CE

SMARTS II™

ULTRA-WIDEBAND RF RADIATION AREA MONITORS

USER'S GUIDE

narda
Safety Test Solutions
an L3 communications company

P/N 42995800

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an (L3) communications company

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Chapter 1
INTRODUCTION

About Your SMARTS II™

The SMARTS II is the latest design in the SMARTS™ family of RF area monitors. They provide continuous detection of RF radiation within a specific area. The SMARTS II uses the latest, ultra-broadband sensor technology developed for Narda Safety Test Solutions' Narda*alert*™ RF personal monitors.

Equipment Supplied

The SMARTS II is supplied with:

♦ SMARTS II area monitor

♦ Mating 9-pin connector, P/N 42995900

♦ Battery, 9 Volt Lithium P/N 88020000

♦ User's Guide, P/N 42995800

Optional Equipment

The following optional accessories are available for use with
the SMARTS II:

- ♦ Weatherproof Housing, P/N 11081900

- ♦ Mounting Adapter Kit, P/N 42993200

The weatherproof housing should be used whenever the
SMARTS II is to be installed in an area exposed to
precipitation.

The mounting adapter kit is used only when it is important
for the SMARTS II to use the same mounting-hole pattern
as the original SMARTS area monitors.

Chapter 2
UNDERSTANDING YOUR SMARTS II

General Description

The SMARTS II™ area monitors, like earlier SMARTS models, provide continuous detection of RF radiation within a specific area. The SMARTS II uses the latest, ultra-wideband sensor technology of the Nard*alert*™ RF personal monitors. The result is an area monitor that covers most of the usable RF spectrum in a single monitor with "shaped" frequency-dependent sensitivity that matches the standard used to determine compliance. The dual sensor design accurately detects all types of electric fields from 2 MHz to 100 GHz. The microwave portion of the sensor employs thermocouple detectors so that radar signals are accurately converted to true RMS values while the patented diode design used for the lower frequencies provides RMS detection even in very complex, multi-signal environments. SMARTS II monitors respond equally to all polarizations and cover an entire hemisphere.

The SMARTS II operates from a common nine-volt battery or an external 12-volt or 24-volt DC supply. Every monitor has an audio alarm. An alarm condition causes a voltage transition (TTL) to occur at the STATUS jack. When the SMARTS II is operated from an external power supply, you have the option to use the contacts of an SPDT (Single Pole Double Through) relay to indicate alarm status. ***The status relay cannot be used under battery operation.*** Either the TTL signal or the relay contacts can be used to provide remote alarms, a record of alarm conditions, and/or automatic shutoff of equipment.

Models

SMARTS II area monitors cover most of the usable RF spectrum in a single monitor with "shaped" frequency-dependent sensitivity that matches the standard used to determine compliance. The "shape" of the frequency response is the only difference between the four SMARTS II models.

Standard or Guidance	Tier	Model
ACGIH	—	B8830
AS/NZ 2772.1 (1998, draft)	Occupational	D8830
Canada Safety Code 6 99-EHD-237	RF Workers	C8830
DIN VDE 0848, Part 2, October 1991 Area 1	Occupational	D8830
ENV 50166-2	Occupational	D8830
FCC 1997	Occupational / Controlled	A8830
ICNIRP 1998	Occupational	D8830
IEEE C95.1-1999 & ANSI C95.1-1992	Controlled	B8830
Japan RCR-38	Controlled	A8830
NATO STANAG 2345	—	B8830
ÖNORMS S 1120, 1992	Occupational	A8830

Specifications

Parameter	Specification
Frequency Range	2 MHz to 100 GHz
Frequency Sensitivity[a]	+6.0 / -3.0 dB (2 MHz to 2.3 GHz) +4.5 / -2.5 dB (2.3 to 30 GHz) +2.5 / -6.0 dB (30 to 50 GHz) +2.5 / -6.0 dB (50 to 100 GHz, Typ.)
Calibration Frequencies	100 MHz, 4 GHz
Alarm Threshold	10%, 25%, 35%, or 50% of Standard
Maximum CW Power Density	3000% of Standard
Maximum Peak Power Density	32 dB above Standard
Battery	9 volt alkaline
External Power Requirements	12 Vdc ±10%, 50 ma max/ 24 Vdc ±10%, 50 ma max

STATUS Signal
  Levels
  Load Impedance, min.
	-4 Vdc standby, +4 Vdc alarm
	100 k

