nardalert S3

Personal Monitor

Operating Manual

L3HARRIS | narda
Safety Test Solutions

⚠ WARNING

Strong electromagnetic fields

High-level electromagnetic fields may be hazardous to your health. This monitor cannot protect you from all electromagnetic hazards that you could encounter.

⇨ This Monitor should only be used after you have read this manual, understood how it operates and consulted with your company's safety officer.

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Contents

1 Useful information

This chapter contains basic information about measuring electromagnetic fields, about using the Nardalert S3, and about the structure of this Operating Manual.

1.1 Measuring electromagnetic fields

In today's world, many industries utilize equipment that generates electromagnetic fields. Our modern need for communications as well as the efficiency of electromagnetic heating systems and the safety that radar systems provide us are just a sample of the applications that are benefitted by exploitation of the electromagnetic spectrum. We also have various engineering considerations as well as regulatory requirements to use the electromagnetic spectrum wisely. Various authorities have long defined limit values designed to protect users from the dangers of exposure to such emissions, and the Nardalert S3 is an effective tool to help companies and individuals demonstrate compliance.

1.2 About this monitor

The Nardalert S3 ("NS3") provides virtually everyone concerned with this subject with an instrument for monitoring non-ionizing radiation that a body might be exposed to within the frequency range from 100 kHz to 100 GHz (depending on the sensor used). The NS3 has a wide range of functions, yet it is very easy to use. It also features a handy design, robust casing, long battery life, and high measurement accuracy.

The NS3 features multiple types of sensors to accurately monitor human exposures while worn on the body. It can be used off the body to detect fields also. Shaped sensors that evaluate the field according to a specific human safety standard are connected to the NS3 basic unit. These sensors are calibrated separately from the basic unit and include a non-volatile memory containing the sensor parameters and calibration data. They can therefore be used with any NS3 without any loss in calibration accuracy. The PC software supplied with the monitor allows you to configure and remote control the NS3, as well as to export saved measurement data and to analyze the results (if unit is configured for that option).

Applications

The NS3 performs measurements for human safety purposes, particularly in workplace environments where high electric or magnetic field strengths are likely. It can also be configured to function as a stand-alone area monitor.

Examples:

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

1.3 About this Operating Manual

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 Nardalert S3 safely. Therefore, please read this chapter carefully and follow the instructions closely.

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 Intended use

! The NS3 is a warning device that gives active notice of the existence of dangerous fields by means of a visible and audible warning signal.

! 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 pages 33-34. 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.
- ! If you remove the unit from your body, it is important that the back of the unit faces your hand (body) especially at microwave frequencies. When you remove unit from body, carefully observe the actual field level displayed when you are approaching an unknown field source.

2.3 Dangers from electromagnetic fields

⚠ WARNING

Strong electromagnetic fields

Very strong electromagnetic fields occur near many radiation sources.

- ⇨ Observe safety barriers and markings.
- ⇨ In particular, persons with electronic implants must keep away from dangerous areas.
- ⇨ This monitor is designed to be directional at microwave frequencies. It cannot warn you about a microwave exposure behind you if the monitor is worn on the front of the body.

Measurement errors

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

- ⇨ Affix labels of any type only to the yellow housing. Metallic labels must be affixed to the rear of the monitor.
- ⇨ If the instrument malfunctions, take it out of service and contact your Narda Sales Partner. The addresses are listed on the Internet at www.narda-sts.com.

Sensor is not installed or operating properly

The NS3 is designed to monitor the presence of the sensor and that the sensor is functional.

- ⇨ Ensure that the sensor is attached properly to the basic unit. Sensor is designed to be even with the surface of the basic unit and to pass a functional test at turn-on. If in doubt, cycle unit off and then on again to perform connection test. If the sensor is defective, not installed or failing pre-test, it will cause the system to not proceed to measurement mode.
- ⇨ Confidence testing of RF/microwave sensors can be accomplished with a simple 2-way radio that generates more than 1 Watt. An upscale indication should be noticed on the display when the radio is transmitting close to the sensor housing.
- ⇨ Before beginning any RF radiation measurement, always inform yourself of the frequencies and field strengths that you could be expected to encounter.

2.4 Dangers from AC mains charger

⚠ WARNING

Danger from mains voltage.

You could experience electric shock from the external power supply.

- ⇨ Do not open the charger as there are no user serviceable parts inside.
- ⇨ Do not expose or submerse the charger in water at any time. It is designed to be used in an indoor, protected environment.
- ⇨ Only use appropriate USB adapter cords. Never use a damaged USB cord.
- ⇨ Only supply AC voltage that meets the voltage specified at the AC input on the Charger. The AC mains charger could be destroyed if the voltage specification of the charger does not match the AC line voltage.

3

Preparing the Nardalert S3 for use

This chapter describes all you need to do before starting to use the Nardalert S3.

