picture below.

Channel 1 NIM 510: EF5001 0.00 CF OFF V/m	Channel 2 NIM 510: EF1801 0.40 CF OFF XYZ V/m	Status All
Channel 3 Nardalert: 2271/11 0 CF OFF % STD	Channel 4 Nardalert: 2271/01 8 CF OFF % STD	Status Max
Channel 5	Channel 6	
Channel 7 NBM 550: EF 5001 0.00 CF OFF V/m	Channel 8	Settings
		03.14.2014 10:48:07 AM

If only 4 inputs are in use or you choose to lock the display to show only four inputs the display looks like the picture below.



If detected levels create an Alarm 1 situation the font and display section for that particular monitor will change from green (normal) to red (Alarm 1).

Exceeding the Alarm 2 threshold will cause the reading displayed on the NBM-580 to be surrounded by a red background (see picture) and audible alarm to step through 5 tones while the vibrate rate is doubled from the Alarm 1 rate. Red and Amber LED's on both sides of the NS3 will illuminate alternately. If customers choose to employ only one alarm, it will indicate Alarm 2 characteristics.

Status Max

In this mode of operation the NBM-580 automatically displays the sensor that has the highest detected levels. If multiple meter/sensor connections exist, you need to specify what group you want to be displayed.



Settings

The Settings key has four sub-categories, **Field Meters**, **NBM-580**, **Options** and **Logging**.

Field Meters	NBM-580	Options	Logging	
Field Meter Probe Part Number 2402/03B S/N 01101 Calibrated (DD.MM.YY) 15.08.12 Field Type E Lower Freq Limit A (HZ) 300000000 Upper Freq Limit A (HZ) 50000000000 Lower Freq Limit B (HZ) 300000000 Upper Freq Limit B (HZ) 50000000000 Shaped NO				Status All Status Max Settings 03.14.2014 11:36:49 AM
CH 1	CH 2	CH 3	CH 4	CH 5
CH 6	CH 7	CH 8		

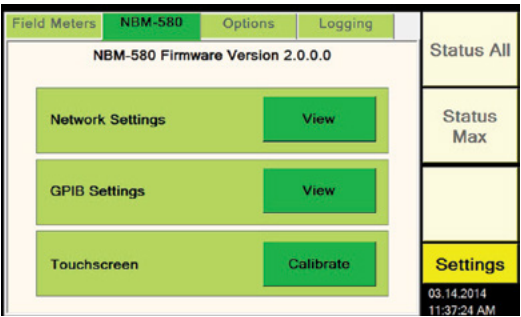
Field Meters	NBM-580	Options	Logging	
Field Meter Type NIM-510 S/N A-0129 Firmware Version V01.02.00 Calibrated (DD.MM.YY) 28.03.12 Battery Level: 100				Status All Status Max Settings 03.14.2014 11:35:04 AM
CH 1	CH 2	CH 3	CH 4	CH 5
CH 6	CH 7	CH 8		

Field Meters

Field meters displays information about the sensors that are attached to the NBM-580. Information such as serial numbers of field meters and probes (likewise NS3 mainframes and sensors) as well as frequency range and calibration information are displayed as well.

NBM-580

The NBM-580 tab displays information about the NBM firmware, Ethernet settings, GPIB settings and calibration of the touch-screen display. **Section 4.3** contains information about setting up network settings.

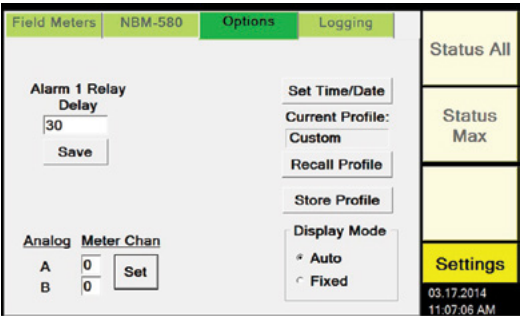


GPIB settings button allows you to view and/or modify the GPIB address and, like the Network settings, are more easily set using the external keyboard.



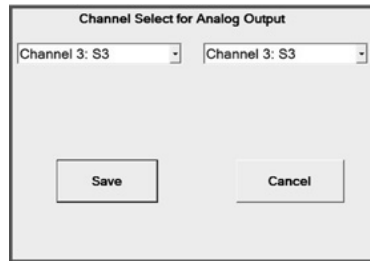
Options

Options tab displays information and customization parameters such as setting a delay time for the alarm relay, changing the sensor that the analog outputs are representative of, setting time and date, measurement profiles and choosing display modes.

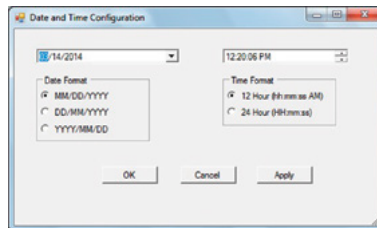


Alarm 1 Relay – This sets the delay time in seconds from the time the unit alarms to the time the relay activates.

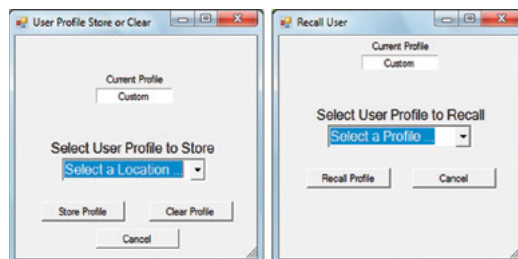
Analog – Meter Chan – This sets the analog output(s) to a specific sensor. The analog voltage will vary from 0 to -4.096 VDC, representing 0 to 100% of the sensors dynamic range.