Status Relay
  Type
  Power Rating
	SPDT Reed Relay
	3W @ 250 mA, 28 Vdc

Recorder
  Output Level
  Load Impedance, min
	1 Vdc full scale (approximate)
	100 kΩ

Temperature
  Operating
  Non-operating
	-10°C to +55°C
	-20°C to +65°C

Size, approximate	9.4" L x 8.1" W x 5.0" H 23.9 cm x 20.6 cm x 12.7 cm
Weight, approximate	26 oz / 0.74 kg
Color	White

[a] Accuracy specified as the mean of the radial and vertical orientations (10 to 1600 MHz) and mean of the vertical and horizontal orientations (1600 MHz to 50 GHz).

Specifications for the optional weatherproof housing are shown in the table below.

Parameter	Specification
Part Number	11081900
Construction	All plastic
Frequency Range	See Note a
Rating	NEMA class 4X[b]
Size	11.8" L x 11.8" W x 7.2" H 30.0 cm x 30.0 cm x 18.3 cm
Weight, approximate	45 oz/6.2 kg
Color	45 oz/6.2 kg

Notes:
a. The insertion loss of the housing is insignificant below 5 GHz but can be as high as 2 dB at higher frequencies (no data is available above 40 GHz). Under rain conditions an additional insertion loss from a water film on the housing can be up to 10 dB at frequencies above 5 GHz.

b. Equivalent to IEC Publication 529, Type IP 66 or CSA Standard C22.2, No. 94.

Test Switch

The **TEST** switch provides a means to test most of the monitor circuitry. Momentarily pressing **TEST** simulates an alarm condition.

Audio Alarm

The audio alarm is sufficiently loud for most indoor applications. An external alarm, audio and/or visual, is recommended when the SMARTS II is located in an area with significant ambient noise or when it is mounted inside the weatherproof housing.

LED Indicator

The red LED indicator flashes approximately every forty seconds whenever the SMARTS II is functioning normally.

Sensor

The SMARTS II accurately detects all types of electric fields from 2 MHz to 100 GHz. The monitor uses three sets of sensors. The microwave portion of each sensor employs thermocouple detectors so that radar signals are accurately converted to true RMS values while the patented diode design used for the lower frequencies provides RMS detection even in very complex, multi-signal environments. The output of the three high frequency sensors is combined and fed to a low-noise amplifier circuit. Similarly, the output of the three low frequency sensors is combined and fed to another low-noise amplifier. The output of these two amplifier circuits is calibrated in terms of Percent of Standard. The sum of these two amplifier levels is used to determine whether the monitor is above or below the alarm threshold that has been selected by the user. SMARTS II monitors respond equally to all polarizations and cover an entire hemisphere.

Battery Compartment

Removing a cover that is attached with four captive screws accesses the battery compartment. The cover has an RFI (Radio Frequency Interference) gasket to ensure that the internal circuits remain isolated from strong electromagnetic fields.

A standard 9-volt alkaline battery is located within the battery compartment. The **BATT–PS** (battery–power supply) switch and a two-section **Alarm Threshold** DIP switch are also located within the battery compartment.

Input/Output Connector

All input and output connections are made via a single, 9-pin D-subminiature male connector located on the side of the SMARTS II. A mating connector is supplied with the monitor. This input/output connector is used to provide connections for:

- ♦ Relay contacts (N.C., COM., and N.O.)

- ♦ ENABLE/RECORDER

- ♦ STATUS (TTL level)

- ♦ External 12 Vdc or 24 Vdc power

The internal cable of the weatherproof housing plugs into this connector.

This input/output connector is filtered to protect the SMARTS II from strong electromagnetic fields. However, a shielded cable is highly recommended.

