

RF900/2400 FEATURES:

- RF module/battery integrates into the ST-48 Monitor enclosure to create a truly wireless transmitter
- Companion RF modems for our popular 4 and 16 channel controllers allows wireless interface to one or many central alarm controllers
- License free 900 or 2400 MHZ FHSS (Frequency Hopping Spread Spectrum) Client/Server networks
- Indoor/urban Range up to 3000' with 2.1 dB dipole antenna. Outdoor line-of-sight Range up to 10 miles with high gain antenna (900MHZ model)
- Magnetic Mount option for very easy installation to steel structures
- Externally powered bridge sensor 'CAT' models available with quick disconnect cables sets for easy installation
- Adjustable 10mW - 1W transmit power (menu selectable); Up to 4 Watts EIRP w/6 dB antenna
- Receiver Sensitivity: -100 dBm
- Tx LED indicates RF transmit
- Both division 1 explosion-proof and division 2 models available
- Allows "one man" sensor calibration in hazardous areas without area declassification.
- Requires only a simple magnetic wand. No other special electronic devices are needed.
- LCD readout is .6" engineering units and graphically as a 30-minute trend or bar-graph.
- Five front panel alarm LED indicators for A1 , A2 , Fail, IN CAL & Tx / Rx are standard.

Dipole Rubberized Antenna suitable for Div 2 Hazardous Areas



Optional 10-0322
Magnetic mounting kit

Dipole XP Antenna suitable for Div 1 Hazardous Areas



The R. C. Systems Inc. ST-48 sensor transmitter, widely used in critical gas detection applications, is now available as a wireless model. The integral FHSS license free radio is available in both 900 and 2400 MHZ models. Radios "broadcast" monitored values onto the wireless "client / server" network. Companion wireless ST-90 four channel and/or ST-71 16 channel controllers may be configured as "Clients" or "Servers" for receiving the wireless broadcasts. One device is configured as a Server and there can be one or many Clients. To establish synchronization, the Server emits a beacon. Upon detecting a beacon, the Client establishes an RF link and an "In Range" symbol is displayed.

Model ST-48EC/RF900/2400 accepts low power electrochemical toxic or oxygen sensors. An integral lithium 'D' cell provides up to one year continuous wireless operation.

Model ST-48CAT/RF900/2400 provides excitation for higher power consuming bridge sensors when combined with solar or other external power sources.

RF900/2400 Module Description

The RF900 or RF2400 module mounts into the ST-48's expansion PCB location. ST-48 options such as relays, RS-485 and isolated 4-20mA outputs are not available in wireless models. RF communication links consume much more power when transmitting. To conserve battery power, ST-48's keep the wireless module powered down until ready to transmit a message. Transmissions occur every 5-minutes when no alarms are detected and increase to each 6-seconds when alarms exist. Each transmission contains gas value, battery level and alarm status. Multiple R.C. Systems Inc. ST-71/ST-90 /ST-95 controllers may be positioned to receive ST-48 transmissions when one is Server, all others are Clients and all are on the same Hop and System ID patterns. RF900 and RF2400 equipped controllers only expect a response every 5-minutes and flag "communication error" if three consecutive messages are missed.

Controller RF Modem Options

RF900/RF2400 Serial Modem options are integral to ST-90Quad & ST-95 controllers. ST-71 radio modems connect to the ST-71 master RS-485 serial port.

RF900 MODEM SPECIFICATIONS

PERFORMANCE

ST-48/RF900 Transmit Power (menu selectable) 10mW - 1W (0-30 dB)
 Indoor/Urban Range (2 dB dipole antenna) Up to 3000 feet
 Outdoor RF line-of-site Range (high-gain antenna) Up to 10 miles
 Receiver Sensitivity -100 dBm

NETWORKING & SECURITY

Frequency (RF900) ISM 902 - 928 MHz
 Spread Spectrum FHSS (Frequency Hopping Spread Spectrum)
 Encryption 256-bit AES Encryption (meets FIPS-197)

ANALOG OUTPUTS (ST-48CAT MODELS ONLY)

ST-48CAT models have 3-Wire 4-20mA current source output.
 With solar 12VDC power supply, loop R is 350 ohms.