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:

- Carrying Case (2270/90.02)
- Nardalert S3 Mainframe (2270/01)
- Silicon Sleeve (2270/90.03), attached to the mainframe
- Lanyard Clip, non-conductive (2270/90.04)
- Belt Clip, non-conductive (2270/90.05)
- Screwdriver Phillips 0 (2270/90.06)
- User's Guide and CD-ROM with Software NS3-TS (2270/90.07)
- Car Charger Adapter, USB 5V (2259/92.20)
- Battery, rechargeable (2259/92.25)
- Cable, USB2.0 Master/Slave - A/B mini, 0.9m (2260/90.58)
- Power Supply, USB 5VDC, 100V-240VAC (2259/92.24, packed separately)
- Calibration Certificate, Mainframe
- Sensor Module with Calibration Certificate (2271/XX, packed separately)

Transport damage

Instrument/accessories damaged during transportation

Check for completeness and damages:

⇨ Remove device and accessories from the case and check for completeness as well as any transport damages.
CAUTION! Do not operate a damaged device.

⇨ In the event of an incomplete delivery and damages to the device or accessories, please contact your Narda sales partner. You can find the Narda sales partner responsible for you on the Narda website at www.narda-sts.com.

After transport and storage

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 °C to +50 °C.

3.2 Battery Installation

The main operating battery (Narda P/N 2259/92.25) is a 3.6 Volt, lithium-ion rechargeable battery, Type RCR123A. The battery needs to be inserted into the NS3 before charging.

1. Unscrew battery door screw and insert battery with the positive (+) side towards the battery door. See picture below.
2. Hold battery door closed while tightening screw.
3. Charge unit with supplied AC or DC chargers and verify operation before attempting to use.

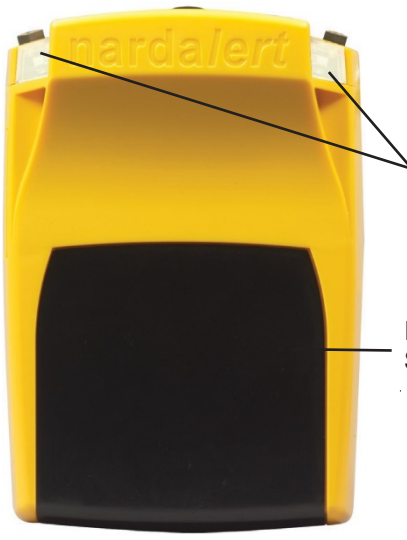
Insert battery with positive (+) side towards battery door

! Do not insert battery backwards.
You could damage the battery door and/or the system will not charge.

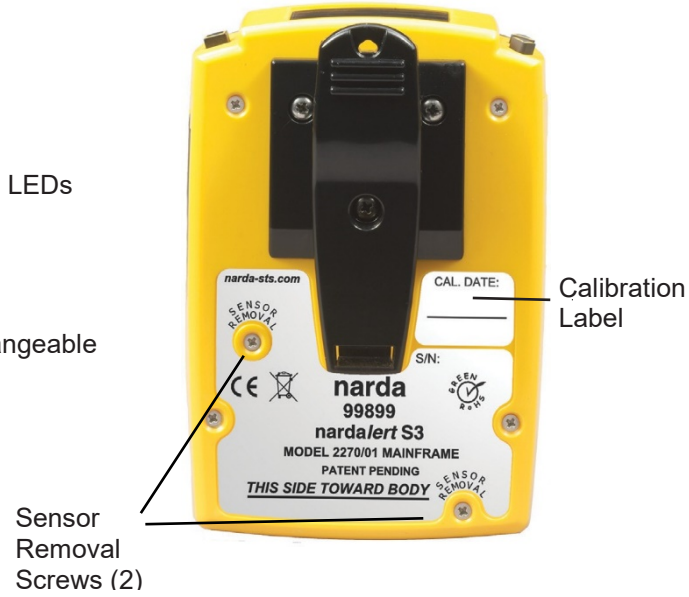
3.3 Instrument overview

Top Panel

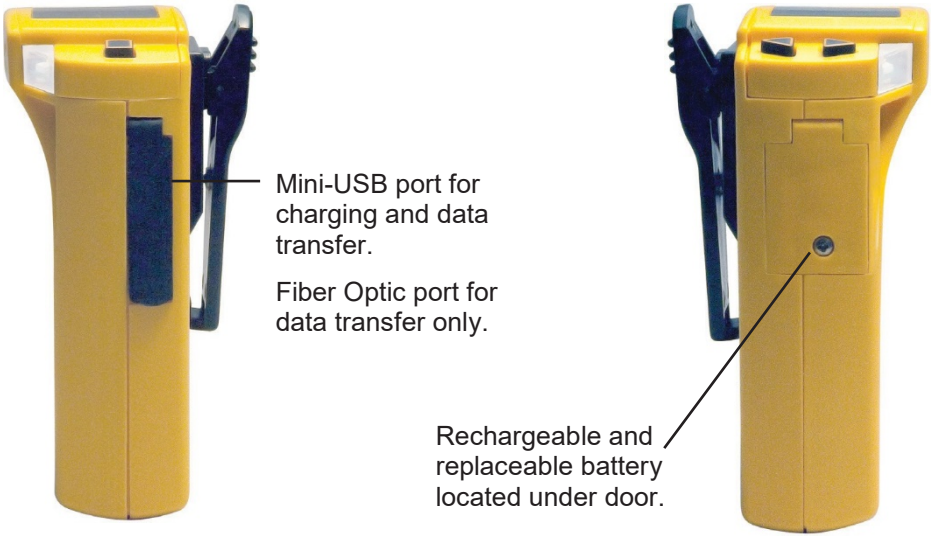
Front Panel



Rear Panel



Side Panels


Mini-USB port for charging and data transfer.
Fiber Optic port for data transfer only.
Rechargeable and replaceable battery located under door.


nardalert
Silicon sleeve for Nardalert protection

3.4 Connecting the sensor

⚠ WARNING

Strong electromagnetic fields

If the Sensor is not operating properly, or if the proper sensor is not chosen, you could be exposed to high field levels without your knowledge.