Outline Drawing
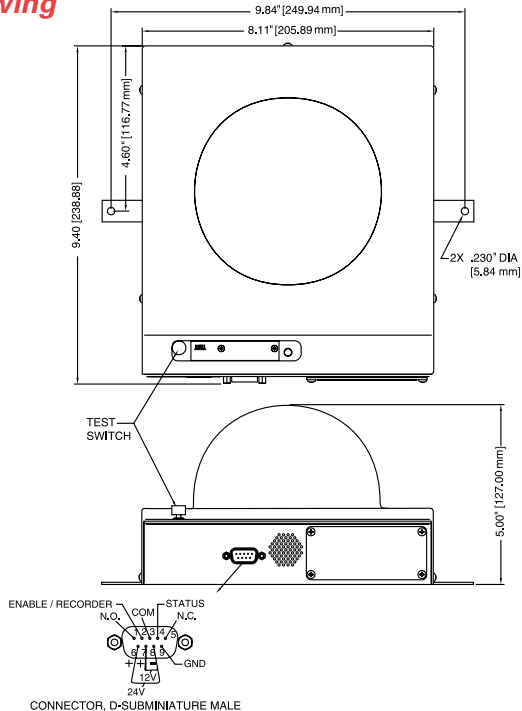
Chapter 3

INDOOR INSTALLATION

Location

The location where you mount the SMARTS II depends on many factors. See Chapter 6, *Determining Location* for an explanation and recommendations.

Options

It is important to decide how the SMARTS II will be used before you mount it. It is far easier to change settings and make connections with the monitor in front of you rather than after it is mounted. The important decisions involve:

- ♦ **Power Source** – either the internal battery or an external 12 Vdc or 24 Vdc power supply can power the monitor.

- ♦ **Alarm Threshold** – the default setting is 50% of Standard. Three more sensitive settings are available.

- ♦ **Alarm Indications** – either the internal audio alarm and/or a remote indication can be used. External alarms require a cable connection.

- ♦ **Remote Test** – available with a cable connection.

- ♦ **Enable** – alarm operation can be inhibited when people are not present during high power operation.

### *Mounting the SMARTS II Indoors*

The basic SMARTS II (without weatherproof housing) is attached to any surface with two screws. The type and size of the screws are determined by the mounting surface. The SMARTS II can be attached to any surface, even conductive metal surfaces.

Basic Battery Operation

The SMARTS II can be used in its basic form by operating from the internal 9-volt battery and the built-in audio alarm. No external connections are required.

To operate the SMARTS II from a battery without external connections…

1. Remove the battery-compartment door by loosening the four captive screws.

2. Connect the battery. The monitor is shipped with the battery supplied in a separate package to maintain battery life while in storage and during shipment.

3. Move the **BATT–PS** switch (battery–power supply), which is located inside the battery compartment, to the **BATT** position.
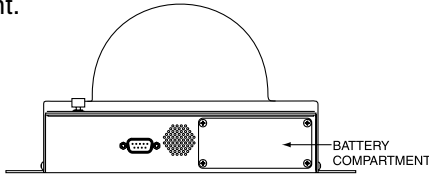

INSIDE BATTERY COMPARTMENT
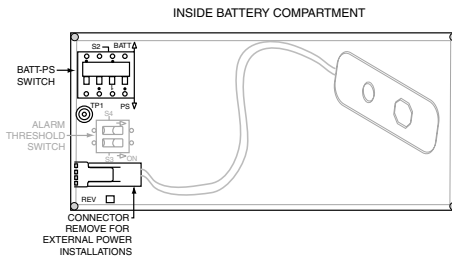
4. Set the alarm threshold to the desired level. See *Alarm Threshold Adjustment.*

5. Replace the battery-compartment cover and finger-tighten the four captive screws.

6. Mount the monitor in the desired location using the holes in the mounting brackets and screws suitable for the surface that the monitor is being mounted on.

Operation with an External Power Supply

The SMARTS II can be operated from an external low voltage supply. It can also be connected to an external circuit to make use of its remote-alarm capability by using the same cable and connector used for the power supply.

To operate the SMARTS II from an external low voltage supply…

1. Remove the battery-compartment door by loosening the four captive screws.

2. Remove the battery if it has previously been installed. The monitor is shipped with the battery supplied in a separate package to maintain battery life while in storage and during shipment.

BATTERY COMPARTMENT

3. Check to make sure that the **BATT–PS** switch (battery-power supply), which is located inside the battery compartment, is set to the **PS** position.

4. Set the alarm threshold to the desired level. See *Alarm Threshold Adjustment.*

5. Insure that the battery connector is not touching a metal surface. Alternately, the battery connector and leads make be removed by simply disconnecting at the printed circuit board.

