

## FLEX-RP-B-2/FLEX RP-B-LL-2 Repeater

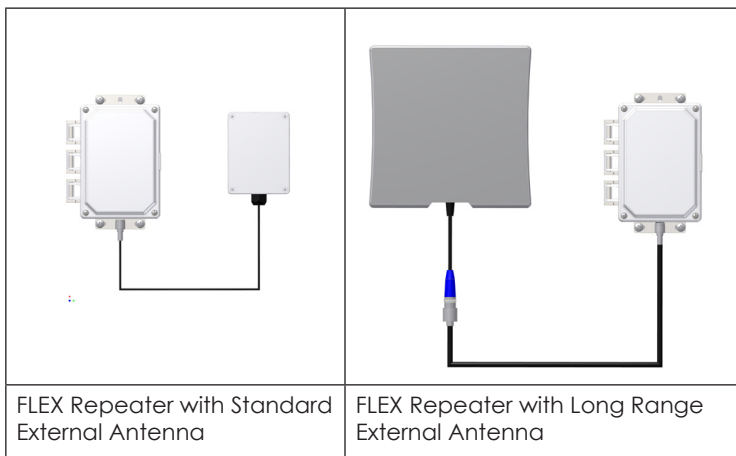
**The Sensys Networks Repeater.** In cases where installed Sensys Networks wireless sensors are out of range of the nearest access point, one or more Sensys Networks repeaters can be used to provide a two-way relay between the out-of-range sensors and the access point. A repeater is mounted by the roadside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

**FLEX Repeaters** are second generation repeaters from Sensys Networks that provide antenna options that extends the range of the repeaters and eliminates the need for additional repeaters operating in tandem. The FLEX-RP-B-2 Repeater is powered with a replaceable battery pack located within the unit; however the FLEX-RP-B-LL-2 Repeater does not have a replaceable battery. Both FLEX Repeaters utilize enhanced RF chipsets and circuitry that improves RF robustness and reduces energy consumption. FLEX Repeaters have an internal antenna and connect with the FLEX External Antenna.

**Antenna Options.** The FLEX External Antenna connects to FLEX Repeaters via a coaxial cable. The antenna, which works in conjunction with a repeater, allows the repeater to be aimed in two directions simultaneously utilizing a pole located between the sensor and access point.

Two types of FLEX External Antennas are supported: (i) the FLEX-ANT-1 with the same RF coverage as the internal antenna and (ii) the FLEX-ANT-2 with Long Range RF coverage.

The FLEX family of repeaters work with the standard repeaters RP240-BH-2 and RP240-BH-LL-2.



*FLEX Repeater Configurations*



### Functions / Features

#### Relay of radio communications

- To/from wireless sensors
- To/from access point
- To/from another repeater (FLEX or RP240)

#### Extension of range and coverage of the access point

- Supports operating in two directions with one repeater; its supported sensors communicate with the access point
- Maximum single-hop range of ~2000 feet (610 meters) from supporting access point or repeater
- 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 sensor)

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

#### Firmware upgrades over-the-air from access point

#### Simple installation

- Any roadside location that provides adequate signal coverage to sensors and the access point or repeater
- No special requirements regarding setback, relative angle of the sun or mounting stability

#### No calibration or adjustment required

### Functional Specifications

<b>interfaces</b>	<ul style="list-style-type: none"> <li>• to/from sensors via 802.15.4 PHY radio</li> <li>• to/from repeaters via 802.15.4 PHY radio</li> <li>• to/from access point via 802.15.4 PHY radio</li> </ul>
<b>over-the-air protocol</b>	Sensys Networks NanoPower (SNP) protocol (TDMA)
<b>physical layer protocol</b>	IEEE 802.15.4 PHY
<b>modulation</b>	Direct Sequence Spread Spectrum Offset Quadrature Phase-Shift Keying (DSSS O-QPSK)
<b>transmit/receive bit rate</b>	250 kbps
<b>frequency band</b>	2405 to 2480 MHz (ISM unlicensed band)
<b>frequency channels</b>	16
<b>channel bandwidth</b>	2 MHz
<b>internal antenna type</b>	microstrip patch antenna (behind front face panel)
<b>antenna field of view</b>	±60° (azimuth & elevation)
<b>nominal output power</b>	3 dBm
<b>spurious emissions</b>	<ul style="list-style-type: none"> <li>• 30 - 1000 MHz: &lt; -36 dBm</li> <li>• 1 - 12.75 GHz: &lt; -30 dBm</li> <li>• 1.8 - 1.9 GHz: &lt; -44 dBm</li> <li>• 5.15 - 5.3 GHz: &lt; -47 dBm</li> </ul>
<b>typical receive sensitivity</b>	-101 dBm (PER ≤ 1%)
<b>saturation (max input level)</b>	≥ 10 dBm

### Power, Physical, & Environmental

<b>power supply</b>	<ul style="list-style-type: none"> <li>• FLEX-RP-B-2: <ul style="list-style-type: none"> <li>– Li-SOCl<sub>2</sub> 3.6V battery pack <ul style="list-style-type: none"> <li>◦ nominal capacity: 57 Ah</li> </ul> </li> </ul> </li> <li>• FLEX-RP-B-LL-2: <ul style="list-style-type: none"> <li>– Li-SOCl<sub>2</sub> 3.6V battery pack <ul style="list-style-type: none"> <li>◦ nominal capacity: 171 Ah</li> </ul> </li> </ul> </li> </ul>
<b>recommended battery/unit replacement</b>	<ul style="list-style-type: none"> <li>• FLEX-RP-B-2: battery replacement every 2 years</li> <li>• FLEX-RP-B-LL-2: unit replacement every 7 years</li> </ul>
<b>dimensions</b>	<ul style="list-style-type: none"> <li>• FLEX-RP-B-2/ FLEX-RP-B-LL-2: 7.75” x 6.5” x 5.37” (19.68 cm x 16.51 cm x 13.65 cm)</li> <li>• FLEX-ANT-1: 5.65” x 3.54” x 4.80” (14.4 cm x 9 cm x 12.2 cm)</li> <li>• FLEX-ANT-2: 9.5” x 9.5” x 4.38” (24.10 cm x 24.10 cm x 11.10 cm)</li> </ul>
<b>weight</b>	<ul style="list-style-type: none"> <li>• FLEX-RP-B-2: 2.56 lb ( 1.16 kg)</li> <li>• FLEX-RP-B-LL-2: 3.93 lb ( 1.78 kg)</li> <li>• FLEX-ANT-1: 0.94 lb ( 0.43 kg)</li> <li>• FLEX-ANT 2: 2.2 lb (1 kg)</li> </ul>
<b>environmental</b>	<ul style="list-style-type: none"> <li>• designed for weatherproof, outdoor operation</li> <li>• NEMA Type 4x enclosure</li> <li>• IP65 ingress protection</li> </ul>
<b>operating temp</b>	-40°F to 176°F / -40°C to +80°C

### Available Products

Products	Descriptions
<b>FLEX-RP-B-2</b>	FLEX Repeater with internal battery pack
<b>FLEX-RP-B-LL-2</b>	FLEX Repeater with long-life battery pack
<b>FLEX-ANT-1</b>	FLEX Standard External Antenna
<b>FLEX-ANT-2</b>	FLEX Long Range External Antenna

### Compliance

<b>safety</b>	2006/95/EC
<b>EMC</b>	<ul style="list-style-type: none"> <li>• 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. Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.</li> <li>• CE0678</li> <li>• 2004/108/EC</li> </ul>

**Local Distributor**