⇨ Refer to Sensor Specifications on page 34 to select appropriate sensor(s).

⇨ Follow instructions below to properly connect sensor.

The NS3 is designed to monitor the presence of the sensor and that the sensor is functional. In order to simplify the turn-on procedure, it is recommended that the sensor be connected to the NS3 and the battery fully charged before beginning.

⇨ Ensure that the sensor is attached properly to the basic unit. The sensor is positioned so that it easily can be inserted and secured to the basic unit by tightening the two screws shown on page 15 (Rear Panel). Sensor is designed to be even with the surface of the basic unit and to pass a functional test at turn-on. If in doubt, cycle unit off and then on again to perform connection test. If the sensor is defective, not installed or failing pre-test, it will cause the system to not proceed to measurement mode.

⇨ Charging of the monitor is accomplished by attaching the proper AC mains plug to the charger and then the supplied USB cable to the charger and NS3. The unit will be rapidly charged when using the supplied USB charger and at a slower rate (longer time) if plugged into a computer. Charging time is approximately 4 hours for a full charge. Note the battery Icon in the top right of the display when the unit is energized, indicating the amount of charge.

⇨ Confidence testing of RF/ microwave sensors can be accomplished with a simple 2-way radio that generates more than 1 Watt. An upscale indication should be noticed on the display when the radio is transmitting close to the sensor housing. The NS3 provides a menu screen "Self Test", to evaluate the output from the three detectors used in the RF/ microwave sensors.

⇨ Before beginning any RF radiation measurement, always try to verify the frequencies and field strengths that you could be expected to encounter.

There are different sensors available for different applications and use with the NS3. You can find more information about the order numbers and specifications of the sensors under Ordering Information on page 38, as well as in the data sheet of the NS3. These documents can also be downloaded from the Narda website on the internet at www.narda-sts.com.

Wrong handling of the sensor

Damage of the sensor antennas

⇨ Always try to store the sensor in the carrying case when not installed in the NS3. This should help protect it from excessive shock and vibration, as well as environmental extremes.

4

Getting started

This chapter describes how to switch on the Nardalert S3 and verify it is operating properly.

4.1 Initial display screens

The NS3 is switched on by depressing and holding the **On/Off** button on the left side of the display. The alarm LEDs will illuminate and the vibrator will activate before the splash screen (Figure 1) is displayed.

Figure 1: Splash Screen

Figure 2: Self Test Screen

Figure 3: Configuration Screen

The NS3 shows each screen for a few seconds as it performs a self test, verifies the monitor and sensor's information and date of calibration before beginning to measure and display detected fields.

⇨ If the sensor is defective or not attached to the basic unit, the start-up sequence will be stopped – screens in Figures 4 and 5 will not be displayed

⇨ If the calibration is more than 2 years old for the sensor, or 4 years old for the basic unit the calibration screen (Figure 4) will have a red background and one of the buttons needs to be depressed to continue.

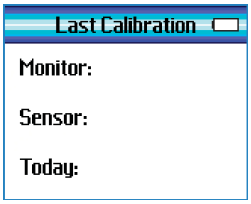


Figure 4: Calibration and Date Screen

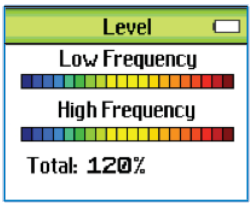


Figure 5: Normal Operation Display

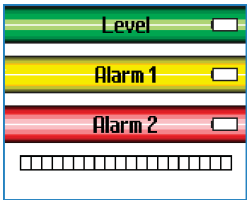


Figure 6: Alarm levels and color changes (not actual screen)

Normal operation

The operation screen (Figure 5) displays the detected fields from the low and high frequency sensors separately to provide information to the wearer about the type of source creating the display. The display considers 1 GHz (approximately) as the separator between low and high frequencies.

Alarm indication

If an alarm threshold is exceeded (Figure 6) the top color bar will change from Green to Yellow (Alarm 1) and from Yellow to Red (Alarm 2), if two alarms are used. If only one alarm is used, then the color bar will change from Green to Red (Alarm). The wearer also receives audible, vibrate and LED visual indications when alarm thresholds are exceeded (factory defaults).

4.2 Checking monitor functions

Performing a function test:

1. Connect the sensor to the NS3. Turn monitor on, insure it completes its POST (Power On, Self Test) and then set menu to Self Test.
2. Use an appropriate check source to generate an upscale indication for that sensor's display on the NS3.
3. An upscale indication indicates an OK Function Test.
4. If no indication is seen on monitor display, verify that the unit passes its turn-on tests and verify the test source is operating properly.