6. Replace the battery-compartment cover and finger-tighten the four captive screws.

7. Connect the SMARTS II to either a 12 VDC or 24 VDC external power supply. *It is critical that the power supply be a "floating" one.*
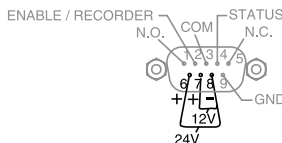
ENABLE / RECORDER STATUS
N.O. COM N.C.
1 2 3 4 5
6 7 8 9
+ + −
12V
24V
GND

CONNECTOR, D-SUBMINIATURE MALE

8. Mount the monitor in the desired location using the holes in the mounting brackets and screws suitable for the surface that the monitor is being mounted on.
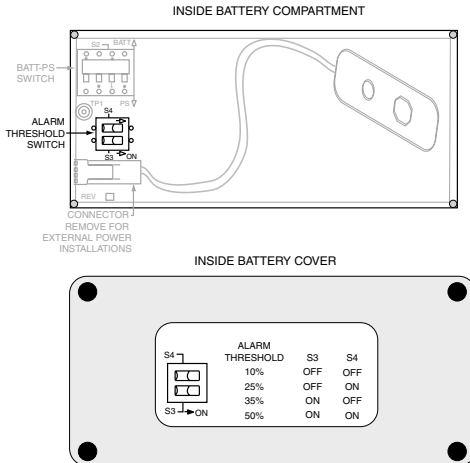
◆◆◆**NOTE**◆◆◆

Use shielded cable to make connections to the input/output connector.

Alarm Threshold Adjustment

The alarm threshold can be set to any one of four values: 10%, 25%, 35%, or 50% of Standard. The default setting is 50% of Standard.

To change the alarm threshold…

1. Loosen the four captive screws and remove the battery compartment cover.

2. Adjust the two-section DIP-switch located inside the battery compartment to set the alarm threshold to the desired level. Use the diagram on the inside of the battery compartment cover to determine the correct setting for each section.

INSIDE BATTERY COMPARTMENT

BATT-PS SWITCH

ALARM THRESHOLD SWITCH

CONNECTOR J REMOVE FOR EXTERNAL POWER INSTALLATIONS

INSIDE BATTERY COVER

ALARM THRESHOLD	S3	S4
10%	OFF	OFF
25%	OFF	ON
35%	ON	OFF
50%	ON	ON

3. Replace the battery compartment cover.

It is recommended that if the SMARTS II is to be operated with a power supply, the **Zero** setting should be checked, and adjusted if necessary. The **Zero** voltage is checked by measuring the voltage between Pins 2 (ENABLE/RECORDER) and 9 (GND) of the 9-pin D-subminiature connector.

Zeroing Procedure

Connect power supply. Select threshold range (see *Alarm Threshold Adjustment*, above). Remove plate adjacent to test button, with two phillips head screws (see outline drawing, page 12). Adjust the middle potentiometer for 0.00 Vdc (± 10 mV) while monitoring between Pins 2 and 9 of the 9-pin D-subminiature connector, or Pins P and C of the 15-pin connector (when mounted in P/N 11081900, Outdoor Enclosure). This adjustment will not affect calibration, as long as it is performed correctly. Re-attach plate after performing adjustment.

Test Switch

The **TEST** switch provides a means to test most of the monitor circuitry. Momentarily pressing **TEST** simulates an alarm condition.
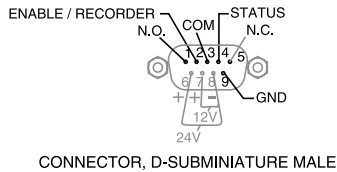
Remote Alarm Indication

Alarm status can be detected remotely by using the **STATUS** signal, the **RECORDER** output level, and/or the **STATUS** relay (Form C or SPDT) connections. The relay cannot be used under battery operation.

♦♦♦CAUTION♦♦♦

Do Not Exceed Relay Contact Rating of 3W @ 250 mA, 28 Vdc

♦ The level on the **STATUS** line transitions from -4 Vdc under standby conditions to a +4 Vdc under alarm conditions.

♦ The ENABLE/RECORDER line serves a dual function. When used to monitor field strength, the Recorder Output Level varies from 0 Vdc to –1 Vdc. Full scale represents the level at which the SMARTS II is set to sound its alarm. For example, if the Alarm Threshold is set to 50% of standard, a –0.5 Vdc level indicates that the field strength is approximately 25% of standard.

♦ The SPDT STATUS relay operates whenever there is an alarm condition. Under alarm conditions, there is a connection between the common (COM) terminal and the normally open (N.O.) terminal.

