# ULTRA-WIDEBAND SMARTS II™ AREA MONITORS

**U.S. Patents: 4,611,166  5,168,265  6,154,178**

## narda
### Safety Test Solutions
an (L3) communications company

- **2 MHz to 100 GHz in a Single Monitor**
- **Shaped Frequency Response Matched to Your Standard**
- **Continuous, Automatic Monitoring – No Operator Required**
- **Audible, Visible, and Remote Alarms**
- **Recorder Output**
- **Battery or Low Voltage DC Operation**
- **Adjustable Alarm Threshold**
- **Weatherproof Housing Option**

## *DESCRIPTION*

Narda Safety Test Solutions latest design in the popular SMARTS™ family of RF area monitors introduces several new features.  The SMARTS II™ area monitors, like the 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 Nardalert™ 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.  They can even be mounted on a metallic wall.  There is a SMARTS II model shaped to match each of the major standards.

The SMARTS II operates from a common nine-volt battery or a 12-volt or 24-volt DC supply.  Every monitor has an audio alarm. An alarm condition causes both a voltage transition to occur and a SPDT relay to operate. 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.

The SMARTS II area monitors can be used outdoors by installing the monitor in a NEMA weatherproof enclosure.

## OPERATION

SMARTS II monitors operate like common household smoke detectors. When operating normally, the alarm LED flashes approximately every 40 seconds. If operating under battery power and the battery needs replacement, a "chirp" accompanies the LED flash. A continuous audible and visual alarm occurs when the SMARTS II detects RF radiation at its preset level or higher. Both an electronic signal and a relay closure are provided during alarm conditions. Either of these indications can be used to activate various user-supplied remote circuitry and systems. The SMARTS II goes into a continuous alarm mode if the battery drops below a critical level or if the detector fails.

Operation can be verified at any time by depressing the TEST button that activates a full-system test. The ENABLE input can be used in situations where the standard operating procedure produces RF field levels in excess of the threshold and exposure to people is possible (e.g., in an anechoic chamber or on 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: (1) high levels of RF are present and (2) motion is detected or a door is open.

The alarm threshold is field adjustable from 10% of standard to 50% of standard. The user can easily switch from battery operation to an external, low voltage DC supply.

## OUTDOOR INSTALLATIONS

An all-plastic weatherproof housing is available that permits operation of the SMARTS II in virtually any environment. This housing is rated NEMA class 4X, which is the equivalent of IEC Publication 529, Type IP66 or CSA Standard C22.2, No. 94. Connections to the housing are made through a MIL-type, multi-pin, circular connector (the mating connector is supplied). Installation of the SMARTS II into the weatherproof housing could not be simpler: remove the housing cover, plug the internal cable into the SMARTS II, then attach the monitor with two screws. Put the cover of the housing back on and attach the external cabling. Since standard visual and audio signals are masked by the weatherproof housing, status and alarm information plus low voltage DC are sent via a user-supplied external, shielded cable.

The insertion loss of the weatherproof housing starts to become significant at about 8 GHz, thus reducing the monitor's sensitivity. Losses are greater in the rain, especially if the weatherproof housing is mounted horizontally which allows water to collect on it. Depending on the frequency, the insertion loss from the housing can be up to 2 dB under dry conditions and up to 10 dB in the rain. The adjustable threshold feature of the SMARTS II can be used to compensate for the insertion loss of the weatherproof housing.
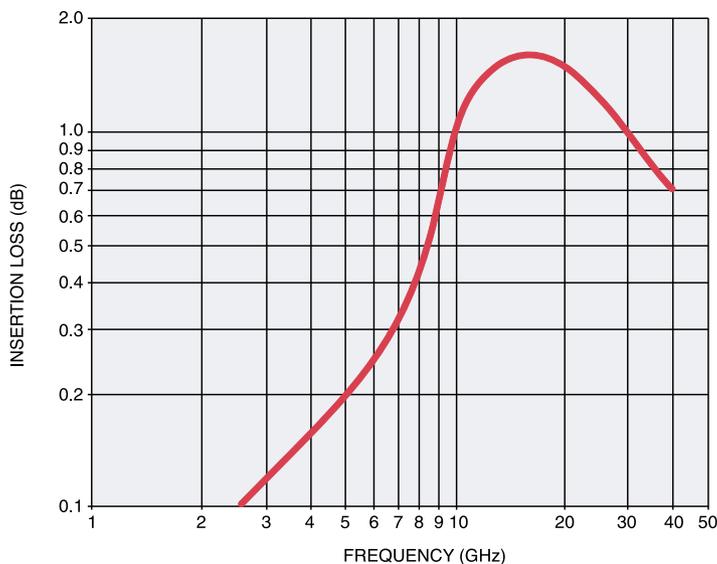


*Insertion Loss of SMARTS II\* Weatherproof Housing*

\*Approximate insertion loss of weatherproof housing under dry conditions with the SMARTS II facing the source of energy (normal to the Poynting vector).