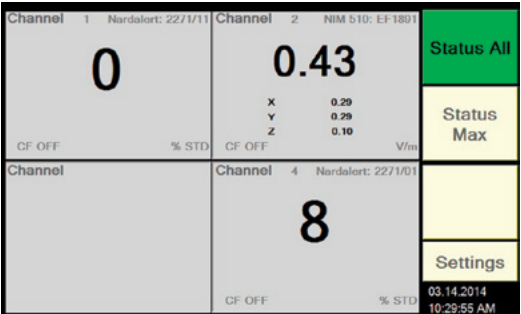
Set Time/Date – Allows setting of time and numerical system to common local formats.



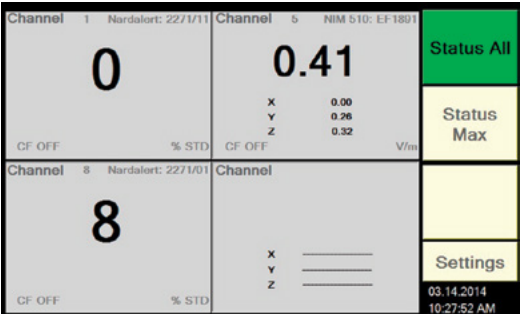
Current Profile – The NBM-580 can store specific measurement and display profiles to simplify repeated testing. Depressing "Store Profile" brings up the "User Profile Store or Clear" screen below. Similarly the user can recall a specific profile by depressing "Recall Profile".



Display Mode – This sets how the connected sensors are displayed on the front panel. In the “Auto” mode, the front panel will display inputs 1 through 4 if sensors are connected to only inputs 1 through 4. If more than 4 sensors are connected **OR** sensors are connected in both 1-4 and 5-8 channels, the NBM-580 will display 8 channels screen.



Fixed Channel Display



Auto Channel Display (<5 sensors)

Logging

Pressing the “Logging” tab displays the following screen. Logging can be in one of three major modes; immediate, conditional or time based. As shown below in “time based”, you can set the duration that begins immediately or at a certain time.

The screenshot shows the 'Logging' tab selected. Under the 'Timer Based' sub-tab, the following settings are visible:

- Timer Running: NO
- Timer Duration (hh:mm): 00:05
- Timer Interval (s): 5
- Timer Start Time: 12:00:00 AM
- Active Mode Progress Bar: Immed. (blue), Prog. (green)

Buttons at the bottom include 'Start Program', 'Start Immediate', and 'Timer Exit'. The right sidebar shows 'Status All', 'Status Max', and 'Settings' (03.14.2014 04:21:33 PM).

Conditional logging allows the system to only log when set conditions are true. In the example below, 5 channels are active. Channel 1 is set to log readings without any threshold level required. Note that you can set a threshold for each sensor independent of any other.

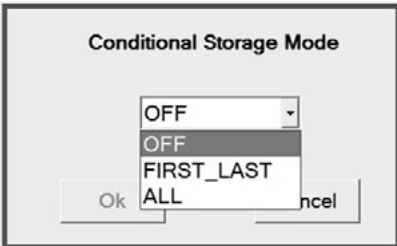
The logging is limited to 10 tables for each sensor of 1 million events each. Each day the logging moves to the next table for each probe regardless of how many events are stored. In effect, there are ten days worth of data that is stored before it is overwritten, for each sensor.

The screenshot shows the 'Logging' tab with the 'Conditional' sub-tab selected. The 'Mode' is set to OFF. Below is a table for 8 channels:

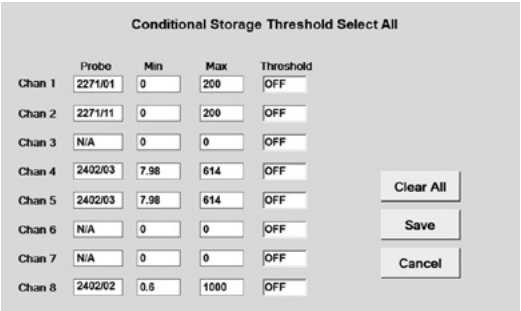
	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 8
Type	2271/01	2271/11	N/A	2402/03	2402/03	N/A	N/A	2402/02
Logging	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	Set	Set	Set	Set	Set	Set	Set	Set
	All On				All Off			
Max	200	200	N/A	614	614	N/A	N/A	1000
Min	0	0	N/A	7.98	7.98	N/A	N/A	0.6
Threshold	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	Set	Set	Set	Set	Set	Set	Set	Set
	Set All							

The right sidebar shows 'Status All', 'Status Max', and 'Settings' (03.14.2014 04:23:56 PM).