CONNECTOR, D-SUBMINIATURE MALE

Using the ENABLE Feature

The **ENABLE** input can be used in situations where the standard operating procedure produces RF fields above the alarm threshold and exposure to people is possible. Examples include an anechoic chamber and the deck of a ship. The **ENABLE** input can be tied to a motion sensor or an interlock switch. Under these conditions, the SMARTS II activates its alarms only when two conditions are satisfied:

♦ High levels of RF are present (above the monitors alarm threshold).

♦ Motion is detected or a door is open.

To use the ENABLE feature…

♦ To inhibit the SMARTS II alarm function under certain conditions connect a switch or relay between the ENABLE line and the monitor's ground: Pins 2 (ENABLE/RECORDER) and 9 (GND) on the Input/Output Connector.

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♦ The SMARTS II will function normally whenever the relay contacts or the switch is open.

♦ The SMARTS II alarm function will not function whenever the relay contacts or the switch is closed.

Remote Test

It is possible to test the SMARTS II from a remote location when it is not practical to reach the TEST switch.

To test the SMARTS II alarm function…

1. Momentarily ground the STATUS line. The monitor should go into alarm status. This is best accomplished by connecting a cable to the 9-pin Input/Output connector. The test is made by connecting pin 4 (STATUS) to pin 9 (GND).

For Relay activation...

1. Connect Pin 4 (STATUS) through the switch and a 10 k ohm resistor (12 Vdc operation), or through the switch and a 100 k ohm resistor (24 Vdc operation). This will test the system and cause the relay to change position.

Low Battery Indication

The SMARTS II indicates a low battery situation by "chirping" its alarm. The alarm will sound in approximately forty-second intervals whenever the battery level is low.

The battery should be replaced as soon as possible.

Chapter 4
OUTDOOR INSTALLATIONS

Location

Where you mount the SMARTS II depends on many factors. See Chapter 6, *Determining Location*, for an explanation and recommendations.

Options

It is important to decide how the SMARTS II will be used before you mount it. It is far easier to change settings and make con-nections with the monitor in front of you rather than after it is mounted. The important decisions involve:

♦ **Power Source** – either a 12 Vdc or 24 Vdc external power supply can power the monitor. Battery operation is not rec-ommended for monitors mounted inside the weatherproof housing.

♦ **Alarm Threshold** – the default setting is 50% of Standard. Three more sensitive settings are available.

♦ **Alarm Indications** – there are three different remote alarm options. The internal audio alarm is not a practical option for monitors mounted inside the weatherproof housing.

♦ **Remote Test** – available via the same cable used to supply power and remote alarm signals.

♦ **Enable** – alarm operation can be inhibited when people are not present during high power operation.
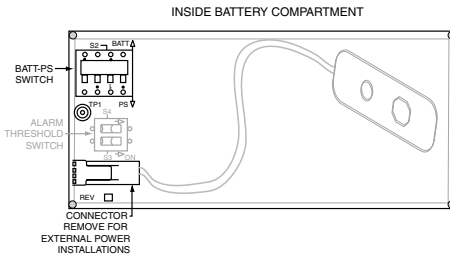
Using the SMARTS II Outdoors

The SMARTS II can be used outdoors, even in severe weather, when installed in the optional Weatherproof Housing, P/N 11081900.

To install the SMARTS II inside the optional weatherproof housing and to mount the entire assembly…

1. Remove the battery-compartment door by loosening the four captive screws.
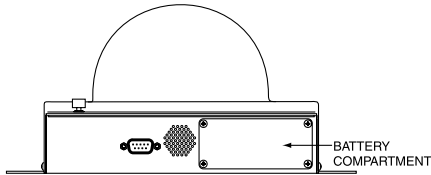

BATTERY
COMPARTMENT

2. Remove the battery if it has previously been installed. The monitor is shipped with the battery supplied in a separate package to maintain battery life while in storage and during shipment.

3. Check to make sure that the BATT–PS switch (battery-power supply), which is located inside the battery compartment, is set to the PS position 4. Set the alarm threshold to the desired level. See Alarm Threshold Adjustment.

INSIDE BATTERY COMPARTMENT

S2 — BATT
BATT-PS
SWITCH
TP1   PS
S1
ALARM
THRESHOLD
SWITCH
ON
REV
CONNECTOR
REMOVE FOR
EXTERNAL POWER
INSTALLATIONS

4. Set the alarm threshold to the desired level.

5. Insure that the battery connector is not touching a metal surface. Alternately, the battery connector and leads may be removed by simply disconnecting at the printed circuit board.