Note: Do not use this function test for verifying calibration. This test is only suitable for checking sensors and their connection to the NS3. The readings displayed on the monitor depend on the type of sensor and are irrelevant for this test, and as such cannot be used to verify calibration.

Appropriate test sources

A convenient method to test the RF/microwave sensors in the NS3 is to use a common two-way radio. In many countries "family radios" generate enough power to produce a full-scale reading if held very close to the sensor itself. The commonly used frequency of 433 MHz will produce an upscale indication for both the low and high frequency sensors, providing a more complete verification.

4.3 Screen navigation

Navigation is accomplished by using the **Up/Down** Arrows and the **Enter** Key. The NS3 responds to two types of key depression, “tap” or “hold”. “Tap” commands are completed by depressing the key for less than one second, while “hold” is for depressing the key for more than one second. Key use is further defined in the table below.

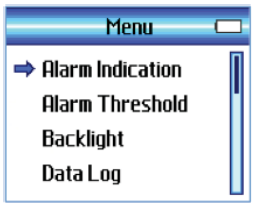
Key	**Function** – *Before Menu Interface*	**Function –** *Menu Selection Screen*	**Function –** *Sub-Menu Screen*
Enter *Tap*	Light the backlight.	Performs the operation of the item that the arrow icon is pointing to.	1. If the arrow icon is pointing to the parameter line and the selection process is not active, start the selection process. 2. If the arrow icon is pointing to the parameter line and the selection process is active, accept the current parameter and place it in hold. 3. If the arrow icon is pointing to the Cancel and Exit line, return to the Menu Selection Screen without implementing the change. 4. If the arrow icon is pointing to the Save and Exit line, implement the parameter change, save the new parameter in memory and return to the Menu Selection Screen.
Enter *Hold (>2 seconds)*	Start power down process.	Start power down process.	Start power down process.
Up Arrow *Tap*	Light the backlight .	Move the arrow icon up to the previous item on the Menu Selection Screen. Scroll the text if necessary.	1. If the selection process is active, scroll to the previous parameter choice. 2. If the selection process is not active, move the arrow icon up to the previous item.
Up Arrow *Hold (1 second)*	Scroll to next screen if unit is not in a safety alarm state.		
Down Arrow *Tap*	Light the backlight.	Move the arrow icon down to the next item on the Menu Selection Screen. Scroll the text if necessary.	1. If the selection process is active, scroll to the next parameter choice. 2. If the selection process is not active, move the arrow icon down to the next item.
Down Arrow *Hold (1 second)*	Scroll to previous screen if unit is not in a safety alarm state.		

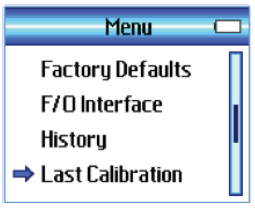
4.4 Additional capabilities of optioned units

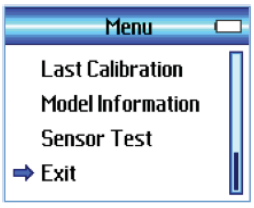
Your NS3 can be upgraded at any time to a full featured monitor that displays additional information as well as stores exposure data. This upgrade can be accomplished by entering a special code through the NS3-TS software and enabling the upgrade.

Menu selection screens

Below are the various menu screens and their functions.







Alarm Indication

Allows for altering of the alarm indication between Audible and Vibrate, Audible only or Vibrate only. Factory default is Audible and Vibrate.

Alarm Threshold

Allows alarm threshold levels to be altered. Alarm 1 can be set from 10% to 100% and OFF. Alarm 2 can be set from 20% to 200%. Factory default is Alarm 1 at 50% and Alarm 2 at 200%.

Backlight

Allows setting of display backlight times to OFF, 5 seconds, 10 seconds, 30 seconds, 1 minute and Permanent ON. Factory default is 10 seconds. Longer backlight times result in lower operating time.

Data Log

Sets data logging rate from 4 per second, 1 per second, 5 seconds, 20 seconds or 1 minute. Factory default is 1 sample per second.

Factory Defaults

Resets all monitor functions back to Factory Default values.

F/O Interface

Sets fiber optic interface for communication or remote vibrator operation. Factory default is the communication setting.

History

Displays maximum, minimum and average readings for the last 6 minutes.

Last Calibration

Displays last calibration dates for sensor and monitor.

Model Information

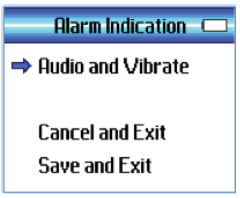
Displays information about the monitor and firmware version as well as sensor information.

Sensor Test

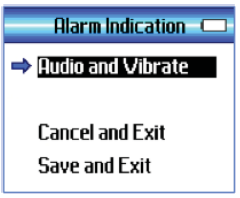
Displays individual sensor output for user to self-test system for proper function.