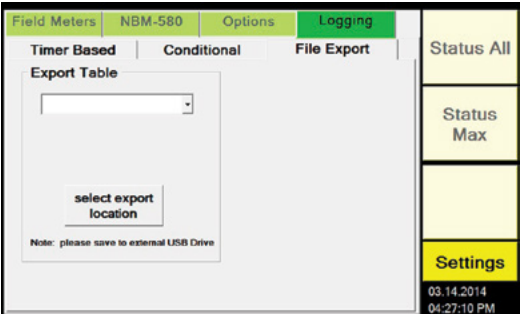
Pressing the **Set** button brings up the window below where the user can choose the type of conditional logging the user wants to employ. You can log all readings that are between the minimum and maximum values set, or log only the first reading between the minimum and maximum and the last reading before the value is outside the minimum and maximum values.



Pressing the **Set All** button brings up the screen below where a minimum and maximum “window” can be set for conditional logging, for each sensor.

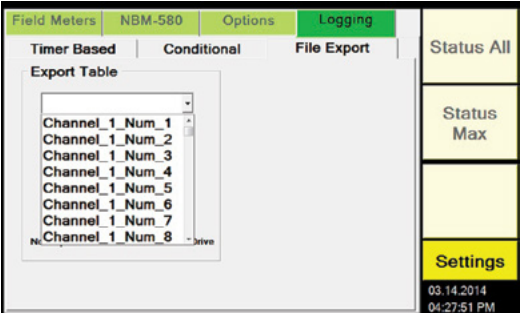


File Export – File Export is used to export files to an external USB device.



User can choose from the Channel (sensor) and tables for each sensor, what data they wish to download.

✓ Any data not downloaded will be overwritten!



4.4 NBM-580 remote protocol

This document is based on NBM-580 firmware Version 2.0.2 and was tested on computers running Windows XP.

Telnet connection

A Telnet Client can be used to connect to the NBM-580's LAN port through a TCP/IP socket, port number 3001. Hyperterminal is one example of a Telnet Client.

The NBM-580 TCP/IP address, subnet mask and default gateway can be set from its front panel through the Settings Screen.

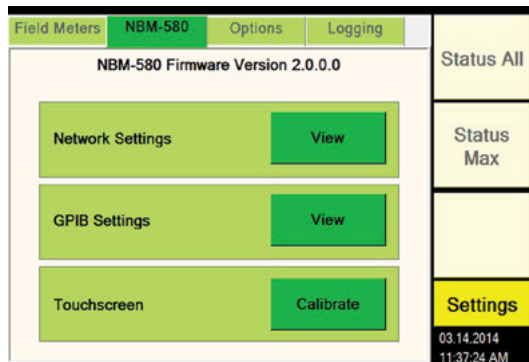
NBM-580 network settings

When the NBM-580 is connected to a LAN, its network settings can be viewed from the front panel. If the unit is not connected to a network, a question mark will be displayed instead of its settings. The steps to view the network settings are outlined as follows:

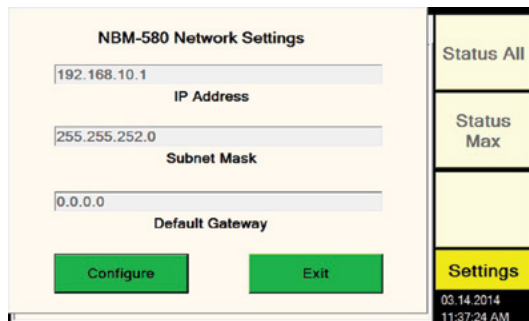
1. Press the Settings button.

Channel 1 NIM 510: EF 5091 0.00 CF OFF V/m	Channel 2 NIM 510: EF 1891 0.40 CF OFF XYZ V/m	Status All
Channel 3 Nardalert: 2271/11 0 CF OFF % STD	Channel 4 Nardalert: 2271/01 8 CF OFF % STD	Status Max
Channel 5	Channel 6	
Channel 7 NBM 550: EF 5091 0.00 CF OFF V/m	Channel 8	Settings 03.14.2014 10:48:07 AM

- Now press the tab on the top marked NBM-580.



- To see the Network Settings, press View.



- If the NBM-580 is connected to a local area network, its IP address, subnet mask and gateway settings will be displayed. If the unit is not connected, a "?" will appear in all three boxes.

To change any of the network settings, press the Configure button. The unit must be connected to a LAN to configure its network settings. If the user tries to configure the settings when it is not connected, the new settings will be lost.

The Exit button must be pressed to go back into the Settings Screen and be able to continue on with unit normal operation.

5. To modify the NBM-580's TCP/IP address settings, connect a USB keyboard to one of the two front panel USB ports. Touch the box of the parameter to be changed and type in the new settings. Press the Update button to change to the new settings. Press the Cancel button to return to the previous screen without modifying the settings.

4.5 Remote commands and instructions

The remote commands are ASCII strings.

The following syntax rules are valid:

A command consists of the command string and a finite number of parameters.

The command string interpreter does not distinguish between upper and lower case.

If there is at least one parameter, one or more white space must follow the command string.

Parameters are and must be separated by a comma

The NBM sends an additional /CR after the comma at defined places to allow line separation in long responses

A command or response must be terminated with a semicolon.

The NBM sends an additional /CR after the semicolon of a response.

A command string for a get command contains a question mark.

A command string for a set command does not contain a question mark.

The response to a query has the same syntax as commands but the command string is missing.

Strings must be braced by a pairs of “ ”.