## MODEL SELECTION GUIDE

| Standard or Guidance | Tier | SMARTS II™ 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 |
| ÖNORM S 1120, 1992 | Occupational | A8830 |

## SPECIFICATIONS – MONITOR

| Parameter | Specification |
|---|---|
| Model Number | A8830 through D8830[a] |
| Frequency Range | 2 MHz to 100 GHz |
| Frequency Sensitivity | ±2 dB (2 MHz to 50 GHz)<br>+2, -5 dB (2 MHz to 100 GHz) |
| Calibration Frequencies | 100 MHz, 4 GHz |
| Alarm Threshold | 10%, 25%, 35%, or 50% of Standard[b] |
| Maximum CW Power Density | 3000% of Standard |
| Maximum Peak Power Density | 32 dB above Standard |
| Battery[c] | 9 volt alkaline |
| External Power Requirements[c,d] | 12 Vdc ±10%, 50 ma max/<br>24 Vdc ±10%, 50 ma max |
| STATUS signal levels | -4 Vdc standby, +4 Vdc alarm (nominal) |
| Status Relay | SPDT |
| Recorder Output Level | -1 Vdc full scale (approximate) |
| Temperature<br>    Operating<br>    Non-operating | <br>-10°C to +55°C<br>-20°C to +55°C |
| Size | 9.4" L x 8.1" W x 5.0" H<br>23.9 cm x 20.6 cm x 12.7 cm |
| Weight (approximate) | 26 oz / 0.74 kg |
| Color | White |
| Accessories Supplied | Mating 9-pin connector, Battery, Operation Manual |
| Optional Accessory | Mounting Adapter Kit[e] |

Notes:

[a] Use Selection Guide to determine the SMARTS II shaped to your standard or guidance.

[b] Determined by DIP switch settings inside battery compartment. There is an additional ±1 dB uncertainty in the alarm threshold when the SMARTS II is set to 10% of Standard.

[c] A switch inside the battery compartment determines whether the battery or an external supply powers the monitor.

[d] Voltage choice (12 Vdc or 24 Vdc) determined by wiring of cable that connects to 9-pin connector. The external power supply must be floating (not grounded).

[e] P/N 42993200 Mounting Adapter Kit allows the SMARTS II to use the same mounting holes as the original SMARTS monitors (Series 8810, 8815, 8820, and 8825).
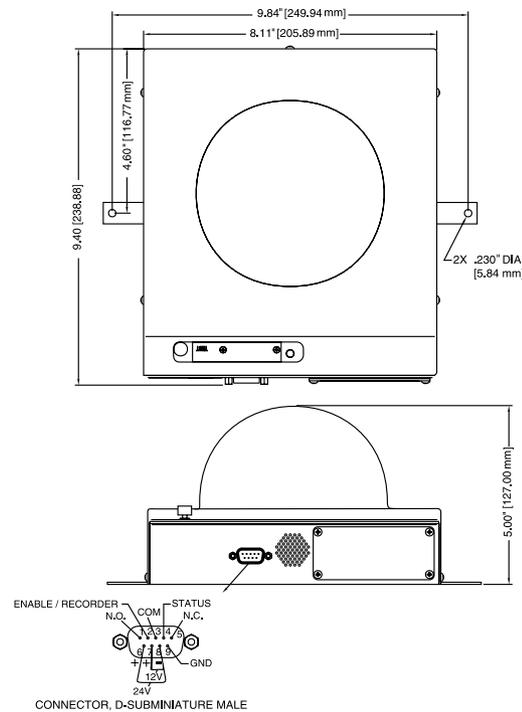
## SPECIFICATIONS – WEATHERPROOF HOUSING

| Parameter | Specification |
|---|---|
| Part Number | 11081900 |
| Construction | All plastic |
| Rating | NEMA class 4X[a] |
| Size | 11.8" L x 11.8" W x 7.2" H<br>30.0 cm x 30.0 cm x 18.3 cm |
| Weight (approximate) | 45 oz / 1.3 kg |
| Color | Light Gray |
| Accessories Supplied | Mating Weatherproof Connector |

*Note:*

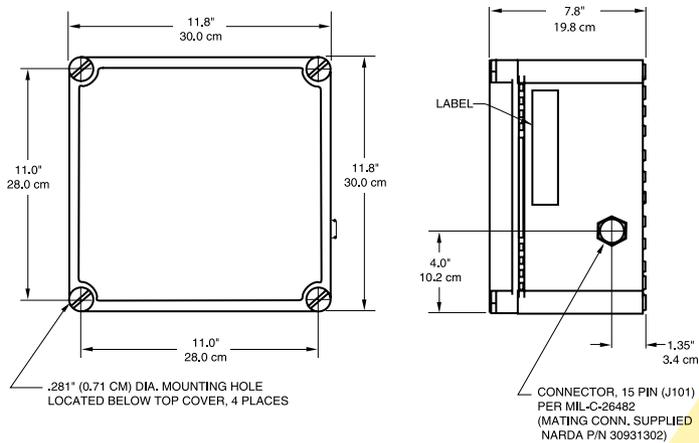[a] Equivalent to IEC Publication 529, Type IP 66 or CSA Standard C22.2, No. 94.

## OUTLINE DRAWINGS

### SMARTS II



9.84" [249.94 mm]
8.11" [205.89 mm]
4.60" [116.77 mm]
9.40 [238.88]
2X .230" DIA [5.84 mm]

5.00" [127.00 mm]

ENABLE / RECORDER  STATUS
N.O.  COM  N.C.
12V
24V
GND
CONNECTOR, D-SUBMINIATURE MALE

### Weather Proof Housing

#### J101 CONNECTIONS

| PIN | DESCRIPTION |
|---|---|
| B | +24 V – FLOATING |
| A | +12 V – FLOATING |
| K | -V – FLOATING |
| G | N.C. – RELAY CONTACTS |
| H | COM – RELAY CONTACTS |
| J | N.O. – RELAY CONTACTS |
| P | GND |
| C | ENABLE / RECORDER |
| E | STATUS |



11.8"
30.0 cm
11.0"
28.0 cm
11.8"
30.0 cm
11.0"
28.0 cm
.281" (0.71 CM) DIA. MOUNTING HOLE LOCATED BELOW TOP COVER, 4 PLACES

7.8"
19.8 cm
LABEL
4.0"
10.2 cm
1.35"
3.4 cm
CONNECTOR, 15 PIN (J101) PER MIL-C-26482 (MATING CONN. SUPPLIED NARDA P/N 30931302)