Navigating sub-menu screen example

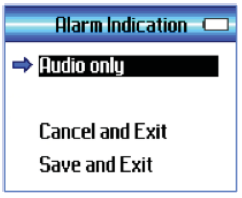
1. Tap the ■ Button when arrow is pointing at **Alarm Indication**.
   ↳ NS3 display changes to:

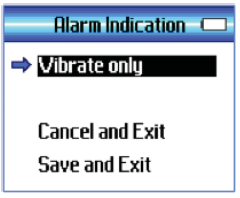


2. Tap the ■ key again to select item to be modified.
   ↳ Item is highlighted to confirm selection.

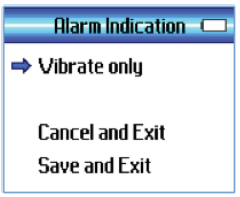


3. Tap either the ▲ or ▼ arrow to cycle through choices.

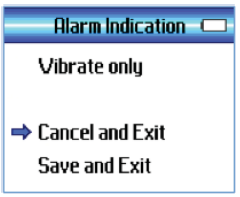




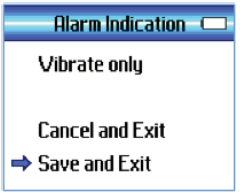
4. Tap the ■ again to select choice. Choice is not confirmed until you “Save and Exit.”



5. Tap the ▼ arrow once to get to the “Cancel and Exit” selection. Tap ■ to leave the function without implementing the parameter change.



6. To implement the change and to store it in memory so the next time the unit is powered up it will recall the setting, move the arrow icon to the “Save and Exit” line (by tapping ▼ twice). Tap the ■ key to return to the menu selection screen.



5

Operation overview

5.1 Normal operation

The NS3 should be fully charged and configured for your personal use. The factory provides both a lanyard attachment and a belt clip for your convenience, and a silicon skin to help provide protection for the unit against shock.

Once you have verified the proper mounting configuration and have charged the unit you should verify that the alarm levels shown on the second start-up screen meet with your company's policy. The NS3 was designed to be mounted with the reverse side towards your body. Some customers prefer to wear the unit mounted to a waist belt while others prefer a lanyard attachment. Either method of attachment is acceptable as long as the unit is normally kept close to the body to improve the radial field sensor's performance.

The default setting for the LCD backlight is to extinguish after 10 seconds, in order to save battery life. You can depress any button to activate the LCD backlight, but the display should be visible in direct sunlight without the backlight. An LED will briefly flash every 10 seconds to indicate the unit is operating properly.

The NS3 samples the sensor's output approximately every 32 msec., and uses the average of 8 samples to log at its fastest rate. The display is updated every second, so the level displayed is an average of the four logs. The monitor can be set to log at a rate as fast as 4 times per second for high speed situations.

Alarms are indicated by the screen, LEDs, audible and vibrate alarms. In an Alarm 1 situation the tone and vibrator alternate at an approximate 1 second rate. Red and Amber LEDs will also illuminate on one side of the display. Exceeding the Alarm 2 threshold will cause the audible alarm to step through 5 tones while the vibrate rate is doubled from the Alarm 1 rate. Red and Amber LEDs on both sides of the display will illuminate alternately. If customers choose to employ only one alarm, it will indicate Alarm 2 characteristics.

The battery icon is always displayed on the unit. When the battery displays a “Red” background there is less than 20% life left and the unit should be charged immediately. If the battery level falls below 10%, audible and LED alarms will be generated without vibration or LCD backlight.

5.2 Nardalert S3 default alarm levels

The NS3 is supplied from the factory with Alarm 1 set at 50% and Alarm 2 set at 200% of RF/microwave Exposure limits for Occupational or Controlled limits. Standards and guidance’s normally recommend conservative exposure limits that are both time and spatially averaged and relate to a 100% reading on the NS3. However, the NS3 cannot typically perform time and spatial averaging when being used as a wearable monitor. Therefore, Narda has historically recommended that a 50% alarm be used to warn the wearer of the presence of strong fields and a 200% reading to warn the wearer to leave the area. While it might be possible that a 200% reading is still compliant with standards once readings are time and spatially averaged, it is beyond the capability of the NS3 to determine that in normal use.

5.3 Special environmental operations

Heavy rain or snow

The NS3 was designed to be water resistant. It is recommended to employ the optional Weatherproof Pouch, P/N 2270/92.01 as a minimum measure to keep water from accumulating within the unit. It is NOT recommended to wear the monitor inside of clothing as wet garments can seriously attenuate microwave field levels the unit may need to detect.

Extreme low temperatures will cause the LCD to respond slowly and for the battery life to be degraded, however the unit will continue to function to -20 °C.

High RF/microwave environments

The NS3 has not, at the time of this writing, developed a high power sensor for use with RF clothing. Persons wearing RF clothing should not use this monitor under the clothing. Currents flowing through the clothing could cause the monitor to false alarm.

5.4 Using the Nardalert S3 as an area monitor

The NS3 functions as an effective, stand-alone area monitoring device. It may be operated continuously from the USB supply while employing the Fiber Optic interface for communicating field level information back to a computer. In Section 8.3 Optional Accessories there are part numbers given for fiber optic cables as well as the F.O. to USB adapter that would be required in order to provide area monitoring operation.

6 Cleaning, maintenance, repair

6.1 Cleaning

NOTICE

Unsuitable cleaning methods

Solvents can damage the Nardalert S3 or the charger. Water can damage the charger.

⇨ Do not use solvents to clean the Nardalert S3 and charger. As cleaning fluid, we recommend the use of lukewarm water to which a drop of liquid detergent has been added.