6. Replace the battery-compartment cover and finger-tighten the four captive screws.

7. Remove the cover of the weatherproof housing.

8. Remove the two screws from inside the weatherproof housing.

9. Plug the cable attached to the weatherproof housing into the 9-pin subminiature D connector on the SMARTS II.

10. Attach the SMARTS II to the weatherproof housing using the same two screws and the same mounting holes.

11. With the SMARTS II now attached, mount the weatherproof housing to any surface using four screws suitable for the surface. These screws install in the four large holes in the corners of the housing used to attach the cover
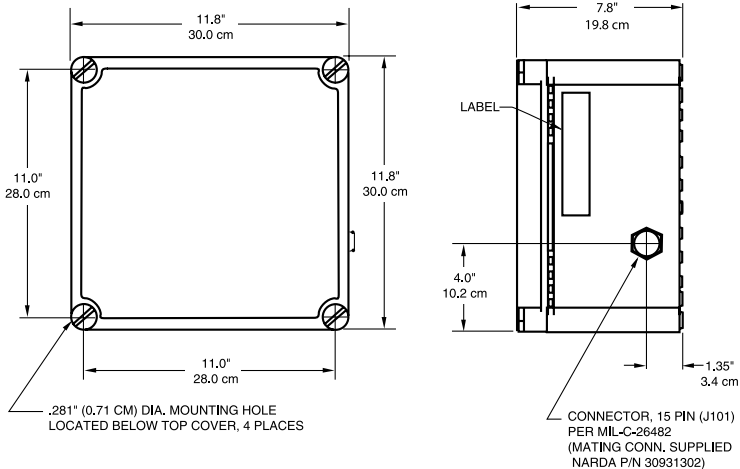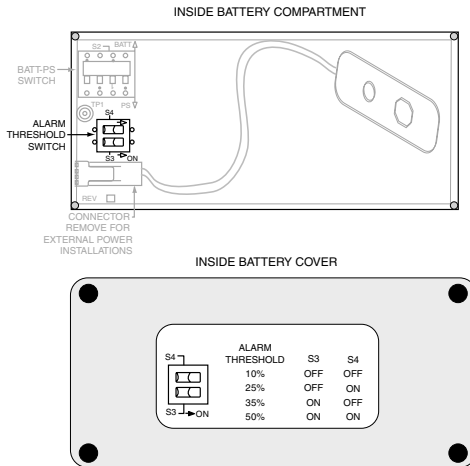

12. Replace the cover of the weatherproof housing.

Alarm Threshold Adjustment

The alarm threshold can be set to any one of four values: 10%, 25%, 35%, or 50% of Standard. The default setting is 50% of Standard.

To change the alarm threshold…

1. Loosen the four captive screws and remove the battery compartment cover.

2. Adjust the two-section DIP-switch located inside the battery compartment to set the alarm threshold to the desired level. Use the diagram on the inside of the battery compartment cover to determine the correct setting for each section.

INSIDE BATTERY COMPARTMENT

BATT-PS SWITCH

ALARM THRESHOLD SWITCH

CONNECTOR
REMOVE FOR
EXTERNAL POWER
INSTALLATIONS

INSIDE BATTERY COVER

ALARM THRESHOLD	S3	S4
10%	OFF	OFF
25%	OFF	ON
35%	ON	OFF
50%	ON	ON

3. Replace the battery compartment cover.

Remote Alarm Indication

The internal audio alarm is of little value when the SMARTS II is mounted inside the weatherproof housing.

Alarm status can be detected remotely by using the **STATUS** signal, the **RECORDER** output level, and/or the **STATUS** relay (Form C or SPDT) connections.

♦ The level on the **STATUS** line transitions from a –4 Vdc
   under standby conditions to a +4 Vdc under alarm
   conditions.

♦ The ENABLE/RECORDER line serves a dual function.
   When used to monitor field strength, the Recorder Output
   Level varies from 0 Vdc to –1 Vdc. Full scale represents
   the level at which the SMARTS II is set to sound its alarm.
   For example, if the Alarm Threshold is set to 50% of stan-
   dard, a –0.5 Vdc level indicates that the field strength is
   approximately 25% of standard.

♦ The SPDT STATUS relay operates whenever there is an
   alarm condition. Under alarm conditions, there is a connec-
   tion between the common (COM) terminal and the normally
   open (N.O.) terminal.