No semicolon may appear inside a string

The NBM ignores soft handshake signals (/DC1, /DC3) and does not send soft handshake signals

The NBM ignores /CR and /LF signals

Some examples for commands with valid syntax:

```
CMD_A;  
CMD_B param1;  
CMD_C param1,param2/CR/LFparam3;  
CMD_A?;  
CMD_B? param1;
```

Some examples for query responses with valid syntax:

```
param1;/CR  
param1, param2;/CR  
param1, param2, /CR param3;/CR
```

It is the same response an “ERROR?” command would give.

Checking this response should be used to verify that communication works properly.

Normally a value of zero will be returned.

Other values indicate an error occurred when handling the last command.

See the chapter “Error Codes” for details.

The communication with get commands can be verified with the query response.

If no response is received after 10 seconds there is a communication problem.

Parameter formats

The following table shows the possible formats for parameters:

String	The maximum number of characters is specified. Within a string upper and lower case is distinguished. Also white space is maintained within a string.
Enum	Stored as a four byte value. A set of defined strings is specified for each command.
Float / Double	Stored as 32/64 bit float value. Input parameters are converted in to float. Output parameters are automatically formatted.
Byte	Stored as 8 bit unsigned integers. Sometimes an allowed range or set of values is specified.
Integer	Stored as 16 bit signed integers. Sometimes an allowed range or set of values is specified.
LngInt	Stored as 32 bit signed integers. Sometimes an allowed range or set of values is specified.
date (dd.mm.yy)	Date stored as three bytes. Input and output as an 8 char string: dd.mm.yy d: 01 to 31, m: 01 to 12, y: 00 to 99. The range of the days is also restricted to possible dates in the years 2000 to 2999.
time (hh:mm:ss)	Time stored as three bytes. Input and output as a 8 char string: hh:mm:ss h: 00 to 23, m: 00 to 59, s: 00 to 59.
xtime	Same as above, but hours from 0 to 99.
Version	Vdd.dd.dd (V00.00.00 ... V99.99.99)

Command abbreviations

In the next chapter all commands are described in a table. Some columns have a very short header which is not self explanatory. The following table describes these short headers:

S	Belongs to	a S et command
G	Belongs to	a G et command
R	Belongs to	the R esponse of a get command

In the next chapter “Commands” there is also information, regarding parameters and default values, included: The factory defaults values and the default values for non-persistent parameters are shown in “**bold**” in the column “Range”.

remote on;

Disconnects Hyperterminal. The local/remote button on the front panel is green. Hyperterminal can reconnect to the NBM-580 without pressing the front panel button.

remote off;

Disconnects Hyperterminal. The local/remote button turns red. Hyperterminal cannot reconnect to the NBM-580 until the local/remote button is pressed and turns green.

⇒ Pressing the local/remote button while it is green will disconnect whatever is attached to the NBM-580 (the button will flash red and then turn green).

Welcome message when first connected:

“Connected to NBM-580. Type “LIST_COMMANDS” for all available remote cmds.

Note: All commands must end in a semicolon.

4.6 Commands

Description	Command	S	G	R
Use the frequency dependent correction factors of the probe	FREQ_COR	X		
	FREQ_COR?		X	
				X
Assumed frequency of the RF signal	FREQ	X		
	FREQ?		X	
				X
Start time for timer controlled storing	TIMER_START	X		
	TIMER_START?		X	
				X
Duration of a timer controlled storing	TIMER_DUR	X		
	TIMER_DUR?		X	
				X
Time interval of timer controlled storing	TIMER_INT	X		
	TIMER_INT?		X	
				X
Mode of conditional storing	CS_MODE	X		
	CS_MODE?		X	
				X
Upper threshold for conditional storing and normal probes	CH_CS_THR <ch. number> <THRESH>	X		
	CH_CS_THR? <ch. number>		X	
				X
Time of the day	TIME	X		
	TIME?		X	
				X
Time format	TIME_FORMAT	X		
	TIME_FORMAT?			
Date	DATE	X		
	DATE?		X	
				X
Date Format	DATE_FORMAT	X		
	DATE_FORMAT?		X	
				X

Parameter Name	Format	Unit	Range	Time out(s)
Frequency Correction	Enum		ON, OFF	< .5
				< .5
Frequency Correction	Enum		ON, OFF	
Frequency	Double	Hz	0.001 ... 300.000 ... 99 999.999 MHz	< .5
				< .5
Frequency	Double	Hz	0.001 ... 300.000 ... 99 999.999 MHz	
Timer Start	Time		00:00:00 ... 23:59:59	< .5
				< .5
Timer Start	Time		00:00:00 ... 23:59:59	
Timer Duration	XTime		00:00 ... 00:10 ... 23:59	< .5
				< .5
Timer Duration	XTime		00:00 ... 00:10 ... 23:59	
Timer Interval	Enum	s	1 - 300	< .5
				< .5
Timer Interval	Enum	s	1 - 300	
Storing Range	Enum	s	ALL , FIRST_LAST, OFF	< .5
				< .5
Storing Range	Enum	s	ALL , FIRST_LAST, OFF	
Threshold (Normal)	Integer		0 ... 60 ...120 MIN READING TO MAX	< .5
				< .5
Threshold (Normal)	Integer		0 ... 60 ...120	
Time	Time		00:00:00 ... 23:59:59I	< .5
				< .5
Time	Time		00:00:00 ... 23:59:59I	
Time Format	Enum		12_H, 24_H	< .5
				< .5
Time Format	Enum		12_H, 24_H	
Date	Date		01.01.00 ...31.12.99	< .5
				< .5
Date	Date		01.01.00 ...31.12.99	
Date Format	Enum		MDY , DMY, YMD	< .5
				< .5
Date Format	Enum		MDY , DMY, YMD	