⇨ To clean the charger, use only a slightly damp cloth. Never allow water to enter the charger.

⇨ If necessary, wipe down the still-damp device parts with a dry cloth.

6.2 Performing calibration

Narda recommends recalibrating the Nardalert S3 mainframe 2270/01 after 4 years latest and the sensor modules 2271/XX after 2 years. For new devices, this recommendation applies from the date of commissioning by the customer. Depending on the conditions in which the device is used, you may independently decide to define other calibration intervals.

⇨ For calibration, send the device to your Narda sales partner. You can find the Narda sales partner responsible for you on the Narda website at www.narda-sts.com.

! ***All NS3 mainframes need to be returned to their local calibration facility at least once every 4 years for replacement of their internal clock battery. There are no operator accessible controls or written procedures available to perform this critical step. If batteries are not changed they may pose a safety hazard as well as damaging the NS3 itself.***

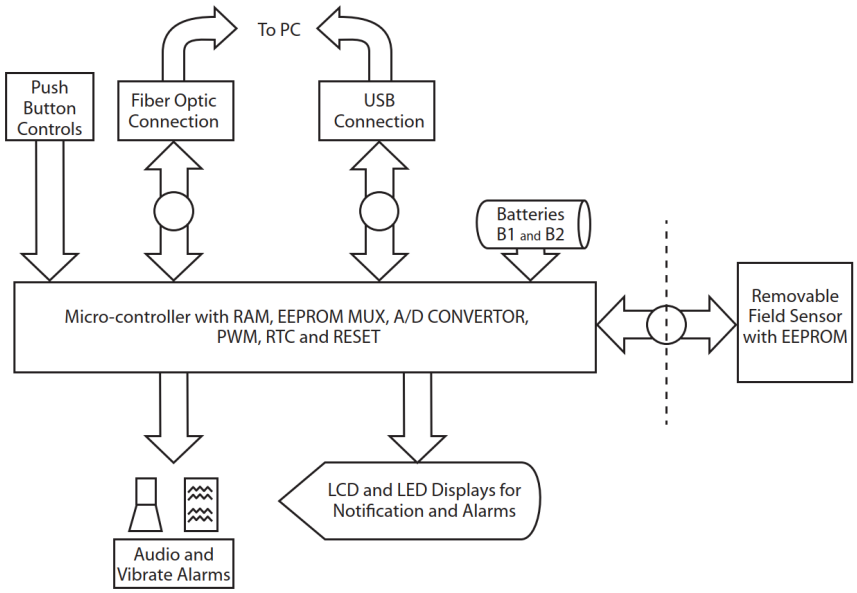
6.3 Repair

Repairs may only be performed by qualified specialists.

⇨ For more information, please contact your Narda sales partner or visit www.narda-sts.com.

6.4 Verification overview

Simplified block diagram



Theory of operation

The NS3's patented design can be supplied with RF/microwave sensors (2271/XX) that detect the electric field over an extremely broad frequency range regardless of signal type or polarization.

- The low frequency detector is a low-impedance, surface-area type designed to detect the radial fields that are characteristic of low frequency communications systems. The diode based detection operates in its "square-law" region to yield accurate results even in complex, multi-signal environments.
- A diode-dipole antenna is added to complement the low frequency sensor in the UHF region and to optimize detection of any and all polarizations.
- Higher microwave frequencies (>2 GHz) are primarily detected with thermocouple arrays. This detector is a true "square-law" sensor that will always yield RMS average results, even in a pulse-modulated exposure environment.
- Individual outputs from all three detectors are processed by the NS3 with their calibration information supplied by the sensor's imbedded EEPROM. All units are individually calibrated to facilitate field support.

The NS3's design utilizes RF shielding and absorbers to isolate it from reflections or scattering produced by the monitor, or the human body. In general, the monitor cannot detect microwave fields from behind the body when it is worn on the front of the body. At low frequencies (<100 MHz), however, the body can act as an antenna and introduce energy into the monitor, even when the source is from behind the wearer.

The sensors field response is by design:
0.1 to 10 MHz = Radial Only
10 to 1600 MHz = Radial and Vertical
1.6 to 100 GHz = Vertical and Horizontal

Testing RF/microwave sensors

The NS3 includes a menu screen (Sensor Test) that allows users to generate their own signal to see the monitor respond. Note that your signal's power and frequency need to be sufficient to register a response on the monitor. Users may find that a common "family radio" operating at 433 MHz and at least 2 Watts of power can be used as a simple, but effective test source.

Operational tests

Units should be visually inspected for complete and correct battery conditions, switches and overall mechanical integrity. Units should pass the "Turn-on" sequence and indicate full or nearly full battery condition.

After successful completion of operational testing, units should be connected to a computer through the Fiber Optic port, to verify

communication capability.

! ***All NS3 mainframes need to be returned to their local calibration facility at least once every 4 years for replacement of their internal clock battery. There are no operator accessible controls or written procedures available to perform this critical step. If batteries are not changed they may pose a safety hazard as well as damaging the NS3 itself.***

6.5 Disposal

Disposing of Nardalert S3

The Nardalert S3 is a high-quality device that can be expected to function for a long time. Nevertheless, this device will eventually reach the end of its service live. At that time, be aware that electrical devices must be properly disposed of.