CERTIFICATIONS

ST-48 with 10-0247/10-0248 sensor heads and Div. 1 antenna is suitable for Div. 1 Gr. B,C,D explosion-proof installations.

ST-48 with 10-0247/10-0248 sensor heads and rubberized antenna is suitable for Div. 2 Gr. A,B,C,D explosion-proof installations.

RF modules have FCC Part 15.247 and Industry Canada (IC). Antenna bushing (10-0295) is designed for Div. 2 Gr. A,B,C,D.

DISPLAY

64 x 128 pixel LCD displays 30-minute trend, bar-graph & large engineering units. Backlight active only when externally powered.

AMBIENT TEMPERATURE RANGE

-40 - 60 degrees C

POWER SUPPLY

ST-48/CAT = 10 - 30 VDC externally powered for higher power bridge sensor models. Wattage depends on sensor.

ST-48/ECNon-rechargeable 3.6V internal lithium battery.

HOUSING

Instrument enclosure suitable for Cl. 1, Div. 1 & 2, Gr. B,C,D

RANGE CALCULATOR (900MHZ)

Dist. between ant's	Fresnel zone diameter	Freespace loss (dB)
1000 ft (300 m)	16 ft (4.9 m)	81
1 Mile (1.6 km)	32 ft (9.7 m)	96
5 miles (8 km)	68 ft (20.7 m)	110
10 miles (16 km)	95 ft (29 m)	116
20 miles (32 km)	138 ft (42 m)	122

In order for a wireless link to work, the available system operating margin (TX power - RX Sensitivity + Antenna gains) must exceed the Freespace loss and all other losses in the system. For best RF line-of-site, the combined height of both antennas must exceed the Fresnel zone diameter.

Example:

The RF900 radio modem has the following parameters:

- TX power: 30 dBm max at 1 Watt
- RX sensitivity: -100 dBm
- Antenna gain (dipole): $2.1\text{dBi} \times 2 = 4.2\text{dBi}$

So the system operating margin is $30 - (-100) + 4.2 = 134.2\text{ dBm}$. Enough to transmit 20 miles if freespace was the only loss in the system. For this to be the case, the antennas must be mounted with a combined height greater than 138ft above all obstructions (including the ground) to keep the fresnel zone clear. In practice however, there are many losses in the system besides just freespace and it is recommended there be at least 10-20dB extra system operating margin.

ORDERING INFORMATION

ST-48/RFxxxx OPTIONS

- 10-0247IS SMART SENSOR HEAD ALUMINUM (ORDINARY LOCATIONS ONLY)
- 10-0247 SMART SENSOR HEAD STAINLESS STEEL (EXPLOSION-PROOF)
- 10-0242EC SMART EC SENSOR PCB (LESS SENSOR; FITS 10-0247 OR 10-0248)
- 10-0242CAT SMART LEL SENSOR PCB (LESS SENSOR; FITS 10-0247)
- 1000-2189 ANTENNA, DIPOLE, 900MHZ, DIV 2 RUBBER
- 1000-2300 ANTENNA, DIPOLE, 2400MHZ, DIV 2 RUBBER
- 1000-2193 ANTENNA, DIPOLE, 900MHZ, DIV 1 XP
- 1000-2301 ANTENNA, DIPOLE, 2400MHZ, DIV 1 XP
- *10-0288 RF900 900MHZ MODEM (ORDINARY AREAS)
- *10-0326 RF2400 2400MHZ MODEM (ORDINARY AREAS)
- *10-0323 RF900 900MHZ MODEM KIT (NEMA 4X)
- *10-0327 RF2400 2400MHZ MODEM KIT (NEMA 4X)
- 10-0322 ST-48 MAGNETIC MOUNTING KIT

* These items for use at ST-71 Controller side. Kits include lightning arrester, 15' coax antenna cable and modem packaged in NEMA 4X enclosure.

SPECIAL ORDER SOLAR POWER STATION SHOWN BELOW:

