SYNAPSENSE™
Wireless Instrumentation Solutions

Wireless Sensor Network Node

Installation and User Manual

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Author	Pat Weston
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2365 Iron Point Rd • Suite 100 • Folsom • CA • 95630

This manual covers the general installation of the following SynapSense Wireless Sensor Network Nodes:

- 99-0039-002
- 99-0039-011
- 99-0039-012
- 99-0039-015
- 99-0189-001
- 99-0217-001
- 99-0331-001
- 99-0348-001
- 99-0360-001
- 99-0766-001

Regulatory Information

Notice to Users:
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Statement:

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. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Antenna Statement:

Only the antenna supplied with this unit may be used. Any attempt to modify this antenna or substitute a different antenna by any means shall void the warranty and will void the FCC approval to operate this equipment. In the event an antenna is broken, a replacement antenna may be obtained by contacting the Product Support Center listed in the warranty section of this manual.

CE Statement:

This equipment has been tested and found to comply with the limits of the European Council Directive on the approximation of the law of the member states relating to electromagnetic compatibility (89/336/EEC) according to EN 55022 Class B.

Industry Canada Equipment Notice:

The Industry Canada certification identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Document(s). The Department does not guarantee the equipment will operate to the user's satisfaction. Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure, for their own protection, that the electrical ground connectors of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This presentation may be particularly important in rural areas.
Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority or electrician, as appropriate.

This device has been designed to operate with the antennas listed below, and having a maximum gain of 2.2 dBi. Antennas not included in this list or having a gain greater than 2.2 dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

SynapSense Antenna P/N78-0036-001

Warranty Information

Limited One Year Warranty

Our company warrants that for two years from the date of purchase, it will replace this product if found to be defective in materials or workmanship. For a prompt, no charge replacement of equivalent product, return the defective product postage prepaid to the appropriate address.

Product Support Center

2365 Iron Point Road, Suite 100

Folsom, CA 95630

United States of America

This replacement is the company's sole obligation under this warranty. SynapSense, Inc. will not be responsible for any incidental or consequential damages or for any loss arising in connection with the use or inability to use this product. Some states/provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty excludes defects or damage due to misuse, abuse, or neglect. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state/province to province.

1. Operation

The SynapNet Node is designed to work in conjunction with a SynapNet Gateway device and the SynapSoft console. Please be sure you have correctly configured SynapSoft on the gateway computer prior to continuing.

SynapNet nodes can be added to an existing SynapSense Wireless Network (driven by a SynapNet Gateway) or be used to form a network. Note that battery life will be compromised if the SynapNet Node is not in range of an active gateway device or other SynapNet Node which is part of a running network.

Devices that are powered by external power adapters must have the power adapter placed outside the server cabinet as the maximum operating temperature of the adapter is +40°C, whereas the device mounted inside the cabinet can operate to +60°C.

Installing/Replacing the external antenna:

a. Power down the device.
b. Remove the antenna from the packaging; making sure the threaded base of the antenna is clear of any debris.
c. Screw the antenna into the antenna port on the top of the device via the metal base in a clockwise direction until it is snug. Do not use a wrench or other high-torque tool to tighten.

Replacing batteries:

a. Turn On/Off Switch to Off position (to right when facing switch)
b. Remove the battery cover (for Remote Gateway 2, the top cover of the housing is removed via the 4 screws in the bottom side of the case).
c. Remove old batteries, dispose of per local code. Contact SynapSense if proper recycling is not available.
d. Insert the batteries into the marked positions in the orientation displayed by the + or – markings on the device near the battery tray (for ThermaNode, the battery polarity marking is on the inside of the battery lid).
e. Replace the battery cover.

f. Turn On/Off switch to ON position (For Remote Gateway 2 this is marked as a I on the faceplate).
g. The device will attempt to join any available SynapSense Wireless Sensor Networks. For more information on network formation, node placement, please see the SynapSense Wireless Network User Guide.

Troubleshooting and Diagnostics:

1. *No lights appear when batteries are inserted or On/Off switch is turned to ON position*

   Please be sure the battery orientation is correct and that the batteries are fresh and charged.

2. *A solid red light appears (Does not apply to Remote Gateway 2)*

   The battery on the device has fallen below allowable operating level and the device has suspended its self to prevent network problems.

3. *The red light flashes briefly every 5 seconds (Does not apply to Remote Gateway 2)*

   The node is currently not associated with an active wireless sensor network. Make sure the node is in range of either an active gateway device or another network-associated SynapNet Node. A node may take up to 20 minutes to fully join an existing network.

   Nodes may fall out of an active network if their signal strength is weak. Consider topology changes such as the addition of repeaters of the movement of other nodes in order to improve signal conditions. For more information, see the SynapSense Wireless Sensor Network User's Guide.

4. *The node appears to have stopped sending on the network (Does not apply to Remote Gateway 2)*

   Check for the flashing red light (above) to see if the node has somehow fallen out of the network.

   The node can be reset without the removal of the battery comportment by the use of a magnetic reset tool, or any medium powered magnet. While watching the diagnostic light area, move the magnet along the long edge opposite the

external sensor ports. The diagnostic lights will light and flash when the node has successfully reset.

5. *The Red LED is flashing on Remote Gateway 2:*
   This indicates the node is operating in battery backup mode. This is caused by loss of 5VDC power supplied to the DC Jack connector. Check the external wall adapter is plugged in and has power.

6. *Loss of Network communication:*
   Cycle power to Remote Gateway 2 by turning the on/off switch to OFF position (marked O on front panel), wait 10seconds, and then to ON position (marked I on front panel).

7. *Plug Meter Controller*
   a. Green LED indicates power present and on
   b. Flashing Blue light indicates network activity