Description	Command	S	G	R
Invoke a zeroing immediately	ZERO	X		
	ZERO?		X	
	ZERO?			X
Content of the device information screen	CH_DEVICE_INFO? <ch. number>		X	
				X
				X
				X
				X
				X
				X
				X
				X
				X
				X
Content of the probe infomation screen	CH_PROBE_INFO? <ch. number>		X	
				X
				X
				X
				X
				X
				X
				X
				X
				X
				X
				X
				X
Battery capacity	CH_BATTERY? <ch. number>		X	
				X
Get the current measurement value(s)	CH_MEAS? <ch. number>		X	
				X
				X
				X
				X

Parameter Name	Format	Unit	Range	Time out(s)
Zero Mode	Enum		SWITCH	< 1
				< .5
Zeroing State	Enum		ZERO, OK	
Product Name	String		max. 15 chars	
Production ID	String		max. 15 chars	
Serial Number	String		max. 15 chars	
Device ID	String		16 chars	
Device Type	Enum		BIG, SMALL	
Firmware Version	Version		V00.00.00 ... V99.99.99	
Calibration Date	Date			
Cal, Due Date	Date			
No. of Options			0 to 63	
Options Name			max. 30 chars	
				< .5
Product Name	String		max. 15 chars	
Production ID	String		max. 15 chars	
Serial Number	String		max. 15 chars	
Calibration Date	Date			
Cal, Due Date	Date			
Field Type	Enum		E, H, S	
Lower Frequency Limit A	Float	Hz		
Upper Frequency Limit A	Float	Hz		
Lower Frequency Limit B	Float	Hz		
Upper Frequency Limit B	Float	Hz		
Shaped	Enum		YES, NO	
Standard Name	String		max. 30 chars	
				< .5
Battery Capacity	Integer	%	0 ... 100	
				< .5
Result 1	Float	x		
(Result 2)	Float	x		
(Result 3)	Float	x		
(Result 4)	Float	x		
(Result 5)	Float	x		

Description	Command	S	G	R
	MEAS_ALL?			
Start conditional storing	CH_CS_START	X		
Exit conditional storing	CH_CS_EXIT	X		
Is conditional storing running?	CS_RUNNING?		X	
				X
Immediate start of timer contr. storing	TIMER_IMMD_START	X		
Programmed start of timer contr. storing	TIMER_PRGM_START	X		
Exit timer controlled storing	TIMER_EXIT	X		
Is timer controlled storing running?	TIMER_RUNNING?		X	
				X
Remaining time until timer controlled storing stops	TIMER_PROGRESS?		X	
				X
Recall the setup	SU_RECALL	X		
Save the setup	SU_SAVE	X		
Delete the setup	SU_DELETE	X		
Assignment of setup	SU_ASSIGNMENT?		X	
				X
List the commands	LIST_COMMANDS		X	
Fast mode	FAST: MODE	X		
Units of result	RESULT_UNIT V/M	X		

Parameter Name	Format	Unit	Range	Time out(s)
			1 - 8, ALL	< .5
			1 - 8, ALL	< .5
				< .5
CS running	Enum		ON/OFF for each channel	
				< .5
				< .5
				< .5
				< .5
TIMER running	Enum		YES, NO	
				< .5
Timer Progress	XTime			
Index	Integer		0 ... 8	5
Index	Integer		0 ... 8	5
Index	Integer		0 ... 8	5
Index	Integer		0 ... 8	< .5
SU Assignment	Enum		FACTORY , USER	
Fast Mode	Enum		ON, OFF	
			V/M	

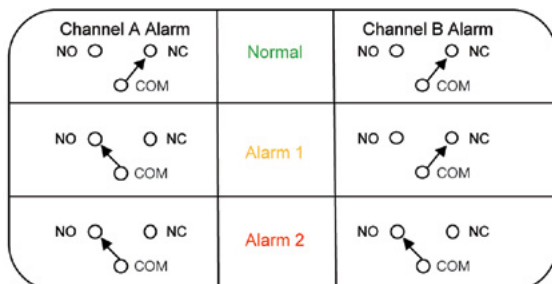
4.7 Error codes

Code	Description	Label used in Firmware
0	no error	STATUS_OK
401	remote command is not implemented in the remote module	STATUS_RCS_CMD_NOT_IMPLEMENTED
402	invalid parameter	STATUS_RCS_INVALID_PARAMETER
403	invalid count of parameters	STATUS_RCS_INVALID_PARAMETER_COUNT
404	invalid parameter range	STATUS_RCS_INVALID_PARAMETR_RANGE
405	last command is not completed	STATUS_RCS_LAST_CMD_NOT_IMPLEMENTED
406	answer time between remote module and application module is too high	STATUS_RCS_ANS_APPLICATION_TIMEOUT
407	wrong quit message from application module	STATUS_RCS_INVALID_QUIT_CMD
408	invalid or corrupt data	STATUS_RCS_CORRUPT_DATA
409	error while accessing the EEPROM	STATUS_RCS_EEPROM_ACCESS_ERROR
410	error while accessing hardware resources	STATUS_RCS_HARDWARE_ACCESS_ERROR
411	command is not supported in this version of the firmware	STATUS_RCS_CMD_NOT_IMPLEMENTED_WRONG_FIRMWARE
412	remote is not activated (please send "REMOTE ON;" first)	STATUS_RCS_REMOTE_NOT_ACTIVE
413	command is not supported in the selected mode	STATUS_RCS_CMD_NOT_VALID_MODE
414	memory of data logger is full	STATUS_RCS_DATA_LOGGER_MEMORY_FULL
415	defragmentation of flash file system is required	STATUS_RCS_DATA_LOGGER_MEMORY_NEEDS_DEFRAG
416	option code is invalid	STATUS_RCS_INVALID_OPTION_CODE
417	incompatible version	STATUS_RCS_INCOMPATIBLE_VERSION
418	no Probe	STATUS_RCS_NO_OR_INVALID_PROBE