Using the ENABLE Feature

The **ENABLE** input can be used in situations where the stan-
dard operating procedure produces RF fields above the alarm
threshold and exposure to people is possible. Examples
include an anechoic chamber and the deck of a ship. The
ENABLE input can be tied to a motion sensor of an interlock
switch. Under these conditions, the SMARTS II activates its
alarms only when two conditions are satisfied:

♦ High levels of RF are present (above the monitors alarm
   threshold).

♦ Motion is detected or a door is open.

To use the ENABLE feature…

1. To inhibit the SMARTS II alarm function under certain condi-
   tions connect a switch or relay between the ENABLE line
   and the monitor's ground: Pins 2 (ENABLE/RECORDER)
   and 9 (GND) on the Input/Output Connector.

2. The SMARTS II will function normally whenever the relay contacts or the switch is open.

3. The SMARTS II alarm function will not function whenever the relay contacts or the switch is closed.

Remote Test

It is possible to test the SMARTS II from a remote location when it is not practical to reach the TEST switch.

To test the SMARTS II alarm function…

Momentarily ground the STATUS line. The monitor should go into alarm status. This is best accomplished by connecting a cable to the 15-pin MIL style Input/Output connector located on the weatherproof housing. The test is made by connecting pin E (STATUS) to pin P (GND).

For Relay activation...

Connect Pin E through external switch and 10 k ohm resistor, to Pin A (12 Vdc operation), or connect switch and 100 k ohm resistor, to Pin B (24 Vdc operation).

Chapter 5
MAINTENANCE

General

SMARTS II area monitors require very little maintenance. No operator adjustments are required other than the initial selection of Alarm Threshold. The plastic housing may be cleaned using a damp cloth. Do not use any type of detergent or solvent.

Calibration

SMARTS II monitors are calibrated before shipment. Narda Safety Test Solutions recommends that the x8830 series SMARTS II monitors be calibrated every two years. Narda will perform this calibration for a nominal charge.

Battery Replacement

The SMARTS II indicates a low battery situation by "chirping" its alarm. The alarm will sound in approximately forty-second intervals whenever the battery level is low. The battery should be changed as soon as possible once the low battery condition is indicated.
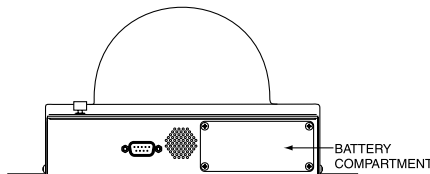
To change the battery…

1. Loosen the four captive screws that hold the battery compartment cover. The screw heads are knurled and should only be finger tight but a slot is provided for a screwdriver should it be needed.

2. Remove the cover.

3. Disconnect the battery leads, replace the battery, and connect the leads.

4. Put the battery into the compartment and replace the cover.

5. Tighten all four screws. It is important that the screws are tightened sufficiently so that the cover slightly compresses the EMI gasket.

Battery Life According to Type

The SMARTS II is shipped with a 9-volt lithium battery. It should operate for approximately 6-8 months before it must be changed. A standard 9-volt alkaline battery will power the SMARTS II for approximately 3-4 months.

Alkaline batteries are available from numerous companies and retail stores. Lithium batteries are usually available wherever cameras and camera supplies are sold.

The lithium battery supplied with the monitor is Ultralife Batteries P/N U9VL.

Chapter 6
DETERMINING LOCATION

Overview

The factors that determine when a SMARTS II monitor will activate its alarms include:

♦ Alarm Threshold setting of the monitor

♦ The field strength at the monitor in terms of Percent of Standard.

The alarm threshold is set at the factory at 50% of standard. Three more sensitive settings available: 35%, 25%, and 10% of standard.

The actual field strength required for the monitor to activate its alarms depends not only on the alarm threshold setting but the field strength of each frequency component. The sensitivity of SMARTS II area monitors varies with the specific model. All four models have shaped frequency response. For example, model D8830 follows the ICNIRP occupational limits. The ICNIRP occupational limits are 1 mW/cm^2 from 10 MHz to 400 MHz and 5 mW/cm^2 above 2 GHz. If the SMARTS II were set to the least sensitive setting of 50% of standard, then the threshold (excluding tolerances) would be 0.5 mW/cm^2 in the VHF region and 2.5 mW/cm^2 in the microwave region. The "weighting" of the frequency response of the sensors automatically compensates for multiple signal environments.

