

FlexRepeat3 Solar Repeater

The Sensys Networks Repeater. In cases where installed Sensys Networks wireless sensors are out of range of the nearest access point, one or more Sensys Networks repeaters can be used to provide a two-way relay between the out of range sensors and the access point. A repeater is pole mounted by the roadside and is positioned so that both the sensors and the tandem repeater or access point are within view and within range.

The Sensys Networks FlexRepeat3 Solar Repeater is a single pole-mounted unit with a 10+ year life that eliminates any battery replacement for the effective life of the wireless sensor networking system thereby lowering ongoing maintenance costs. This version of the solar repeater represents significant advantages over the previous model, as the FlexRepeat3 Solar is housed in a robust enclosure that provides excellent protection against the environment. The solar panels are mounted on two sides of the enclosure cover to allow increased exposure to sunlight during the sun's trajectory over the course of a day seasonally.

The FlexRepeat3 Solar has a connector for an external antenna for greater flexibility in providing a two-way relay between sensors and the access point.

The FlexRepeat3 Solar has three different power sources: (i) the solar panels used when there is sunlight, (ii) a rechargeable battery that is charged by the solar panels and used when there is no sunlight, and (iii) a lithium battery as backup where there might be extended periods of low sunlight. The multiple power sources provide a reliable mechanism to provide power for the repeater for at least 10 years.

Antenna options. The optional external antenna connects to the FlexRepeat3 Solar via a coaxial cable. The external antenna allows the repeater to be aimed in two directions simultaneously utilizing a pole located between the sensor and access point.

Two types of external antenna are supported: (i) the FLEX-ANT-1 with the same RF range as the internal antenna and (ii) the FLEX-ANT-2 with Long Range RF range. The FlexRepeat3 Solar can also operate without an external antenna.



Features and Functions

Relay of radio communications

- To/from wireless sensors (downlink)
- To/from access point (uplink)
- To/from another repeater (uplink or downlink)

Extension of range and coverage of the access point

- Tandem operation – one repeater and its supported sensors can communicate with another repeater and then to the access point
- Maximum single-hop range of ~2000 feet (610 meters) from supporting access point or repeater with a Long Range External Antenna
- Maximum single-hop range of ~300 feet (91 meters) from sensors with Long Range External Antenna

Fully wireless operation – no cable connections

Radio signal quality measurements (of each link to wireless sensors or tandem repeater)

- Receive Signal Strength Indicator (RSSI, in dBm)
- Link Quality Index (LQI, figure of merit 40-99)

Enclosure

- Robust protection against outside environment

Simple installation

- Any roadside location that provides adequate height and line of sight to sensors and the access point or repeater
- External connector and indicator to activate unit

No calibration or adjustment required

Firmware upgrades over-the-air from access point

Functional Specifications

interfaces	<ul style="list-style-type: none"> to/from sensors via 802.15.4 PHY radio to/from repeaters via 802.15.4 PHY radio to/from access point via 802.15.4 PHY radio
over-the-air protocol	Sensys Networks NanoPower (SNP) protocol (TDMA)
physical layer protocol	IEEE 802.15.4 PHY
modulation	Direct Sequence Spread Spectrum Offset Quadrature Phase-Shift Keying (DSSS O-QPSK)
transmit/receive bit rate	250 kbps
frequency band	2400 to 2483.5 MHz (ISM unlicensed band)
frequency channels	16
channel bandwidth	2 MHz
internal antenna type	microstrip patch antenna (behind front face panel)
internal antenna field of view	±60° (azimuth & elevation)
nominal output power	+3 dBm
spurious emissions	<ul style="list-style-type: none"> 30 - 1000 MHz: < -36 dBm 1 - 12.75 GHz: < -30 dBm 1.8 - 1.9 GHz: < -47 dBm 5.15 - 5.3 GHz: < -47 dBm
typical receive sensitivity	-101 dBm (PER ≤ 1%)
saturation (max input level)	≥ 10 dBm

Power, Physical, & Environmental

power supply	<ul style="list-style-type: none"> Solar panels (2): 100 mm x 35 mm, 0.33 W each Rechargeable battery: Lithium ion 18650 with protection, 3.6 V, nominal capacity 2.2 Ah Backup battery: Li-SOCl₂ 3.6 V primary battery pack, nominal capacity 57 Ah
recommended system replacement	<ul style="list-style-type: none"> every 10 years
dimensions	<ul style="list-style-type: none"> FLEX-RPT3-SLR: 9.5" x 5.59" x 4.32" (24.13 cm x 14.19 cm x 10.97 cm) FLEX-ANT-1: 5.65" x 3.54" x 4.80" (14.4 cm x 9 cm x 12.2 cm) FLEX-ANT-2: 9.5" x 9.5" x 4.38" (24.10 cm x 24.10 cm x 11.10 cm)
weight	<ul style="list-style-type: none"> FLEX-RPT3-SLR: 2.2 lb (1 kg) FLEX-ANT-1: 0.94 lb (0.43 kg) FLEX-ANT-2: 2.2 lb (1 kg)
environmental	<ul style="list-style-type: none"> designed for weatherproof, outdoor operation
operating temp	-40°F to +176°F / -40°C to +80°C

Available Products

Order Codes	Description
FLEX-RPT3-SLR	FlexRepeat3 Solar Repeater (NA)
FLEX-ANT-1	Standard External Antenna
FLEX-ANT-2	Long Range External Antenna

Compliance

EMC	<ul style="list-style-type: none"> FCC: This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. IC: This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device. IC : Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
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