4.8 Alarm relay operation

Shown below is the operation of the high power relays accessible from the rear panel of the NBM-580.

NC = Normally Closed, NO = Normally Open and COM = Common.



5

Instrument maintenance

[5.1 Cleaning the instrument \(page 48\)](#)

[5.2 Disposal \(page 48\)](#)

[5.3 Checking instrument functions \(page 49\)](#)

5.1 Cleaning the instrument

NOTICE:

Damage to the instrument from liquids

The instrument may be damaged or destroyed if liquids are allowed to get inside the casing.

- ⇒ Make sure that no liquid gets inside the instrument.

NOTICE:

Solvents

Solvents can corrode the surfaces of basic unit, probe and AC Adapter / Charger.

- ⇒ You must not use solvents to clean the basic unit, probe, and AC Adapter / Charger.

Cleaning the instrument

1. Use a soft cloth to clean the instrument. You can use lukewarm water to which a little detergent solution has been added as a cleansing agent.
2. To prevent streaks and spots, wipe off the instrument with a dry cloth while it is still damp.

5.2 Disposal

This product is subject to European Guideline 2002/96/EC governing the disposal of waste electrical and electronic equipment (WEEE).

Do not dispose of this instrument with the normal household waste. You should dispose of it in accordance with the waste disposal ordinances in your country.

Within the European Union, all electronic measuring systems purchased from Narda after 13th August 2005 can be returned when they reach the end of their useful life. The measuring systems that come under this regulation or the documents that accompany them are clearly marked with the symbol of a garbage bin crossed out with black lines.

You can obtain further information from your local Narda Sales Partner or at www.narda-sts.com.

5.3 Checking instrument functions



WARNING

Probe is not operating properly

Possibly present high radiation values can not be recognized when a probe is defective.

- ⇒ Check probes for proper operation with a signal source before using this measuring instrument. This is especially important for thermocouples because the sensors can be affected by various mechanical and environmental stressors. Narda offers portable sources to accomplish this important step (see [Accessories on page 58](#)).
- ⇒ Before beginning any RF radiation measurement, always advise yourself of the frequencies and field strengths that you could expect to encounter.

Performing a function test:

1. Connect the sensor to the NBM-580
2. Use an appropriate check source ([See Appropriate Test Sources on Page 50](#)) to generate an upscale indication for that sensor's display on the NBM-580.
3. An upscale indication indicates an OK Function Test. If no indication is displayed on the NBM-580, check that indication is displayed on the sensor display.

4. If sensor displays reading, verify proper connection to NBM-580. Re-establish connection to NBM-580 and repeat test.
5. If no indication is seen on sensor display follow trouble shooting information given in sensor manual.

NOTE: Do not use this function test for measurements. This test is only suitable for checking sensors and their connection to the NBM-580. The readings displayed on the NBM meter depend on the type of sensor and are irrelevant for this test, and as such cannot be used to verify calibration.

Appropriate test sources

The following table shows appropriate test sources for a function test.

Probe	Test Source: 27 MHz (2244/90.38)	Test Source: 446 MHz PMR Pocket Radio ¹
EF0391	✓	✓
EF0392	✓	✓
EF1891	✓	✓
EF6091	✓	✓
HF3061	✓	✓
HF0191	✓	✓
EA5091	–	✓
EB5091	–	✓
EC5091	–	✓
ED5091	–	✓
EF5091	–	✓
EF5092	–	✓
EF0691	✓	✓

1. PMR Pocket Radios are commonly available in electronics stores.

6

Specifications

- [6.1 Display \(page 52\)](#)
- [6.2 Measurement functions \(page 52\)](#)
- [6.3 Memory \(page 53\)](#)
- [6.4 Interfaces \(page 53\)](#)
- [6.5 General specifications \(page 54\)](#)
- [6.6 Declaration of origin \(page 54\)](#)

6.1 Display

Display type	TFT Active Matrix, Touchscreen
Display size	6.95 inches, 156 x 82.8 mm, 800 x 480 pixels
Backlight	White LED's
Display Refresh Rate	250 msec.

6.2 Measurement functions

Result units	mW/cm ² , W/m ² , V/m, A/m, % of standard
Display range	0001 to 9999, switchable between variable and permanent triads
Display range, variable triads	0.01 V/m to 100.0 kV/m 0.01 mA/m to 265.3 A/m 0.001 mW/m ² to 26.53 MW/m ² 0.1nW/cm ² to 2.653 kW/cm ² 0.0001% to 9999%
Display range, fixed triads	0.01 to 9999 V/m 0.0001 to 265.3 A/m 0.0001 to 9999 W/m ² 0.0001 to 9999 mW/cm ² 0.0001% to 9999%
Result types (isotropic, RSS)	Latest value (Actual), Maximum, Minimum, Average, Maximum Average
Result type (XYZ mode)	Latest values: Actual X, Actual Y, Actual Z (for probes with separate axis connections)
Time averaging	Averaging time selectable from 4 s to 30 min (2 s steps)
Spatial averaging	Individual or continuous sampling
Multi-position spatial averaging	Averaging over up to 24 spatially averaged results, storage of individual position results and of the total value
Progress memory (History mode)	Graphical display of the latest values versus time (time span 2 min to 8 h)
Correction frequency	1 kHz to 100 GHz or OFF (direct frequency selection, interpolation between calibration points)

Hot Spot search	Acoustic indication of increasing or decreasing field strength (Actual or Maximum)
Alarm function	2 kHz warning tone (4 Hz repetition rate), variable threshold
Timer controlled recording (Timer Logging)	Starting time setting: Up to 24 h in advance or record immediately Recording time: up to 100 h Store interval: Every 1s to 6 min (in 11 steps) Number of store intervals: up to 32000

6.3 Memory

Memory	4 GB (expandable through USB Memory)
--------	--------------------------------------

6.4 Interfaces

Remote Operation Interface	Optional via IEEE-488.2 GPIB or RS-232
Sensor Connection	4 optical USB interfaces (serial, full duplex, 115200 baud, no parity, 1 start bit, 1 stop bit). 4 additional USB interfaces on rear panel
Keyboard and Mouse	2 front panel USB interfaces
High Power Alarm Relays	Two user-configurable relays rated for 3 Amps at 115/130 VAC or 5 Amps at 30 V

6.5 General specifications

Recommended calibration interval	24 months ¹
Temperature range	Operational: -10°C to +50°C Non-operational (transport): -30°C to +70°C
Input voltage	100 - 240 VAC, 50/60 Hz, 2A
Environment	Polution Degree 2, Indoor use only
Humidity	5 to 95% relative humidity, no condensation; ≤29 g/m³ absolute humidity (IEC 60721-3-2 class 7K2)
Size	21 x 17 x 5.25 in. (53.4 x 43.2 x 13.4 cm) excluding rack mount angles
Weight	14.25 lbs. (6.46 kg)
Accessories (included)	AC Power cord, Manual, Calibration Certificate

1. only for basic instrument; probes are specified separately

7

Ordering information

[7.1 NBM-580 \(page 56\)](#)

[7.2 Probes \(page 56\)](#)

[7.3 NBM-520 \(page 57\)](#)

[7.4 NBM-550 \(page 57\)](#)

[7.5 Accessories \(page 58\)](#)

[7.6 Declaration of origin \(page 58\)](#)

[7.7 Declaration of conformity \(page 59\)](#)

7.1 NBM-580

NBM-580 Narda Broadband Field Meter, Set 1 contains:

- NBM-580 Basic Unit (2404/01) **2400/801**
- Operating Manual NBM-580
- Certificate of calibration

Other NBM Meters and Probes are not included

7.2 Probes

Probe EF 0391, E-Field, 100 kHz - 3 GHz, Isotropic	2402/01
Probe EF 0392, E-Field, 100 kHz - 3 GHz, Isotropic	2402/12
Probe EF 0691, E-Field, 100 kHz - 6 GHz, Isotropic	2402/14
Probe EF 1891, E-Field, 3 MHz - 18 GHz, Isotropic	2402/02
Probe EF 5091, E-Field, Thermocouple, 300 MHz - 50 GHz, Isotropic	2402/03
Probe EF 5092, E-Field, Thermocouple, 300 MHz - 50 GHz, Isotropic	2402/11
Probe EF 6091, E-Field, 100 MHz - 60 GHz, Isotropic	2402/04
Probe HF 3061, H-Field, 300 kHz - 30 MHz, Isotropic	2402/05
Probe HF 0191, H-Field, 27 MHz - 1 GHz, Isotropic	2402/06
Probe EA 5091, Shaped E-Field, FCC, 300 kHz - 50 GHz, Isotropic	2402/07
Probe EB 5091, Shaped E-Field, IEEE, 3 MHz - 50 GHz, Isotropic	2402/08
Probe EC 5091, Shaped E-Field, SC6, 300 kHz - 50 GHz, Isotropic	2402/09
Probe ED 5091, Shaped E-Field, ICNIRP, 300 kHz - 50 GHz, Isotropic	2402/10

7.3 NBM-520

NBM-500 Set 2, Narda Broadband Field Meter contains:

- NBM-520 Basic Unit (incl. 2 x NiMH batteries, AA type)(2403/01)
- Rigid shell case for basic unit and up to two probes (2400/90.07)
- AC Adapter / Charger, 9 VDC, 100 - 240 VAC (2259/92.06)
- Shoulder strap, 1 m (2244/90.49)
- Cable, fiber optic, duplex (1000 μ m) RP-02, 2m (2260/91.02)
- O/E converter USB (2260/90.07)
- Software, NBM-TS, PC transfer (2400/93.01)
- Operating manual NBM-520
- Calibration certificate

2400/102

Probes are NOT included in the set.

NBM-500 Set 4 Narda Broadband Field Meter

identical to NBM-500 Set 2 (2400/102) above,
but with a larger case (2400/90.06) for up to 4 probes.

2400/104

Probes are NOT included in the set

7.4 NBM-550

NBM-500 Set 1, Narda Broadband Field Meter contains:

- NBM-550 Basic Unit (including 4 x NiMH batteries, AA) (2401/01)
- Hard case, holds meter and up to 4 probes (2400/90.06)
- Power supply 9 VDC, 100 V-240 VAC (2259/92.06)
- Shoulder strap, 1 m (2244/90.49)
- Tripod, benchtop, 0.16 m, non-conductive (2244/90.32)
- Cable, USB interface for NBM-550, 2 m (2400/90.05)
- Software, NBM-TS, PC transfer (2400/93.01)
- Operating manual NBM-550
- Certificate of calibration

2400/101

Probes are NOT included in the set.

7.5 Accessories

Test generator 27 MHz	2244/90.38
Tripod (non-conducting), 1.65m, with carrying bag	2244/90.31
Tripod extension (non-conducting), 0.50m (for 2244/90.31)	2244/90.45
Extension handle (non-conducting), 0.42m	2250/92.02
Cable, coaxial, multi-pin to BNC for NBM-550, external triggering, 2m	2400/90.04
Cable, optical fiber, duplex (1000 µm) RP-02, 2m	2260/91.02
Cable, optical fiber, duplex (1000 µm) RP-02, 20m	2260/91.03
Cable, optical fiber, duplex, F-SMA to RP-02, 0.3m	2260/91.01
O/E converter RS232, RP-02/DB9	2260/90.06
O/E converter USB, RP-02/USB	2260/90.07
Cable, adapter, USB 2.0 - RS232, 0.8m	2260/90.53
Cable, adapter, optical fiber, duplex RP-02 to M12, 0.25m	2260/92.01
Cable, adapter, optical fiber, duplex RP-02 to M12, 4.0m	2260/92.02
Cable, adapter, optical fiber, duplex RP-02 to M12, 2.0m	2260/92.03
Cable, adapter, optical fiber, duplex RP-02 to M12, 60.0m	2260/92.04
Cable, optical fiber, duplex M12 to M12, 200m	2260/92.05
Cable, optical fiber, duplex M12 to M12, 12m	2260/92.06
Adapter, bulkhead, duplex, M12 to M12*	2260/92.10

*NOTE: Limit of 2 adapters per channel (contact factory for long cable requirements)

7.6 Declaration of origin

Country of origin:	United States of America
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7.7 Declaration of conformity

	Ref. Certif. No. US-22500-UL
IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME SYSTEME CEI D'ACCEPTATION MUTUELLE DE CERTIFICATS D'ESSAIS DES EQUIPEMENTS ELECTRIQUES (IECEE) METHODE OC	
CB TEST CERTIFICATE Product Produit Name and address of the applicant Nom et adresse du demandeur Name and address of the manufacturer Nom et adresse du fabricant Name and address of the factory Nom et adresse de l'usine <small>Note: When more than one factory, please report on page 2 Note: Lorsque il y plus d'une usine, veuillez utiliser la 2^{ème} page</small> Ratings and principal characteristics Valeurs nominales et caractéristiques principales Trademark (if any) Marque de fabrique (si elle existe) Type of Manufacturer's Testing Laboratories used Type de programme du laboratoire d'essais constructeur Model / Type Ref. Ref. De type Additional information (if necessary may also be reported on page 2) Les informations complémentaires (si nécessaire, peuvent être indiqués sur la 2 ^{ème} page A sample of the product was tested and found to be in conformity with Un échantillon de ce produit a été essayé et a été considéré conforme à la As shown in the Test Report Ref. No. which forms part of this Certificate Comme indiqué dans le Rapport d'essais numéro de référence qui constitue partie de ce Certificat	CERTIFICAT D'ESSAI OC Broadband Field Meter L-3 NARDA MICROWAVE 435 MORELAND RD HAUPPAUGE, NY 11788 United States L-3 NARDA MICROWAVE 435 MORELAND RD HAUPPAUGE, NY 11788 United States L-3 NARDA MICROWAVE 435 MORELAND RD HAUPPAUGE, NY 11788 United States <input type="checkbox"/> Additional Information on page 2 100-240V, 50/60Hz, 2A NARDA NBM-580 National Differences specified in the CB Test Report. <input type="checkbox"/> Additional Information on page 2 IEC 61010-1(ed.3) E363534-A1-CB-1 issued on 2013-11-13
This CB Test Certificate is issued by the National Certification Body Ce Certificat d'essai OC est établi par l'Organisme National de Certification	
 Date: 2013-11-13	<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 10px;"> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <div> UL (US), 333 Pfingsten Rd IL 60062, Northbrook, USA UL (Denko), Borupvang 5A DK-2750 Ballerup, DENMARK UL (JP), Marunouchi Trust Tower Main Building 6F, 1-8-3 Marunouchi, Chiyoda-ku, Tokyo 100-0005, JAPAN UL (CA), 7 Underwriters Road, Toronto, M1R 3B4 Ontario, CANADA </div> </div> <div style="margin-top: 10px;"> Signature:  Jolanta M. Wroblewska </div>
For full legal entity names see www.ul.com/ncbnames	



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