Area coverage is a far more complicated subject. There are several factors that should be considered in determining the best location for the monitor and the area that can be considered "protected."

Factors Determining Area Coverage

Energy sources, either purposeful emitters such as antennas, or unintentional emitters such as waveguide leaks, can be omni-directional or focused in one direction. Field strength (power density expressed in mW/cm^2 or W/m^2) drops off rapidly with distance from the source. In the far field, field strength follows the inverse square law, i.e., at twice the distance there is one quarter the field strength. Similarly, at ten times the distance, the field strength is only one percent as strong. Factors influencing area coverage include:

♦ Location of the SMARTS II

♦ Location of the energy source

♦ Location of people

♦ Energy level of the source.

♦ Direction of energy being emitted

♦ Orientation of the SMARTS II

Preferred Location

The **ideal location** for a SMARTS II is **between the source of energy and people**. The SMARTS II should be "pointed" at the energy source. Under these conditions the sensitivity of the monitor is never an issue because it will always detect a higher field level than the people are exposed to. Since the SMARTS II activates its alarms at levels below the standard, the monitor will always activate its alarm whenever people are in a field that exceeds the standard. Under these conditions, there is no limit to the area that is "covered."

Every other location scenario involves a great deal more thought and some risk that people can be exposed to field levels above the standard while the SMARTS II is in fields below its alarm threshold.

Alternate Locations

♦ **Mounting the SMARTS II closer than people will be to the energy source, but not between the two.** A test bench is a common example of this situation. The worker sits or stands in front of a test bench that contains a piece of equipment, like an amplifier, that is being tested. The SMARTS II is typically hung from the ceiling just above the transmitter. In this application, the monitor normally detects an unexpected "leak". Such a leak can occur when there is a missing, or poor, connection.

♦ **Mounting a SMARTS II in a small room with conductive walls.** Transportable military shelters and the remote broadcast trucks used in television radio operations for Electronic New Gathering (ENG trucks) have similar attributes. Both are relatively small "rooms" with conductive walls, ceilings, and floors. An energy leak can be detected in two ways – directly and/or via reflection off the wall or ceiling.

♦ **Mounting a SMARTS II further from the energy source than people will be.** Although it is possible to use a SMARTS II in this application, it is risky. In order to use this approach successfully, it important to calculate the relative energy levels that the monitor and people will be exposed to based on the distance from the energy source to the monitor and the distance from the source. Then, determine whether the monitor is sensitive enough to provide "protection".

♦ **Inside large industrial process systems.** SMARTS II area monitors can be used as a form of built-in monitoring in large systems.

♦ **Outdoor test ranges.** SMARTS II monitors are commonly used as redundant systems to determine when RF is being propagated on a test range.

Warranty

Narda Safety Test Solutions (Narda STS) warrants the SMARTS II to be free from any defect in material and workmanship for a period of two years from date of shipment. All warranty returns, however, must first be authorized by a factory office representative.

The limit of liability under this warranty shall be to repair or replace any product, or part thereof, which proves to be defective after inspection by Narda STS. This warranty shall not apply to any Narda STS product that has been disassembled, modified, physically or electrically damaged or any product that has been subjected to conditions exceeding the applicable specifications or ratings.

Narda STS shall not be liable for any direct or consequential injury, loss or damage incurred through the use, or the inability to use, any Narda STS product.

Narda STS reserves the right to make design changes to any Narda STS product without incurring any obligation to make the same changes to previously purchased units.

This warranty is the full extent of obligation and liability assumed by Narda STS with respect to any and all Narda STS products. Narda STS neither makes, nor authorizes any person to make, any other guarantee or warranty concerning Narda STS products.

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About Narda Safety Test Solutions

Narda Safety Test Solutions is the new name for the world leader in non-ionizing radiation safety equipment. In February 2000, Narda – an L-3 Communications Company – acquired the Safety Test Solutions business from Wavetek Wandel & Goltermann. To give more focus to the RF safety business and to separate it from Narda's other business in components and networks, a new division was formed – Narda Safety Test Solutions. It combines the complementary product lines and expertise of these two businesses. The company holds more than 95% of the patents in the field. Products are available to accurately measure electromagnetic fields from a few Hertz to over 100 GHz plus static magnetic fields. RF personal monitors cover 100 kHz to 100 GHz and area monitors detect energy from 300 kHz to 100 GHz.

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