The Nardalert S3 complies with the WEEE Directive of the European Union (2002/96/EC) and belongs to Category 9 (monitoring and control instruments).

As the manufacturer, you can return the device to Narda free of charge for proper environment-friendly disposal.

For more information, please contact your Narda sales partner or visit www.narda-sts.com.

Disposing of batteries

During normal use, no environmental damage is caused by the batteries. Both rechargeable and non-rechargeable batteries are, however, special waste and must be disposed of separately after use as they contain hazardous chemicals.

Both types of batteries must only be disposed of through an approved take-back system. Under no circumstances may batteries be disposed of with household waste.

⚠ CAUTION

Your Nardalert S3 contains a Lithium ion battery pack.

There is a risk of fire and burns if the battery pack is handled improperly.

- ⇨ Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- ⇨ Do not attempt to open or service the battery pack.
- ⇨ Replace only with the battery pack designated for this product.

7

Specifications

7.1 Monitor specifications

Display	
Type	TFT color LCD, transmissive
Size	1.77 inches, 28 x 35 mm, 128 x 160 pixels
Backlight	White LEDs
Refresh Rate	250 msec.
NS3 Option Key	Allows access to stored data from NS3-TS and/or LCD screen. Additional items made available include Alarm Mode, Alarm Set, Backlight, Data Log, Fiber Optic Interface, and History
Memory [a]	
Size	62,000 events
Storage Rate	4 per second, 1 per 1, 5, 10, 20 or 60 seconds
Storage Time	Variable - from 4.3 hours (4/ 1 s) to 43 days (1/ 60 s)
Remote Operation	
Interface	USB or Optical RS-232
USB	Serial, Full Duplex, 57600 baud, USB 2.0 mini B jack
Optical	Serial, Full Duplex, 57600 baud, connector type RP-02
Recommended Calibration Interval	4 Years for Mainframe (P/N 2270/01)
Battery Type/ Approximate Life	RCR123A, Li-Ion (rechargeable via USB port) 25 hours
Temperature Range	
Operating	-10 °C to +50 °C (14 °F to 122 °F)
Non-operating	30 °C to +70 °C (-22 °F to 158 °F)
Humidity	5% to 95%, non-condensing (≤ 29 g/m³, IEC 60721-3-2 class 7K2)
Dimensions (H x W x D)	117 mm x 83 mm x 32 mm (4.6 in x 3.25 in x 1.25 in), mainframe with sensor
Weight	230 g (0.5 lb), mainframe with sensor
Accessories (included)	Carrying Case, AC Charger with Plugs, Car Charger Adapter, Charger/Data cable (USB 2.0), Belt Clip, Lanyard Clip, Screwdriver, Manual, NS3-TS Software, Calibration Certificate

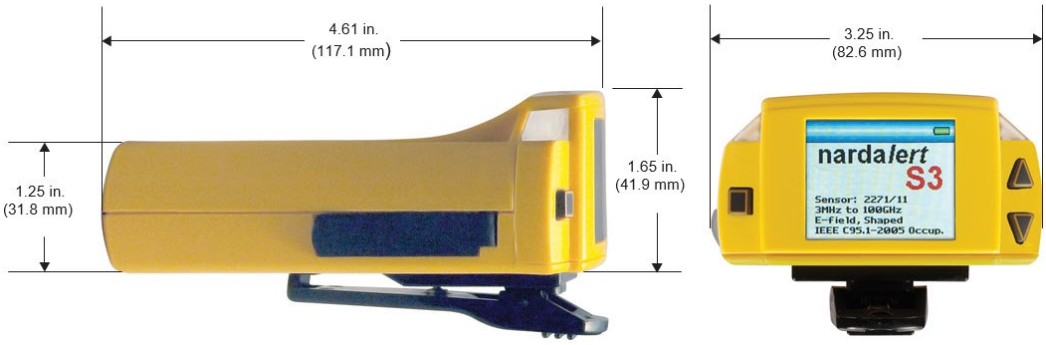
Notes:
a Memory function only available to “Optioned” units.

7.2 Sensor specifications

Sensor Module	2271/11 IEEE	2271/01 FCC	2271/22 SC6	2271/31 ICNIRP
Frequency Range	3 MHz to 50 GHz	100 kHz to 50 GHz		
Field Measured	Electric Field, V^2/m^2			
Sensor Design	Radial Field, Diode-Dipole and Thermocouple Array			
Alarm Accuracy	+4.5 / -3.0 dB (100 kHz to 30 GHz) +2.5 / -6.0 dB (30 to 50 GHz) +2.5 / -6.0 dB (50 to 100 GHz, Typical)			
Monitor Range [a]	5% to 200% of Standard or Guidance			
Immunity at 50/60 Hz	100 kV/m			
CW Overload	3000% of Standard or Guidance			
Peak Overload	32 dB above Standard or Guidance			
Recommended Calibration Interval	2 Years for Sensors (P/N 2271/XX)			

Notes:
a Percentages related to the highest power density allowed by Standard or Guidance (Controlled, Occupational).

7.3 Outline drawing



7.4 Declaration of conformity

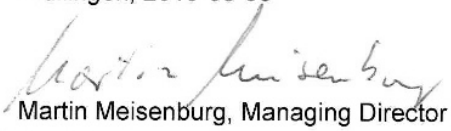
Supplier's Declaration of Conformity

(in accordance with ISO/IEC 17050-1)

SDoC no.:	2019-04	
Issuer's name:	Narda Safety Test Solutions GmbH (manufacturer)	
Issuer's address:	Sandwiesenstr. 7, D-72793 Pfullingen, Germany	
Object of declaration:	**Part No.**	**Designation**
	2270/01	Nardalert S3 Mainframe
	This declaration includes the following sensor modules:	
	2271/01	Sensor Module, FCC 1997
	2271/11	Sensor Module, IEEE C95.1-2005
	2271/22	Sensor Module, Safety Code 6
	2271/31	Sensor Module, ICNIRP 1998

The object of the declaration described above is in conformity with the requirements of the following documents:

Documents No.	**Title**
2014/30/EU	Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (previously 2004/108/EC)
EN 61326-1: 2013	Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements
2014/35/EU	Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits (previously 2006/95/EC)
EN 61010-1: 2010	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements
2011/65/EU (RoHS)	Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (previously 2002/95/EC)

Signed for and on behalf of:	Narda Safety Test Solutions GmbH
Place and date of issue:	Pfullingen, 2019-08-05
Signature:	
Name, function:	Martin Meisenburg, Managing Director

Annex – EMC

of Supplier's Declaration of Conformity

Relates to: SDoC no. 2014-04

Object: Part No. 2270/01 with sensor modules — Nardalert S3 Mainframe Part No. 2271/xx

Conformance of the product with Directive 2014/30/EU (EMC Directive) is given according to the harmonized European standard: EN 61326-1: 2013

Tests according to EN 61326:

Electromagnetic immunity	Standard	Test level, condition
Immunity to electrostatic discharge	EN 61000-4-2	2 kV / 4 kV (criterion B)
Immunity to radiated electromagnetic fields	EN 61000-4-3	compliant, verified by EN 61000-4-21 with test levels > 200 V/m
Fast transient common mode immunity (on power supply port)	EN 61000-4-4	1 kV (criterion A)
Surge immunity	EN 61000-4-5	0.5 kV / 1 kV (criterion A)
Immunity to conducted high frequency disturbances	EN 61000-4-6	3 V rms (criterion A) 150 kHz – 80 MHz
Power frequency magnetic field immunity	EN 61000-4-8	30 A/m (criterion A)
Immunity to voltage dips, short-time interruptions and voltage fluctuations	EN 61000-4-11	500 ms (70 % supply voltage) 200 ms (40 % supply voltage) 20 ms (0 % supply voltage) 5000 ms short interruption
Electromagnetic emission	Standard	Test level, condition
Radiated emission	EN 55011 (CISPR 11)	Class B
Conducted emission	EN 55011 (CISPR 11)	Class B
Harmonic current emissions	EN 61000-3-2	Class A
Voltage fluctuation and flicker	EN 61000-3-3	10 min observation time

7.5 Declaration of origin

Country of origin	Germany


Nardalert S3
Personal Monitor Transfer Software
& Instruction Manual
nardalert
S3
DELL

8

Ordering information

This chapter contains the information needed for ordering the NS3, together with its sensors and accessories.

8.1 Nardalert S3 part numbers

NARDALERT S3 MONITOR SET INCLUDES: Nardalert S3 Mainframe (2270/01) Carrying Case (2270/90.02) Silicon Sleeve (2270/90.03), attached to the mainframe Lanyard Clip, non-conductive (2270/90.04) Belt Clip, non-conductive (2270/90.05) Screwdriver Phillips 0 (2270/90.06) User's Guide and CD-ROM with Software NS3-TS (2270/90.07) Car Charger Adapter, USB 5V (2259/92.20) Power Supply, USB 5VDC, 100V-240VAC (2259/92.24) Battery, rechargeable (2259/92.25) Cable, USB2.0 Master/Slave - A/B mini, 0.9m (2260/90.58) Calibration Certificate	
AND YOUR CHOICE of SENSOR MODULE: with **FCC** Sensor Module	2271/101
with **IEEE** Sensor Module	2271/111
with **SC6** Sensor Module	2271/122
with **ICNIRP** Sensor Module	2271/131

Option Key, Nardalert S3	2270/90.01

8.2 Sensor part numbers

Sensor Module, FCC 1997 "Occupational/ Controlled"	2271/01
Sensor Module, IEEE C95.1-2005, "Controlled"	2271/11
Sensor Module, Safety Code 6, "Controlled"	2271/22
Sensor Module, ICNIRP 1998, "Occupational"	2271/31

8.3 Optional accessories

Nardalert Weatherproof Pouch	2270/92.01
Cable, FO Duplex, RP-02, 2m	2260/91.02
Cable, FO Duplex, RP-02, 10m	2260/91.07
Cable, FO Duplex, RP-02, 20m	2260/91.03
Cable, FO Duplex, RP-02, 50m	2260/91.04
Cable, FO 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, USB2.0 - RS232, 0.8m	2260/90.53

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